

Navigating the purchasing power gap in new product development in multinational corporations

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Biography:

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Abstract

Multinational corporations (MNCs) face a significant purchasing power gap of customers between developed and emerging economies. In R&D intensive industries making physical products, MNCs can benefit from economies of scale. Therefore, managers strive to achieve a product standardization-adaptation (S-A) balance when navigating the purchasing power gap. Through focusing on five MNCs headquartered in developed countries, I examined how MNCs can achieve such a balance through new product development (NPD). I found that (1) an S-A balance can be achieved through three NPD strategies (product simplification, product retaining, and reverse innovation); (2) managers need to take into account five key factors when choosing NPD strategies (product complexity, product modularity, brand strategy, position in local competition, and internal technical standards); and (3) the NPD strategies can be implemented through structural separation, temporal separation, and a shared value. This research reveals the complexity of achieving an S-A balance when managers navigate the purchasing power gap in NPD. Different NPD strategies have certain advantages and shortcomings. High product complexity and product modularity can serve as favorable conditions for a product simplification strategy. A brand strategy of leading-edge technologies can serve as an adverse condition for a product retaining strategy. Strong local competitors in emerging markets can be a motivation for a reverse innovation strategy, while stringent internal standards for safety can be an adverse condition. This research also reveals

the nuances of implementation of NPD strategies in terms of managing innovation and refinement activities. MNCs may need temporal separation when adopting both downhill and uphill NPD strategies.

Keywords: multinational corporations; new product development; standardization; adaptation; emerging markets.

1. Introduction

Multinational corporations (MNCs) manage products at the global level (Kotabe, 1990; Ohmae, 1989). MNCs from developed countries have increasingly turned to emerging markets for growth (Landau et al., 2016; London and Hart, 2004). However, the purchasing power gap between developed and emerging markets is significant (Govindarajan and Ramamurti, 2011; Ray and Ray, 2011). Many companies encountered setbacks when serving both developed and emerging markets. For example, Apple sells standardized mobile phones (iPhones) globally, but in China, it has suffered from significant sales declines as iPhone models are considered too expensive (Fingas, 2019). More and more Chinese customers have turned to local brands, such as Huawei, offering good value for money (Nellis et al., 2019).

For R&D intensive companies making physical products, such as Apple, in order to handle the purchasing power gap effectively, they need to pursue a balance between global standardization and local adaptation of products (Subramaniam and Hewett, 2004). On the one hand, with high R&D costs, they need to achieve economies of scale through standardization (Shefer and Frenkel, 2005). On the other hand, they need to adapt products to offer low-cost features in emerging markets and high-quality features in developed markets (Ray and Ray, 2011). While many MNCs' managers agree on the importance of a standardization-adaptation (S-A) balance, they are struggling to find the right approaches to achieving such a balance. Dewhurst et al. (2012) interviewed MNCs' managers and found that the efforts for standardization can clash with local needs, which is further complicated by emerging markets.

Research has indicated that new product development (NPD) is the key to achieving an

S-A balance (Gunzenhauser and Bongulielmi, 2008; Muffatto, 1999). However, prior research has offered very limited insights into different NPD strategies for achieving an S-A balance when MNCs are navigating the purchasing power gap. We also know very little about how these NPD strategies can be adopted (i.e. factors for consideration) and implemented (i.e. the mechanisms for implementation). In NPD, MNCs' managers need to make many interrelated decisions, such as objectives of NPD projects, product features, and task assignment for different R&D centers (Clark and Fujimoto, 1991; Montoya-Weiss and Calantone, 1994), which can complicate the adoption and implementation of the NPD strategies.

To advance our understanding in this area, the research question of this study is set as: *How can MNCs (in R&D intensive industries making physical products) achieve an S-A balance (for the purchasing power gap between developed and emerging markets) through NPD strategies?* To be specific, three issues are to be addressed to answer the main research question:

- What are the NPD strategies for MNCs to achieve an S-A balance?
- What are the key factors to consider by managers when choosing NPD strategies?
- What are the mechanisms for implementing the NPD strategies and how are the mechanisms used?

A qualitative, multiple-case study was conducted because the literature cannot provide a feasible answer to the research question (Eisenhardt and Graebner, 2007). Through analyzing the data of five MNCs headquartered in developed countries, I found three NPD strategies, five key factors for choosing NPD strategies, and three implementation mechanisms. More

importantly, I reveal their relationships which show the complexity of balancing standardization and adaptation through NPD strategies in MNCs for the purchasing power gap.

The remainder of the paper is structured as follows. Section 2 reviews the relevant literature and provides a theoretical framework for this study. Section 3 describes the research methods and the research setting. Section 4 presents the findings of the study. Finally, Section 5 discusses theoretical and practical implications, limitations, and future research directions.

2. Theoretical background

2.1. An S-A balance for the purchasing power gap and economies of scale

The strategic choice between global standardization and local adaptation has been regarded as an important element of the product strategy in MNCs (Dow, 2006; Hultman et al., 2009; Prahalad and Doz, 1987; Schmid and Kotulla, 2011). Studies have revealed drivers for product standardization and adaptation. For example, MNCs may face market heterogeneity across countries in terms of customers' tastes and habits, regulations, competition, and purchasing power (Jain, 1989; Katsikeas et al., 2006; Kotler, 1986), which is a driver for adaptation. The benefit of economies of scale (i.e. lower costs) is the driver for standardization (Jain, 1989; Levitt, 1983; Samiee and Roth, 1992; Zou and Cavusgil, 2002). When the two kinds of drivers exist simultaneously, which is the case for many industries and MNCs, an MNC is likely to maintain a balance between standardization and adaptation (i.e. avoiding extremes) to achieve superior performance (Lehrer and Behnam, 2009; Pehrsson, 1995).

This study focuses on the specific context – navigating the purchasing power gap

between developed and emerging economies in some R&D intensive industries – where both kinds of drivers exist simultaneously. In R&D intensive industries making physical products, MNCs can benefit from economies of scale through sharing R&D spending among more products sold (Shefer and Frenkel, 2005). When possible, MNCs will operate in both developed and emerging economies and standardize some components in order to benefit from economies of scale.

However, the purchasing power gap between developed and emerging markets is significant due to different economic conditions in these countries (Govindarajan and Ramamurti, 2011). It is a very challenging dimension of market heterogeneity to navigate by MNCs. Customers' tastes have somewhat converged over the last decades due to more cross-border communication and traveling (Levitt, 1983; Padhi, 2013). Governments have made progress in harmonizing standards and regulations across countries (Kanusky, 1993). However, the purchasing power gap remains significant. For example, as for per capita income, China was only 13% of the U.S. level, while India was only 3% of the U.S. level in 2016, according to World Bank (2019). In general, customers (in terms of individuals or organizations) in emerging markets differ from those in developed countries regarding affordability and acceptability criteria (Immelt et al., 2009; Ray and Ray, 2011). They are willing to compromise product quality for lower costs/prices (Trimble, 2012). MNCs need to provide high-quality products in developed markets in order to be competitive, which cause higher costs/prices. However, products with lower levels of price and quality, without premium features and sophisticated technologies, are needed in emerging markets (Zeschky et al., 2014).

Overall, while there are great potential benefits, we still have limited knowledge regarding how to achieve an S-A balance in this context. Prior studies have revealed the drivers (e.g. the benefit of economies of scale and market heterogeneity) for product standardization and adaptation, and have explained the level of standardization/adaptation as an outcome. However, there are still many unaddressed issues regarding the paths (e.g. NPD strategies) leading to an S-A balance (the research gap shown in Figure 1). In this study, the drivers (i.e. the benefit of economies of scale and market heterogeneity) are taken as control variables in order to examine the paths leading to an S-A balance.

Insert Figure 1 about here

2.2. NPD strategies for an S-A balance and the adoption

Studies show that NPD is crucial for achieving product-related objectives (Clark and Fujimoto, 1991; Montoya-Weiss and Calantone, 1994). Therefore, it is essential to understand how an S-A balance can be achieved through NPD. Prior studies have offered some insights by proposing downhill and uphill NPD strategies (Trimble, 2012; Von Zedtwitz et al., 2015). Adopting these strategies can contribute to achieving an S-A balance when navigating the purchasing power gap. Prior studies have pointed out product simplification as a downhill NPD strategy. Product simplification means that MNCs first develop products for the high-quality requirements in developed markets, and then modify the products for emerging economies by removing some components or premium features (Gadiesh et al., 2007; Trimble, 2012). Prior studies have also revealed reverse innovation as an uphill NPD strategy (Immelt et al., 2009; Zeschky et al., 2014). MNCs first design new products from scratch with low cost in mind for emerging markets, and then modify the products by adding some

(premium) features so that these products can be sold in developed markets. However, while prior studies have acknowledged the possible diversity of NPD strategies for the purchasing power gap, there are still unaddressed issues. For example, are there any other NPD strategies? What factors need to be taken into account when choosing NPD strategies? This study will fill these gaps.

2.3. Implementation of NPD strategies

When implementing NPD strategies, firms need to handle competing tasks, especially for MNCs navigating the purchasing power gap. For example, London and Hart (2004) argued that serving the rich and serving the poor require different capabilities. Also, developing new products and modifying existing products may need different mindsets and capabilities (Andriopoulos and Lewis, 2009). Prior studies provided some insights regarding how to reconcile competing tasks. These studies have pointed out differentiation and integration mechanisms. Differentiation emphasizes the focus on each task through structural separation (conducting different tasks in different locations) or temporal separation (conducting different tasks in different times) (Raisch et al., 2009). Integration stresses interdependence of seemingly competing tasks (Smith and Lewis, 2011). A shared value can be formed for organizational members to embrace competing tasks (Andriopoulos and Lewis, 2009). While these may be useful mechanisms, we still have limited knowledge regarding how these implementation mechanisms may be used when MNCs are navigating the purchasing power gap in NPD. The linkages between NPD strategies and implementation mechanisms are still unclear and needs further investigation.

3. Method

3.1. Multiple-case study approach and case sampling

A qualitative, multiple-case study was conducted to answer the research question through understanding the phenomenon. Although the literature can shed some light on the research question, it cannot identify the specific factors for choosing NPD strategies (for an S-A balance in MNCs), any additional NPD strategies, and how implementation mechanisms are used. Therefore, the case study approach is desirable as key factors/strategies/mechanisms and relationships can be discovered through rich qualitative evidence (Eisenhardt and Graebner, 2007). In this study, I adopted a multiple-case design so as to draw more generalizable conclusions through replication (Yin, 2009).

The five case MNCs were selected based on the theoretical sampling approach (Glaser and Strauss, 1967; Sigelkow, 2007). I selected MNCs which are suitable for addressing the research question and are revealing. The case selection criteria are: The MNCs should operate in both developed and emerging markets, instead of focusing on one kind of markets only; The MNCs should operate in industries making physical products with high R&D intensity so that it can benefit from economies of scale; The MNCs should be both globally integrated and locally responsive in order to achieve an S-A balance. Access to the case MNCs was gained through my personal network. Table 1 describes the case MNCs.

Insert Table 1 about here

3.2. Research setting

In the sample, the case MNCs are developed-country MNCs (DMNCs). Two of the case MNCs are headquartered in the U.S. and three in Europe. According to Gerybadze (2010), these MNCs operated in industries with high R&D intensity: medical equipment, automotive,

power and automation, consumer electronics, and computer accessories. These firms operated globally, including developed markets such as the U.S. and Europe, and emerging markets such as China, India, and Southeast Asia. These MNCs are both globally integrated and locally responsive, and strived to achieve an S-A balance for products.

In general, the case MNCs achieved good performances in both developed markets and emerging markets, though with some variation across MNCs. For MediInc, it achieved an 11% market share in the U.S. and a 30% market share in China for computed tomography (CT) equipment. For PowerInc, it held a 20% market share globally with varied performance in emerging markets (e.g. a 25% market share in Vietnam and a 10% market share in China). For CarInc, it had a 15% market share in the U.S. The market share in emerging markets varied significantly. In China, it was 3%, whereas in Vietnam, it was nearly 10%. ShaverInc had high market shares globally for shavers (e.g. U.S. 26% and China 21%), but not for other product categories. MouseInc held a 28% market share in the U.S. and a 30% market share in China.

3.3. Data collection

I conducted semi-structured interviews with executives, R&D managers, product managers, marketing managers, and engineers in the case MNCs. The snowball sampling approach (Patton, 2002) was adopted when selecting interviewees. The detailed interview protocol is presented in Appendix A. I asked interviewees to answer the questions based on their strategies and operations at the time of interviews. In total, I conducted 22 interviews with 20 interviewees (see Table 2). All interviews were recorded and transcribed for analysis.

Also, I collected secondary data including internal documents from the companies (e.g.

project documents and meeting slides) and published information (e.g. annual reports and product catalogs from company websites and news articles from media companies). Overall, there are 322 useful files. The secondary data served as important information for me to understand the companies' contexts (e.g. products available in different countries, product specifications, organizational structures, corporate strategies, and processes). With a thorough understanding of the contexts, I conducted interviews efficiently (e.g. interviewees did not need to explain terminologies).

Insert Table 2 about here

I cross-checked the responses of interviewees and secondary data whenever possible to arrive at data triangulation, mitigating the bias (Eisenhardt, 1989). To ensure correct interpretation of qualitative data, I conducted member check – writing reports of cases (including what happened in the companies and the research findings) and sending them back to participants for review and feedback (Miles and Huberman, 1994).

3.4. Data analysis

I first conducted a within-case analysis to examine what happened in each case firm. I conducted coding for the data for each case MNC, focusing on data chunks related to the research question (Strauss and Corbin, 1998). Three NPD strategies (such as “product retaining”) were identified as themes. Then I tried to explain why certain NPD strategies were adopted and how they were implemented, using managers' perspectives and pattern-matching (Yin, 2009). Different products were compared for pattern-matching. Some related themes (such as “product complexity” and “structural separation”) were further identified. In the next step, I conducted a cross-case analysis, comparing the firms pair-wise (Eisenhardt, 1989),

again using pattern-matching. I found some differences across firms, such as different NPD strategies. Such differences helped me to confirm key factors that managers need to consider when choosing NPD strategies. The relationships between NPD strategies and implementation mechanisms were also confirmed. Through the cross-case analysis, replication was achieved, so that only findings that could explain all five MNCs were retained, leading to more robust findings. Figure 2 shows the data structure of the findings.

Insert Figure 2 about here

The following tactics were adopted to ensure construct validity, internal validity, external validity, and reliability of the study (Gibbert et al., 2008). To ensure construct validity, a clear chain of evidence was established (as shown in Figure 2), data triangulation was carried out, and member check was conducted (interviewees confirmed my conceptualization) (Yin, 2009). Internal validity was enhanced through pattern-matching (Gibbert et al., 2008), in both within- and cross-case analysis. Regarding external validity, for case study research, external validity should refer to analytic generalization (to theory) instead of statistical generalization (to population) (Siggelkow, 2007; Yin, 2009). This study focused on a certain type of MNCs (as specified in Section 3.1). Through examining five cases in different industries, I generated findings that are likely to be generalizable to other MNCs of this type. Reliability was ensured through using a case study protocol (e.g. the interview protocol in Appendix A) and a case study database (Yin, 2009).

4. Findings

This section presents three NPD strategies adopted by the case MNCs to achieve an S-A balance, five factors for managers to take into account when choosing NPD strategies, and

three implementation mechanisms. Figure 3 summarizes the research findings.

Insert Figure 3 about here

4.1. Three NPD strategies for an S-A balance

Three NPD strategies (as elaborated next) were adopted in case MNCs for an S-A balance. Table 3 shows the adoption of the strategies in each MNC.

Insert Table 3 about here

4.1.1. Product simplification

The first strategy is product simplification (defined in Section 2.2), which is a downhill NPD strategy. MediInc, PowerInc, and CarInc adopted this strategy.

For example, in MediInc, the R&D team first developed high-quality Computed Tomography (CT) equipment, as required by developed markets. After the launch of the new CT equipment globally, the R&D team in emerging markets simplified the product design by removing the research function and moving the control function to the computer workstation. The core functions, such as imaging, remained standardized globally. The simplified versions were sold in emerging markets such as China, India, and Thailand.

Similarly, PowerInc adopted a product simplification strategy. The firm first launched the new high-quality switchgear product globally; then it further designed low-cost versions of this product with cheaper material, such as aluminum-plated instead of silver-plated busbars, and with certain functions removed for emerging markets. Core functions and components, such as the interrupters, were still globally standardized. In CarInc, for a new B-car, the firm removed features such as the voice-control function, entertainment systems,

and side-curtain airbags for emerging markets. The core parts, such as car engines and chassis, were standardized.

4.1.2. Product retaining

The second strategy is product retaining, which is a downhill strategy not sufficiently analyzed in prior studies. Based on the empirical observation, product retaining is defined as: MNCs first develop new products for the high-quality requirement, and when these products are *phased out* in developed markets, they retain (i.e. continue to sell officially) these products with minor upgrades in emerging markets. It is possible that MNCs sell new and old product models simultaneously in developed markets (which is not product retaining according to the definition). A product model must be *old enough* to be phased out in developed markets. Product retaining means that when some product models are too old to sell in developed markets, they are still sold in emerging markets by an MNC.

The benefit of this strategy is that, for the old-generation products, engineering costs have already been paid off. Therefore, products can be sold at lower prices to reach customers in emerging economies. Often, which products to retain depended on the business case analysis. Therefore, the retained products may vary country by country. Standardization and adaptation were balanced because the retained products in emerging markets reused components/features from old-generation products, which contributed to the economies of scale, while adaptation happened as minor upgrades. CarInc, ShaverInc, and MouseInc adopted this strategy.

CarInc retained an old-generation B-car in India, and another old-generation C-car in China, Malaysia, and Thailand. They were originally developed with high-quality criteria for

developed markets. Then they were phased out in developed countries but retained in emerging markets and sold at lower prices. For ShaverInc, in emerging markets such as China and India, the firm retained some two-headed shavers that were originally developed for, but were phased out in, developed markets. They were sold at lower prices with upgrades (regarding colors and user interfaces) over time. Similarly, for MouseInc, the firm retained an old Bluetooth mouse in China and Malaysia, adding the thumb buttons and selling the product at a lower price.

4.1.3. Reverse innovation

The third strategy is reverse innovation (defined in Section 2.2), which is an uphill NPD strategy. Reverse innovation was adopted in MediInc, ShaverInc, and MouseInc.

In MouseInc, a set of new Bluetooth mice were developed by R&D teams in emerging markets (as they are more experienced for reducing costs). These mice were much cheaper than previous products because they were designed from scratch using low-cost materials and parts. Also, the product design methods and technologies were radically changed, leading to a new design comprised of fewer parts. It was the first mouse in MouseInc that had only three plastic parts. The costs and prices were reduced by more than 50% under this strategy, while product simplification and product retaining strategies can often reduce 10-20% of costs and prices only. The Bluetooth mice were also sold in developed countries as value products with some modifications to satisfy local regulations.

In MediInc, a portable ultrasonic device was developed in China due to the significant demand for low-cost products in the rural area. This was a radical change from the conventional bulky equipment. After the product had been launched in China and India, the

firm found the need for this product in developed markets. It was then modified (for minor upgrades) to sell in developed markets. In ShaverInc, low-cost shavers were developed from scratch in China for emerging markets as basic shavers. Cheaper components of plastics, motors, batteries, and control boards were developed. Then these basic shavers were sold in developed markets with adaptations as travel shavers because they were small and light.

Combining the findings above, MNCs' managers have three NPD strategies to choose from. They can choose one or more of them.

Insight 1: MNCs' managers can choose product simplification, product retaining, and/or reverse innovation NPD strategies.

4.2. The key factors for choosing NPD strategies

Though all of the three NPD strategies can potentially contribute to an S-A balance, each strategy has certain advantages and disadvantages. Therefore, MNCs' managers need to take into account some firm-specific and industry-specific factors when choosing NPD strategies. I identified five key factors for consideration.

4.2.1. Product complexity

This study defines product complexity as the number of components and features in a product (Novak and Eppinger, 2001; Swaminathan, 2003). Three case firms – MediInc, PowerInc, and CarInc – had more complex products than those in ShaverInc and MouseInc. For instance, cars are much more complex than mice. According to the R&D managers and internal documents in CarInc, a car has tens of thousands of components and was developed by hundreds of engineers. In contrast, a mouse usually has ten or fewer components, and the R&D team was much smaller (i.e. 5-20 engineers).

Complex products contributed to the adoption of a product simplification strategy in MediInc, PowerInc, and CarInc. Complex products tend to have more functions, features, and components to remove to lower the costs. For example, CarInc adopted product simplification because it could reduce the price of a car by 20% (original price of a B-car at around €14,000) by removing features such as the voice-control function, the entertainment system, and side-curtain airbags. The 20% reduction was appealing to many customers due to the amount of money saved. Similarly, PowerInc managed to remove many features in protection relays, transformers, and meters.

Less complex products like mice tend to have fewer functions, features, and components to remove. Even if the prices (e.g. at €40) can be lowered by 20% through product simplification, such price reduction is less likely to be appealing to customers. Given that there are certain engineering costs incurred by the product simplification strategy, it is less likely to be profitable for firms simplifying less complex products.

Insight 2: MNCs' managers need to take into account product complexity when choosing NPD strategies; a high level of product complexity can be a favorable condition for a product simplification strategy.

4.2.2. Product modularity

Product modularity is defined as the one-to-one mapping from functions to components and the decoupled interfaces (Ulrich, 1995). In the case firms, higher product modularity contributed to the adoption of a product simplification strategy. CarInc presents a good example as it had a relatively high level of modularity. Many components are modularized such as engines, seats, wheels, the entertainment system, and airbags. Such a modular design

made it easier to remove or modify certain features and components for emerging markets without changing other components.

In contrast, MouseInc did not adopt product simplification partly because its mouse products were less modular (i.e. more integral). Most components were designed to be specific for a product for better esthetics and performance. Therefore, for instance, the change of a scrolling wheel would influence other components such as the body and the switch mechanism. It was a better option to design from scratch for different requirements. ShaverInc had a similar situation.

For one product, the level of modularity can vary across sub-systems. For example, in CarInc, the voice-control system and airbags were more modular, while the car body parts (e.g. doors) was more integral. It was more difficult to change less modular sub-systems. Therefore, modular sub-systems can also contribute to product simplification.

Insight 3: MNCs' managers need to take into account product modularity when choosing NPD strategies; a high level of product (or sub-system) modularity can be a favorable condition for a product simplification strategy.

4.2.3. Brand strategy of leading-edge technologies

The cases show that a firm's brand strategy (whether to maintain a brand image of leading-edge technologies) could affect the attractiveness of the product retaining strategy.

In the early 2000s, PowerInc created new switchgear to replace old switchgear. Although the old switchgear was still needed by customers in emerging markets, the firm still phased out the old switchgear globally (including emerging markets) to pursue the leading-edge technology, as the old switchgear could bring an out-dated brand image. The firm also helped

customers to switch to the new switchgear.

In MediInc, the firm's brand strategy had changed in the last decade. It used to retain old-generation products in emerging markets. After the change, the firm believed that the best approach was to design products specifically for emerging markets with brand-new technologies, either through a product simplification strategy or a reverse innovation strategy. The company aimed at building a brand image of "transformational" technologies for patient care. Therefore, product retaining was not adopted.

In contrast, CarInc, ShaverInc, and MouseInc did not emphasize such a brand strategy (i.e. leading-edge technologies). They saw clear benefits of retaining some products in the emerging markets – value for customers and continued revenue of old products. The company aimed to build a brand image of functionality. This contributed to the adoption of a product retaining strategy.

Overall, when MNCs put a great emphasis on maintaining a brand image of leading-edge technologies, a product retaining strategy may not be so attractive as it can bring an old-fashioned brand image. Firms without such an emphasis may find it desirable due to the low-cost benefits.

Insight 4: MNCs' managers need to consider the brand image when choosing NPD strategies; a great emphasis on maintaining a brand image of leading-edge technologies can be an adverse condition for a product retaining strategy.

4.2.4. Position in local competition

The cases show that when emerging markets were dominated by local competitors (that are more capable of low-cost innovation), it could motivate a firm to adopt a reverse

innovation strategy due to higher price pressure.

CarInc, as an automaker, faced lower price pressure from local automakers in emerging markets. In emerging economies, the automotive markets were dominated by MNCs from developed countries and local automakers played a less important role (i.e. accounted for a smaller market share, such as lower than 30% in China). This was due to high failure rates (low reliability) of cars manufactured by local automakers in emerging markets. Therefore, product simplification and product retaining strategies were deemed sufficient for competing with local firms. The company was not motivated to adopt a reverse innovation strategy.

In contrast, MouseInc faced very fierce competition on product prices in emerging markets, as local competitors accounted for a larger market share (e.g. nearly 50% in China). Though the technologies were not superior, local competitors offered products with acceptable quality and reliability at much lower prices. MouseInc was under high price pressure, and thus adopted reverse innovation to design products from scratch to lower costs significantly. The situation was similar for ShaverInc.

Insight 5. MNCs' managers need to consider local competition when choosing NPD strategies; the dominance (i.e. a high level of market share) by local competitors in emerging markets can be a reason for adopting a reverse innovation strategy.

4.2.5. Internal technical standards

MNCs have certain technical standards internally (which can be more stringent than national standards) for product development to ensure product safety and quality. The cases show that demanding technical standards for product safety in firms served as an adverse condition for adopting a reverse innovation strategy, due to design restraints caused by the

standards.

The case MNCs all had certain technical standards for product development, but they were different in content. For example, in PowerInc, product safety was a big challenge. The technical standards emphasized product safety and required numerous tests to ensure it. Such standards restrained the freedom of design (e.g. certain structures could not be used), and thus cost reduction, even if a product would be designed from scratch. Therefore, a reverse innovation strategy was not viable and thus not adopted. This is also true for CarInc, as the internal standards for safety performance, and noise, vibration, and harshness performance prevented a reverse innovation strategy.

In contrast, ShaverInc and MouseInc had technical standards as well, but product safety was not a very significant issue to consider. They focused on satisfying market needs in NPD. Therefore, product costs could be significantly lower through designing from scratch, and so, a reverse innovation strategy was adopted in the two firms to better compete with local firms in emerging markets.

The standards in MediInc varied across product categories. For ultrasound devices, safety was not a major issue, but for nuclear medicine equipment, there were stringent technical standards for safety. This contributed to adoption of different NPD strategies.

Insight 6. MNCs' managers need to take into account the internal technical standards when choosing NPD strategies; stringent internal technical standards for product safety can be an adverse condition for a reverse innovation strategy.

4.3. Implementing NPD strategies through managing different kinds of activities

Implementing the NPD strategies incurred certain challenges. There were different kinds

of NPD activities requiring different resources and capabilities. MNCs effectively managed these activities through three mechanisms.

4.3.1. Different kinds of activities in NPD

The case firms show that each of the three NPD strategies involved different kinds of activities – *innovation* activities (developing new products with new technologies) and *refinement* activities (modifying products based on existing designs without changing core parts) – which needed to be managed in implementation. For product simplification, one type of activity was developing new, high-quality products for developed countries (i.e. innovation). The other type of activity was modifying products for low-cost requirements in emerging markets (i.e. refinement). Similarly, for product retaining, designing new, high-quality products for developed countries was innovation. Minor upgrades of old products for emerging markets were refinement. For reverse innovation, developing new, low-cost products from scratch for emerging markets reflected innovation, while modifying such products for developed countries reflected refinement.

Two kinds of NPD activities posed different requirements on resources and capabilities in case firms. Innovation activities needed engineers who were creative and willing to take risks when designing products. They should be able to experiment with new designs, embrace failures, and learn from failures in projects. They should also be equipped with leading-edge technical knowledge in relevant areas.

In contrast, refinement activities required engineers who were fast learners and were efficient in modifying products based on existing design. Engineers should be able to modify products for certain different requirements at a low cost within a short timeframe. They

should also respect the original design of the products, keeping core parts the same.

4.3.2. Structural separation

For each NPD strategy, case MNCs managed two kinds of NPD activities through structural separation as a mechanism of differentiation. Innovation and refinement activities were conducted in different organizational units (R&D centers) in different locations, which had different resources and capabilities. For example, in PowerInc, when implementing the product simplification strategy, the R&D center in Sweden focused on innovation, developing high-quality products needed in developed countries. Swedish engineers often changed specifications and redefine things in NPD. The R&D center in India focused on refinement, modifying these products for low-cost requirements in emerging markets, but the core parts were unchanged. The two R&D centers developed different resources and capabilities.

For product retaining and reverse innovation, structural separation was adopted as well in case MNCs. For example, when implementing product retaining, MouseInc conducted innovation for new high-quality products in Swiss R&D and conducted refinement (minor upgrades of old products) for emerging markets in Chinese R&D. When implementing reverse innovation, MediInc conducted innovation for low-cost products in Chinese R&D and conducted refinement of these products for developed markets in American R&D.

Insight 7: Each of the NPD strategies (product simplification, product retaining, and reverse innovation) can be implemented by MNCs' managers through structural separation of innovation and refinement activities in NPD.

4.3.3. Temporal separation

For MediInc, ShaverInc, and MouseInc, temporal separation, as a different mechanism

of differentiation, was leveraged to manage two kinds of NPD activities. Temporal separation happened only when certain combinations of NPD strategies were adopted – combinations of downhill and uphill strategies. For example, in MediInc, some engineers in Chinese R&D conducted both refinement for product simplification and innovation for reverse innovation at different times. As innovation and refinement required different resources and capabilities, only some engineers who excelled at both types of activities conducted the temporal separation for the two. For temporal separation, these engineers also needed to be able to shift the mindsets and routines for different projects with different natures. Managers helped such shifts. Similarly, some engineers in American R&D needed to shift the mindsets and routines for innovation for product simplification and refinement for reverse innovation. ShaverInc and MouseInc experienced similar shifts for engineers.

Insight 8: The combination of reverse innovation and product simplification (or product retaining) can be implemented by MNCs' managers through temporal separation of innovation and refinement activities of NPD in the same locations.

4.3.4. A shared value

In all case MNCs, a shared value was established as an integration mechanism for the two types of NPD activities. For example, PowerInc conducted innovation and refinement in different locations (i.e. structural separation) for product simplification. Managers and engineers understood the importance of both innovation and refinement for the organization to be competitive in the global market. They, therefore, embraced the difference between the two in operations and supported each other when necessary. A shared value was created for integration.

With a shared value, R&D centers collaborated with each other globally in PowerInc. When conducting refinement in Indian R&D (removing certain features or functions), Swedish R&D which did innovation provided technical knowledge and support for Indian R&D. This was done through teleconferences and co-location. This helped Indian R&D to understand the product design and technology in order to fulfill its tasks in a better way. Similarly, Indian R&D collaborated with Swedish R&D so that late modifications could be considered early when developing new products in Sweden.

Another example is ShaverInc, where some engineers needed to conduct both kinds of activities in R&D centers (i.e. temporal separation). With a shared value, they understood the need for both kinds of activities for organizational competitiveness. Therefore, they embraced the shifts between the two kinds of activities. Such shifts could be challenging as they needed to change their routines and mindsets of designing products, but they overcame such a challenge due to the shared value.

Insight 9: NPD strategies (product simplification, product retaining, and reverse innovation) can be implemented by MNCs' managers through a shared value for innovation and refinement activities in NPD.

5. Discussion

5.1. Theoretical implications

With a focus on NPD strategies (as paths), this study addresses the issue of achieving an S-A balance when MNCs are navigating the purchasing power gap. Prior studies have revealed factors that influence MNCs' choices between product standardization and adaptation, such as market heterogeneity and the benefit of economies of scale (Katsikeas et

al., 2006; Schmid and Kotulla, 2011). In this study, I found that as these factors/drivers exert competing effects towards standardization/adaptation, MNCs endeavor to achieve a balance between the two when both drivers exist. This study reveals the paths to achieving such a balance, which is an under-researched topic. While market heterogeneity and the benefit of economies of scale revealed in prior studies can explain an S-A balance, they cannot explain the adoption of a certain NPD strategy. The five key factors I revealed can explain and thus advance our understanding of this topic.

Prior studies have analyzed downhill (mainly product simplification) and uphill (reverse innovation) NPD strategies (Govindarajan and Trimble, 2012; Trimble, 2012), which are confirmed in this study. However, I found an additional downhill (product retaining) strategy not sufficiently analyzed previously, and the key factors to take into account by managers. Therefore, this study shows multiple options for managers when navigating the purchasing power gap and the advantages and shortcomings of each option.

By exploring how NPD strategies are implemented in MNCs, this study reveals mechanisms of managing different kinds of NPD activities. The findings contradict some of the prior findings. For example, Chai et al. (2012) argued for NPD team continuity – the same team members developing the original products will be responsible for modifying products. This study reveals an alternative approach. Developing the original products and modifying products can be done by different teams in different locations (i.e. structural separation). However, a shared value (i.e. integration) must be in place to make sure teams support each other in every stage of product development. This approach offers advantages such as specialized resources, capabilities, and knowledge for different kinds of NPD activities.

As for another insight, while previous studies have noted the possibilities of using both structural separation and temporal separation simultaneously (i.e. a hybrid approach) (Andriopoulos and Lewis, 2009), this study advances our understanding of the interactions between the two when using a hybrid approach. For example, in MediInc, for most of the times, American engineers did innovation and Chinese engineers did refinement. This was the structural separation. However, for one project (for reverse innovation), Chinese engineers switched to innovation, and American engineers then switched to refinement. The switches reflected temporal separation. Through a coordinated manner, temporal separation influenced the operation of structural separation (in terms of which R&D center did which task).

5.2. Practical implications

This study has some practical implications (as shown below) for MNCs' managers navigating the purchasing power gap between developed and emerging markets.

- **Multiple options of NPD strategies:** Managers need to realize the importance of achieving an S-A balance for products, even if with outstanding product quality and brand equity. While NPD is a critical task for achieving such a balance, managers need to be aware of multiple options of NPD strategies – product simplification, product retaining, and reverse innovation. Sometimes, managers stick to one strategy without sufficient evaluation of others, which may cause missed opportunities to achieve a better balance. Due to the dynamic changes in the environment and the firm, these options need to be continuously evaluated to spot opportunities. More than one strategy can be adopted when suitable.
- **Factors for choosing NPD strategies:** When evaluating the suitability of the three

NPD strategies, managers need to take into account a number of factors. Among them are the five key factors shown in this study (product complexity, product modularity, brand image, position in local competition, and internal technical standards). While these factors can be used to evaluate the general suitability of the NPD strategies, managers also need to consider local market demand (in a specific emerging market) when choosing products to implement an NPD strategy. For example, product A may be simplified for country X (as country X does not need product B), while product B may be simplified for country Y (as country Y does not need product A).

- **Implementation mechanisms:** For the three implementation mechanisms I discovered, managers should use them to manage innovation and refinement activities when implementing the NPD strategies. Structural separation and a shared value should always be used, while temporal separation should be used only when managers adopt both downhill and uphill NPD strategies.

5.3. Limitations and future research

This study has some limitations which can be addressed in future research. Firstly, this study examined DMNCs which are characterized as high technological capability (Govindarajan and Ramamurti, 2011). With high technological capability, DMNCs are able to adopt the NPD strategies (revealed in this study) for an S-A balance. However, for many emerging-market MNCs (EMNCs) such as ones headquartered in China and India, they tend to have low technological capability (De Beule et al., 2014; Luo and Tung, 2007), and thus their products may not be accepted by developed markets. Therefore, for EMNCs,

technological capability can be an important factor for achieving an S-A balance for the purchasing power gap. Future research can explore how EMNCs can achieve such an S-A balance and the role of technological capability. Specifically, EMNCs tend to adopt a 'springboard' approach in international expansion for capability upgrading (De Beule et al., 2014; Kothari et al., 2013; Luo and Tung, 2007). It will be meaningful to examine in the future how EMNCs' capability upgrading can affect the adoption and implementation of NPD strategies for an S-A balance for the purchasing power gap. Also, this study investigated western DMNCs. Future research can compare Asian (e.g. Japanese) MNCs and western MNCs to see if cultural features can affect the choice of NPD strategies.

In addition, this study focuses on MNCs making physical products (hardware specifically), as premium features and sophisticated technologies can affect the costs/prices (Trimble, 2012). Software products and services are not covered in this study. For software products, the literature suggests that MNCs pursue an S-A balance for the purchasing power gap as well (Hill, 2012). Different software products at different price points are needed in developed and emerging markets. Therefore, the findings of this study may also apply to software products, but it needs to be examined in future research. Future research can also investigate whether software products need special strategies or tactics. For services, they often need to be highly customized for different countries or customers, so the findings of this study may not apply to services. However, in the future, it is worthwhile to study how MNCs navigate the purchasing power gap for highly customized services.

Appendix A. Interview protocol

A.1. Market requirements and product standardization-adaptation

- Are developed and emerging markets different in market requirements? If yes, how?
- What is your position between global standardization and local adaptation of products?

A.2. NPD strategies

- How do you handle the purchasing power gaps in NPD?
- Do you differentiate product designs between developed and emerging markets? If yes, how?
- What are the challenges to satisfy low-cost requirements in emerging markets? How to handle them?

A.3. Factors for choosing NPD strategies

- Why do you pursue product simplification/product retaining/reverse innovation?
- Is product simplification/product retaining/reverse innovation feasible or desirable for your company? Why?
- What are prerequisites for product simplification/product retaining/reverse innovation?

A.4. Implementation of NPD strategies

- How do you organize NPD activities for product simplification/product retaining/reverse innovation?
- Who is responsible for developing new products and who is responsible for modifying products for different requirements? How are tasks coordinated/managed?
- What are the challenges of developing new products and modifying products respectively? How to handle these challenges?

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Table 1 Description of case companies

Case companies	Location of headquarters	Industrial sector	Product category^a	Revenue^b	R&D costs /sales ratio^c
MediInc	North America	Medical equipment	Imaging products	14 billion	7.1%
PowerInc	Europe	Power and automation	Power products	25 billion	4.6%
CarInc	North America	Automotive	Small and medium passenger car	102 billion	5.1%
ShaverInc	Europe	Consumer electronics	Shaver	5 billion	5.6%
MouseInc	Europe	Computer accessories	Mouse	2 billion	6.5%

^a The main product category explored in this study

^b The total revenue of the relevant business in 2014, converted to Euro by the annual average exchange rate

^c Based on the data in 2014 of (the R&D spending and the revenue of) the relevant business

Table 2 The list of interviews

Interviewee no.	Company	Position	Interview duration (min)
1	MediInc	Product manager	42
2	MediInc	R&D manager	29
3	MediInc	Executive	33 31
4	MediInc	Executive	38
5	PowerInc	Product manager	46
6	PowerInc	Product manager	101
7	PowerInc	R&D manager	58
8	PowerInc	R&D manager	80
9	PowerInc	Executive	58
10	CarInc	R&D manager	165
11	CarInc	R&D manager	78 113
12	CarInc	Marketing manager	48
13	CarInc	Engineer	35
14	CarInc	Executive	29
15	ShaverInc	Marketing manager	56
16	ShaverInc	R&D manager	52
17	ShaverInc	Engineer	44
18	MouseInc	Product manager	81
19	MouseInc	R&D manager	43
20	MouseInc	Engineer	52

Table 3 NPD strategies in case companies

Case companies	Product simplification	Product retaining	Reverse innovation
MediInc	Medical equipment was developed mainly based on requirements of developed markets. Then simpler versions were developed for emerging markets. Certain functions (e.g. research) were removed for lower costs.	Not adopted.	A portable ultrasound device was invented. It was different from conventional devices as it was based on a laptop. The cost was reduced significantly. It was later sold in developed markets as well, as it was convenient to use in certain circumstances.
PowerInc	Switchgear products were developed initially for the high-quality requirement in developed markets. Later, simpler versions (with cheaper material and parts, and fewer functions) were developed for the low-cost requirement in emerging markets.	Not adopted.	Not adopted.
CarInc	For the B-car segment, cars were developed with high quality for developed markets. Then simplified versions were designed to lower the cost in emerging markets. Features such as a voice-control system and side-curtain airbags were removed.	For B-car and C-car segments, cars were developed with high quality. After the cars were phased out in developed markets, they were still sold in emerging markets, but at lower prices. The designs of old-generation cars were slightly modified or upgraded.	Not adopted.
ShaverInc	Not adopted.	Some high-quality shavers were still sold (at lower prices) in emerging markets after they were phased out in developed markets. Minor modifications (e.g. styling upgrades) were done.	Significantly cheaper shavers were developed in emerging markets. They were designed from scratch to reduce costs to a larger extent. As they were small and functional, they were sold as travel shavers in developed markets after minor modifications.
MouseInc	Not adopted.	After phased out in developed markets, some mice were still sold in emerging markets, but prices were lowered. They were upgraded by adding thumb buttons.	Through radical innovation of product designs (e.g. smaller memory and fewer parts), the cost was much lower. After modifications, products were sold in developed markets as value products.

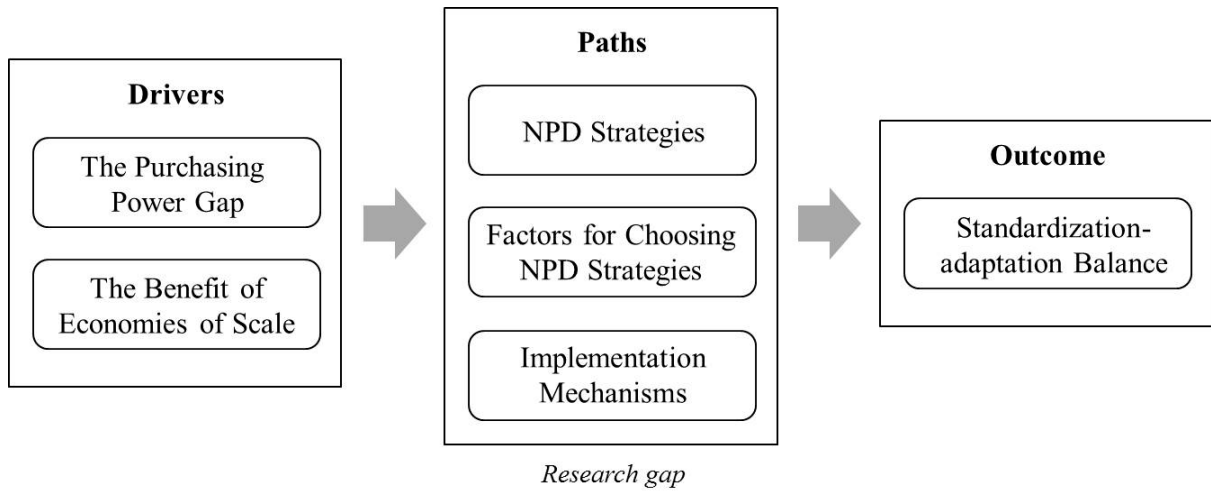


Figure 1 An S-A balance: A theoretical framework

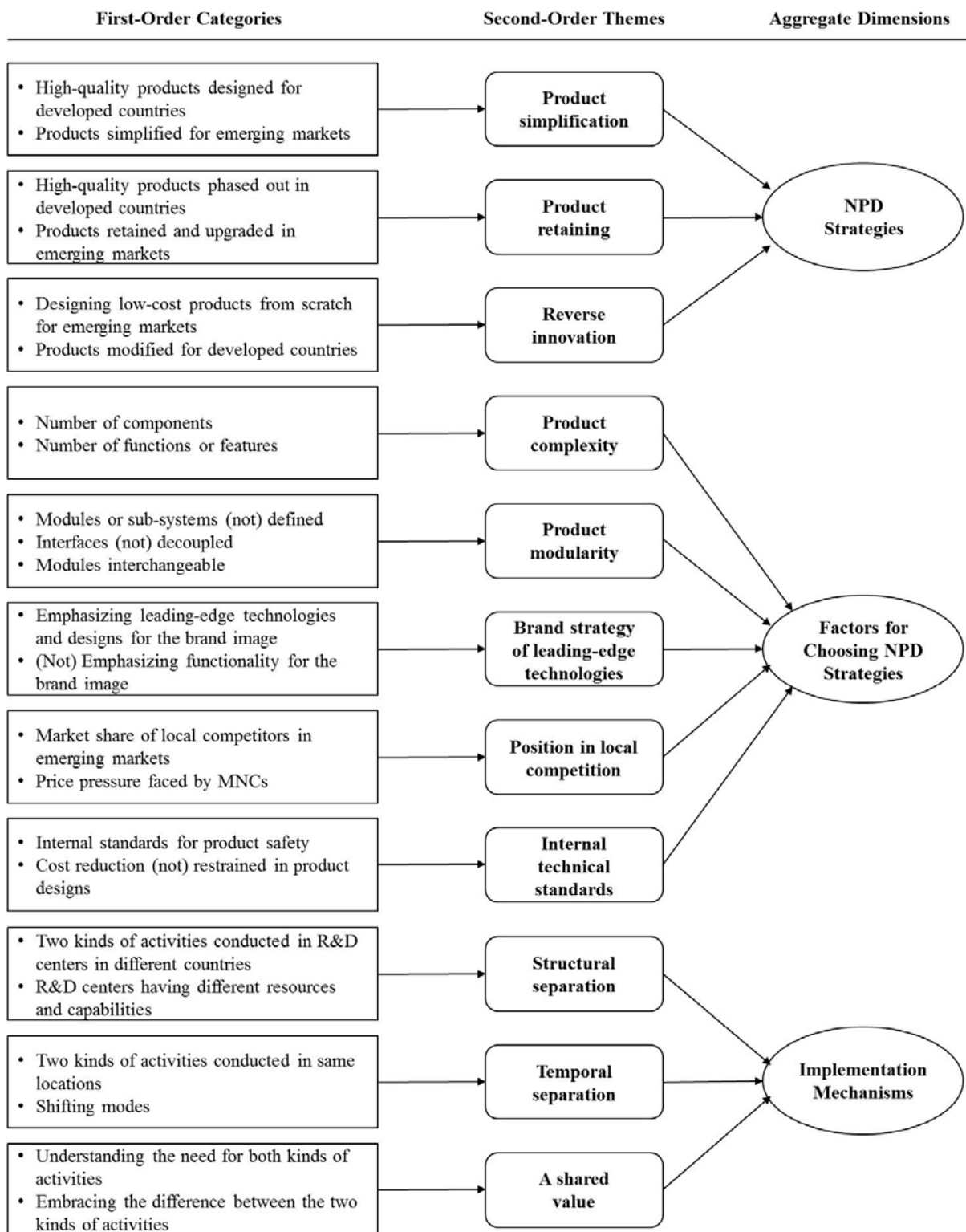


Figure 2 Data structure

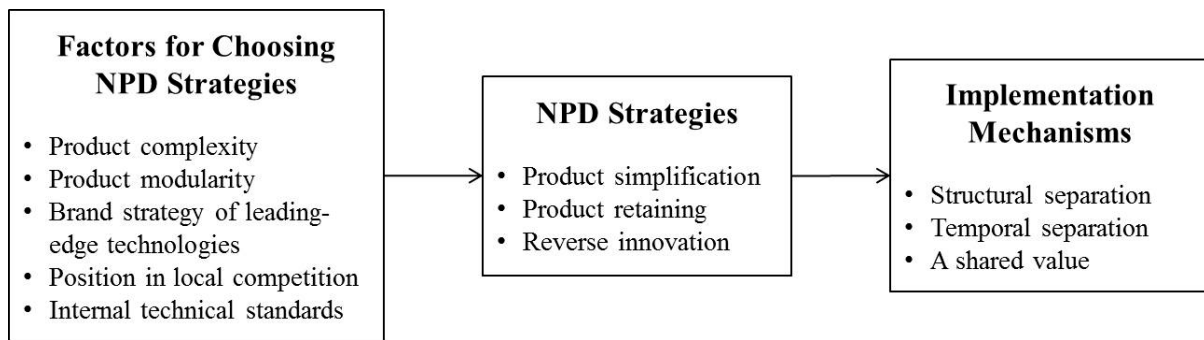


Figure 3 Achieving an S-A balance when navigating the purchasing power gap in NPD