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Three Core Competences and Product Architecture Strategy: Case Studies of Indian Markets

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ABSTRACT

The aim of this article is to discuss the emerging challenges of global supply chains and their need for understanding the upstream and downstream collaborative Global network for global markets in the context of Emerging economies. This article explores the following research questions: (1) What particular success factors from the perspectives of core competences and product architecture. (2) In the context of Emerging economies, how are these business practices implemented? This article presents new linkage competence models that include three types of competencies plus the concept of product architecture. From these theoretical lenses, we analyze cases of Japanese global firms in India. Increasingly, Japanese firms sustain their global advantage by utilizing manufacturing capacities and market strategies in India. This paper deals with the strategic practices of Japanese manufacturers—particularly Toyota, Honda, and Denso. These firms not only use India as their production basis

for the global markets but also provide their own successful products that satisfy Indian customers. Case studies of Japanese global firms in the Indian market suggest that their market strategy is based on new supply chain management, which implements active localization practices in terms of sensing local market needs, developing Indian suppliers, and using context-driven marketing rather than bringing their domestic products with modest variations. These firms effectively use linkage competence that integrates both technology and customer competence. From the product architecture perspective, these firms also integrate their high technology competence (i.e., closed integral architecture for technological excellence) with the reality of uneven quality performance of local suppliers (i.e., open integral architecture for reasonable quality performance and market context accommodations).

Keywords: Core competences, Product Architecture, Emerging market, Japanese firms, Indian markets

INTRODUCTION

Shortly after the global financial crisis in 2009, the world economy was deteriorating on a global scale. Nevertheless, since 2010, it has recovered gradually. However, this recovery process varied distinctly according to the countries and regions. The International Monetary Fund (IMF) forecast of the world economy in April 2011 indicated that the growth rate of the world economy in 2010 increased by 5% over that of the previous year following a record−0.5% decrease in 2009. The gap of economic growth between the advanced and emerging economies further

widened since 2011, and the imbalance in growth in various forms is rising.

Emerging markets show fast economic growth and the speed of change among income groups is rapid. The accelerating growth rates of middle-income groups are transforming the economic structure from a pyramid shape of poor nations of the past to the diamond structure of advanced nations.

According to Japanese Economic Industry Bureau Statistics, the total number of households in Asia that have annual disposable income between $5,000 and $35,000 was 140 million in 1990, 220 million in 2000, and 880 million in 2008. This reflects the rapid growth of middle-income groups from China, India, and the Association of South East Asian Nations (ASEAN). From a global perspective, the large share of middle income groups is distributed in these areas. With rapid economic growth and increase in customer base, these economies hold amazing purchasing potential for new products and services.

Product strategy for these emerging economies requires linkage competence that combines technology competence for high functionality quality-performance-driven products and customer competence for high customer needs, lifestyle, and values-based products (Park and Hong, 2012). The obvious obstacle for advanced nations' global firms to penetrate emerging markets such as BRICs is customer competence. In particular, many Japanese global firms have relatively high technology competence through their long product development experiences for customers from North America and Europe that expect high quality, functionality, and safety of their products.

In contrast, these global firms experience patterns of business that are new. Comprehending different customer needs and translating them into successful products is the key for strategic positioning in these emerging markets. To enhance

customer competence in the emerging markets, these global firms need to develop customer experts with sensing capability and who can utilize information technology (IT) infrastructure. For business-to-consumer (B-to-C) product markets, it is important to assess what particular types of products customers prefer to purchase through direct customer visits and marketing research in retail stores. The size of demand in B-to-C consumer markets is directly proportional to the increase of personal incomes. The growth rate of business-to-business (B-to-B) markets (i.e., intermediate industrial goods) corresponds to keeping up with the economic growth of emerging economies, while the purchasing pattern differs by regions.

For meaningful examination of these research questions, we employ case studies of Japanese firms in the context of emerging markets. Firms that participate in the case studies are carefully chosen to study the framework to show relationship between core competences and product architecture strategy. Case findings suggest that successful global firms build linkage competences to satisfy customer needs in the emerging market.

RESEARCH MODEL

Three Types of Core Competences and Global Expansion Strategy

In 2000, Malcolm Gladwell introduced Tipping Point: How Little Things Can Make a Big Difference. This book became one of the bestselling books for years. This book illustrates the idea of linkage competence in the daily context of American life. Malcolm Gladwell (2000) focuses on three types of people that play prominent roles in making particular ideas or concepts to spread like social epidemics. The first type is connector. The concept of connector refers to those who have extraordinary levels of social

contacts. For example, the size of social circles of average people among 1,000 in a random sample is about 35 people or so. In any group, at least one person has 130 to 150 (i.e., five to six times the average). These connectors play very important roles in spreading new ideas. The second type is mavens which are somewhat different from connectors. They are information experts. When superstores offer "special buys," most people do not remember the individual prices of the products on sale. But 0.1% of people remembers the pricing details and spreads the news to others. Thus, the databases stored in the minds of these mavens make a big impact on linkage competence. The third type is salespersons. They exercise a huge influence on the customers who finally decide to purchase particular products through their timely and credible suggestions. These three types of people take quite active roles in social network distribution. The above-mentioned influential people are what in Rogers (1983) are referred to as "2.5% innovators" and "13.5% early adopters."

This paper examines the building process of linkage competence from the standpoint of global market expansion based on extensive field studies (Voss et al., 2002). Our special focus is to examine linkages between various choices of cross-functional competences and their impact on competitive performance (Brown, 2013). In other words, this paper discusses how global firms successfully build their linkage competence in the emerging markets. The determining factor of any firm's competitive advantage is its unique resources or advantageous position (Penrose, 1959; Wenerfelt, 1984; Rumelt, 1984; Hamel and Prahalad, 1990; March, 1991; Leonard-Barton, 1992; Morone, 1993; Henderson, 1993; Dougherty and Heller, 1994; Daugherty, 1995; Helfat and Raubitschek, 2000; Danneels, 2002; Barney, 2002; Rosenzweig et al., 2003; Park, 2009; Park and Hong, 2012). In a relatively stable business environment, it is common for

firms to utilize their core competence for a long period once it had been successfully built over the years. However, in a turbulent market environment the core competence of the past may turn out to be the reason for business failures.

After the 2008 global financial shock, the demise of Japanese electronics firms illustrate this point (Nonaka and Takeuchi, 1995; Fujimoto et al., 2005; Fujimoto, 2006). As firms concentrate on incremental innovation, architectural knowledge embedded in work routines and regular work flows rarely change. Consequently, the internal innovation leaders will depend on organizationally filtered information, outdating their perception of organizational architecture and absorptive knowledge. These firms can no longer face the challenges of the disruptive innovation of rival firms. In this context, researchers in the 1990s presented the dynamic capability theory (Teece et al., 1990; Utterback and Suarez, 1993; Teece and Pisano, 1994; Henderson and Cockburn, 1994; Teece et al., 1997; Teece, 1986; Miller and Morris, 1999; Teece, 2007; Quinn and Dalton, 2009). Firms lose their competitive advantage once their organizational governance is unable to create, store, and explore knowledge assets through their routine work processes. In this sense, dynamic capabilities are defined as "the systematic organic effort to capture the new innovation opportunities by connecting to the external network and to translate into organizational core capability that reconfigures and protects their knowledge assets for sustainable competitive advantage" (Teece, 1986; Snow et al., 1992; Nonaka and Takeuchi, 1995). Thus, the crucial elements of dynamic capability are organizational sensing of external environment, exploration of business opportunities, and stretch and leverage of innovative knowledge assets (Hamel & Prahalad, 1994; Park and Hong, 2012).

In this paper, such dynamic capability is referred to as three competences which are customer competence associated with external environment, resource securing for enhancing technology competence, and linkage competence that combines external and internal resources (Park and Hong, 2012).

First, the strengths of Japanese firms are in their technology competence that develops products with high functionality and quality. This derives from product development capability, patent rights, multi-skilled human resources, product design, and manufacturing capability embedded in organizational system and work processes. The indicators of technology competence are productivity, production lead time, time to market, number of new product projects, product integrity, and design quality (Fujimoto, 2001). Technical experts with years of experience in manufacturing floors (e.g., heavyweight project managers of Toyota Company) can recognize the level of technology competence with their intuition and careful observation of manufacturing processes (Fujimoto, 1997).

Second, in the emerging new markets relative weakness of Japanese firms lies in customer competence, which is essential to inspire customers through aggressive marketing and promotional efforts. This involves innovative methods of communicating the unique value of their products, which force them to adopt new lifestyle patterns. Customer competence includes comprehensive measures such as customer satisfaction ratings, repeating purchase rates, the number of new customers, market share, customer loyalty, and customer's willingness to pay. Expert managers with years of experience in the areas of customer service would be able to estimate the extent of customer competence.

Third, the capability to transform an idea into a tangible substance (i.e., linkage competence) is to integrate product

concept into tangible products (i.e., linking customer competence to technology competence). However, many Japanese firms are not familiar with this "linkage competence" concept. Japanese firms assume that their weak customer competence is the main reason for their relatively weak position in the global markets. Thus, many firms reinforce their marketing efforts and yet they do not necessarily understand the critical role of linkage competence for their marketing success. Linkage competence is realized as firms attain adequate market sensing capability, develop customer-trend sensitive managers, implement product architecture, and achieve overall product-process integrity in diverse manufacturing industries (Park et al., 2012a, 2012b).

Core Competence and Product Architecture Strategy for emerging markets

In this paper, we introduce the successful examples of Japanese global firms in India. For this purpose, we present the relationship between three types of competence and product architecture. Outstanding global firms are keenly aware of changing requirements of their organizational environment (Rosenzweig, et al., 1991). As we mentioned, the winning product strategy of global firms for these emerging economies includes technology competence (i.e., utilizing technological capability to make good products), customer competence (i.e., understanding lifestyles of customers and capturing the hearts of customers), and linkage competence (i.e., integration of technology and customer competence) (Park and Hong, 2012). In other words, market success of global firms depends on their supply chain responsiveness in terms of effective deployment of their technology competence to fit the unique needs of the customers in emerging economies (Roh et al., 2011, 2014). This paper defines

the capability of firms to detect the needs of customers in India and translate them into the right products as sensing competence (Park, 2011a). Emerging markets also show two patterns: (1) the impact of direct income growth that impacts the rapid demand growth in business-to-customer (B to C) markets, and (2) industrial or intermediate goods in business-to-business (B to B) markets based on the macroeconomic growth. Interestingly, customer competence is what global firms from advanced nations find most challenging to master for their winning performance in the emerging markets. Japanese firms discussed in this paper possess high levels of technology competence (i.e., product quality and safety performance capability) with their long experiences in advanced countries. Yet, their weakness in customer competence of emerging economies has dismantled their ability to penetrate new markets. Emerging economies have unique market conditions that greatly deviate from those of advanced markets. Therefore, the crucial competitive advantage lies in their linkage competence that integrates technological and customer competence in these emerging markets.

Meanwhile, a critical issue of global firms is how to effectively respond to the turbulent dynamic global business environment—particularly to the emerging markets. Product architecture is a useful concept to analyze rapidly changing markets. Firms focusing on finished products tend to use closed integral architecture while component product manufacturers offering the commodity nature of products usually adopt an open modular architecture (Christensen et al., 2002; Park and Hong, 2012). The global business environment is rapidly changing from a closed integral to an open modular environment. Thus, firms search for linkage competence, which provides speed (Park and Hong, 2012).

Product architecture is the basis of product design. In general, a modular type is for combination of separate independent parts while an integral type is for integration of complex interdependent elements (Henderson and Clark, 1990; Ulrich, 1995; Fine, 1998; Baldwin and Clark, 2000; Fujimoto, 2001). Modular types show one-to-one relationship between functionality and structure. Therefore, each module requires independent design of each component. In contrast, integral types involve multi-to-multi relationships among interdependent parts. Any change in one part of the design influences other aspects and thus complex system design is a necessity. Common product structures of manufacturing products are hierarchical. Therefore, even for many modular products the foundational structure is integral architecture (Clark, 1985). For example, a LCD TV has integral elements in the upstream manufacturing process/front-end design process, and the downstream manufacturing assembly process includes mostly modular types (Park et al., 2008; Park, 2010).

Here, two sets of parameters are the following: (1) modular/integral (i.e., types of product architecture), and (2) open/closed (i.e., relationship extent between firms). "Open" refers to the technological specificity that defines the extent of how a firm's modules are openly related to those of other firms to make a particular product. In contrast, "closed" is about the incompatibility of one's modules (e.g., pure and unique components) with other firm's modules. An "open" structure allows for communalization and standardization among modules and thus a linkage mechanism among interfaces (i.e., common linkage between component parts and shared connectivity protocols for information flows). On the other hand, a "closed" structure does not allow interface design rules among modules

(i.e., unique modules of each firm are unrelated to those of other firms).

Thus, a 2 × 2 matrix shows four types of product architecture. An "open-modular" product indicates a modular architecture with open interface structure. Open-modular products allow combinative design of component parts. Firms are able to offer products with a high level of functionality and value potential through a smooth combination of diverse quality component parts from multiple firms (Fine, 1998; Fujimoto, 2001). Thus, maximum functionality of products is determined by the functionality potential of component parts.

In contrast, "closed-integral" products define unlimited functionality potential through complex internal integration mechanisms. The realistic functionality maximum is determined by cost and cycle time.

March (1991) emphasized dynamics of firms as learning organization and used the term of exploration and exploitation. According to March (1991), exploration refers to the elements of search, variation, risk taking, experimentation, play, flexibility, discovery, and innovation. Exploitation is about refinement, choice, production, efficiency, selection, implementation, and exaction. The idea of core competence dynamics can be further expanded in view of the concept of exploration and exploitation of competences (Park and Hong, 2014). Figure 1 shows the interrelationships among customer competence, technology competence, and linkage competence in terms of product architecture. Technology competence allows firms to enhance closed-integral product architecture, not necessarily followed by product attractiveness. On the other hand, customer competence may fit open-modular product architecture, while technology level might not be enhanced simultaneously. Thus, we hypothesize that product architecture relates to different core competences.

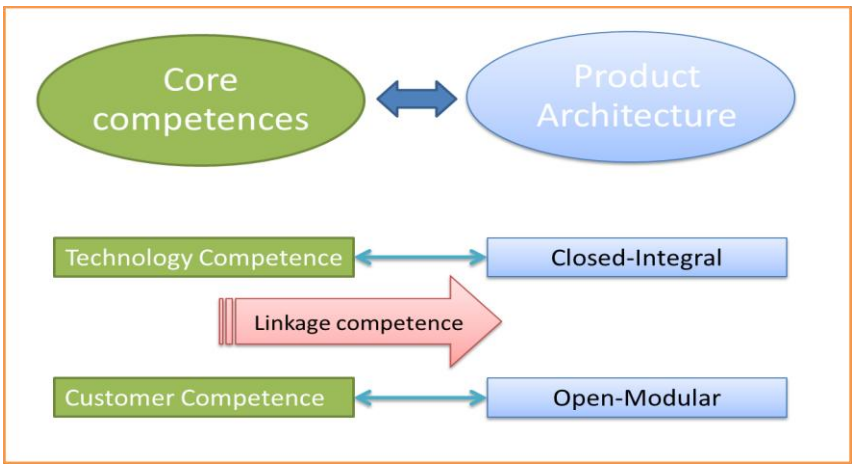

Figure 1. Dynamic Mechanism of Customer-Technology Competence

CASE STUDY

This paper notes how Japanese global firms recognize such strategic cost constraints in the emerging markets. Successful Japanese firms in the emerging markets adopt an open integral product architectural strategy (as opposed to a closed integral architectural strategy) while utilizing linkage competence. These firms determine customer needs of emerging economies and raise the level of localization (i.e., use local suppliers for majority of component parts) and yet stick to integral product architecture to ensure product quality and sustainability goals. In the paper, based on the theoretical framework of the core competence model and product architecture strategy, we discuss further in depth successful business strategy of Japanese global firms in India.

Strategy of Toyota India

The key for a successful market strategy in emerging markets is to integrate technology competence into sensing and translating local market needs through customer competence. For this purpose, Japanese global firms move away from the previous focus on product development based on their technology competence and replication of their domestic market driven product development models. First, we discuss Toyota's strategy in the Indian market.

Toyota Kirloskar Motor (TKM) and Toyota

In 1997 Toyota established Toyota Kirloskar Motor (TKM), a joint venture with an Indian firm, and since then it has marketed several product lines including Innova and Corolla Altis. Among them, the most successful model was the Innova and Etios model. Innova is the Indian version of Toyota's global strategic brand called IMV (innovative multipurpose vehicle). Its production was the fourth in Southeast Asia next to Thailand, Indonesia, and the Philippines. IMV was truly an epoch-making project in that all the main processes (e.g., component parts sourcing, production, and logistics) are simultaneously implemented in ten countries. Then the products are supplied to 140 countries. Toyota Kirloskar Auto Parts (TKAP), as a part of IMV, produces major engine parts (e.g., transmission) in India. All the auto parts that TKAP produces are exported all over the world to those that use IMV product lines. The TKAP business unit is quite strategic for Toyota. The president of TKAP explained, "it recognized the strengths of India's auto-manufacturing potential for global market" (Shimada, 2005). Certainly, auto manufacturing in India has several advantages.

First, it has solid makers for manufacturing facilities. India has a basic manufacturing infrastructure capacity which is rather rare among developing nations. India is more advantageous than China in this respect. Such technological capability is based on its long history of auto manufacturing. Second, India's large domestic market is steadily growing. The market size advantage allows many firms to implement economies of a large scale of production, and their global competitiveness is also formidable. For example, over 380 million Indians (72 million households) have an annual household income of over $10,000. Third, India has caught up with the global trend of FTAs among many nations. In the automobile industry, most nations require firms to pursue local sourcing options and international comparative advantage (i.e., labor-intensive nations focus on their labor cost advantage while technology/capital–intensive nations seek their technological advantages) is not well practiced. Since India has established FTA with other nations, the automobile industry shows an international comparative advantage just like the electronics industry. Fourth, India has abundance of skilled human resources. Indians are fluent in English and quick to learn Japanese. Since India is a nation where diverse languages are spoken, Indians have a greater ability to reasonably guess what others are saying in foreign languages. TKM, with the support of TKAP in the previous contexts, was able to succeed in the product development of car models such as Inova and Etios that fit the particular demands of Indian consumers.

Linkage competence for development of Etios Sedan

Toyota's product development strategy for the Indian market went far beyond its development patterns for the Japanese domestic market. Etios Sedan (that has been popular

among Indian consumers) illustrates this point. Etios is Toyota's first successful emerging market-driven product. The project leaders started from a zero base (i.e., start the entire process from the beginning for the Indian market requirements) including its platform design and manufacturing processes. Etios is different from the other Toyota models that are marketed in Japan, the United States, and Europe. For example, Japanese passengers do not want direct exposure to the cold air from a car's air conditioner. Yet, Indians love direct access to cold air in the car. Recognizing Indian consumers' preference for auto air-conditioner functionality, Toyota installed the air-conditioning unit in Etios in the way Indians wanted. Toyota benchmarked the new product development practices of Korean household electronics firms and Hyundai-Kia that successfully defended their market leadership in the Indian market. Toyota also accommodated additional space for Indians who like to put their "Ganesha" (Hindu religious statues) inside their automobiles. Many Indians also walk on barefoot so Toyota provided special soft covers in the guide rail of the front seat. In view of much of the unpaved Indian road system, Toyota installed an additional cover for the lower engine parts area. This enhances the performance of the anti-dust shock absorber, which in turn benefits its longevity in dusty regions.

All these features indicate Toyota's commitment for the Indian market and reflect the practical needs of Indian customers in their product design and manufacturing processes. Three additional aspects of Etios' development strategy are noted for further discussion here (Park and Amano, 2011).

First, a new product development team visited India numerous times and maintained collaborative relationships with Indian local R&D teams. The Japanese chief engineer who planned and executed the Etios model project visited India several times and observed the riding habits and demand

patterns of Indian customers. He also toured many regions of India—a total of 200,000 km—by car. He insisted on the field adaptation test of the Etios prototype in India to be executed at least four times (instead of one time in Japan). Since Toyota established Toyota Kirloskar Motor (TKM) in 1997, the key competitive challenge has been to successfully sell its models for market leadership in India. Toyota's senior management leadership accepted the fact that their previous development platform focusing on the advanced market (e.g., Japan, North America, and Europe) did not fit customer needs in emerging markets like India. For translating the local needs in product design and manufacturing, it became obvious that Japanese engineers alone could not adequately reflect all local customer requirements. Toyota very closely collaborated with local Indian engineers of TKM. The Etios model was born in the course of these Indian engineers working together with Japanese counterparts.

Second, a crucial element that the emerging market needs is price competitiveness. This requires localization of component parts and development of an Indian suppliers' network. In the case of the Etios model in India, the goal of drastic cost reduction was achieved through bold product design. Take steel plates as an example. According to the Japanese chief engineer responsible for the Etios development project, most of component parts for the Etios model were sourced from Indian suppliers. India's Tata Steel Company supplied steel plates. Unlike Japanese high-quality steel plates, Tata steel plates' inconsistent quality performance remained a huge challenge.

However, Toyota devised a product design that covered this particular quality challenge. Since the highest quality level of steel plates that Tata could offer was 440 MPa (MegaPascal; 1 MPa = 1 N/mm), which was not the high-grade level of 500 to

1000 MPa, the design team came up with an option that substantially strengthened product performance with 440 MPa steel plates. Toyota has achieved about 70% of localization in India. By 2011, its goal is to increase up to 90% including engine and transmission systems as well.

Third, Toyota's innovative product development strategy accomplished cost reduction goals and vast performance improvements that satisfied Indian customer requirements through various technological functionality enhancements such as standing oil jet technology for piston cooling, forged crankshaft and connecting rod for durability, EPS (electric power steering) system for fuel efficiency, suspension system for comfortable ride, and shock absorber for anti-dust performance. All these comprehensive product development efforts indicate how Toyota achieved its integral product architecture in the Indian market contexts (e.g., India's high temperature, bumps in the uneven road surface and dusty regions, and high gasoline costs) utilizing open components.

Strategy of Honda India

Japanese Makers Lead in Indian Motorcycle Market

There has been a substantial increase in motorcycle demand in major cities with a relatively reliable road system such as New Delhi, Mumbai, and Calcutta. The growing Indian middle class prefers to use motorcycles for their transportation means because passenger cars are still relatively expensive, while motorcycles are affordable for their income level. In response to this present condition, global motorcycle makers have poured their newer models into the Indian market, and India's financial loan system supported such surging consumer appetites (Kadokura, 2006).

According to data published by the Society of India Automobile Manufacturers (SIAM), the sales volume of motorcycles in India has maintained two-digit growth rates every year. The market growth of Japanese motor bicycle manufacturers also shows steady performance in the ASEAN market with their competitive prices and high product quality reputation. The global ranking of India's motorcycle market is next to that of China. Nevertheless, by international standards, the diffusion rate in India is still fairly low. As of 2003, out of 1,000 people, the Japanese rate is 106.3 and India shows 35.4 (Kadokura, 2006). India's motorcycle market is huge and its growth potential is high. A simulation result based on the Japanese diffusion growth rate up during the climax years suggests that India will show similar patterns of growth in 2015, 98.2 per 1,000 and by 2020, 131.7 per 1,000. The estimated forecast of its demand in the Indian market is 15,663,000 in 2015 and 18,846,000 in 2020. The annual growth rate in the period of 2005 to 2020 is expected to be 10.5% (2005 to 2010), 7.7% (2010 to 2015), but only 3.9% (2015 to 2020) with the rapid passenger car demand in that period.

In the Indian motorcycle market, ten firms (including global rivals from Japan, the United States, and Europe) maintain both manufacturing and market networks. The Hero Honda has the largest market share. The Hero Honda was established in 1984 by Honda (Japan) and Hero (India) with each holding 26% of ownership. With the recent termination of such a joint venture, both Honda and Hero hereafter consider separate manufacturing and marketing strategies in India. In 2004 both firms extended technological cooperation for an additional 10 years and thus by the end of 2013 the collaboration relationship continued.

Linkage competence for development of PCX 150

Honda is excellent with its technology competence and linkage competence that translate local market needs in its products. Based on such a strategy, Honda maintains an absolute advantage in BRICs markets (i.e., China, Brazil, and India) and other ASEAN markets (e.g., Thailand, Vietnam).

First, Honda exerts strategic efforts in reinterpreting its technology competence in relation to customer competence. Such initiatives started in China and now are extended to Thailand, Vietnam, and India. For example, Honda's products sold in Thailand reflect its unique contexts—especially the prices of motorcycles, which drop exceedingly every year. In emerging markets, the key for market advantage is in speed and cost competitiveness. Thus, the long-term strategy of emerging markets must consider total low cost strategy. More and more Chinese and Indian indigenous firms are introducing their inexpensive models aggressively in the markets. In India, Hero Honda's market share was up to 60% but Chinese motorcycle rivals steadily challenge Honda's competitive position. In response to such competitive threats, Honda identifies national market needs and translates them into its products that appeal to customers of each region. In principle, Honda conducts new product design and development by individual country. In practice, Honda defines maximum common denominators based on market research of every country and determines the global model platform first. Low-cost competitiveness for product development and manufacturing is crucial in this vital process.

This is the firm's linkage competence that uses low-cost component parts and materials for all their products. Honda's competitive advantage in emerging markets such as China and India is in its capability to utilize sourcing network infrastructure

to achieve the best possible choices for multiple customer requirements in terms of quality, cost, and delivery. In other words, Honda integrates its brand reputation, advanced technological capability (environment/safety/efficiency), and economies of scale production capability to sustain its superior market position. For example, Honda developed PCX150 as a global model by applying such a network development infrastructure using the sourcing/manufacturing infrastructure of emerging countries and the product concept of advanced nations. It offers the fuel economy of the most frugal scooters, but is big and powerful enough to carry a passenger and ride on the highway.

Honda India rapidly grew with a joint venture with Hero, an Indian firm. Its market share in India exceeds 60%. The primary reason for the market leadership is cost competitiveness based on a high percentage of local sourcing of component parts through India's indigenous firm Hero and other Indian suppliers. The Japanese engineering design team provides product structure and detailed design blueprints, and all the component parts are secured by local Indian suppliers. Product design of PCX 150 in India accommodates a strong rear structure, which allows three or four people to ride a motorcycle. Thus, PCX 150 is an example of how Honda combines its strong engine performance, local sourcing, and India customer-specific design structure. Honda India separated from Hero, an Indian partne. This will require continuous prominent local sourcing as well as product development strategy that satisfy changing customer requirements in India.

Strategy of Denso India

Denso India

Firms that target emerging markets are not only the manufacturers of finished goods (e.g., Toyota, Honda, Seiko Epson, and Makino) but also component parts suppliers. Denso is a leading supplier of advanced automotive technology, systems, and components for all the world's major automakers. With approximately 126,000 employees in more than 35 countries, its global turnover places it amongst some of the largest companies in the world. Denso started its operation in India from 1984 onwards and since then has been continuously supplying superior quality products to its customers. With current workforce of over 3000 associates in India, Denso caters to virtually all the major automakers in India.

Linkage competence for development of wiper systems for Nano

Denso India also recognizes the importance of sensing customer needs in India—particularly price competitiveness. Denso's innovative approach to designing new products for emerging markets is not by using the previous design of existing products. Instead, it starts from a zero base and defines essential minimum functionality and performance requirements and then devises products that would sustain Denso's brand in terms of functionality, performance, and value added. Denso's cost target for emerging markets is generally half of the price of its past products. Since Denso's products are mostly automotive component parts, its customers are primarily original equipment manufacturers (OEMs). To secure customers that market their finished products in emerging markets such as India, China, and Brazil, Denso's strategic priority is to sustain superior cost

competitiveness and a high-quality workforce that can sense local customer needs.

Denso India became the supplier of wiper systems for Nano which is a strategic product vehicle for Tata, through developing local Indian engineering talents. For many years Denso's primary customer base has been Japanese makers such as Maruti Suzuki, Yamaha, Honda, Suzuki, and Toyota. From 2006, Denso participated in Nano product development processes and became the local supplier of its wiper system. It was through the Indian engineers who had been working at Denso for more than 10 years that Denso could develop a strategic partnership with Tata. Under the leadership of an Indian chief engineer, Denso was able to reduce the total cost by 30% to 40% for the ideal product considering the local customer needs. At the same time, Denso's customer relationship with Tata by an Indian chief engineer was also quite smooth. Denso India has instituted the training program that selects two Indian engineers who receive one year of intensive training in Japan. As of 2011, more than 30 Indian engineers have completed their education and training in Japan. From 2011, Denso has also constructed testing labs for India's small and medium suppliers. In this way, Denso has developed an extended linkage competence that includes both its own R&D facilities for regular customers of Japanese and Indian OEMs and additional testing labs to serve the needs of small and medium Indian suppliers.

Comparison of Japanese firms

Increasingly, Japanese component parts suppliers sustain their global advantage by utilizing manufacturing capacities and market strategies in India. This paper deals with the strategic practices of Japanese manufacturers—particularly Toyota, Honda, and Denso. These firms not only base their production in India for

the global markets, but also provide their own successful products that satisfy Indian customers. Case studies of Japanese global firms in the Indian market suggest that their market strategy is based on new supply chain management, which implements active localization practices in terms of sensing local market needs, developing Indian suppliers, and using context-driven marketing rather than bringing their domestic products with modest variations.

These firms effectively use linkage competence that integrates both technology and customer competence. From the product architecture perspective, these firms also integrate their high technology competence (i.e., closed integral architecture for technological excellence) with the existing circumstance of uneven quality performance of local suppliers (i.e., open integral architecture for reasonable quality performance and market context accommodations).

Table 1. Comparison of case firms

	Toyota	Honda	Denso
Product	Automobile	Motorcycle	Wiper
Original competence in Japan	Technology	Technology	Technology
Original architecture in Japan	Closed-Integral	Closed-Integral	Closed-Integral
Competence strategy in India	Linkage (strenthing customer competence)	Linkage (strenthing customer competence)	Linkage (strenthing customer competence)
Architecture strategy in India	Open-Integral	Open-Integral	Open-Integral

DISCUSSION AND CONCLUSION

Based on the product architecture perspective, this paper has clarified the organizational processes of Japanese firms in India. Here, it is meaningful to compare Japanese firms with Korean global firms in terms of emerging market strategy. The localization strategy of successful Korean firms in China, Brazil, and India suggests several common factors. Starting from the mid-1990s, they accelerated the localization implementation efforts in the emerging economies. Their initial focus was to meet the market demand of India, China, and Brazil. From the latter 1990s, the scope of localization expanded to support the increasing requirement of global market sales. Large-scale investment, decisive and timely decision making by the owner-management and innovative utilization of information technology (IT) infrastructure are their key factors to success.

While Japanese counterparts mostly focused on North American and European markets by the mid-1990s, Korean firms kept their strategic priority in India, Brazil, and China and rapidly deployed their resources to target these growing markets. Japanese firms were less confident of the emerging markets opportunities because of India's volatile political circumstances. In the 2000s, as India were about to take off with their rapid economic growth, Japanese firms were less aggressive with resource constraints from Japanese prolonged domestic recessions. In contrast, Korean firms, immediately after the Asian Financial Crisis, adopted aggressive investment policy directions in India.

However, at the headquarters' level, no global firms had sufficient capital to meet the needs of all the global markets including the emerging economies. Thus, effective investment decisions for market growth in emerging economies require

careful consideration of timing, changing political contexts, and economic policies. Figure 2 shows how Japanese and Korean global firms apply their product strategy from core competence and product architecture perspectives.

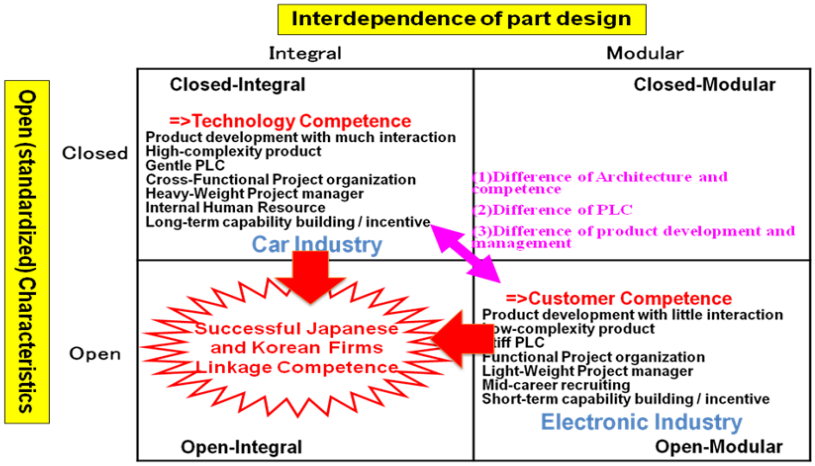

Figure 2. A Model of Successful Japanese Global Firms in Indian Markets

In general, Japanese firms implement an open-integral strategy based on their strong integral architecture development capability and cost-competitive performance of local component parts suppliers. Korean global firms mostly adopt open-modular architecture with their speedy and bold decision making. Their products, based on open-modular architecture, have very short product life cycles (PLC). They are extremely market responsive by applying short PLC (i.e., introduction-growth-maturity-decline). Furthermore, they implement an effective supply chain strategy that combines design differentiation, functional

differentiation by market segments, timely market offerings of new products, and integration of production and marketing.

In the coming years, as more global firms turn their attention to Indian markets, it is all the more interesting to see how successful global firms in India implement integration of their core competences and product architecture.

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