Evolution of a manufacturing system and its manufacturing strategies: From firm-based level to business ecosystem-based level

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Background
Transformative technologies, such as steam engine, atomic energy have revolutionized the way manufacturing industries made products in the past. Nowadays, emerging technologies such as 3D printing attracts huge attention in the area of manufacturing. Those technologies have now being regarded as technologies that will dramatically change the traditional manufacturing industry (Anderson and Sherman, 2007; Berman, 2012; Cohen et al., 2015; Technology Strategy Board, 2012). The challenge facing the manufacturing industries now is how manufacturers can incorporate these benefits of emerging technologies via appropriate manufacturing strategies.

Motivation
M1: Implementing emerging technologies into traditional manufacturing industry brings more challenges along with those opportunities. Due to the complexity of the whole industry, it is difficult to achieve desired advantages if only with an individual firm. Distributions resources and activities should be considered across the business ecosystem, which will brings advantages to both individual firms and the whole ecosystem (Baldwin, 2012).

M2: Prior studies on manufacturing strategy in the field of Operations Management (OM) have mainly focused on configuration and manufacturing capabilities, at firm and network level (Baldwin, 2012; Voss, 2005). A study from a business ecosystem perspective is still rare, in particular in observing an emerging technology/industry (Research gap).

Research Questions
RQ1: What are the configuration patterns of the manufacturing system during its transformation?

RQ2: How different configuration patterns influence manufacturing capabilities of the manufacturing system?

RQ3: How the manufacturing systems evolved with the introduction of emerging technologies?

Methodology
Case study is adopted as the main research method:
➢ To reflect the contemporary and complex nature of research in the field of emerging technologies (Yin, 2008).
➢ Multiple case studies are used to enable a broad exploration of the research question and produce more robust conclusions.

Data Collection
Data will be collected through in-depth interviews with the managers in around 8 case companies which all have adopted emerging technologies in their processes.

Data Analysis
Collected data will be coded for further analysis by following the defined framework.

Literature Review
L1: Manufacturing system evolution
L2: Configuration
➢ Traditional OM perspective
➢ Social network theory perspective
L3: Manufacturing capabilities
➢ Resource-based view
➢ Dynamic Capabilities
L4: Business ecosystem

Research Framework

References