
Editorial

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Biographical notes: Yu-Shan Su is an Associate Professor of Technology Management at the National Taiwan Normal University, Taipei, Taiwan and an Adjunct Associate Professor of the IBMBA Program at National Sun Yat-Sen University, Kaohsiung, Taiwan. Her research interests are innovation management in the high-tech industry. She is an Associate Editor of *Technological Forecasting and Social Change*. She is an editorial review board member of both *Academy of Management Perspectives* and *Management and Organization Review*. She has published her works in *Journal of World Business*, *Asia Pacific Journal of Management*, *Technological Forecasting and Social Change*, *Computers in Human Behavior*, *International Journal of Innovation and Technology Management*, *International Journal of Photoenergy*, *Sun Yet-Sen Management Review* (in Chinese), *Tsinghua Business Review* (in Chinese), and others. She also co-authored and published a book of *Innovation Management: Winning the Competitive Advantage in the Globe* in Chinese in 2015.

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Jin Chen is the Editor-in-Chief of *International Journal of Innovation Studies* and *International Journal of Knowledge Management Studies*, and Associate Editor of *Engineering Management Review*, *International Journal of Technology Marketing* and *International Journal of Foresight and Innovation Policy*. Besides, he is also a member on the editorial boards of the journals: *International Journal of Technology Management*, *Journal of Zhejiang University – Science*, *International Journal of Innovation and Technology Management*, *International Journal of Technological Learning*, *Innovation and Development*, *Journal of Chinese Economic and Business Studies*, and *Frontier of Engineering Management*.

Emerging technologies are those technologies newly emergent from science base at an early and pre-commercial stage. And, emerging technologies are those technologies that have potential to enable innovations that will fundamentally allow new value proposition and disrupt the existing markets. Plus, emerging technologies may be adopted by existing industries or new industries. More important, emerging technologies may result in the growth of new industries, which are called emerging industries. The electric vehicle and robot are good examples of such innovations and industries. Leading examples tend to come from developed economies such as Apple, Google, Microsoft, and Amazon in the USA, while some leading examples tend to come from emerging economies such as Haier, Alibaba, Tencent, and Xiaomi in China.

Harvard Business School Professor Clayton M. Christensen proposed the concept of disruptive technologies to predict the industry change. By disruptive technologies, the technology enablers disrupt business model in making new products and services affordable and accessible. Emerging technologies and disruptive technologies may arise from:

- 1 a major scientific breakthrough, like radar or next-generation genomics
- 2 the integration of several technologies, like advanced robotics or energy-storage devices or systems
- 3 a single advanced that enable a much bigger innovation, like electric vehicle (e.g., Tesla Motor) or high speed rail (e.g., CRRC Corporation).

Accordingly, emerging industries can come out by emerging technologies or new business model, like e-commerce platform (e.g., Alibaba), interactive social media (e.g., Tencent), or application software (App) (e.g., Uber), etc.

Many advances of newly emerging technologies and industries transform the way of our life, business and economy. We offer several good examples of emerging technologies and industries for your reference. The electric vehicles change the way of our transporting, energy system, and public transporting system, e.g., Tesla Motors. The robots and robotic tools take the human being's tasks by automation and intelligence design, e.g., Fanuc Corporation. The rise of 'sharing economy' describes a type of business built on the sharing of resources, allowing customers to access goods when needed. Examples of Uber and Airbnb are consequences of the sharing economy. The challenges and opportunities are deserved attentions by emerging technologies and industries. There are great shifts of innovation and production hubs to East Asia today. In this special issue, we discuss on managing emerging technologies and industries in East Asia, such as China, Japan, South Korea, and Taiwan.

In this special issue, the 11 papers present intriguing commonalities and differences. We think you will find this issue provides a rich set of context in emerging economies in East Asia for management of emerging technologies and emerging industries through various analytical approaches. We include a variety of emerging technologies and emerging industries, such as solar cell technology, Taiwan's biotechnology industry, Taiwan's LED industry, China's OLED industry, China's nuclear power, Taiwan's electric vehicle industry, and smartwatches in Korea. Moreover, we also include a variety of issues in this special issue, such as catch-up strategy of Huawei, reverse innovation of multinational enterprises operated in China, symbiosis strategy of new ventures in China, and strategic transformation through innovation, etc.

We spotlight major points of special interests as follows.

Motohashi and Tomozawa analyse the role of university research in industrial innovation by different phases of the technology life cycle (TLC) and by patent analysis of solar cell technology. In the early phase of TLC, the role of academic research is to broaden the technology scope to provide a variety of technologies to the market. In the later phase of TLC where both product and process innovation are important, university industry collaboration patents are greater in patent quality.

Joo, Oh and Lee study catch-up strategy of Huawei vs. Ericsson with patent data. Huawei, a newly emerged firm from China, entered the industry, grew rapidly, and finally, overtook Ericsson in terms of sales in 2012. They first verified that Huawei's market share catch-up is rather owing to its technological capabilities than its cost advantages. Then, Huawei grew rapidly by developing technologies. And Huawei relies more on recent and scientific knowledge in its innovation strategies.

Zheng, Chen and Zheng summarised three typical modes and concluded four characteristics of reverse innovation through multiple cases study of H3C, King-Mazon, Cisco, HP and GE. Along with the internationalisation, the products designed for emerging market start to enter the market of developed country. The three modes of reverse innovation are product-driven reverse innovation, capital-driven reverse innovation and cooperation-driven reverse innovation.

Su, Hu and Wu study three Taiwan's biotechnology firms leveraging open innovation in developing new drugs. In the phase of the new drug discovery, Taiwan's companies acquired technology from external sources, such as Duke University (USA) and University of Washington (USA). Through technology transfer, three Taiwan's companies licensed out the new drug to Genzyme Pharmaceutical (USA), Boehringer Ingelheim Group (Germany) and Otsuka Pharmaceutical (Japan), respectively.

Chen, Fang and Hsu study on technological trajectory of light emitting diode (LED) in Taiwan by using patent data. At the company level, this study combines technique for order preference by similarity to an ideal solution (TOPSIS) with criteria importance through intercriteria correlation (CRITIC), utilising six patent indicators to explore the competitive conditions of a company in the LED industry. At the technology level, this study integrates the concepts of technological trajectory and TLC to draw development trends of key LED technologies.

Li, Zhou, Xue and Huang study roadmapping for industrial emergence and innovation gaps to catch-up by using a patent-based analysis of OLED industry in China. This paper proposes a framework addressing three key issues for the later comers: first, the significant capability gaps to catching-up in innovation; second, the future external

environment factors (policy, market, and industry dynamics) that may influence the innovation gaps; third the strategic development pathways that reduce these gaps.

Chen, Liu and Hu study on the innovation ecosystem of a nuclear power giant – China general nuclear power group (CGN) for the period 1987–2014, this paper presents a framework to explicate the micro-foundation of the formation mechanism of an innovation ecosystem for complex product systems (CoPs). Three ecosystem stages are identified: ecosystem incubation, ecosystem figuration and ecosystem self-renewal. Through the three stages, CGN has been extending its ecosystem gradually from core business to extended network and ecosystem periphery.

Cai, Chen, Peng and Chen study the effect of symbiosis strategy on opportunity creation of new ventures in China. This study compares the opportunity creation strategies of two private high-tech firms in China. They apply case-based approach directly to investigate what factors drive firms to choose symbiosis strategy, how Chinese ventures use symbiosis strategy to create opportunity over time, and how resource combination affects this process.

Liu, Chen, Xie and Wu study strategic transformation through innovation in emerging industry. From a case study of a Chinese manufacturing firm, they show evidence that traditional firms can utilise the analytical tool of technology mapping to capture new innovation opportunities in emerging industries. This study suggests that accumulated technological competency not only can propel a firm to move up on the current value chain but can also help it leap to an emerging market to capture new opportunities.

Su, Lin and Li study an assessment of innovation policy in Taiwan's electric vehicle industry based on Rothwell and Zegveld's policy tool. And they also study the policy comparison between Taiwan, the USA, Japan, Germany and China. By adopting the analytic hierarchy process (AHP), this study found that the demand side was the most important in three dimensions of policy. Besides, 'procurement', 'legal and regulatory' and 'public enterprise' are the top priorities for Taiwan's electric vehicle industry.

Cho and Park study the influential factors on the diffusion of smartwatches in Korea. This study sets emotional design, content quality, and system quality as external factors. This study sets performance expectancy, effort expectancy, hedonic motivation, social influence, and price value in the perception layer with regard to directly influences of the intention to use smartwatches. This study empirically tests the research model based on 273 samples in the Republic of Korea.

We would like to thank *IJTM* Editor-in-Chief Mohammed A. Dorgham for providing full support in this special issue. We would also like to thank all contributors who shared their research in this special issue. We feel there are still many more opportunity to exploit managing emerging technologies and industries in East Asia. We look forward to the continuing work of these and other researchers in this topic. Finally, we do thank financial support from Taiwan's Ministry of Science and Technology (MOST 103-2511-S-003-045- and MOST 104-2511-S-003-033-MY2).