

Global Manufacturing Network and Supply Chain Management for the Electronics Industry

Chen-Fu Chien^a and Yongjiang Shi^b

^a Department of Industrial Engineering and Engineering Management, National Tsing Hua University – Taiwan, cfchien@mx.nthu.edu.tw

^b Centre for International Manufacturing, University of Cambridge – U.K. ys@eng.cam.ac.uk

Manufacturing industry is experiencing several fundamental changes. From industrial sector perspectives, in many industries such as home electronics appliance, computer, telecommunication, semiconductor, and even bio-technology, the traditional vertical-integrated company based business model has been dramatically replaced by collaborations between many fragmented but complementary and specialized value stars and value constellations. From geographic perspectives, more and more activities of value creation in manufacturing are reallocated in developing nations, especially in the Far East region where is emerging as a new factory of the world. From business dynamics perspectives, it is interesting to observe that, when some companies are seeking subcontracting or even hollowing-out by positioning themselves to engage with variously final customers directly, at the same time, others are accumulating up the outsourced tasks and sharply focusing on few core capable skills to provide operational service in a very professional way. It is more exciting to understand not only the interactions between original equipment manufacturers (OEMs) and electronics manufacturing service (EMS) providers but also their evolutionary adaptations and even place exchanges. In general, globalization between nations and collaboration between firms are deeply challenging the existing business models and classical concepts such as manufacturing, service, supply chain, and even firm or enterprise.

This special issue of the International Journal of Business aims to address the critical issues involved in global manufacturing network by using electronics industry as a reference model. Conceptual models and quantitative analysis methodologies are proposed to deal with wide range of challenges of global manufacturing and supply chain via validation with empirical research and observation in real setting. Within the broad themes, this special issue addresses the following specific topics:

- a transformation process from an technology imitator towards a leading innovator,
- performance evaluation of research and development,
- synchronization of global manufacturing and supply chain,
- a new statistical process control methodology for LED industry, and
- evaluation of government's semiconductor industry development strategy.

This special issue not only covers the different levels of management and decision issues in the global manufacturing network and supply chain but also provides

more up-dated management experiences and background from the Far East region where is becoming a more and more important region powering the world economy. The articles provide fresh insights and experiences from the newly developed and developing nations including China, Taiwan, Singapore, and South Korea.

From the papers' research and discussions, several key issues and academic agenda have been also arisen.

Firstly, global manufacturing network and supply chain is a very complex system. This special issue just explored a very limited part of it. Its complexity includes several dimensions such as the system of manufacturing and supply chain itself with expansions of the boundaries and dynamics from shop floor, to factory/plant and to factory network in big multinational corporations; internationalization engaging different nations and dispersions of resources; collaborations with different alliances with different modes of co-operations; and synthesis of them all together in order to achieve integrated power for growth and competitiveness. All of these ask new management visions, tools, and processes.

Secondly, reading between the papers in this special issue, an evolutionary path might be able to be identified. Different countries or regions are studying and concerning different issues from production in China, to supply chain synchronization in Singapore, evaluation and appraisal of R&D projects as well as government technology strategy in Taiwan, and up-grading and focusing on innovation power in South Korea. They interestingly reflect different stages of development and maturity in industrialization. It might be more interesting to observe whether knowledge flow and capability evolutions happen in the transformation between the stages.

Finally, this special issue has a clear focus on operational issues in contrasting with the manufacturing paradigm shifts in the Far East manufacturing industry. Is this Asian academic limitation? On one hand, it is obvious that the Asian industry is creating a new business which fundamentally transforms manufacturing from vertical integrated firm model into virtual collaborative inter-firm network model, but on the other hand, the Asian academia have not realized its significant impacts. Indeed, new technologies and business models have had profound effect on practices of management, yet the managerial research falls far behind the needs in real settings. Most of the Asian researchers still follow the linear path developed by the western scholars based on their industry demands and successes. The academics in developing nations should have more confidences to study national or local issues and generalize own business models, which will contribute more fundamentally to both industrial and academic worlds.

ACKNOWLEDGEMENTS

The editing of this special issue falls within a collaborative effort on "Evolutionary Development of Taiwan Electronics Industry," jointly supported by National Science Council, Taiwan and Royal Society, UK (NSC 92-2911-I-007-009; NSC 93-2911-I-007-002). Special thanks go to Professor KC Chen, Professor WC Wang, Professor Mike Gregory, Professor PL Chang, Director James HC Chang, HW Lee of Department of International Programs, NSC, and British Trade and Cultural Office.