CHAPTER 2

LITERATURE REVIEW AND BACKGROUND

This chapter presents a review of functional upgrading & electronics industry in Thailand, success criteria and the Balanced Scorecard, a multiple-theory framework to analyze the critical success factors.

2.1 Definitions of OEM, ODM, and OBM

There are many variations in definitions of OEM, ODM, and OBM. In this study, OEM, ODM, and OBM are defined as follows:

Original Equipment Manufacturing (OEM) refers to an equipment manufacturer who creates and assembles products which are then marketed under a brand name or company by a separate vendor or reseller.

Original Design Manufacturing (ODM) refers to a manufacturer who anonymously designs and manufactures its own products. They are usually under contract with OEM companies, who then market the products separately.

Original Brand Manufacturing (OBM) refers to products manufacturers through the products brand that is set up by oneself and on sale throughout the thorough fare, popularizes and sells the products produced by it on the market.

2.2 Global Value Chains in the Electronics Industry

The role of firms from developing economies which is often limited to the lower value-added contract manufacturers, whereas firms from more advanced economies, plays a more dominant ‘lead firm’ role (Sturgeon & Kawakami, 2010). On the other hand, contract manufacturers make products for these lead firms through production services, which are often known as ‘electronics manufacturing services’ or OEM. Manufacturing plus production design services is known as ODM. Contract

manufacturers are often located in developing countries and often faced with intense competition and low profitability (Pananond, 2013).

Mudambi (2007) and Mudambi (2008) used the concept of 'smile of value creation' to argue that the value-added activities are often concentrated at the upstream and downstream ends of the value chain. Upstream (input) activities are based on R&D knowledge (basic and applied research and development), whereas downstream ones are typically based on marketing knowledge (marketing, advertising, brand management, sale and after-sale services). While upstream and downstream activities tend to be concentrated in advanced economies, those in the middle—mass manufacturing and assembly, are often found in emerging markets (Mudambi, 2008). Applying this concept to the electronics industry, Shin, Kraemer, and Dedrick (2009) and Shin et al., (2012) confirm that value creation is not equally captured throughout different stages of the electronics' GVC. Lead firms and component suppliers, particularly suppliers of key components, capture most of the value created from a successful product in the electronics industry, compared to other players in the GVC.

Thailand has been part of the electronics industry's GVC for the past few decades. Similar to other countries in Southeast Asia, Thailand has been a major production and export base for MNEs producing electronics hardware, especially consumer goods, computing and telecommunication equipment, hard disk drive and semiconductor components. Export-oriented subsidiaries are generally established to perform basic assembly activities, with technology supplied by parent companies. Technological upgrading of both production processes and the type of products manufactured can be mastered next when local subsidiaries acquire useful manufacturing process skills and some limited product design capabilities and limited R&D activities. At that stage, local subsidiaries should be able to perform ODM activities. Through a continuous process of technological upgrading, local subsidiaries may then be able to be engaged in R&D activities that aim at new product and process innovation (Pananond, 2013).

2.3 Industrial Upgrading in Global Value Chains

One of the feasible responses of firms to maintain or increase their competitiveness in the increasingly globalized economy is to upgrade their production. Upgrading involves engaging in the production of higher value-added products, employing more efficient production strategies, and/or increasing the skill content of activities by firms (Humphrey and Schmitz, 2002; Kaplinsky, 2000). In the global value chain (GVC) approach (e.g. Gereffi, Humphrey and Sturgeon, 2005), the concept of industrial upgrading refers to the 'process by which economic actors—nations, firms and workers—move from low-value to relatively high-value activities in global production networks' (Gereffi, 2005). These processes operate at different geographic scales: within factories, within inter-firm enterprise networks, within local or national economies, and within macro regions at the international scale (Gereffi, 1999). Industrial upgrading is vital for creating possibilities to enhance value and thus for creating possibilities for economic development (Henderson, Dicken, Hess, Coe, and Yeung, 2002). Humphrey and Schmitz (2000, 2002, 2004) have identified four different types of upgrading: process, product, functional and inter-sectoral. Process upgrading refers to the introduction of more efficient production methods and better technology leading also to the improved quality of produced goods and increased flexibility of producers. Product upgrading involves moving to the production of more sophisticated and higher value-added products. Functional upgrading is the process during which firms acquire new functions generating higher incomes or abandon old functions generating low incomes in the value-chain. Its goal is to increase the overall skill content of firm's activities. Inter-sectoral upgrading takes place when a firm uses its acquired production knowledge to move horizontally into new sectors. Additionally, Dunn, Sebstad, Batzdorff and Parsons (2006) have identified channel upgrading which refers to firms entering new higher value-added end markets in the value chain in order to lower their risk and increase sales volumes through diversification and receive higher prices for their products.

Firms can enhance their competences in GVCs through four main channels, namely processes, products, functional areas and inter-chain interactions.

1. Process Upgrading.

Process upgrading, concerned with improvements in the production system. This involves acquiring new machinery, implementing a quality control program, shortening delivery times, reducing waste, and in general providing a more efficient transformation of inputs into outputs (Humphrey and Schmitz, 2000).

2. Product Upgrading.

Product upgrading, which deals with introducing new products, changing designs, improving quality, and producing a more sophisticated final output (Humphrey & Schmitz, 2000).

3. Functional Upgrading.

Functional upgrading, which involves moving into different stages (or functions) beyond production. Most commonly this implies moving into new links of the value chain –usually with higher margin and difficult-to-replicate activities– such as original design, branding, and marketing (Humphrey & Schmitz, 2000).

4. Chain, or Inter-sectoral Upgrading.

Chain, or inter-chain upgrading refers to applying the competence acquired in a particular function to move into a new chain. When firms move from one value chain to another, processes and functions may also change, or they may not, but both immediate and final customers are in new sectors. The basic processes of the firm may stay the same, but inter-sectoral shifts come with new customers and requirements (Humphrey and Schmitz, 2000).

2.4 Functional Upgrading

A functional upgrading can be defined as the move towards higher value adding activities within the GVC (Humphrey & Schmitz, 2002). It can be drawn like transforming of OEM (i.e. the manufacturing of low value-added products under contract to a buyer) to become ODM (i.e. the design of products sold under the brand names of other firms) and finally to become OBM (i.e. the sale of its own branded products) which can provide better returns.

This research consider a functional upgrading as the acquisition of a set of necessary new capabilities that will allow firms to move into higher value-added (i.e. better remunerated, higher margin) activities in the value chain, such as design, marketing, and branding. Therefore, it is important for Thailand's electronics OEMs to (possess and) develop their own capabilities necessary for upgrading or more value-added activities.

According to functional upgrading (Mudambi, 2007; 2008),firms can acquire new functions in the chain, such as moving from production to design or marketing, to increase the overall skill content of activities. For instance, in the global value chain, functional upgrading would involve a move from OEM where the firm offers a wider range of production capacities and services to buyers, to ODM where firms carry out all parts of the production process including design and new product development, to OBM where firms engage in marketing and branding functions.

The process of manufacture upgrade can be described as progression along a value creation chain from OEM, ODM to OBM (Humphrey, 2004). In manufacture upgrade, low cost producers of labor intensive OEM would be moving to operations that create competitive advantage based on product design in ODM, and proprietary technology and brand equity in OBM (Eng & Spickett-Jones, 2009).

In recent years, manufacturers in the global value chain have been transforming and upgrading in the hope that they can gradually transform along the value curve, moving from production activities to R&D or design and marketing business with higher added value. Alternatively, they try to push up the value curve through upgrading the production technology and product quality so as to enhance the overall competitiveness and added value of the business. The value curve of functional upgrading in the global value chain is shown in Figure 2-1.

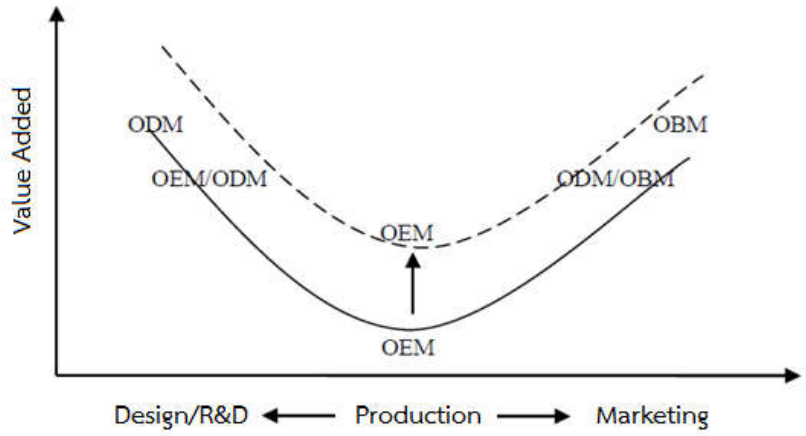

Figure 2-1 Value curve of functional upgrading in the global value chain

Sources: Adapted from Mudambi (2007; 2008)

2.5 Upgrading Trajectory

The reference point for the literature on industrial upgrading is the East-Asian experience. This has often been analyzed in terms of the sequence of acquisition of functional capabilities, as shown in Figure 2-2.

Assembly ↓	The focus is on production alone, often following buyers' specifications and using materials supplied by the buyer.
Original equipment manufacture (OEM) ↓	The supplier takes on a broader range of manufacturing functions, possibly including the sourcing of inputs and logistics functions. The buyer is still responsible for design and marketing.
Original design manufacture (ODM) ↓	In addition to manufacturing, the supplier carries out parts of the design process, possibly in collaboration with the buyer. In the most cases, the buyer merely attaches its own brand to a product designed and made by the supplier.
Original brand manufacture (OBM)	The supplier designs, produces and markets its own products under its own brand. It no longer relies on a buyer for these functions.

Figure 2-2 Upgrading trajectory

Sources: Taken from various sources, including Hobday (1995) and Gereffi (1999)

2.6 Functional Upgrading & Electronics Industry in Thailand

Most firms in the electronics industry in Thailand are OEMs which mainly assemble or manufacture products required by customers (contractors/vendors within the supply chain). Thailand was once a source of low-cost labor which was a source of competitive advantage (Suphachalasai, 1998; Watchravesringkan, Karpova, Hodges, & Copeland, 2010). However, under intense competitive pressure, such low-cost labor cannot be the only source of a national industry's competitive advantage (Jin & Moon, 2006). Since the early 1990s, competitive advantages of manufacturing firms' in Thailand similar to other developing countries have been derived from their

technological capabilities accumulated through the incremental learning process (Pananond, 2007).

In the context of Industry 4.0 and Thailand 4.0, Thailand local suppliers/OEMs have become increasingly global. To enhance competitiveness and profitability (and escape the middle-income trap by transitioning towards more knowledge-intensive and higher value-added activities), Thailand local suppliers/OEMs tend to gradually upgrade themselves from OEM to ODM and finally OBM by engaging in product design and development and building up their marketing and sales capabilities. However, upgrading in GVCs (moving up the value chain through process, product, functional and chain upgrading), especially functional upgrading, is not easy to achieve. According to Intarakumnerd and Charoenporn (2015), suppliers/OEMs in Thailand have generally not succeeded to upgrade into ODM. However, there are some notable exceptions, such as the success stories of Thai domestic electronics companies including the Siam United Hi-Tech Limited and the Hana Microelectronics Group (UNCTAD, 2005), which can serve as models for other firms.

2.7 Success Criteria and the Balanced Scorecard

Success criteria or performance indicators are ‘the measures by which success or failure of a project or business will be-judged' (Cooke-Davies 2002:185). They should reflect the firm's goals and critical success factors (Bala & Koxhaj, 2017). There are many different success criteria when functional upgrading takes place in firms. According to previous studies (e.g. Anker, Chernyshev, Egger, Mehran, & Ritter, 2003; Burger, Jindra, Kostevc, Marek, & Rojec, 2015; Kamau, 2009; Kaplinsky & Readman, 2005; Milberg & Winkler, 2011), the performance indicators of functional upgrading are mainly focused on the increase of market share, the improvement of abilities and skills of employees, productivity through product design, profitability, customer and employee satisfaction, and growth indicators. However, it is very important to limit them to those success indicators/criteria that are

critical to the firm to easily monitor operations and evaluate the success of a specific project (e.g. functional upgrading) in which the firm engages.

In developing a comprehensive set of performance indicators or success criteria, Kaplan and Norton (1996b) introduced the Balanced Scorecard (BSC), a performance measurement framework which includes both financial and non-financial metrics, and contains four categories/perspectives of measurements (Kaplan & Norton, 1992; 1993; 1996a).

The BSC's four perspectives: financial, customer, internal, and learning & growth, are explained briefly as follows (Kaplan & Norton, 1996b):

Financial perspective: Kaplan and Norton (1996b) defined a financial perspective as 'the readily measurable economic consequences of actions already taken' in the other three perspectives (customer, internal business process, and learning and growth), which are usually related to profitability.

Customer perspective: this perspective considers customers as the source of business profits. An increase in recognition of the importance of customer focus and satisfaction is the objective pursued by firms.

Internal business process perspective: in this perspective, a complete internal business-process value chain that can meet needs and have the greatest impact must be excelled by a firm can help company in achieving competitive advantage.

Learning and growth perspective (or innovation and learning): This perspective considers people as the main resources in a knowledge-worker organization through people learning and development including employee training and corporate culture that relate to individual and organizational improvement.

2.8 A Multiple-Theory Framework to Analyze Critical Success Factors

A functional upgrading is generally considered successful if its goals are achieved and its key stakeholders are satisfied with its outcomes, while success factors can be defined as a set of factors that contribute to the successful functional upgrading or

have positive influence on firm performance while also increasing the firm's competitive advantage.

In this study, three complementary theoretical perspectives i.e. resource-based, relational and institutional perspectives are used to articulate success factors and help explain how competitive advantage (or performance) is gained and held from these factors.

2.8.1 The resource-based view

The resource-based view of the firm (RBV) explains that a sustainable competitive advantage stems from firm-specific resources that are valuable, rare, inimitable, and non-substitutable, so-called VRIN attributes (Barney, 1991; Lin & Wu, 2014). In other words, resources (its broad concept, i.e., assets and capabilities) which are controlled by a firm and its employees (Barney, 1991; 2001) must fulfill VRIN criteria in order to provide competitive advantage and sustainable performance. Therefore, based on this interpretation, internal resources with VRIN attributes, within the control of an organization's management, can be considered as 'potential success factors'.

2.8.2 The relational view

In the relational view, a firm's competitiveness not only comes from internal resources, but also the resources that may span firm boundaries and may be embedded in inter-firm resources and routines (Dyer & Singh, 1998). This view emphasizes that firms may be able to generate rents by partnering and establishing relationships with other firms (Dyer & Singh, 1998; Lavie, 2006). According to the relational view (Dyer & Singh, 1998), four potential sources of inter-organizational competitive advantages are relation-specific assets, knowledge-sharing routines, complementary resources, and effective governance. Therefore, based on the relational view, the firm's relational

resources that serve as potential sources of inter-organizational competitive advantages can be considered as ‘potential success factors’.

2.8.3 The institutional theory

Among supplementary views that can be incorporated with resource-based and relational views for explaining firms’ performance, particularly in the global economy, is the institutional theory (DiMaggio & Powell, 1983). In such economy, external factors coupled with internal factors (within organization) and relational factors (inter organization) can be more effective in addressing firms’ performance. Institutional factors based on the institutional theory are considered as the critical success factors (see Gudienė, Audrius, Nerija, & Jorge, 2013) due to their highly effect on firms’ strategy and performance (Hoskisson, Eden, Lau, & Wright, 2000; Peng, Wang, & Jiang, 2008).

Based on the framework of the institutional theory, the social environmental factors are categorized into three groups: regulative, normative and cognitive factors (Scott, 1995). Regulative (coercive) factors, related to government organizations and dominant trading partners, include rules, laws and regulations. Normative factors, associated with professional associations, include societal values, responsibilities, and role expectations. Cognitive (mimetic) factors include shared conceptions of social reality (Scott, 2005; 2008; Yamakawa, Peng, & Deeds, 2008) and occur when firms imitate the actions of successful competitors in an industry (Aerts, Cormier, & Magnan, 2006; Glover, Champion, Daniels, & Dainty, 2014; Sarkis, Zhu, & Lai, 2011). Therefore, based on the institutional theory, the factors in three following groups; regulative, normative and cognitive can be considered as ‘potential success factors’.

In a comprehensive view, this study considers three complementary theoretical perspectives with the interpretation of each perspective as mentioned above as a means of pre-selecting firms’ desirable resources/factors (including within organization, inter organization, and external factors) so-

called ‘potential success factors’. Consequently, those success factors can be classified into three main categories identified by each of the theories, namely, internal (RBV-based), relational (relational view-based), and institutional (institutional theory-based) factors. Such classification of theoretical success factors is necessary for developing a theoretical framework.

2.9 Dynamic Capabilities and Functional Upgrading

The dynamic capability view (DCV) extend RBV is needed to explain how competitive advantage is gained and held (Teece & Pisano, 1994). Dynamic capabilities are defined as ‘the firm’s ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments’ (Teece, Pisano, & Shuen, 1997: 516). According to Wu (2007), dynamic capabilities enable a firm to leverage its resources to improve its performance, and moreover, dynamic capabilities mediate between firm’s resources and performance, without dynamic capabilities to convert resources into competitive advantage, the resources cannot translate into performance.

Through an organizational learning based on dynamic capabilities perspective, this study considers dynamic capabilities as an intermediating the relationship between a firm’s performance and the success factors. In other words, the dynamic capabilities could play an intermediate role to transform the success factors into performance in order to create a competitive advantage and performance consequences through strategic upgrade from OEM to ODM and OBM.

Based on literature review, the following four core dimensions of dynamic capabilities were identified to explain the successfully achieved functional upgrading in manufacturing industries such as the electronics industry: i) absorptive capability (Jean, 2014; Lau & Lo, 2015; Palit, 2006; Wang, Chen, Wang, Lutao, & Vanhaverbeke, 2014; Zhao, Tong, Wong, & Zhu, 2005; Zhai, Shi, & Gregory, 2007), ii) innovative capability (Altenburg, Schmitz, & Stamm, 2008; Jean, 2014; Mahmood & Zheng, 2009; Zhao et al., 2005), iii) integrative capability (Chen, Lee, Xing, & Chen, 2014; Chen, Qiao, & Lee, 2014; Huang, Chen, Stewart, & Panuwatwanich,

2013; Liu, 2012), and iv) sensing capability (Holweg & Pil, 2008; Pandit, Joshi, Sahay, & Gupta, 2018; Ralston, Reid, Dunn, & Hainsworth, 2015). The dynamic capabilities' four dimensions are explained briefly as follows (Kaplan & Norton, 1996b):

Absorptive capability is a firm's ability to utilize (identify, assimilate and exploit) external knowledge and information to firm's own competitive advantage e.g. producing commercial products or services (Malhotra, Gosain, & El Sawy, 2005).

Integrative capability is a firm's ability to integrate knowledge within and across organizational boundaries (Henderson, 1994) and utilize it productively (Woiceshyn & Daellenbach, 2005).

Sensing capability is a firm's ability to understand new technology developments (technology-sensing), customer needs and market dynamics (market-sensing) better than its competitors.

Innovative capability is a firm's ability to develop new products and/or markets through aligning strategic innovative orientation with innovative behaviors and processes (Wang & Ahmed, 2004).

Concluding Remark

This chapter presented review of GSCM in Thailand, sustainability performance of the triple bottom line, GSCM Practices, GSCM Drivers, and the organizational theories including the RBV of the firm, the relational view, and the institutional theory as the theoretical foundation of the study and the relevant literature that provide a theoretical basis for identifying the theoretical drivers and prioritizing their relative importance.