

Marco B. Zeschky, Stephan Winterhalter, and Oliver Gassmann (2014)

## **From Cost to Frugal And Reverse Innovation:**

### **Mapping the Field and Implications for Global Competitiveness**

The final version of this manuscript will be published in the *Research-Technology Management (RTM)*, 57 (4), in press. DOI: 10.5437/08956308X5704235

The final publication is available at

[http://www.iriweb.org/imis15\\_dev/Main/Library/RTM\\_Journal/Public\\_Site/Navigation/Publications/Research-Technology\\_Management/index.aspx](http://www.iriweb.org/imis15_dev/Main/Library/RTM_Journal/Public_Site/Navigation/Publications/Research-Technology_Management/index.aspx)

Please note that differences between this manuscript and the final publication may exist. In case of questions, please contact the corresponding author, Stephan Winterhalter (stephan.winterhalter@unisg.ch).

# From Cost to Frugal And Reverse Innovation:

## Mapping the Field and Implications for Global Competitiveness

*Marco B. Zeschky, Stephan Winterhalter, and Oliver Gassmann*

**Abstract:** *Product and service innovations aimed at resource-constrained customers in emerging markets have recently attracted much research and management attention. Despite the prominence of this topic, however, there are some misconceptions around the different innovation types in this domain that may limit managers' ability to derive informed implications for strategy and operations. This article analyzes the different types of resource-constrained innovation—cost, good-enough, frugal, and reverse innovation—conceptualizes the distinctions between them, and discusses the implications for strategy providing a framework for managers to systematically analyze their own approaches to resource-constrained innovation and craft proper development processes. By highlighting the differences between the various types of resource-constrained innovation, this article also provides the conceptual grounds for further systematic research.*

**Keywords:** Cost innovation; Frugal innovation; Reverse innovation; Resource-constrained innovation; Emerging markets

### Introduction

The economic rise of emerging markets, especially in China and India, has created a new market segment, variously referred to as the middle market (Govindarajan 2012), the low-income market (Hart and Christensen 2002; Sanchez and Ricart 2010), and sometimes the good-enough market (Gadiesh, Leung, and Vestring 2007). The fierce competition among firms fighting for the middle-class consumers emerging in these areas has made this market segment the “next global battleground” (Gadiesh, Leung, and Vestring 2007, 82). However, despite increasing incomes, emerging middle-class consumers still have little excess income compared to Western consumers and often suffer from additional constraints, such as poor public and private infrastructure or poor service availability. As a result, firms have started to develop market-specific solutions that are characterized by high value and low costs.

These solutions, which have attracted much attention from both managers and researchers, have been captured under the terms cost innovation (Williamson 2010), good-enough innovation (Gadiesh, Leung, and Vestring 2007; Hang, Cheng, and Subramanian 2010), frugal innovation (Zeschky, Widenmayer, and Gassmann 2011; Economist 2010), resource-constraint innovation (Ray and Ray 2010), trickle-up

innovation (Reena 2009), and reverse innovation (Immelt, Govindarajan, and Trimble 2009; Trimble 2012; Govindarajan 2012). The innovation types described by these terms are structurally different from each other with respect to their original motivation, value proposition, and value creation mechanisms. For example, while some solutions may emerge from the redesign of an existing product to make it drastically cheaper, others may be entirely new and create new markets, as well.

However, researchers and practitioners alike often use these terms interchangeably, obscuring the important strategic implications of the differences among them. In fact, based on a survey of the literature and a series of case studies, we argue that there are three distinct types of resource-constrained innovation for emerging markets: cost, good-enough, and frugal innovation. These three types differ from each other with respect to their technology and market novelty and therefore significantly affect how firms approach, develop, and position solutions. Therefore, a sound conceptualization of the different innovation types is essential for management practice and research to move forward in a systematic and fruitful manner.

## **Methodology**

We started this study by analyzing extant literature on innovation for resource-constrained consumers in emerging markets. Our initial aim was to understand the commonalities and differences between the most frequently used terms—cost, good-enough, frugal, and reverse innovation. We then began to construct a database of cases of resource-constrained innovations; the database now includes 85 cases collected between 2009 and 2013; while some cases were based on data gathered through personal interviews, some relied on extensive secondary data analysis.

While all of the cases in our database were characterized by drastically lower prices or operating costs compared to Western products, we employed the Ansoff matrix (Ansoff 1965) as an analytical framework to classify the cases. In the Ansoff matrix, innovations are distinguished according to their technical and market novelty; the matrix thus classifies innovations by whether they are market extensions based on existing technologies, original product development activities for existing markets, or newly developed products for entirely new markets.

For this article, we have selected 13 cases that are most illustrative to substantiate our conceptualization. Four of these cases rely on interviews with managers (including two cases representing good-enough innovations and two representing frugal innovations). For the other nine cases (seven cost innovations, one good-enough, and one frugal innovation), we used data gathered from well-respected resources.

## Findings

Our final definitions of the three types of resource-constrained innovation emerged from an iterative process of analysis of the cases we had collected, using the Ansoff matrix to categorize the various examples. Ultimately, we defined solutions or products that scored low on both the market and technical novelty dimensions as cost innovations, those that scored low to medium on both dimensions as good-enough innovations, and those that scored medium to high on both dimensions as frugal innovations (Table 1). During our analysis, it became clear that reverse innovation was not congruent with the other types of resource-constrained innovation. Rather, reverse innovation cut across the other categories; reverse innovations were always built on cost, good-enough, or frugal innovations (Figure 1). About half of all the cost, good-enough, and frugal innovations we analyzed were ultimately transferred to developed markets, becoming reverse innovations.

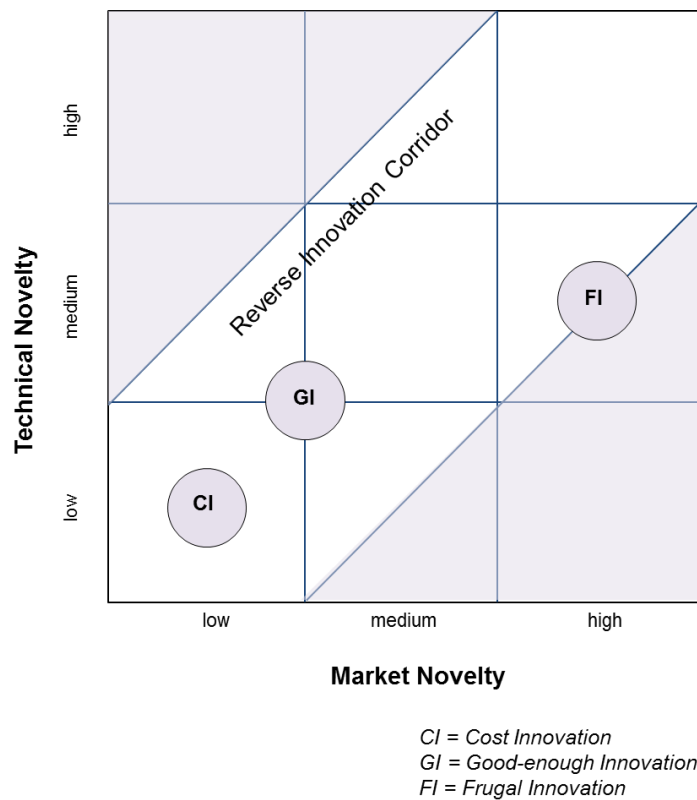


Figure 1. – The resource-constrained innovation matrix.

Table 1.—Overview of case studies analyzed

<b>Industry</b>	<b>Cost Innovation</b>	<b>Good-enough Innovation</b>	<b>Frugal Innovation</b>	<b>Total</b>
Automotive & transportation	4 (2)	4 (2)	0	8 (4)
Chemicals	1 (1)	1	2	4 (1)
Energy and infrastructure	2 (2)	3 (1)	4	9 (3)
Financial services	0	1	2	3
Food, health, & hygiene	5 (1)	4 (1)	0	9 (2)
Household	2 (2)	4 (2)	0	6 (4)
Information & communication	4 (1)	3 (2)	2 (1)	9 (4)
Medtech	3 (1)	11 (8)	8 (3)	22 (12)
Tools & machinery	3 (1)	10 (9)	1	14 (10)
<b>Total</b>	<b>25 (11)</b>	<b>41 (25)</b>	<b>19 (4)</b>	<b>85 (40)</b>

*Numbers in parentheses represent reverse innovations*

*Cost Innovation: Same Functionality at a Lower Cost*

Cost innovations are solutions that offer similar functionalities to Western products at lower costs for resource-constrained customers. Cost innovation is not a novel concept. There are numerous cases in which low-cost competitors have turned an expensive good into a commodity by drastically reducing costs. For example, by developing a method to produce rechargeable lithium-ion batteries at ambient temperature and humidity (all Western competitors used expensive “dry rooms” for production), the Chinese company BYD was able to reduce the production costs of lithium-ion batteries by 70 percent, to the point where they could be priced at a point that matched lower-performing nickel-cadmium batteries (Williamson 2010). Another Chinese firm, Huawei, is able to sell top-notch smartphones at about 20 percent of the cost of Western competitors. In 2009, the Chinese company even beat Ericsson on its Swedish home turf in a tender for a 4G mobile network deal, by offering the same functionality and quality of the Swedish company at a much lower cost (Ward 2009).

The purest form of cost innovation can be found in consumables, for which the cost of a product can be reduced simply by reducing its size until it fits into the “affordability zone” for resource-constrained consumers. The Indian firm Godrej sells its established soaps Cinthol and Fair Glow to the rural Indian market in packs of only 50 grams (Kaur 2013). Similarly, Hindustan Unilever (HUL) re-launched its Rin Shakti detergent powder in 2004 in pack sizes between 2 kilograms and 25 grams to make it affordable for every customer segment (Ghosh 2004).

Cost innovations are triggered by the economic realities of emerging markets. To respond to these realities, firms often exploit local cost advantages that help improve R&D and production processes, which ultimately result in cost innovations. For example, China's lower wages allowed ZPMC, a Chinese harbor crane manufacturer, to hire up to 40 times more engineers than its German counterparts for the same cost. This enabled ZPMC to offer a very high level of customization in its products while keeping costs at a mass-market level (Williamson and Zeng 2009).

The revival of cost innovation has largely been sparked by emerging market firms based in China and India. These firms have achieved huge cost reductions through process innovations largely grounded in cost advantages enabled by low labor costs, local sourcing, standardized components, and cost-effective raw material sourcing, as well as scale and efficiency (Williamson 2010). But they have built on these cost reductions with innovative and disruptive business models (Williamson and Zeng 2009).

Despite their low technical and market novelty, cost innovations can expand a company's market by tapping potential customers who are resource-constrained primarily in terms of capital, making them first-time customers (Prahalad 2010). However, the appeal of cost innovations is not necessarily limited to emerging-market customers. They can also attract more affluent customers seeking a bargain or expand the market for what had once been a niche or specialty product. Haier, for instance, created a consumer market for wine refrigerators, which had until then been designed primarily for restaurants and wine connoisseurs, redesigning the products for home use and reducing prices (Williamson 2010).

#### *Good-Enough Innovations: Tailored Functionality at a Lower Cost*

Good-enough innovations are solutions that include functionalities and features designed to meet a range of resource constraints beyond capital constraints. Like cost innovations, good-enough innovations achieve low price points by taking advantage of local cost advantages combined with better local sourcing conditions. However, in addition to cost innovations, good-enough innovations are adapted or re-engineered to fit the specific use requirements of the low-income market. For example, the Swiss laboratory equipment manufacturer Mettler Toledo developed a basic, good-enough weighing scale for the Chinese market that achieved cost reductions both through low-cost manufacturing and materials, but also by incorporating a more basic minimum feature set than Mettler's Western products (Zeschky, Widenmayer, and Gassmann 2011). This basic weighing scale has now become a sought-after product for customers in many markets seeking basic functionality at a low cost. Logitech has developed several good-enough products for emerging markets. The wireless computer mouse M215 offers simple core functions and user friendliness in a product that incorporates cheaper materials for noncritical parts and drastically reduced packaging to cut costs (Zeschky, Widenmayer, and Gassmann 2011). Similarly, Saurer Volkmann, a global manufacturer

of twisting machines entered the emerging middle market in 2004 with a twisting machine called Focus that offered fewer features, tailored to emerging-market needs, as well as low energy consumption—a crucial benefit for customers needing to keep operational costs low (Ryans 2005a, 2005b, 2009).

The practical challenge of developing good-enough innovations lies in identifying and customizing value-adding functions while eliminating those that do not deliver value for the target customer—all at very low cost. Successful good-enough innovation usually requires some degree of product novelty, which often emerges from the concentration on core features, increased robustness, high ease of use, and manual rather than automated processing. While Logitech’s good-enough mouse is a low-cost product, it uses the same state-of-the-art transmission and laser sensors used in the company’s high-end products. Logitech incorporated these features because the mouse is frequently used as a remote control for the computer (which is often used as a television) and therefore needs to work properly on a wide variety of surfaces. Because of the higher transmission power required to perform this function, the shielding of the mouse was improved to avoid interference with the remote controls of other people in highly crowded urban areas (Govindarajan and Trimble 2012). Traditionally, good-enough innovations have been the domain of emerging-market firms that address price-sensitive customers (Gadiesh, Leung, and Vestring 2007). However, as our examples show, Western firms have begun to develop good-enough products to meet the specific customer needs of these growing markets.

#### *Frugal Innovation: New Functionality at a Lower Cost*

The term “frugal innovation” has been used to denote innovations specifically developed for resource-constrained customers in emerging markets (Zeschky, Widenmayer, and Gassmann 2011; Sehgal, Deehoff, and Paneer 2010; Sharma and Iyer 2012). Other terms for frugal innovation are Ghandian innovation (Prahalad and Mashelkar 2010) or jugaad (Sharma and Iyer 2012; Cappelli et al. 2010; Petrick and Juntiwasarakij 2011), terms that emphasize the specific Indian context in which such innovations have often been created. In contrast to good-enough innovations, frugal innovations are not re-engineered solutions but originally developed products or services for very specific applications in resource-constrained environments. Frugal innovations based on new product architectures are often quite disruptive; for example, by making a stationary product portable, a frugal innovation may reach an entirely new customer group.

A case in point is the mobile phone-based microfinance service M-Pesa, a joint venture of Kenyan Safaricom and UK-based Vodafone, which uses existing mobile phone technology and infrastructure to reach people who previously had no access to banking (Graham 2010). The mobile money transfer service allows users to transfer funds via short message service (SMS) without a bank account. This technologically

simple solution has revolutionized the flow of cash for an entire region by enabling financial transactions for people who have no bank account, and it has increased personal safety by reducing the need for people to carry cash (Graham 2010). The Dutch firm Qiagen offers another example of frugal innovation with its careHPV device, designed specifically for the detection of HPV (human papillomavirus) in rural environments. The careHPV includes an easy-to-use interface, a simple color-coded system for indicating test results, high robustness for rough use conditions, and portability, a feature previously unavailable for this kind of system. The system tolerates changes in the temperature of blood samples, which is important as refrigeration is often not available in remote rural areas, and is so simple to use that non-medical staff can be trained to use it in just a few hours. As an interview partner at Qiagen told us, “The device is so intuitively easy to operate that we can deploy it in any market in the world.”

Another prominent example of frugal innovation is GE’s portable ultrasound device, Logiq Book, developed for use in rural areas in China (Govindarajan and Ramamurti 2011). This notebook computer–based product has significantly fewer features than traditional ultrasound machines; however, it offers other benefits important for its rural target markets. On top of a price reduction of almost 80 percent over traditional ultrasound machines, the Logiq Book is much smaller and lighter and offers only core functions; its portability means that rural patients do not have to travel to far-away cities for diagnosis and treatment (Immelt, Govindarajan, and Trimble 2009).

Overall, in contrast to cost and good-enough innovations, frugal innovations are fairly novel from both the technology and market perspectives. Although existing technologies are employed in most cases, frugal innovations are typically built on new product architectures that enable entirely new applications at much lower price points than existing solutions.

### *Reverse Innovation: Selling Low-Cost Innovations from Emerging Markets Elsewhere*

In contrast to cost, good-enough, and frugal innovation, reverse innovation refers to a market rather than a product concept. In the past, the flow of innovation has predominantly been from developed to emerging markets (Vernon 1966). But as developed market customers have been attracted to cost, good-enough and frugal innovations often developed for emerging markets, this dominant paradigm has been at least partly overthrown. More and more, companies are redeploying their resource-constrained innovations to Western markets, to attract cost-minded customers or to fill gaps in these large, developed markets.

GE’s Logiq Book portable ultrasound device is a popular showcase of reverse innovation. Since its market introduction in China in 2002, an advanced version of the frugal product has been developed and sold worldwide, including Europe and the United States. The device’s value proposition—drastically lower costs and portability—has led to the development of new applications in the West. Today, the device is used at



doctors' offices and in operating rooms that are too small for stationary machines, or deployed in ambulance vehicles to be used at the site of an accident (Immelt, Govindarajan, and Trimble 2009; Govindarajan and Ramamurti 2011). Logitech's M215 wireless mouse is now sold worldwide (Trimble 2012; Govindarajan and Trimble 2012) as is Mettler Toledo's basic weighing scale (Zeschky, Widenmayer, and Gassmann 2011). Cost innovations have been particularly successful in finding their way to developed markets. For example, ZPMC has become the largest player in the global market for harbor cranes, selling their products in developed markets as well as developing economies. In addition to the crane business, ZPMC has begun to leverage its cost innovation capabilities to move into other areas, such as bridge construction. As one of their first projects in this field, they directly won a tender in the U.S. to construct the new San Francisco Bay Bridge (Barboza 2011).

Govindarajan and Ramamurti (2011) have defined reverse innovation as innovations that are first adopted in emerging markets before being adopted in rich countries. Without exception, all of the reverse innovation examples we analyzed were either cost, good-enough, or frugal innovations. Therefore, we conclude that reverse innovations are cost, good-enough, or frugal innovations that find a market among customers outside of the emerging markets at which they were originally targeted.

## **Discussion**

Our analysis has shown that cost, good-enough, and frugal innovation are distinct concepts with clear differences in technology and market novelty and in other key traits of the products (Table 2): Cost innovations are low-cost alternatives to Western products, with cost reductions realized through process innovations and cost advantages in emerging markets. Good-enough innovations are also cost innovations, but in addition, the products are tailored to the resource-constrained market, with non-value-adding functions eliminated and specific value-adding functions designed to meet the specific requirements of resource-constrained customers. Frugal innovations build on good-enough innovations but feature new applications developed specifically for resource-constrained environments, generating an entirely new value proposition. Finally, reverse innovations are cost, good-enough, or frugal innovations that are transferred from the emerging-market environment to developed-country markets. Reverse innovation, as a market innovation rather than a product innovation, may be based on any one of these innovation types.

The different natures of cost, good-enough, and frugal innovation suggest that each will require a different set of technological and organizational capabilities (Zeschky, Widenmayer, and Gassmann 2014). As cost-innovation products are usually made up of readily available components, the key success factor for these innovations is process capabilities such as managing production facilities in low-cost regions. The example

of BYD highlights this: lithium-ion batteries are not new, but BYD's innovative production capabilities have paved the way for market success.

Good-enough innovation, with its increased novelty in product and market dimensions, requires additional technological and customer know-how. For example, to create a low-cost mouse that would meet customer needs, Logitech had to go beyond simply cutting costs; developing a successful product required an in-depth knowledge of customer behavior and the use environment—and the technological know-how to meet customer demands at an acceptable price. The Mettler Toledo example also illustrates this: It took the firm thirteen years to develop the in-depth customer insights necessary to develop the basic weighing scale tailored to the needs of customers with basic requirements at affordable cost. The process required not only the establishment of an extensive sales and marketing network in China, but also the creation of a local R&D unit dedicated to the development of affordable products.

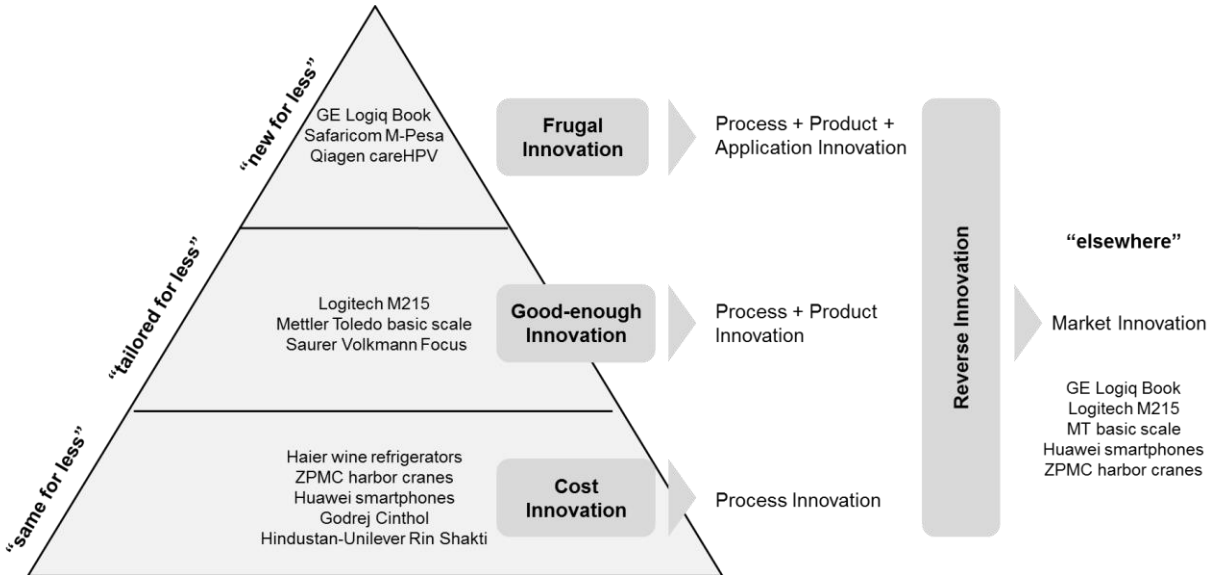
From a capability perspective, frugal innovation is even more challenging than good-enough innovation. Often, first-time customers in underserved areas are at the center of these innovation efforts, requiring that firms learn to develop new products defined by entirely new parameters. As one of our interview partners at GE told us, in reference to GE's portable ultrasound device, "Building up the engineering capability is relatively easy, but we are still learning to build up a marketing and product management capability. This takes a lot more time and it is a more challenging task than the technical." When developing the Logiq Book, GE addressed this challenge by creating a local team to learn about rural customers and their use requirements. Only after the product requirements were defined could the team draw on GE's internal resources to develop a prototype. GE also set up a designated sales team focused on the device's customer group—rural hospitals in China.

## Resource-Constrained Innovation

	<i>Cost Innovation (CI)</i>	<i>Good-enough Innovation (GI)</i>	<i>Frugal Innovation (FI)</i>	<i>Reverse Innovation (RI)</i>	
<i>Examples</i>	BYD—batteries Huawei—phones and infrastructure Nokia—cell phones ZPMC—cranes Haier—wine coolers Godrej—soap HUL—detergent	MT—weighing scale Logitech—M215 Saurer—Focus	GE—Logiq Book Qiagen—careHPV Safaricom—M-Pesa	Logitech—M215 MT—Weighing scale Saurer—Focus GE—Logiq Book	
<i>Novelty of Solution</i>	Technical: low Market: low	Technical: low–med Market: low–med	Technical: med–high Market: med–high	Technical: low–med Market: low–high	
<b>PRODUCT PERSPECTIVE</b>	<i>Description</i>	Cost-engineered emerging market solution	Value-engineered emerging market solution	Application-engineered emerging market solution	Cost-, value-, or application-engineered global market solution
	<i>Typical Traits</i>	<ul style="list-style-type: none"> <li>• Cost-effective raw materials</li> <li>• Local sourcing</li> <li>• Local production</li> <li>• Standard components, commodities</li> <li>• Smaller package sizes</li> </ul>	<ul style="list-style-type: none"> <li>• Cost-effective raw materials</li> <li>• Local sourcing</li> <li>• Local production</li> <li>• Standard components, commodities</li> <li>• Limitation to core features</li> <li>• Less automation</li> <li>• High robustness</li> <li>• High ease of use</li> </ul>	<ul style="list-style-type: none"> <li>• Cost-effective raw materials</li> <li>• Local sourcing</li> <li>• Local production</li> <li>• Standard components, commodities</li> <li>• Reduction of size</li> <li>• New applications (e.g., portability)</li> <li>• Tailored for environments with poor infrastructures</li> </ul>	Cost, good-enough, or frugal innovation characteristics

<b>FIRM PERSPECTIVE</b>	<i>Innovation Strategy</i>	Cost cutting <i>Cheaper, existing solution</i>	CI + feature optimization <i>Cheaper, specialized existing solution</i>	GI + application innovation <i>Cheap, specialized new solution</i>	CI, GI, or FI + global rollout <i>Cheap, good-enough or frugal solution for Western markets</i>
	<i>Target Customer</i>	Initially: First-time / resource-constrained customer	Initially: First-time / resource-constrained customer	Initially: First-time / severely resource-constrained customer	Resource-constrained or efficiency-seeking customer
		Potentially: Efficiency-seeking high-income customer	Potentially: Efficiency seeking high-income customer	Potentially: Efficiency-seeking high-income customer	
	<i>Enabler</i>	Improved processes	Improved processes and engineered product features	Improved processes, engineered product features, new applications	Other geographic market or market segment with resource-constrained needs

There is a cascade-like dependency between the various types of resource-constrained innovation; more novel resource-constrained innovations typically entail all of the traits of less novel ones (Figure 2). Cost innovations are enabled through process innovations that reduce operational costs. For example, Godrej adapted its production lines to allow production of smaller lot sizes of its soap, and BYD developed process technologies that allowed them to produce lithium-ion batteries in settings with variable humidity and temperature, reducing production costs by eliminating traditional dry rooms. Good-enough innovation combines cost-cutting process innovations with the elimination of features that are not important to resource-constrained customers while tailoring or enhancing features specifically required in the use environments. Logitech, for example, began by offshoring its production plants to China to reduce production costs (Williamson and Zeng 2009); using the insights it gained into resource-constrained customers, the company then developed a good-enough mouse specifically for the Chinese market.



**Figure 2.—Hierarchy of resource-constrained innovation**

The most complex technical and organizational capabilities are required for frugal innovation. This is illustrated by GE’s development of the Logiq Book, which presented both technical and market challenges: the company had to create an entirely new product architecture based on software rather than hardware, and then sell it to an entirely new market. Although the software components were not entirely new (a GE team in Israel developed them and passed them on to the Chinese team), the team had to integrate the right technical, engineering, production, and sourcing capabilities with distinct market knowledge of former non-customers. For this reason, from a product development perspective, frugal innovation can be considered the pinnacle of innovation capabilities in resource-constrained markets.

Reverse innovation requires different organizational capabilities than any of the other types, and these may vary depending on the type of innovation being reversed. Clearly, internal knowledge transfer from emerging markets to developed markets is crucial. Firms that are reversing cost, good-enough, or frugal innovations must first sense solutions for resource constraints in emerging markets and then seize opportunities to leverage these to relevant customer segments in developed markets.

The value and impact of reverse innovation depends on the kind of innovation being reversed. Reverse innovation of cost or good-enough innovations can help firms extend their product portfolio at the low end to tap cost-conscious or efficiency-seeking customers in developed markets. In this way, cost and good-enough innovations created for emerging markets may provide firms with additional flexibility as they can be strategically reversed when needed (for instance, when low-cost competition arrives at home or the opportunity arises to target new customer segments).

The situation is a bit more complex for frugal innovations, which are typically more closely tailored to their emerging market use environments. Frequently, the frugal value proposition is so unique to the emerging market that there is no reverse transfer potential; when a frugal innovation can be reversed, it frequently creates an entirely new market in the West. For example, text message-based microfinance services fill a very clear need in Africa, where the banking infrastructure is missing or fragmented; such a service has very little application in developed markets with strong banking systems. This would be a difficult innovation to reverse. By contrast, although the Logiq Book was developed for emerging markets, GE was able to identify a need for mobile and portable ultrasound machines in developed markets as well—allowing the company to build an entirely new mobile ultrasound business.

## **Conclusion**

Innovation for resource-constrained consumers in emerging markets has received increasing attention, but the discussion thus far has lacked a common understanding with regard to the definition of the various types of resource-constrained innovation. As emerging markets continue to grow, capabilities for resource-constrained innovation of all types will become key elements of growth for global firms. A clearer understanding of the various types of innovation in play, and their requirements and challenges, is important for firms seeking to craft appropriate offerings for emerging markets—and, ultimately to bring them back to Western markets. Relying on process improvements and offshoring to create a cost innovation is a very different undertaking from developing entirely new products tailored to resource-constrained markets, and each offers different advantages. Entering resource-constrained markets with a simple set of cost innovations offers different competitive advantages and strategic options than altering products to create a good-enough innovation or creating entirely new markets with frugal innovation.

Our conceptualization contributes to a clearer understanding of existing innovation concepts for resource-constrained environments and thereby provides the grounds for systematic future research.

## References

- Ansoff, H. I. 1965. *Corporate Strategy*. New York: McGraw-Hill.
- Barboza, D. 2011. Bridge comes to San Francisco with a made-in-China label. *The New York Times*, June 25. <http://www.nytimes.com/2011/06/26/business/global/26bridge.html?pagewanted=1&r=2>.
- Cappelli, P., Singh, H., Singh, J., and Useem, M. 2010. The India way: Lessons for the US. *The Academy of Management Perspectives* 24(2): 6–24.
- Economist*. 2010. First break all the rules: The charms of frugal innovation. Special report on innovation in emerging markets. *The Economist*, April 15. <http://www.economist.com/node/15879359>
- Gadiesh, O., Leung, P., and Vestring, T. 2007. The battle for China's good-enough market. *Harvard Business Review* 85(9): 81–89.
- Ghosh, B. 2004. Hind Lever relaunches "Rin Shakti." *Hindu BusinessLine*, January 3. <http://www.thehindubusinessline.in/2004/01/04/stories/2004010401430200.htm>
- Govindarajan, V. 2012. A reverse innovation playbook. *Harvard Business Review* 90(4): 120–124.
- Govindarajan, V., and Ramamurti, R. 2011. Reverse innovation, emerging markets, and global strategy. *Global Strategy Journal* 1:191–205.
- Govindarajan, V., and Trimble, C. 2012. *Reverse Innovation: Create Far From Home, Win Everywhere*. Boston, MA: Harvard Business School Press.
- Graham, F. 2010. M-Pesa: Kenya's mobile wallet revolution. *BBC News*, November 22. <http://www.bbc.co.uk/news/business-11793290>.
- Hang, C.-C., Chen, J., and Subramanian, A.M. 2010. Developing disruptive products for emerging economies: Lessons from Asian cases. *Research-Technology Management* 53(4): 21–26.
- Hart, S. L., and Christensen, C. M. 2002. The great leap. *MIT Sloan Management Review* 44(1): 51–56.
- Immelt, J., Govindarajan, V., and Trimble, C. 2009. How GE is disrupting itself. *Harvard Business Review* 87(10): 56–65.
- Kaur, M. 2013. Rural marketing: A case study on Hindustan Unilever Limited. *International Journal of Applied Research and Studies* 2(6): 1–14.
- Petrick, I. J., and Juntiwassarakij, S. 2011. The rise of the rest: Hotbeds of innovation in emerging markets. *Research-Technology Management* 54(4): 24–29.
- Prahalad, C. K. 2010. *The Fortune at the Bottom of the Pyramid: Eradicating Poverty through Profits*, 5th ed. Upper Saddle River, NJ: Wharton School Publishing.

- Prahalad, C. K., and Mashelkar, R. A. 2010. Innovation's holy grail. *Harvard Business Review* 88(7/8): 132–141.
- Ray, P. K., and Ray, S. 2010. Resource-constrained innovation for emerging economies: The case of the Indian telecommunications industry. *IEEE Transactions on Engineering Management* 57(1): 144–156.
- Reena, J. 2009. 5 tips for trickle-up innovation from C. K. Prahalad. *Business Week*, April 7. [http://www.businessweek.com/innovate/next/archives/2009/04/5\\_tips\\_for\\_trickle-up\\_innovation\\_from\\_ck\\_prahalad.html](http://www.businessweek.com/innovate/next/archives/2009/04/5_tips_for_trickle-up_innovation_from_ck_prahalad.html).
- Ryans, A. 2005a. Saurer: The China Challenge (A). IMD-5-0688. Lausanne, Switzerland: The Case Center, IMD.
- Ryans, A. 2005b. Saurer: The China Challenge (B). IMD-5-0689. Lausanne, Switzerland: The Case Center, IMD.
- Ryans, A. 2009. Low cost competition in China: Lessons from Saurer. October. Lausanne, Switzerland: IMD. [http://www.imd.org/research/challenges/upload/TC075-Template\\_PDF.pdf](http://www.imd.org/research/challenges/upload/TC075-Template_PDF.pdf).
- Sanchez, P., and Ricart, J. E. 2010. Business model innovation and sources of value creation in low-income markets. *European Management Review* 7:138–154.
- Sehgal, V., Dehoff, K., and Panneer, G. 2010. The importance of frugal engineering. *Strategy + Business*, Summer (May 25). <http://www.strategy-business.com/article/10201>.
- Sharma, A., and Iyer, G. R. 2012. Resource-constrained product development: Implications for green marketing and green supply chains. *Industrial Marketing Management* 41(4): 599–608.
- Trimble, C. 2012. Reverse innovation and the emerging-market growth imperative. *Ivey Business Journal*, March/April. <http://iveybusinessjournal.com/topics/innovation/reverse-innovation-and-the-emerging-market-growth-imperative#.Um52doGwVFI>.
- Vernon, R. 1966. International investment and international trade in the product cycle. *The Quarterly Journal of Economics* 80(2): 190–207.
- Ward, A. 2009. Huawei contract win is blow to Ericsson. *Financial Times*, December 19. <http://www.ft.com/cms/s/0/8946acb4-ec3e-11de-8070-00144feab49a.html>.
- Williamson, P. 2010. Cost innovation: Preparing for a 'value-for-money' revolution. *Long Range Planning* 43:343–353.
- Williamson, P., and Zeng, M. 2009. Value-for-money strategies for recessionary times. *Harvard Business Review* 87(3): 66–74.
- Zeschky, M., Widenmayer, B., and Gassmann, O. 2011. Frugal innovation in emerging markets. *Research-Technology Management* 54(4): 38–45.
- Zeschky, M., Widenmayer, B., and Gassmann, O. 2014. Organising for reverse innovation in Western MNCs: The role of frugal product innovation capabilities. *International Journal of Technology Management* 64(2/3/4): 255–275.