Journal of Global Information Management
Volume 29 • Issue 4 • July-August 2021

An Empirical Study on Innovation Ecosystem, Technological Trajectory Transition, and Innovation Performance

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ABSTRACT

This paper explores technological trajectory transition in the perspective of innovation ecosystem and their effect on innovation performance of latecomers in market. A structural equation model is developed and tested with data collected from 366 firms in China. In specific, this paper categories technological trajectory transition creative accumulative technological trajectory transition (CCT) and creative disruptive technological trajectory transition (CDT). The results indicate that firms' organizational learning ability positively affect their technological trajectory transition and innovation performance. Firms' network relationship strength negatively affects their technological trajectory transition and positively affect their innovation performance. Governments' environmental concerns positively affect firms' technological trajectory transition and their innovation performance, whereas firms' environmental concerns do not. CCT does not positively affect their innovation performance. In contrast, CDT positively affects their innovation performance.

KEYWORDS

Innovation Ecosystem, Innovation Performance, Technological Trajectory Transition

1. INTRODUCTION

In emerging economies, firms face a dilemma: continuing the low-cost and imitation-based competitive strategy or enhancing R&D to become leaders in innovation (Cao et al 2019; Chaudhry et al 2018; Hobday, et al., 2004; Xiao, et al., 2013). Recently, some industries in emerging economies have obtained global competitiveness via low labor costs. They achieved technological progress through technology introduction, absorption, and re-innovation. However, when firms in emerging economies try to catch up the industrial leaders for reducing the technological gap, sudden technological changes initiated by the industrial leaders cause these firms to fall behind again. Therefore, it is difficult for firms in emerging economics to follow the technological trajectories established by industrial leaders. As a result, technology leapfrogging becomes an option for firms in emerging economics to realize technology catchup (Lei, Lin, Sha 2016). Latecomers can catch up with industrial leaders through leapfrogging some phases of technological trajectories or creating new trajectories.

DOI: 10.4018/JGIM.20210701.oa7

Adner and Kapoor (2015) point out that social-economic factor, such as institution, social concerns, industrial organization, and power allocation, play an important role in technological transition. However, they did not examine the mechanism how these factors affect technological transition. How socio-economic factors affect firms' strategies in technology catching up and their innovation performance remains unknown. Accordingly, this paper categories technological trajectory transition into creative accumulative technological trajectory transition (CCT) and creative disruptive technological trajectory transition (CDT). It further proposes a theoretical framework to explore the relationship among innovation ecosystem, technological trajectory transition, and innovation performance. Particularly, this paper applies structural equation modeling to examine how some key socio-economic factors, namely organizational learning ability, network relationship strength, and environmental concerns, affect firms' technological trajectory transition. Moreover, it examines how these factors and technological trajectory transition affect firms' innovation performance.

Data collected from 366 firms in China is applied to examine the research model. The results indicate that that firms' organizational learning ability positively affects their CCT, CDT, and innovation performance. Firms' network relationship strength negative affects their CCT and CDT, whereas positively affect their innovation performance. Governments' environmental concerns positively affect firms' CCT, CDT, and innovation performance. Firms' environmental concerns do not positively affect their CCT, CDT, and innovation performance. Firms' CCT does not positively affect their innovation performance. In contrast, firms' CDT positively affects their innovation performance.

Other than enriching the theories of technological trajectory, this paper provides implications for managers and policy-makers in emerging economies. In specific, it provides guidance on how to make strategic choices when facing different technology development paths, and on how to implement technological trajectory transition.

The remainder of this paper is organized as follows. We review relative literature in Section 2. We develop a research model and propose hypotheses in Section 3. We describe the research methodology and measurements in Section 4. Section 5 analyzes the structural equation model and discusses the empirical results. Section 6 summarizes the findings, outlines the managerial implications, discusses the limitations of our research, and points out directions for future research.

2. LITERATURE REVIEW

2.1 Innovation Ecosystem

Traditional innovation (Innovation 1.0) is inbound closed. Technological progress, global competition, and ecology development have driven innovation paradigm to evolve from inbound closed innovation to ecosystem network innovation (Innovation 2.0) (Rupčić, Majić, Stjepandić 2020), and then to embedded innovation (Innovation 3.0), which highlights resource integration (Xu, Cai, Zhao and Ge 2016) and symbiotic development (Li, et al., 2014).

According to Zhao and Zeng (2014), an innovation ecosystem can be seen as a self-organized evolution system that is associated with environment dynamically. It consists of members that evolve together, including firms, consumers, markets, and the natural, social, and economic environments (Hu and Li, 2013). It promotes the co-evolution of innovation groups and innovation environment by connecting and transmitting material flow, energy flow, and information flow (Li, et al., 2014). It is more dynamic and evolutionary than innovation system.

Adner and Kapoor (2016) noted that technology substitution is not merely the competition between two technologies. It is also the competition between two technology ecosystems. Components and complements bring challenges to the emergence of new technology ecosystem. They also provide opportunities for extending old technology ecosystems. When a technology is seen as part of a system, the value that the technology can bring to its users depends on the technology itself as well as the