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Introduction to the special issue from the 2018 ISS conference

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It is a great pleasure to launch this special issue of JEEC from the ISS 2018 conference held in Seoul, South Korea, July 2–4. The theme of the ISS 2018 was “Innovation, Catch-up, and Sustainable Development”. Keun Lee, one of the guest editors of this special issue, served as the President of the Society (2016–2018) and also as the main host or Chairman of the Organizing Committee, for the Seoul conference. Actually, it took 26 years to return to Asia: the last ISS conference in Asia was held in Kyoto, Japan in 1992. This turned out to be a good decision for the International Schumpeter Society: About 380 papers were presented out of the 469 initial submissions from more than 50 nations around the world. Among these 380 presentations, there were about 90 papers presented by young scholars who are either graduate students and new PhD’s.

At the conference, keynote speakers included long-standing Schumpeterian scholars as well as those scholars whose research subject is related to the theme of the conference. In the opening session, Bengt-Åke Lundvall gave a speech on Transformative Innovation Policy and Global Challenges: a System’s Perspective, and Sir David Sainsbury talked about New Economic Thinking: A Dynamic-Capability Theory of Economic Growth.

Other notable scholars gave their talks in special sessions on the following topics: creative destruction and capitalism, innovation policies and strategies, productivity slow-down, issues in east Asian economies, Schumpeterian economics, frontiers of innovation studies, and finally a session in honor of Luigi Orsenigo. Some of the names are as follows, in the order of the days and time of their speech: Massimo Egidi, Horst Hanusch, Mike Gregory, Chen Jin, João Carlos Ferraz, Slavo Radošević, Giovanni Dosi, Justin Yifu Lin, Hiroyuki Odagiri, Jang-Hee Yoo, John Mathews, Bjørn T. Asheim, Bo Carlsson, Yoshinori Shiozawa, Ben Martin, Uwe Canter, Franco Malerba, William Maloney, Andreas Pyka, John Walsh, Kazuyuki Motohashi, Cesar Hidalgo, Xiaobo Wu, and Mei-Chih Hu.

In the meantime, the Schumpeter Prize of the ISS 2018 went to two eminent scholars in the field. Professor John Mathews and Michael Best shared the Prize for their books

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on “Global Green Shift” (Anthem Press, 2017), and “How Growth Really Happens” (Princeton University Press 2017), respectively. John Mathews has also contributed a piece to this special issue, on a theme related to his prize winning book, that is, Schumpeterian economic dynamics of greening.

The President of the Society, Keun Lee, followed the custom of the ISS to deliver the presidential address. The topic of his address was “the Art of Economic Catch-up: Barriers, Detours and Leapfrogging in Innovation Systems,” and a part of his lecture was about the measurement and analysis of the national innovation systems. That part has become the basis for the contribution entitled “National Innovation System, Economic Complexity and Economic Growth” which opens this special issue. This paper develops a composite NIS index, and shows that it is a powerful predictor of economic growth, more robust than other measures of economic complexity. The online-first version of this paper has been awarded the Kapp Prize by the EAEPE (European Association for Evolutionary Political Economy).

Whereas there are many researches measuring national innovation systems (NIS) which is a key theoretical concept in Schumpeterian economics, they often use too many variables from heterogeneous sources, which make the measurement very demanding, less comparable and less coherent. This article, co-authored by Keun Lee and Jongho Lee, develops a new, coherent and less-demanding way of measuring NIS of nations around the world, using five variables, made up from patent citation data, which show the way knowledge is created, diffused and used in each nation. Each of the five variables represent different aspects of innovations in each country, such as concentration, diversification, localization, originality of innovations as well as cycle time of innovations. These five variables are also combined into one composite NIS index, so that we may compare and rank countries around the world using this index at a time and also investigate their change over time. Thus, it also helps policy makers to find out weak or strong aspects of each nation’s innovation system.

The second contribution to this special issue, authored by the 2018 Schumpeter-Prize winner, John Mathews, is entitled as “Schumpeterian Economic Dynamics of Greening: Propagation of Green Eco-platforms,” and takes up the issue of sustainable development from the conference theme. John Mathews’ approach applies fundamental Schumpeterian principles of economic development, such as increasing returns, learning curve effects and emerging innovation and production networks, which contrasts sharply with the negative perspective of degrowth and zero-growth approaches that got stuck in the quantitative view of the economic mainstream and therefore are not capable of understanding the economic opportunities that emerge from the overcoming of the lock-in in fossil-based technologies.

Darío Vázquez’ contribution focuses on the ongoing economic transformation process of our days, albeit targeting different industries. He compares the innovation dynamics and effects on sectorial variation as a source of creativity and competitiveness of two industries, namely, the defense industry and the health industry. Combining network analysis and econometrics, the author shows that, due to better connectivity of health-related industries to other sectors in an economy, their contribution to economic growth is higher compared to defense industries, which often claim the opposite in political discussion of budget distributions.

The contribution by Yoshinori Shiozawa is a purely theoretical exercise, which has become rare in the last years, to gain a better understanding of the transmission

mechanism between innovation and economic growth. Shiozawa's theory is value based and places - very much in a Schumpeterian spirit - central dynamic efficiency. Allocative efficiency in his theory is self-destructive and dynamic efficiency is maintained by innovation alone. The theory not only focused on supply side dynamics, but includes demand side phenomena in a Pasinetti flavor as well.

Fang Wang's contribution takes up the catching up topic of the conference. Fang Wang empirically analyzes the relationship of regulation on product innovation in the Chinese economy in 2012, a year when China was about to accomplish the target of catching-up to the world technology frontier. In the analysis a trade-off relation between opportunities generated by regulations and potential resource misallocation due to increasing transaction costs is identified, which leads to an inverted U-relationship between regulation and product innovation in the Chinese case. The increasing difficulties of benefiting from regulation come from both sides, the administration and the regulated companies, and indicates problems of rent seeking behavior as well as inflexibilities when confronted with high complexities of innovation processes.

The contribution by Marlene O'Sullivan touches the sustainable development topic of the conference. The author analyzes, with a remarkable data base, global developments in the renewable energy sector over the last 25 years. In particular, she highlights the developments in the wind energy sector and applies concepts from industry dynamics, namely, the idea of industry life cycles. It is most interesting to see that, in a comparative analysis of various international and national developments, the global development derived from aggregating national developments. While innovation processes in the wind energy industry are global, the dynamics of the national industry development follow national patterns.

The contribution of Meihan He and Jongsu Lee introduces an agent-based simulation model to study the effects of social culture on innovation. The contribution entitled "Social Culture and Innovation Diffusion: a Theoretically Founded Agent-based Model" shows the flexibility of this most important method in evolutionary economics. In particular, when data availability restricts analysis, agent-based models can fill this gap and use the sheer unlimited possibilities to generate artificial data to test econometrically relevant hypotheses and to identify important relationships. In the case of Meihan He and Jongsu Lee, the social culture dimensions are taken from Hofstede's cultural dimension theory. The authors analyze the impact of individualism, power distance, and uncertainty avoidance in the diffusion of innovation and compare their outcomes with real world diffusion data.

The contribution "The Destruction Phase of Public Sector Innovation: Regulations Governing School Closure in Australia" by Aaron M. Lane is the second contribution in this special issue that takes up the topic of the relationship between regulation and innovation. Aaron M. Lane has studied a case from Australia that deals with Schumpeter's concept of creative destruction, most interestingly not with the creative but with the destructive aspects of the case of the closing of public schools. This approach for a better understanding of regulatory constraints can be transferred to other public sector innovations as well and therefore offers a widely applicable template.

Cristiano Antonelli and Christophe Feder return to the conference's catch-up topic with their contribution entitled "Total Factor Productivity, Catch-up and Technological Congruence in Italy, 1861-2010". So far, the focus of most investigations of catch-up processes has been on the rate of catching-up and not on the direction of technological

change. Cristiano Antonelli and Christophe Feder present an innovative approach to measure the effects of direction. Their most interesting empirical case is Italy's economic development from the mid of the nineteenth century until present day.

The contribution, "Acting as an Innovation Niche Seeder: How Can the Reverse Salient of Southeastern Asian Economies be Overcome?" by Hsien-Chen Lo, Ching-Yan Wu and Mei-Chih Hu, deals with a typical (co-)evolutionary problem of catching up processes. It is most likely that the speed of development of single system components differs and that the success of any system transformation critically depends on the slowest system component. The authors highlight this co-evolutionary relation in the catching up of South East Asian economies and analyze as a case study the development in Taiwan.

The following paper by Giorgio Prodi, Francesco Nicolli and Federico Frattini is also focusing on catching-up processes in Asia. This time a regional perspective is applied on Chinese prefectures. In their contribution "Embeddedness and Local Patterns of Innovation: Evidence from Chinese Prefectural Cities" the authors find evidence for a strong explanatory meaning of the time regions are exposed to innovation, determining how structures are aligned to innovation dynamics for varying innovation performance in Chinese prefectural cities for a period of 30 years from the 20th to the beginning of the twenty-first century.

The last contribution to this special issue takes up the sustainability topic of the Seoul conference and focuses on the importance of the precautionary principle for sustainability. Although written more than two years before the Corona pandemic, the insights are most relevant today when we can observe that companies having implemented sustainability thinking in their business strategies get through the crisis much better than traditional fossil-resources-based companies. The two authors, Shyama V. Ramani and Mhamed-Ali El-Aroui, apply their ideas on the seed industry in their contribution "On the Application of the Precautionary Principle to Ban GMVs: An Evolutionary Model of New Seed Technology Integration" and model in a game the conditions for varying outcomes. It is by far not self-evident that the precautionary principle becomes dominant, in particular if different time horizons influence the decisions of the agents. For sustainability, however, it is required that our decisions are not tightly calculated but offer scope for adaption to allow for resilience.

Once again, the papers selected for the special issue of the Schumpeter conference show the broadness and high standard of Schumpeterian analysis today. The ideas of dynamics, heterogeneity, novelty and innovation as well as transformation are the most attractive fields in economics today and offer the most prolific interdisciplinary connections now and for years to come when humankind, our global society, has to master the transition towards sustainable economic systems by solving the grand challenges and wicked problems with which we are confronted today.

With the publishing of this special issue following the 2018 Seoul conference, the 12 year term of Andreas Pyka as editor for the International Schumpeter Society ends. Having edited the special issues from Rio de Janeiro in 2008, Aalborg in 2010, Brisbane in 2012, Jena in 2014, Montreal in 2016 and Seoul in 2018, always cooperating closely with the distinguished Presidents of the Society as co-editors, I want to thank the members of the society for their trust, and, most important, for the intellectual delicacies that helped me, for more than a decade, to develop an understanding for the broadness of evolutionary economics and to escape from the tiny box of my own field within this wide, diversified and exciting intellectual landscape.

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