



# Mapping the frugal innovation phenomenon



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## ABSTRACT

This study aims at mapping the frugal innovation phenomenon. The study reveals that scholars affiliated with Indian institutes and originated from India have played a key role in this research discipline. Country wise, the highest number of frugal innovation cases is from India. The articles on frugal innovation have published in a wide range of disciplines and journals. Scholars, practitioners, and policy-makers have understood frugal innovation concept in various ways. Studies are predominantly in sectors, such as healthcare, electric and electronics, transport, finance, ICT, and energy. On the contrary, despite high importance, agriculture and education sectors have received limited attention.

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## 1. Introduction

Frugal innovation has emerged as an important concept for scholars, practitioners and policy makers. It is highly relevant for multinationals, small and medium enterprises (SMEs), non-government organizations, and state organizations [28,83]. Until recently, frugal innovation was an unknown phenomenon. Frugal innovation is considered as a new source of innovation mainly to meet the needs of low-income customers. Hence, it has primarily been explored emphasizing on affordability. However, what is frugal innovation is still under a great debate [101]. There are numerous definitions of frugal innovation [14,43,75]. Hossain et al. [43: 133] define frugal innovation... “as a product, service or a solution that emerges despite financial, human, technological and other resource constraints, and where the final outcome is less pricey than competitive offerings (if available) and which meets the needs of those customers who otherwise remain un-served”.

Misconceptions and multiple conceptions are associated with the concept [71,75,101]. The frugal innovation concept overlaps with over a dozen of other concepts including cost, good-enough, the base of the pyramid, inclusive, grassroots, disruptive, jugaad, and reverse innovations [71,75,101]. All of these concepts have a common denominator: developing low-cost but good enough product, service, and business model for low-income customers in the developing countries. However, reverse innovation concept goes a step further. It encompasses some set of customers in rich

countries. Developing capability of frugal innovation is a prerequisite for reverse innovation [102]. When an innovation is used in the developing countries and then comes to the developed countries, it is considered as reverse innovation [33,43]. The overlap of frugal innovation with some other concepts hinders the development of literature on it [71]. Some recent studies have explored how frugal innovation concept is different from the overlapping concepts [2,71,101].

Even though frugal innovation is highly cited in the popular press, there are limited scholarly publications on this phenomenon [45]. Most of the studies on frugal innovation are conceptual or case-based. Some prominent frugal innovation cases have been frequently cited in the literature. What cases are considered as frugal innovation is not clear. Hence, developing a comprehensive list of frugal innovation cases, their sectors, and their origins, etc. is crucial so that scholars, practitioners, and policy makers get an overall understating of the phenomenon. This study aims at mapping the frugal innovation phenomenon. This study reveals the popular outlets of publications on frugal innovation, most frequently used keywords in the studies, dominant sectors, countries of origin, and a comprehensive list of frugal innovation cases.

The remainder of the paper is structured as follows. The following section presents the current understanding of the frugal innovation phenomenon. Section three explains the methodological approach of this study. Section four includes the findings of the study. Implications, limitations, and future research avenues are presented in the final section.

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## 2. Current knowledge on frugal innovation

The number and quality of frugal innovations are increasing dramatically [83,100]. Frugal innovations generate better business and social value than traditional innovations. Angot & Plé [7] argue that frugal innovation includes four main characteristics: affordability, good performance, sustainability, and usability. Hartley [37] provides some propositions intending to pursue academics, managers, and policy-makers to consider new approaches to innovation. Gewald et al. [31] advocate that firms should develop frugal innovations considering the needs of poor customers as the starting point and work backward by optimizing product features down to essentials. Bhatti & Ventresca [12,13] emphasized that the frugal aspect involves solving problems without being stymied by affordability, resource, and institutional constraints.

Frugal innovations are cheap, robust in harsh environments, easy to use and repair, new uses of existing technologies, and made of used and local materials [25,78]. According to [54], frugal innovation improves the well-being of poor people in four dimensions: (1) income generation and security, (2) education, (3) infrastructure, and (4) distribution. It reduces the necessity of sophisticated labs, instead relies on basic engineering skills [59]. Moreover, Prabhu & Gupta [70] argue that three broad innovation heuristics are used for frugal service innovation: (1) combining existing materials, processes and resources through bricolage, (2) reducing time, materials and human resources, and (3) creating self-service options for users. However, Lazcano [55] believes that a global business continuity program is necessary to foster frugal innovation.

The developing countries are increasingly embracing innovation in their national innovation policy [10,23,98]. They have prioritized their agenda to boost frugal innovation [16]. Recently, planning commission of India has emphasized on frugal innovation for inclusive growth [9,63,71]. Even though income level of many customers are growing, they have still little access to many essential needs [101]. Mukerjee [62] believes that affordability is a key to serve low-income customers with frugal innovation. On the contrary, Gupta [36] argues that frugal innovation is beyond affordability because some aspects, such as collecting sachet for shampoo and hair oil are expensive. Although frugal innovation has primarily been explored emphasizing on affordability, even low-income customers are increasingly looking for attractive designs of products [92,93].

There has been a substantial shift in global innovation and Western MNCs are increasingly preferring countries, such as China (62%) and India (29%) as a source of innovation [95]. Thus, the technical and social changes in the developing countries seem to become key drivers of innovation in near future [68]. By exploring subsidiaries of Bosch and 3M in India, Ojha [66] found that these MNCs are reframing their global strategies and emphasizing more on low-income countries to develop frugal innovations. Most sophisticated frugal innovations are developed by research and development (R&D) subsidiaries of Western firms in emerging countries with high autonomy [100]. MNCs such as General Electric (GE) and Siemens are continuously bringing frugal innovation into the market to tap new customers [47,78].

Frugal innovations in emerging market take place in three levels [52]. At the first level, many Western MNCs now have full-fledged R&D centers in emerging countries, such as India and China. Among fortune 500 listed firms, 98 have R&D facilities in China and 63 in India [28,81]. At the next level, local MNCs pursue innovative research in their home and other emerging countries. Multinationals of emerging markets, such as India and China are developing inexpensive products considering the resource-constrained environment and low-income customers. Their products provide

high value per price. Tata Nano – the cheapest car in the world, and Tata Swach – water purifier by Indian conglomerate Tata have provided a new way of serving underserved customers in the developing countries.

At the third level, innovations are emerging from the grassroots level. Low- or not-educated grassroots innovators with their frugal mindset develop products and services aiming to meet local needs. For example, Mitticool – a clay fridge developed by a potter, and milking machine by a school teacher both in India are prime examples of how these frugal innovations are meeting local needs. India is believed as the epicenter of frugal innovation [63,78]. However, Prathap [72] debunks that belief and argues that other countries are more active in frugal innovation than India. Frugal innovations, such as Embrace and mOm by Western individuals are available at 10–20% (several hundred dollars) of the price of traditional baby warming products. Many non-government organizations are also playing a key role in frugal (service) innovations [80]. Thus, frugal innovations are emerging from a wide range of sources.

The developing countries possess some competitive advantage over the developed countries, such as skilled human capital at a very low cost and a mega market for products [30]. Many frugal innovations trickle up Western countries with some modifications to satisfy Western customers [43]. Frugal innovation is not all about the product rather it entails services, too [104]. Western MNCs are developing products in co-creating with customers, empowering local engineers with a clean slate approach for product development in the developing countries [50]. The economic state of the developed countries is plummeting. For example, the median income of US household decreased by 7.5% from 2007 to 2014 [24]. Gross disposable income of households in most European countries has also decreased. Therefore, many customers in the developed countries are increasingly becoming poorer. Consequently, they look for affordable products to meet their tight budgets. Firms need a novel strategy to sell products that are within the purchasing power of low-income customers [7]. Therefore, embracing frugal innovation is important to meet the needs of some sets of customers in the developing and developed countries.

## 3. Research methods

### 3.1. Article searching process

To search articles on frugal innovation, we adopted a systematic approach (see [103]). Fig. 1 depicts the steps of the article (including book chapters and working papers) searching process (N indicates the number of articles). We used “frugal innovation” as a searching term on five databases. Only articles in English were included in searching. The first attempt of searching was on the Web of Science and 24 articles were found from there. To include more articles, the second attempt was made on the Scopus database and 55 articles were retrieved from there. Removing 40 overlaps (and irrelevant articles) between the Web of Science and the Scopus, 39 articles were considered from those two databases. The third attempt was made on the EBSCO database using academic search elite and 50 articles were identified. After removing overlaps, 42 articles were found from the EBSCO database. Thus, we found 81 articles altogether from the Web of Science, Scopus, and EBSCO. The fourth attempt is made on the Google scholar and 10 more articles were found. Finally, particularly to include more recent articles, we looked at the Social Science Research Network (SSRN) database where many forthcoming articles and working papers are included. However, only three articles were found from the SSRN. Thus, 94 articles were found from the five databases.

Altogether 94 articles were considered to quickly check if they

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