

## Regular article

## Frugal innovation in developed markets – Adaption of a criteria-based evaluation model



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## ABSTRACT

This paper establishes a criteria-based evaluation model to better understand frugal innovations and the reasons they are either successful or unsuccessful in developed markets. The three criteria for frugal innovation introduced by Weyrauch (2018) form the basis for the evaluation model. In order to analyze products and services while also including user-related factors, certain dimensions and tools were combined with the criteria set defined by Weyrauch, which resulted in the presented evaluation model. Furthermore, this study acknowledges that frugal innovation in developed markets differs from frugal innovation in developing markets, especially concerning usability, quality, and price difference. Therefore, the term “second-degree frugal innovation” is introduced to refer to frugal innovation in developed markets. Three different case studies are analyzed with the adapted evaluation model. The results show that the success and/or failure of frugal innovations, as well as the definition of frugal innovation itself, is highly dependent on the market in which it is launched. This paper can also benefit practitioners as it provides tools such as value analysis to optimize the use of the evaluation model and it contributes to the existing knowledge in the area of frugal products and services in general.

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## Introduction

The concept and term of frugal innovation only emerged quite recently and was coined by Carlos Ghosn, former Chairman and CEO of Renault–Nissan (Soni & Krishnan, 2014). After the article “First break all rules” was published in *The Economist* (2010), frugal innovation became known to a wider public. Since then, several scholars have discussed frugal innovation, compared it with other innovation types and tried to characterize it (e.g., Zeschky, Winterhalter & Gassmann, 2014; Herstatt & Tivari, 2015; Weyrauch & Herstatt, 2016; Hossain, 2018; Michelini, Pisoni & Martignoni, 2018). The first scientific paper on frugal innovation (in English) was published in 2005. By 2012, 11 publications had already been released, and the number of papers published finally peaked in 2016 with 31 publications (Michelini et al., 2018). This significant increase not only highlights the growing interest of the scientific community in this concept, but also illustrates that innovation strategies are expected to satisfy the needs of a large group of low-budget customers (Kroll et al., 2015b). Especially emerging markets in Asia and Africa are a

breeding ground for frugal innovations (e.g. Tata Nano car, M-Pesa money transferring system, GE Vscan handheld ultrasound device).

The definitions of frugal innovation are as diverse as the delineation of this innovation type. Hossain (2018) offers a broad overview of the English literature on frugal innovation by comparing it with other innovation concepts, such as reverse and disruptive innovation. In an earlier publication (Hossain, Simula, & Halme, 2016, p. 133), frugal innovation was defined as “a resource scarce solution [...] (where) the final solution is significantly cheaper than competitive offerings [...] and is good enough to meet the basic needs of customers.” Bound and Thornton (2012) argue, “frugal innovations are not only lower in cost, but outperform the alternative, and can be made available at large scale.” Zeschky et al. (2014, p. 7) characterize frugal innovation as “not re-engineered solutions but originally developed products or services for very specific applications in resource-constrained environments.” Michelini et al. (2018) define three generations of frugal innovation definitions. They distinguish between product-oriented (1st generation), market- and process-oriented (2nd generation), and criteria-oriented definitions (3rd generation). The third generation of definitions “represents a breaking point” (Michelini et al., 2018, p. 7) because it is based on the origin of the concept. Agarwal and Grottko (2017, p. 4) describe frugal innovation as “[...] good enough” and affordable products that suffice the needs of resource-

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constrained consumers” and have a huge set of characteristics. The characteristics listed by scientists are very similar to the three criteria of frugal innovation outlined by Weyrauch (2018) as well as Weyrauch and Herstatt (2016) (see chapter 3.1).

Focusing on the third generation of frugal innovation definitions and the criteria by Weyrauch (2018), the research questions are as follows:

- 1 Which criteria need to be considered to identify frugal innovations in developed markets?
- 2 Which criterion is/criteria are crucial for success or failure of a frugal innovation?

Most literature on frugal innovation focuses on markets in developing and emerging countries (see chapter 1). However, “most developed countries have failed to embrace a frugal approach in the past, and the world is seeing resource shortages, environmental damage, and a plethora of other negative consequences as a result of the conventional approaches to product and service innovation” (Basu, Banerjee, & Sweeny, 2013, p. 64). This study seeks to fill the knowledge gap about frugal innovation in developed markets, their successful or unsuccessful implementation, as well as adequate methods for a more effective introduction of frugal products and services. By using an established model (Weyrauch, 2018) as a starting point and adapting it, this study will contribute to the development of a broader understanding on how frugal innovations can be successfully implemented in developed markets.

Chapter one gives an overview on the status quo of frugal innovation in research. The second chapter offers a delineation of different innovation approaches and proposes a new concept for frugal innovation in developed markets. Chapter three describes the methods used in this paper while focusing on the three criteria model for frugal innovations by Weyrauch (2018). In addition, it will present the proposed adaptations including function analysis. Chapter five briefly outlines different cases, which are then analyzed by the adapted evaluation model in chapter six, which will also illustrate the results. Chapter six will also discuss the limitations of this paper before reaching a conclusion.

## Theories and ideas

### *Disruptive vs. reverse vs. frugal innovation*

Soni and Krishnan (2014) claim that every frugal innovation is also a disruptive innovation but not vice versa. Sometimes, disruptive innovations are based on new technologies that might not be accessible to everyone. This supports the thesis that not every disruptive innovation is a frugal innovation when high investments are required for research and production. Combining high-end products with a new architecture, however, such as turning a stationary into a portable device (GE VScan), might be considered disruptive because the new product can reach a completely new customer group (Zeschky et al., 2014). In contrast to disruptive and frugal innovations, reverse innovations are linked to geographical aspects and refer to an innovation transfer from emerging to developed countries (Herstatt & Tivari, 2015). Hossain (2018) argues that “several frugal innovations have turned into reverse innovations by tickling up into developed countries from developing countries.” Similarly, Govindarajan and Ramamurti (2011) insist that reverse innovation must be adopted in developing and emerging markets before being introduced to developed markets. In developing and emerging markets, frugal value proposition is often unique and has no reverse innovation potential. If an innovation can be reversed, it frequently induces completely new opportunities for

developed markets (Zeschky et al., 2014).<sup>1</sup> Even so, reverse innovation “refers to a market rather than a product” (Zeschky et al., 2014, p. 8).

### *Frugal innovation in developed markets*

“We have enough tools for product development [in developed markets], but frugal innovation is a question of mindset” (Tiwari R. in Schäfer, 2018).

A recent study on the potential of frugal innovation in the European Union (Kroll et al., 2015a) reveals the existing demand for this type of innovation. The economic crisis had led to a sustained change in customer behavior, which persisted even after the crisis in 2012. Furthermore, demand for frugal products [and services] is currently rising as a result of deleveraging and slow growth in developed economies (Bound & Thornton, 2012). In addition, an increase in “sustainability-conscious” consumers can be noticed, who voluntarily adopt a frugal lifestyle and call for frugal models of production and consumption (Bound & Thornton, 2012; Kroll et al., 2015a). Almost every developed country has agreed to reach the climate and energy targets set by the Paris Agreement (EU Commission, 2015). This, in turn, requires a change in production and consumption patterns with less resource input.

A growing group of low-budget customers and other groups of “sustainability-conscious” consumers might be considered the main target of frugal innovations in developed markets. Nevertheless, there are other relevant factors such as pressure on public finances due to population ageing, which will necessitate a new approach in the health sector and an increase in new-technology platforms (Bound & Thornton, 2012). Although frugal products and services would be a sensible innovation for developed markets, the markets are still not quite ready for it. The increasing need for and the potential of frugal solutions and innovations on the European market have not manifested themselves in market demand yet (Kroll et al., 2015b).

Due to cost pressure, however, frugal innovation is expected to play a significant role in developed markets (Tivari & Herstatt, 2014). “Another interesting issue is to explore the mindset of developed and developing countries to develop and foster an environment for frugal innovation” (Hossain, 2018, p. 935). One main driver for companies to take a greater interest in frugal innovation is the desire to attract new, low-cost customer groups that either “cannot pay” or “do not want to pay” a certain price. More so in the absence of adequate market-solutions to satisfy those customer groups (Herstatt & Tivari, 2015). Another driver might be the prevention of the Innovator’s Dilemma (Christensen, 1997) – being more sensitive to over-engineering the company’s products and disruptive innovations. According to most definitions of frugal innovation presented in this paper, this type of innovation mainly corresponds to developing countries. Frugal innovations introduced in developed countries are usually reverse innovations adapted to developed markets (Agarwal & Brem, 2012). Despite the fact that Weyrauch and Herstatt (2016) discovered that the perception of frugal innovation in emerging markets is similar to the perception in developed markets, a distinction between the geographical locations of frugal innovations is useful. Consequently, frugal innovation in developed markets is referred to as “second-degree frugal innovation” in this paper.

<sup>1</sup> Mobile phone-based money transfer systems like M-Pesa fulfill a need in Africa, while developed markets with an existing banking infrastructure do not require this service.

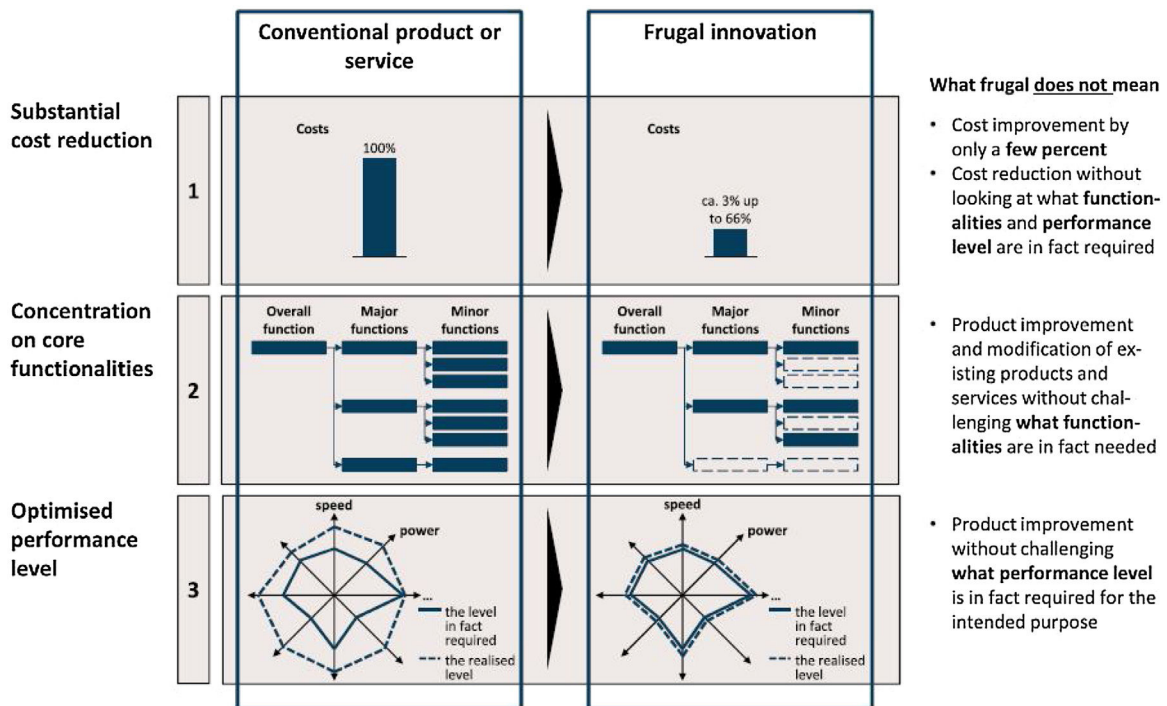


Fig. 1. Three criteria of frugal innovations (Weyrauch & Herstatt, 2016).

## Methodology

This study is based on an extensive literature review in the field of frugal innovation (Science Direct, Scopus, Google Scholar). In order to fill the knowledge gap concerning frugal innovations in developed countries and companies' strategies for establishing frugal innovations in home markets, an evaluation model was created. Based on the existing "three-criteria model" by Weyrauch (2018), this model was combined with elementary ideas from value and function analysis. The cases discussed in chapter four are based on the analysis and research of secondary data, such as corporate reports and scientific publications on frugal characteristics of the product or service.

### Three-criteria model by Weyrauch

Weyrauch and Herstatt (2016) developed a model (Fig. 1) to differentiate frugal innovations from other types of innovations. They conducted 45 interviews with German managers and derived three defining criteria: (1) substantial cost reduction, (2) concentration on core functionalities, and (3) optimized performance level. The defining process of these three criteria was preceded by a substantial literature research. The first criterion "substantial cost reduction" includes characteristics such as *cheaper initial costs*, a *reduction of total cost of ownership* as well as *minimizing material, and financial resources* (e.g., Tiwari & Herstatt, 2012; Rao, 2013; Weyrauch, 2018). The second criterion "concentration on core functionalities" focuses on a *decrease to necessary functions*, *minimizing material resources*, and *user friendliness* (e.g., Rao, 2013; Herstatt & Tivari, 2015; Weyrauch, 2018). The third criterion "optimized performance level" comprises factors such as *low price but high quality*, *easy to use*, and *robustness* (e.g., Rao, 2013; Zeschky et al., 2014; Weyrauch, 2018). Weyrauch (2018) argues that some criteria might also apply to other types of innovation, yet in contrast

to other types of innovation, frugal innovation must meet all the criteria.<sup>2</sup>

The main limitation of this model is that the interviews were only conducted with German managers, although on a positive note, the interviewees were at least managers of multi-national companies. Despite these limitations, the authors of this study deliberately decided to use these three criteria as a basis for their evaluation model because it solely focuses on frugal innovation in developed markets. However, they argue that the manifestation of the criteria of different products and services depends on the users, their environment, and the market. By using the three criteria as a starting point and adapting the model, this study will contribute to the development of a broader understanding on how frugal innovations can be successfully implemented in developed markets.

### Function analysis based on value analysis

Value analysis or value engineering was introduced by Lawrence D. Miles, an employee at General Electric. It was initially developed as a systematic process aimed at improving existing products, but it soon transpired that value analysis could also be applied to new products (Friedl, 2007; VDI, 2010). Following this approach, several institutions (e.g., VDI, SAVE International Value Standard) developed this idea further by integrating additional methods, which eventually resulted in standards and work recommendations for value analysis.

"In value analysis, every individual effect of an examined value analysis object is considered to be a function" (VDI, 2019, p. 5). Function analysis "focuses on what functions must be included in

<sup>2</sup> The three criteria and all its implications are based on the dissertation by Timo Weyrauch (2018) "Frugale Innovationen – Eine Untersuchung der Kriterien und des Vorgehens bei der Produktentwicklung [eng.: Frugal innovations – An investigation of the criteria and the procedure in product development]."

an object in order to fulfil the requirements placed on the object” (VDI, 2019, p. 3). It is necessary to further define the aforementioned effects and use them as the basis for the refinement of the three-criteria model by Weyrauch (2018). In addition, a clear distinction between function types and function classes is also essential. By determining function classes, a ranking on the importance of functions for the user of the product or service is created (core functions and unnecessary/undesired functions). An object (product or service) must have at least one core function. Function analysis also distinguishes between two types of function: use function and aesthetic function (VDI, 2019). However, value analysis as an engineering discipline has also its limitations such as the strong focus on cost related parameters.

## Model development

By introducing “second-degree frugal innovation” as a new categorization of frugal innovation, this study does not intend to propose a general definition of the term. The authors of this research are convinced, however, that frugal innovation in developing and emerging markets differs from frugal innovation in developed markets. In some cases, frugal innovation in developed markets will perhaps not be considered as such in developing and emerging markets due to over-engineering (e.g., stricter safety regulations, different consumer demands). The environment in which second-degree frugal innovations either occur or are introduced to is decisive. The idea of second-degree frugal innovation is based on the three-criteria model by Weyrauch (2018) as presented in Fig. 2 and several modifications of these criteria (see Fig. 3). Though these criteria were originally applied to product development, the model used in the present study was modified in order to analyze services as well. Additionally, the optimized performance level (3rd criterion by Weyrauch) was divided into product-related and user-related performance and then complemented with elements used in value analysis: use functions and aesthetic functions. In terms of product-related performance, use functions encompass objectively quantifiable actions (e.g. of technical nature) of an object that serve the appropriate use. User-related performance refers to less quantifiable but subjectively perceptible aspects of the innovation’s performance. Aesthetic functions are subjectively perceptible user-related effects of an object (e.g., consumer acceptance, image of the innovation; VDI, 2019). Sustainability was not explicitly mentioned as a criterion, yet a decrease in resource input was considered essential for frugal innovations.<sup>3</sup>

- Criterion 1: Substantial cost reduction

Frugal innovations differ from conventional products in terms of significant cost reductions for both the manufacturer and the customer (lower purchase costs and lower cost of ownership). Hossain et al. (2016) argue that a frugal product must be considerably cheaper than a conventional product. Price reductions for frugal products range from 58% to 97%<sup>4</sup> (Rao, 2013) and Weyrauch and Herstatt (2016) suggest a substantial cost reduction of at least one third of the conventional product’s price. The new, adapted evaluation model presented in this paper employs this criterion.

- Criterion 2: Concentration on core functionalities

<sup>3</sup> Nevertheless, the authors are aware that not all pillars of sustainability, particularly social sustainability, are necessarily relevant for frugal products/services.

<sup>4</sup> Rao (2013) used a small sample of 13 frugal products and compared it with their conventional counterparts. Thus, this cannot be regarded as representative.

Weyrauch and Herstatt (2016) address the importance of focusing on core functions in order to achieve the highest customer benefit (e.g. through simplification). Apart from that, the concentration on core functions can also help to minimize the use of material and resources as a more sustainable approach (Leadbeater, 2014; Radjou & Prabhu, 2016). Other aspects related to this criterion are factors such as usability and user-friendliness (Agarwal & Brem, 2012). In order to identify the core functions of a product or service, function analysis is used as a systematic approach and as a tool for determining the main and side functions of the innovation. Additionally, unnecessary and undesired functions can be analyzed and identified (VDI, 2010).

- Criterion 3: Optimized performance level

The optimized performance level is probably the “trickiest” criterion, as it depends on specific information about local (market) conditions. If the desired, optimized performance level is not achieved because performance is too high or too low, costs might be too high and/or the objectives of frugal innovations cannot be met (Weyrauch & Herstatt, 2016).

The criterion proposed by Weyrauch (2018) focus on the technical (here, product-related) performance of frugal products. Reaching the necessary performance level of frugal products is essential, yet performance levels vary from case to case. As this study strives to assess frugal services as well, a corresponding adaptation was necessary. The authors of this paper included another dimension regarding the customers’ point of view on the performance of an innovation—user-related performance. In the “original” version of the model, Weyrauch and Herstatt combine factors of user-related performance with the second criterion. “Concentrating on core functionalities can also have the purpose of (...) meeting a specific lifestyle or consumer behaviour” (Weyrauch & Herstatt, 2016, p. 9). However, as an innovation can only be defined as such if it is successful on the market (Lercher, 2017), it can be argued that a stronger emphasis on these qualitative factors is necessary. Therefore, “criterion 3b: user-related performance” was added to the evaluation model.

- ○ Criterion 3a: Product-related performance level

This criterion is based on the concept of use functions according to function analysis. Use functions describe objectively quantifiable actions of an object that serve the appropriate use (VDI, 2019). Factors such as speed, power, and durability, ought to be specifically analyzed (Weyrauch & Herstatt, 2016), however, this performance level can differ from one target market to another. Consequently, the needs of frugal target groups must be evaluated to optimize an innovation’s performance. The aforementioned factors can also vary depending on the product/service and the market/country the frugal innovation will be introduced in.

- ○ Criterion 3b: User-related performance level

Understanding the moral concept of your customers is indispensable for making a product or a service a success. Why does a customer choose to buy a product or a service? This question can be answered by applying value analysis’ aesthetic functions (Bender, 2017). Aesthetic functions are subjectively perceptible user-related effects of an object (VDI, 2019); these are the less quantifiable but “subjectively perceivable” (VDI, 2019, p. 5) aspects of the innovation’s performance. In addition, market-related characteristics are summarized in the term user-related, as the user determines the market the frugal innovation is used in.

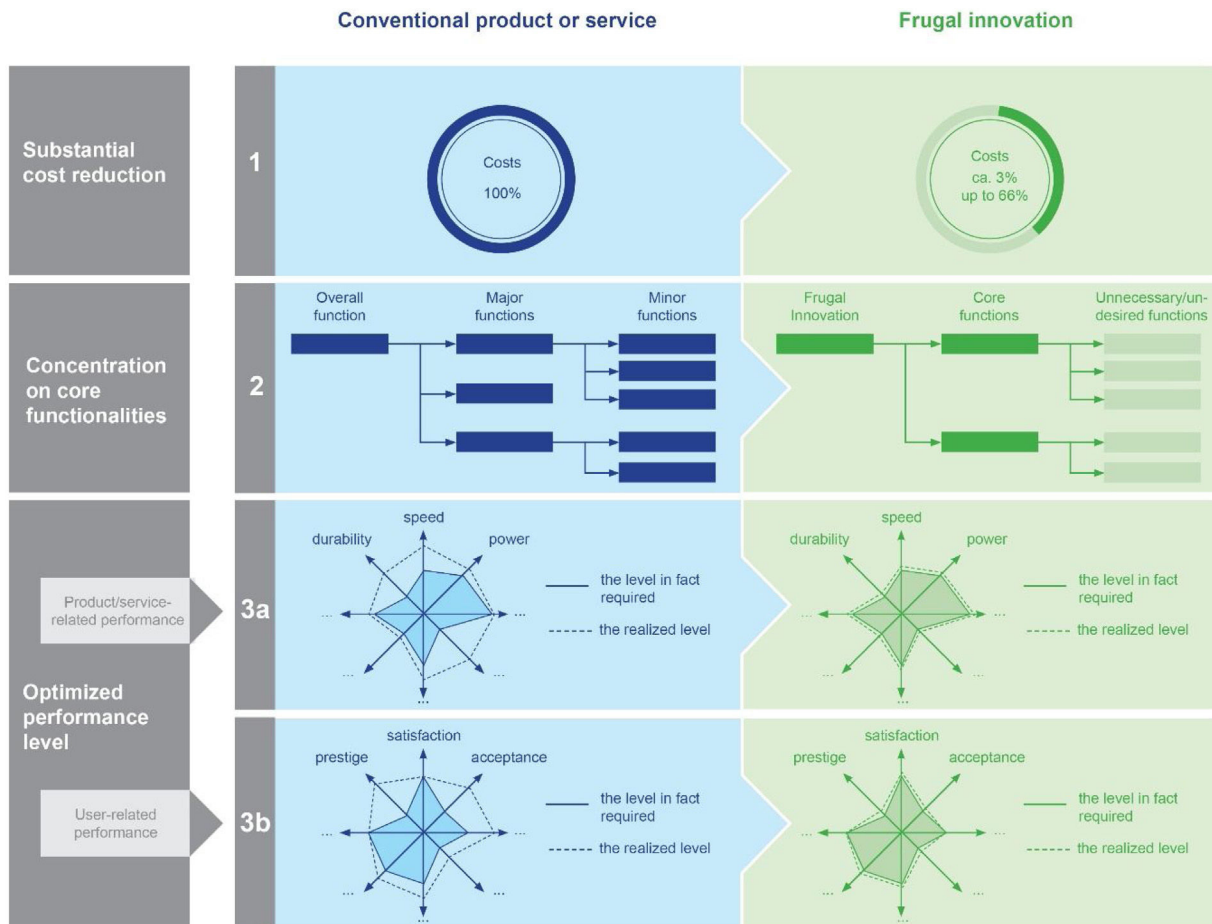


Fig. 2. Evaluation model for second-degree frugal innovation.

**Cases of frugal innovations**

The following cases give a brief overview of well-known frugal innovations in developing and developed markets, including both products and services introduced by already well-established companies as well as recently founded firms. The first of the following three case illustrates a failure of a frugal innovation due to wrong marketing, the second describes a product that was a major success and has already inspired new products and services or an improvement of the original innovation. From today’s point of view, the third case examines a product that is still developed in order to satisfy the demands of its customers. All cases reveal useful insights into the implementation of frugal products and services.

Following the description of each case, an analysis according to the evaluation model was conducted. Based on the results obtained by the analysis, an explanation for the success and failure of the products and services as well as reasons for their potential categorization as a second-degree frugal innovation can be derived.

*Tata Nano*

In 2008, the Tata Nano was presented at the Indian Auto Expo in New Delhi as a car that would meet the fundamental needs of its owner. The starting price was promised to be 100,000 Indian Rupees and it was branded as the “World’s most affordable car.” As the main target group consisted of families that only owned a motorbike, it was also referred to as the “people’s car” by the CEO of Tata Motors. The car’s presentation was preceded by a four-year development phase including a cooperation with a global network,

which won Tata’s engineers the Edison Award in the transportation category in 2010. Shortly after being launched in India, the car got about 200,000 preorders that generated roughly \$500,000,000. Initially, this frugal innovation appeared to be ready even for the markets in developed economies (Bound & Thornton, 2012; Lee Yohn, 2013; Ketan & Lijee, 2016; Ayyar, 2018). Yet, after the success in 2008/09, internal and external problems arose and eventually led to the set-back of the Nano. The manufacturing site had to be relocated due to local protest and political problems causing a delayed delivery of the first Nanos. In addition, the manufacturing capacity was well below the pre-orders and the customers were expected to stand unbearable waiting periods before receiving their car. In 2009, Nanos reportedly burst into flames for no obvious reason. Even so, the Tata was struggling with even more severe problems: a “wrong” marketing campaign and the inability of the Tata’s PR department to deal with it. The car was promoted as the “World’s cheapest car” and owning the Nano led to a negative association with lower social status. (Tivari and Herstatt, 2012).

*Emporia mobile phone*

In 2015, more than 7 billion contract mobile phones were registered globally (ICT, 2015). In developed countries, an estimated 85% of people aged 65 and older use mobile phones, although in the U.S. only 40% of those surveyed own a smartphone, while the rest use regular cell phones (Pew Research Center, 2018). Most of the studies that deal with mobile phone behavior have focused on people under 60. A study team from Italy observed that different age groups do not vary in their motivation to use a mobile phone or

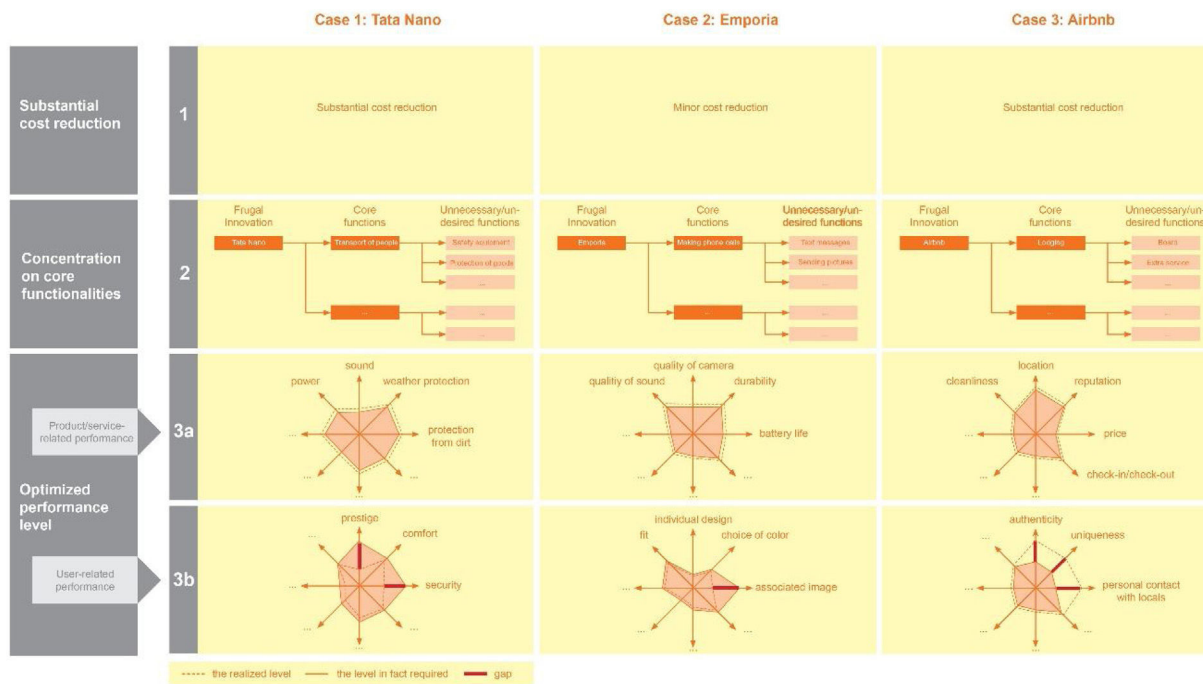


Fig. 3. Evaluation of three cases of frugal innovation according to the adapted model Fig. 3.

smartphone (Conci, Pianesi & Zancanaro, 2009). In fact, the users' demands on the device play a more decisive role in this context.

The Austrian company Emporia Telecom uses a frugal approach in the development of its products by focusing on the simplicity of the product and reducing its functions. Most of the Emporia phones were narrowed down to their core functions and combined with the special needs of the target group—elderly people (Emporia, 2019). Elements or functions, which are considered unimportant or negligible by the target group, are not part of the final product. Rather, they prioritize features such as the telephone function, big buttons, and good sound quality, instead of focusing on the internet connection, an MP3 player, or a high-quality camera (Habich, 2016). Many elderly people, however, reject products specially designed for their needs because it makes them feel old (Wohlfart in Habich, 2016).

### Airbnb

In 2007, two roommates in San Francisco could no longer afford their rent. Well aware of the fact that an upcoming major conference would result in a shortage in guest accommodation in the city, they decided to turn their flat into a low-budget design bed and breakfast. They made room for three air mattresses and set up the webpage airbedandbreakfast.com. It took the founders another two years to find investors, create a user-friendly webpage, change the name to Airbnb, and make it a financial success (Carson, 2016; Gallagher, 2017).

Airbnb defines itself as an organization that “uniquely leverages technology to economically empower millions of people around the world to unlock and monetize their spaces, passions and talents to become hospitality entrepreneurs” (Airbnb, 2019). Soon after the company became a global player, Airbnb was confronted with legal issues, when some guests left the accommodations in a devastating state or hosts were evicted for renting their homes out (Carson, 2016). These problems have not been solved yet and, in some cases, even caused cities to try to ban Airbnb from their region (Praider, 2018).

Guttentag and Smith (2017) assessed the disruptive potential of Airbnb in contrast to conventional lodging establishments. By

using already existing space, the company offers an innovative alternative to traditional lodging (Varma, Jukic, Pestek, Shultz, & Nestorov, 2016). Even though scholars discovered that Airbnb is not a truly disruptive innovation compared to budget and mid-range hotels/motels due to a different set of performance attributes (Guttentag & Smith, 2017), it can be argued that they have pursued a frugal approach. Especially when considering the notion of tolerating flaws to enjoy other advantages such as cheap prices, simpler room setup, and so on (Guttentag, 2015), and the peer-to-peer rental approach. Airbnb is an example of a sharing economy, which was initially based on a frugal approach and became a financial success.

## Discussion and results

### Discussion

The different cases of Tata Nano, Emporia and Airbnb are analyzed by using the adapted criteria model. They serve as examples of a successful frugal service and two frugal products, respectively. Fig. 3 illustrates the results of the case analyses.

#### Analysis of case 1: Tata Nano

The Tata Nano is a frugal innovation by definition as it fully complies with the underlying criteria “substantial cost reduction” and “concentration on core functionalities” (transport of people). Unnecessary and eventually undesired functions as belts and airbags were neglected. Furthermore, the product-related performance level was optimized according to the core functionalities: It lacks an oversized engine, special sound engineering (branding), trunk lid, and so on. Yet, it does satisfy the product-related needs of the customer, such as transport of people and goods, protection against bad weather and dirt, driving within the allowed speed limit, and so on. In terms of user-related performance, the Tata Nano as a frugal innovation fails to meet the needs of the user. The discrepancy between actual and demanded performance in prestige and security is particularly significant in this context.

The Tata Nano was promoted as “the world’s cheapest car.” As a car is (still) seen as a status symbol in India, a large part of the target group preferred a used car with more prestige to a new Tata Nano (Tivari & Herstatt, 2012; Ketan & Lijee, 2016; Ayyar, 2018).

Although the Tata Nano complied with all legal and safety requirements in India, the car was not admitted to the European market, as it did not meet elementary UN safety requirements. The car received zero out of five stars in the Global New Car Assessment Programme (NCAP) for adults and for children.

This example demonstrates that the success of frugal innovations is not only connected to a low price and a reduction in cost-of-ownership. Other aspects such as achieving the necessary image in order to attract customers as well as quality and safety issues are important and cannot be dismissed (Tivari & Herstatt, 2012).

#### *Analysis of case 2: emporia mobile phone*

Compared to other mobile phones with buttons, the big button Emporia product line is not exactly cheap. Elderly customers find it difficult to use conventional mobile phones with buttons, as the keys are too small and too close to each other. Unlike smartphones, which have already replaced mobile phones with buttons, Emporia phones are considerably less expensive (prices range from €45 to €85; Amazon, 2019) and lack many features conventional smartphones have.

The frugal approach pursued by the Emporia mobile phone focuses on its core function: making phone calls. Many smartphone features such as text messages or a camera have been identified as unnecessary and have consequently been omitted.

The performance level of Emporia phones is similar to other frugal innovations and is characterized by a negligible gap between the required performance level and the actual performance. Emporia strive to meet, but not exceed, the required standards for product- or service-related parameters in particular, such as quality of sound and camera, durability, and battery life.

Many user-related parameters like fit, comfort, individual design, and choice of color are realized at the required level. In terms of associated image, however, a disparity between required and actual level of performance may occur because some customers may refuse to buy an Emporia phone due to its image as a phone designed specifically for elderly people. Although potential customers are in fact senior citizens, they would rather not be considered old or unable to cope with a conventional smartphone (Wohlfart in Habich, 2016).

#### *Analysis of case 3: Airbnb*

Airbnb is one of the few frugal service innovations. The original concept of Airbnb is a frugal innovation by definition, yet the business model of Airbnb has changed over time. This section analyzes the original concept of “airbedandbreakfast.”

In contrast to the existing concept of a budget hotel, the concept of Airbnb results in a substantial cost reduction because it relies on already available space and not on real estate that must be either adapted or built from scratch (Guttentag & Smith, 2017). The same applies to the core functionality. The basic service a customer demands is lodging. This can be fully accomplished by renting an existing room (incl. access to a bathroom) for a short time in an existing property located in the desired area. The customer is not interested in most of the services offered by a hotel besides the room, but they must pay for it anyway. Other options such as breakfast, superior rooms or special treatment are often considered unnecessary or even undesired “functions” for customers, but they are provided upon request. These unnecessary and undesired features are deliberately neglected in the concept of Airbnb.

In the case of Airbnb, service-related performance parameters include cleanliness, location, reputation, price, value, room com-

fort, and security. These performance parameters usually satisfy the customers’ requirements, but they do not exceed their expectations (Guttentag & Smith, 2017). Another performance-related parameter—check-in and check-out—can be problematic at times, as a personal meeting with the host must be arranged (Guttentag & Smith, 2017). In the original concept, however, hosts rented out a bed in their apartment and were present at the time of rental.

Airbnb outperforms budget- and mid-range hotels when it comes to user-related parameters such as authenticity and uniqueness of the unit in particular. (Guttentag & Smith, 2017). Moreover, due to the close contact between customer and service provider (reception, eventually living in the same apartment or house), further user-related parameters like personal contact with the host, locals or community, can also be rated higher than in a standard hotel.

#### *Summary and limitations of the case analysis*

As stated by Weyrauch and Herstatt (2016), frugal innovations need to meet the three main criteria of substantial cost reduction, concentration on core functionalities, and optimized performance level. Nevertheless, even recognized frugal innovations do not fully meet these three criteria when assessed concerning their user-related performance, which is mainly important in developed countries. For example, the Tata Nano does not fulfill the required level of prestige and security demanded in developed markets. Emporia faces image problems, as it is associated with elderly people that are reluctant to adapt to advanced technology. In the case of Airbnb, user related performance exceeds the required level in some characteristics like authenticity or uniqueness.

The assessment described above is an ex-post assessment. In order to evaluate a product or service with this model, it must have been launched at least for a certain time. Of course, this results in a delay from market entry to a possible estimation of failure/success. In addition, determining the right characteristics is problematic. The gap analysis as conducted and presented in Fig. 3 is a mere qualitative assessment and depends on the specific case and market. Frugal innovations can be successful in a certain market, but as the characteristics are case-/market-dependent (i.e., security requirements, authenticity) evaluation might differ.

#### *Results*

This paper proposes the term “second-degree frugal innovation,” which defines frugal innovations in developed countries. In terms of second-degree frugal innovation, the authors of this study support the model of Weyrauch and Herstatt (2016) and therefore agree that a frugal product or service must fulfill all of the three criteria (substantial cost reduction, concentration on core functionalities, and optimized performance level) to be categorized as frugal innovation. Nevertheless, frugal innovations need to be evaluated by taking the respective market into account because the basic requirements differ. According to the general definition of innovation, an innovation can only be considered as such if it brings about an economic optimization and is consequently a success on the market (Vahs & Brem, 2015). Therefore, this paper introduces the concept of user-related performance (representing personal or market requirements) as an indicator for the success or failure of a frugal innovation, particularly in developed markets. This study examines different cases of services and products, which are classified as frugal innovations even though some characteristics are either not quite fulfilled or over-fulfilled. This line of thought results in an easier delineation of the term frugal innovation from other types of innovation.

Due to several requirements, legal obligations, and safety issues, frugal innovations in developed countries differ significantly from

such innovations in developing countries. Thus, the optimized performance criterion need to be adapted to user-specific characteristics - This also include the geographical location (e.g., market-related details, legal requirements) in which the innovation is implemented, as the location is determined by the user as well. If local performance characteristics are accomplished, the innovation can be described as a frugal innovation, even though the underlying criterion might not be fulfilled in another geographical location or market. In a post-market-entry assessment of frugal innovations (as presented in Fig. 3), failure and success can also be derived from the user-related performance. If user-related characteristics are not fulfilled, the frugal innovation is most likely to be a failure on the specific market.

### Limitations

The limitations of this study can be attributed to the novelty of the research field. To date, several studies about frugal innovation in developing and emerging markets have been published, though studies on frugal innovation in developed markets are still quite rare. It was therefore essential to include non-peer-reviewed publications and reports as well in order to advance the research field. Furthermore, this study is based on a review of secondary literature; a case study was not carried out.

The lack of a definition of frugal innovation presented a problem for this study. There are several ways of approaching the topic with similar conclusions, but an overall definition is not available. The main limitation of this model is that only German managers were interviewed, but they were at least managers of globally active enterprises.

The analyses of the presented cases are only partially based on facts, such as the indicators for 3a and 3b in the case of Airbnb, while other parts are based on assumptions (e.g. user-related indicators for Tata Nano). Therefore, the assessment is linked to chosen characteristics. Nevertheless, the assessed cases and the chosen characteristics were all based on several internal meetings with innovation experts and consultants.

The evaluation model can only be applied when analyzing already existing products and services as opposed to new products. Analyzing existing cases, however, will further contribute to gaining a broader understanding of frugal products and services in developed markets. Furthermore, the model will be used in a research project in 2019 and 2020, where it will be thoroughly tested and, if necessary, expanded and adapted further.

### Conclusion

This study proposes a new evaluation model to identify frugal innovation in developed markets and to distinguish it from those in developing markets by introducing the concept of second-degree frugal innovation. Based on the evaluation model by Weyrauch (2018), the existing set of criteria had to be extended by integrating user-related factors such as acceptance and prestige, so that the model could display the success or failure of an innovation. This study also recommends tools and suggests guidelines on how to obtain the optimal output from the model. By using function analysis as a systematic approach and as a tool for determining the main and side functions of the innovation, the second criterion of the model can be identified.

The analysis and discussion of the cases serve as a first test of the proposed evaluation model. It is essential to consider the limitations of this study as well. The results presented above are all case- and market-dependent. The characteristics of the third criterion play an important role in the overall evaluation of the innovation. Yet, these characteristics need to be selected by the user of

the evaluation model. Furthermore, the evaluation is an ex-post assessment.

The evaluation model will be used and tested in an upcoming research project over the next two years. During this period, it will be possible to collect more data and, if necessary, adapt the model once again. This will help to broaden the knowledge in the area of frugal products and services in general.

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