工業 3.5：
製造智慧和彈性決策力的系統化

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【摘要】

Global Manufacturing networks are facing disruptive challenges due to new technologies and solutions such as Big Data, Internet of Things, Cloud, and artificial intelligence, in which value chain positioning of individual firms may be restructured and the firm boundary has become blurred. Leading nations including Germany and USA have reemphasized the importance of manufacturing in the corresponding national competitive strategies such as Industry 4.0 and AMP. The paradigm of production and manufacturing system is shifting, in which the increasing adoption of new technologies have empowered an unprecedented level of manufacturing intelligence with profound effects on the controls, management, resource allocation and decisions involved in smart production. Indeed, various companies are battling for dominant positions in this newly created arena via providing novel value-proposition solutions and/or employing new technologies to enhance smart production. On the other hand, most of industry structures in emerging countries including Taiwan may not ready for the migration of Industry 4.0. This study aims to propose a disruptive innovation strategy called Industry 3.5 as a hybrid strategy between the best practice of existing manufacturing for

Industry 3.0 and to-be Industry 4.0. A conceptual framework of Industry 3.5 is proposed, while a number of empirical studies in different companies are used to illustrate how manufacturing intelligence can be extracted from big data and domain knowledge to empower flexible decisions for smart production that is one of fundamental objectives for Industry 4.0. In particular, big data analytics and resources optimization can be employed for intelligent manufacturing under existing Industry 3.0 to address some of the needs for flexible decisions and smart production in Industry 4.0. Future research directions are discussed to implement the proposed Industry 3.5 as shifting paradigms for industrial engineering.
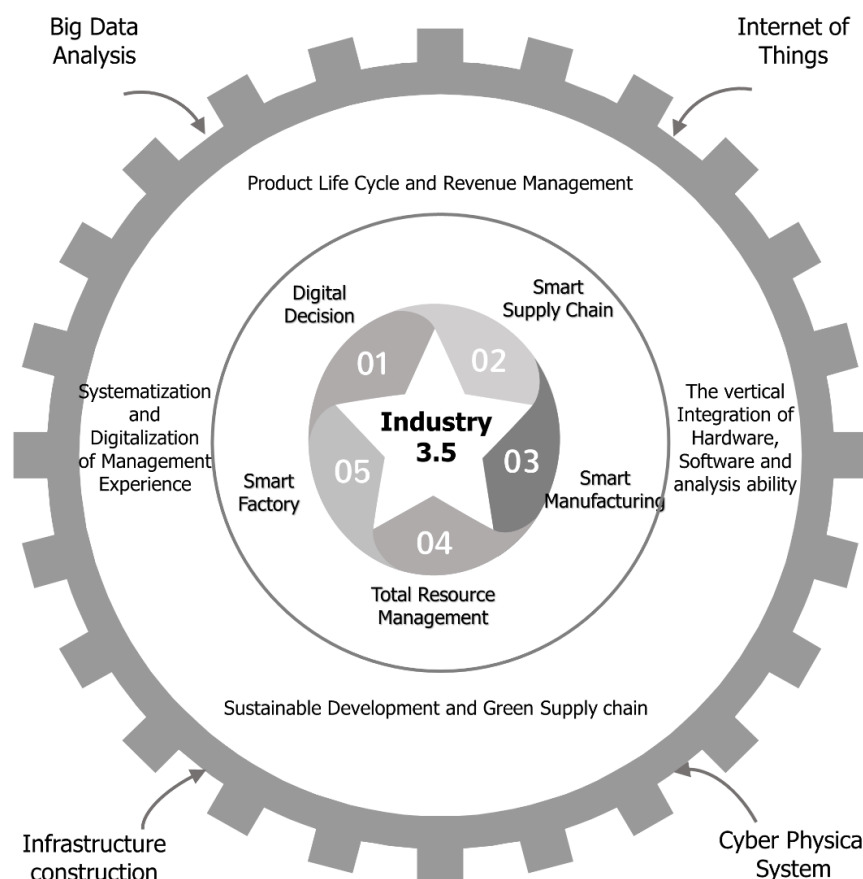

Figure. Conceptual Framework of Industry 3.5 (Chien, Lin, Shen, and Wu,

2016)