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Frugal innovation

Some theoretical observations from innovation-economic and social-entrepreneurial perspectives

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3. Frugal innovation: some theoretical observations from innovation-economic and social-entrepreneurial perspectives

Cees van Beers and André Leliveld

3.1. INTRODUCTION

Since 2010, the term Frugal Innovation has emerged in the innovation literature. The frugal innovation discourse has its origin in the practitioner community, beginning around 2008, exemplifying innovation by Asian firms and by the emerging market giants India and China. The term was coined by *The Economist* (2010) to refer to newly arising innovation manifestations in emerging markets, notably in Asia.

As put forward in the first chapter of this *Handbook*, one dominant characteristic of frugal innovations is that they are constraint-based (see among others Agarwal et al., 2017). Bhatti and colleagues (2018, 108) distinguish three types of constraints. These are (1) resource constraints that can be addressed by technological innovation; (2) affordability constraints that can be addressed by social innovations; and (3) institutional voids that can be addressed by institutional innovations (Bhatti et al., 2018, 108).[1]

The phenomenon of frugal innovations is multi-dimensional, which complicates opportunities to investigate it theoretically, that is, coming to generalizable conclusions. The multi-dimensionality aspect has led to different conceptualizations and definitions that have drawn attention away from theoretical elaborations (see the first chapter in this *Handbook*). From an inductive perspective, the lack of representative empirical studies hampers the formation of theories. From a deductive perspective, it is necessary to raise the question of whether frugal innovations are different from non-frugal or 'standard' innovations with regard to characteristics and assumptions. This chapter is an attempt to relate the phenomenon of frugal innovations to two theoretical perspectives.[2] The first relates to deductive reasoning with an economic focus on innovations in general and starts from the Schumpeterian perspective. The second perspective relates to inductive reasoning and is a recent exploratory contribution by Bhatti and colleagues (2018) who examine frugal innovations through a social entrepreneurial lens.

The next section presents a concise overview and discussion of the question of whether frugal innovation is a distinctive, new type of innovation. In Section 3.3, we briefly discuss, first, the economic Schumpeterian perspective and, second, the social entrepreneurial perspective as put forward by Bhatti and colleagues (2018). Section 3.4 draws some conclusions and offers an initial plan for a research agenda.

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3.2. ARE FRUGAL INNOVATIONS NEW AND DISTINCTIVE INNOVATIONS?

In this section, we move to the system innovation literature and the induced innovation way of thinking with the aim of examining whether and, if so, how constraints are relevant in innovation processes. The section moves on to focus on how constraints play a role in arriving at frugal innovations.

3.2.1. Constraints on Innovations and Technical Change

In the innovation economics literature, innovations are commercially successful technical and non-technical inventions originating from intentional investment decisions by profit-maximizing agents such as inventors/entrepreneurs (Romer, 1990). As the focus is on a sharp analysis of the incentives (capturing expected innovation revenues) of economic agents to come up with inventions and innovations, it is implicitly assumed that constraints on the innovation processes do not exist, due to perfectly working administrative and technical institutions, markets, and infrastructure. In other words, differences between high income- (HIC), and low- and middle-income countries (LMIC), as well as the direction of technical change, do not exist here.

The innovation systems literature has focused on describing the impact of properly working institutions on the production of (technical) innovations and hence economic growth in the context of developed economies (for example Dosi, 1982; Freeman, 2002). Lundvall and colleagues (2009) pay specific attention to innovation systems in low- and middle-income countries, and how these systems and their innovation output are affected by 'formal' institutional voids, policies, etc.

The direction of technical change was introduced through the induced innovation literature, which started with Hicks (1932) who observed that 'a change in the relative prices of the factors of production is itself a spur to invention, and to invention of a particular kind – directed to economizing the use of a factor which has become relatively expensive' (Hicks, 1932: 124–125). For example, if the scarcity of the production-factor labour increases, the price of labour (w = wages) goes up, and the relative price of labour to capital (w/r; r = rents) increases too. Capital becomes relatively less expensive and provides an incentive to invent and introduce technologies that use relatively more capital (the relatively cheap production factor) and less labour (the relatively expensive production factor). This can be extended with more production factors such as human capital, natural resources, etc. As such, depletion of natural resources would lead to relatively higher prices for these resources, thereby inducing technical change that is less natural-resource intensive. Government policies can be aimed at changing the prices of production factors through subsidies and taxes, and hence can influence the direction of technical change.

In properly working markets, all constraints that technology development and innovations encounter will be translated into increased (shadow) prices due to higher scarcity of the constrained factors as compared with the situation without constraints. As markets, especially in many low-income countries, do not work properly, or even sometimes do not exist, this mechanism is not (completely) valid in these countries.

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3.2.2. Frugal Innovations as Constraint-based Innovations

Frugal Innovations are innovations that work around several different constraints in institutions, technology, (financial) resources, and demand restraints in output markets. To be more precise, a distinction should be made between constraints on the supply side of innovation producers and those on the demand side of the users (see, for example, Ploeg et al., 2021). In both high-income and low-income countries, producers are restrained by supply factors such as the costs of energy, labour, and other inputs, although the intensity of these restraints in low-income countries is much more severe (frequent power cuts, etc.). What makes frugal innovations distinctive in this reasoning are constraints on the demand side. In low-income countries, especially with regard to Bottom-of-the Pyramid (BoP) users (daily spending of less than US$2.50), purchasing power is so restrictive that innovation processes should be completely different in terms of design and development than in high-income countries (Lim and Fujimoto, 2019). The design process faces three challenges, which are all related to the constrained environment in which the innovations are meant to be designed, produced, and marketed, that is, (1) resource constraints at the input side of the innovator or the innovating organization; (2) specific income and cultural constraints that customers living at the BoP are confronted with; and (3) institutional voids (Bhatti, 2012; Bhatti et al., 2018).

Kaplinsky (2011) refers to the literature on appropriate technology (AT) in the 1970s and 1980s, which received a great boost with Schumacher's publication of *Small is Beautiful* (Schumacher, 1973). The AT literature also pointed out the specific constraints in low-income countries that require different innovations and innovation processes compared with developed high-income economies. Technology designed, developed, and used in low- and middle-income countries should be small-scale, decentralized, labour-intensive, energy-efficient, environmentally sound, and locally autonomous. In this view, technology transfer from high-income to low- and middle-income countries – and also the other way around if applicable – does not lead to economic growth and development. Kaplinsky (2011) also refers to the informal sector literature, in which it has been shown that small-scale and locally owned firms are key providers of tailor-made products and services for low-income consumers. But for a long time, informal sector studies have also been 'below the radar' of theories on innovation, technology, and economic growth in low-income settings (Kaplinsky, 2011; Chataway et al., 2014). Muchie and colleagues (2016) represents an interesting attempt to shed more light on informal sector innovations.

Kaplinsky (2011) refers to three big global changes that will have implications for the nature of technical progress and innovation in the 21st century: (1) the development and extension of global value chains, (2) the global diffusion of technological capabilities due to the digital revolution, and (3) the rapid growth of consumption in low-income countries (LICs). The first two lead to 'polycentric innovation', which designates the global integration of specialized research and development capabilities across multiple regions to create novel solutions that no single region or company could have developed completely on its own (Radjou, 2009). This is also in line with two important phenomena that can be observed in innovation processes over the last two decades. First, greater product and technology complexity has increased costs and risks for innovators such that these can barely be dealt with by relying on one firm's own limited resources and capabilities alone. This has pushed companies to collaborate with external partners in developing their innovations. Second, the globalization wave of the last two decades has opened up more possibilities for cross-national alliances that contribute to creat-

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ing competitive advantage in foreign markets (Lavie and Miller, 2008; Van Beers and Zand, 2014). This gives agency to local (often poor) producers and consumers and thereby creates potential for frugal innovations, taking into account the characteristics of the environment in which the local consumers and producers have to operate.

The third big change observed by Kaplinsky (2011) is that the rapid growth of consumption in low-income countries creates new markets. Nakata and Weidner (2012) make three observations in this respect. First, the BoP and the rising middle classes represent the most significant remaining, or unaddressed, global market. Second, the people at the BoP do, in fact, have financial resources, representing about five trillion USD in purchasing power parity, according to estimates by Hammond and colleagues (2007). Third, the BoP and emerging middle classes are receptive and willing to spend money on quality products, provided these are suitable, well-made, and reasonably priced.

The frugal innovation process employs bottom-up, human-centric, appropriate, local, and cost-efficient approaches through processes such as design thinking, bricolage, creative improvisation, and lean and reverse engineering. Although none of the concepts are new, it is the combination and the shift in how these all work together through varied actors that is new and distinctive. For companies and other organizations involved in frugal innovations, frugal innovation forces them to take a fresh look at their business models and innovate in order to come up with quality products at dramatically lower prices (Govindarajan and Trimble, 2012; Prahalad, 2012). Frugal innovation requires business to reconsider and replace existing innovation processes, strategies, finances, partnerships, research methods, business objectives, and organizational learning routines (Nakata, 2012; Radjou et al., 2012). Cheap labour does not suffice for this type of innovation, as it is more about redesigning products and processes, rethinking the entire production process, discarding unnecessary features and frills, negotiating with suppliers and distributors for the best deals, and finding newer cost-effective means of reaching consumers. Frugal innovations reconfigure business models as well as provide new developmental challenges for local and multinational enterprises in the developing world, with winners and losers. They suggest new patterns of innovation that have not been observed before (Van Beers et al., 2012: 64).

3.3. SOME THEORETICAL OBSERVATIONS ON FRUGAL INNOVATIONS

Although the field of frugal innovation research has been developing fast over the last ten years, theoretical thinking is still scarce (Hossain, 2020; Hindocha et al., 2021). This section focuses on theoretical notions from two perspectives, namely an economic and a socio-entrepreneurial perspective. The first perspective is an economic one and based on the original work of Schumpeter (2012). It is an existing theoretical notion analysing how, in a developed country, a market economy, and an industrializing country, environmentally innovative entrepreneurs contribute to economic development and transformation. In order to use this way of thinking for frugal innovations, some possible adaptions are presented with the help of polycentric innovation strategies and Comprehensive Neo-Schumpeterian Economics. The second perspective is a social-sciences approach presented by Bhatti and colleagues (2018), constructed by studying the economic and social environment in low-income countries.

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3.3.1. Schumpeterian Economics as a Theoretical Perspective for Frugal Innovations

Innovations are a dominant force in economically transforming societies. This was argued by Schumpeter (2012) when he introduced the process of creative destruction. This is the destruction of products or production processes due to the introduction of new (innovative) products and production processes. Creative destruction drives economic transformation in a capitalist society. Schumpeter expected the creative destruction to come mainly from (often newly established) entrepreneurs operating in competitive markets. This is referred to as Schumpeter I. However, innovation processes are erratic and risky. The uncertainty of innovation processes induces innovating entrepreneurs or firms to control their external environment by growing in size. Larger firms are better able to control their external environment. Moreover, they have more financial means and they are able to spread R&D costs over a higher turnover, thereby reducing fixed costs per unit product. The idea of large firms being in a better position to produce innovations is referred to as Schumpeter II (Schumpeter, 1942).

Turning Schumpeter's original ideas into a useful framework for understanding frugal innovation in terms of the extent to which it contributes to local economic transformation, it is necessary to elaborate on two kinds of observations. First, more should be said about the features of the empirical manifestation of frugal innovation itself, which seem to be unique to frugal innovation and not accounted for in Schumpeterian theories. Second, the realities of today's low- and middle-income economies and their transformation processes should be examined.

3.3.2. Polycentric Innovation: A Hybrid of Schumpeter I and II?

An important part of innovation and technology development takes place in large firms, particularly multinational enterprises (MNEs), which have research facilities abroad aimed at adapting products to local markets but also at tapping knowledge and technology from foreign innovations systems. This suggests a Schumpeter-II world in which routinization and bureaucratization becomes the norm. In frontier markets, however, it is necessary to have a guide that is able to show the way around. In particular, frontier markets for frugally innovated products and systems require a polycentric way of innovation. The ambitions of Western multinational enterprises (MNEs) with regard to frugal innovations confront the MNEs with new challenges on their innovation processes (Prahalad, 2005). The focus of the MNEs is still on business models that are traditionally designed for developing and producing products for consumers in high-income countries or the small number of high-income consumers in low-income countries. The increasing focus of western MNEs on frugal innovations in emerging markets requires organizational structures and capabilities to enable the development of frugal products and systems (Zeschky et al., 2011: 40).

Two kinds of organizations for frugal innovation can be distinguished. First, frugal innovations take place in local R&D subsidiaries of MNEs in the new emerging markets. Zeschky and colleagues (2011) claim this to be relevant based on a case study of the Swiss weighing-instrument manufacturer Mettler Toledo. The advantage of this kind of innovation is partly controlled by the parent firm. The disadvantage is that it is focused on high-income markets in rich countries in which resource constraints on customers – a distinctive characteristic of frugal innovations (see Section 2.2. above) – are much less important than in low-income and/or emerging economies. Particularly in the case of frugal innovations aimed at supplying

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the customers in the Bottom-of-the-Pyramid in low-income countries, the resource constraints of customers need to be taken into account.

The second way of producing frugal innovations is through polycentric innovation production in technology networks in which both MNEs and local entrepreneurs operate and collaborate. This requires a completely different business model and combines elements of both Schumpeter I and II. Schumpeter II large-sized firms result in learning effects for local collaborating entrepreneurs as to how to innovate continuously, while Schumpeter I small, local entrepreneurs have a better sense of, and information about, the needs of local customers. Locally embedded knowledge and technology networks are an important element in successfully re-engineering high-value products for low-value but high-volume markets. The Schumpeterian elements here are innovation (novelty) and entrepreneurship (Hagendoorn, 1996; Hanusch and Pyka, 2007). The new point is the international dimension, that is, technology networks between firms of different size located in different countries with different income levels.

Current trends in the development of innovations, including frugal innovations, and in particular in emerging economies, do not fit neatly into Schumpeter I or II. On the one hand, individual local entrepreneurs might drive frugal innovation, while on the other hand frugal innovation might be driven by MNEs that have the resources to engage in R&D. Currently, most frugal products are still being developed and introduced by MNEs, which would make frugal innovation fit into the Schumpeter-II pattern of innovation. But the typical polycentric and knowledge-sharing features and the related business model also have features of a Schumpeter-I pattern of innovation and make frugal products and services the result of a kind of hybrid pattern of innovation, which does not fit the classical Schumpeterian pattern. Often, many local entrepreneurs in, for example, Africa are innovative, but a key bottleneck seems to be that of becoming involved in wider technology networks that allow them to become more integrated in broader (national and international) innovation systems. Further study of polycentric networks and strategies should shine light on how to deal with this.

In low-income economies, innovations are often of a bricolage character invented and implemented by local entrepreneurs. These innovations show up incidentally when a practical problem needs to be solved. In order to make innovation a driving force of local economic transformation, it is necessary to increase the number of innovations with the help of routinization of the innovation production process. Innovation and technology networks between large oligopolistic enterprises – often MNCs – and smaller local entrepreneurs can play an important role in making routinization of innovations a dominant force in economic transformation. The Bottom-of-the-Pyramid can provide a demand-driven force necessary for (frugal) innovations (Schmookler, 1966). As local private firms in, for example, Africa are generally not very large (the exceptions being in South Africa, Nigeria and Ghana), large foreign firms could provide the required routinization experience. The smaller local firms can deliver on knowledge of local markets and the resulting requirements that frugal innovations need to have in order to become successful. Therefore, frugal innovations developed in innovation and technology networks between foreign and local firms may have much more potential to be relevant for local economic transformation than views which consider a 'one size fits all' external solution to solve the perceived backwardness in technology and innovation or a pure local solution lacking in upscaling opportunities. Such polycentric networks can also contribute to the availability of knowledge on how to use technology.

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3.3.3. Neo-Schumpeterian Economics: Elements for Modelling Frugal Innovations

The ideas of Schumpeter have spurred further theoretical thinking and modelling, becoming manifest in Schumpeterian endogenous growth models and what is called Neo-Schumpeterian Economics (NSE). Besides Schumpeter, the intellectual roots of NSE are Evolutionary Economics, approaches dedicated to change and development, and systems theory (see Hanusch and Pyka, 2007).

The most distinguishing mark of Neo-Schumpeterian Economics is its focus on novelty, whereby innovation, and in particular technological innovation, is the most visible form of novelty. In NSE, innovation competition takes the place of price competition as the coordinating mechanism of interest. In addition, inseparably connected with innovation, true uncertainty enters the scene with important consequences for the analysis. This introduces the possibility of 'potential surprises' and, instead of becoming concerned with allocation and efficiency with a certain set of constraints – as neoclassical economics does – NSE is concerned with the conditions for and consequences of a removal and overcoming of these economic development limiting constraints (Hanusch and Pyka, 2007: 276).

Hanusch and Pyka (2007) introduce a Comprehensive Neo-Schumpeterian Economics (CNSE). That is, NSE should move beyond 'standard' technological innovation produced in a stable and controlled environment by including all facets of open and uncertain developments in socioeconomic systems. CNSE should, for instance, not only consider transformation processes on the industry level but also on the public and monetary side of an economy. Together, these should constitute the three pillars of CNSE. With regard to industry, Hanusch and Pyka (2007) refer to the increased importance of knowledge, combined with an increasing internationalization of business, which leads to processes of catching up and leapfrogging affecting the international competitiveness of nations and regions, and confronting established companies with major technological and organizational transformation processes. Modern innovation processes are more complex and demand collaboration with small and new entrepreneurial and technological start-up companies. Heterogeneous agents with varying competences and capabilities, industries at very different stages of maturity, and institutional frameworks differing between sectors, regions, and nations coexist in CNSE, strongly enriching the complexity of the economic systems of analysis. At the meso level, 'several emergent properties and nonlinearities have to be considered then, e.g., unbalanced growth processes, catching-up, leapfrogging as well as forging ahead, etc., become part of the economic reality' (Hanusch and Pyka, 2007: 282). In an NSE perspective only a narrow corridor exists for a prolific development of socioeconomic systems, namely between the extremes of uncontrolled growth and exploding bubbles, on the one hand, and stationarity (zero growth and stagnancy), on the other (Hanusch and Pyka, 2007: 284).

These theoretical notions and ideas are relevant for improving the understanding of how frugal innovation – as a phenomenon that exemplifies current developments in modern innovation processes – relates to and affects processes of economic transformation. NSE can help us to better understand frugal innovation and its relevance for economic transformation beyond the level of industry or business. In fact, frugal innovation should be analysed both at the micro (entrepreneur/enterprise), meso (sector), and macro (economy) level, and how these levels are linked matters for the outcome of frugal innovation for economic transformation and development. Understanding how frugal innovation relates to and affects socioeconomic systems and trajectories requires analyses of sectors other than industry as well, including the

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finance and public sectors. CNSE also draws attention to the existence of heterogeneous agents that coexist and interact at various levels, none of them being a role model or being representative for the other. Particularly in studying frugal innovation processes, the acknowledgement of heterogeneity of agents is relevant (for example, large foreign firms and small local firms).

3.3.4. A Socio-entrepreneurial Approach to Frugal Innovations

Bhatti and colleagues (2018) have provided an interesting contribution to theory development by constructing a conceptual framework aimed at encompassing the pluralistic phenomenon of frugal innovations. His focus is on social entrepreneurs as key players in constructing frugal innovation under constraints or extreme conditions marked by institutional voids and resource scarcity. The focus on social entrepreneurs is considered as a middle ground or reconciliation between the objectives of profit maximization and social impact – often considered as contradictory (Bhatti et al., 2018: 106). It should be noted that the theoretical notions developed here are based on conceptual innovation models that are not universally and materially objective as they are built upon empirical observations of social entrepreneurs from the perspective of critical realism (Bhatti et al., 2018: 107).

Based on interaction between inductive and deductive reasoning, Bhatti and colleagues (2018) developed two innovation models that can be useful in describing the phenomenon of frugal innovations. The first model focuses on the sources and determinants of innovations along the dimensions of (1) need or vision and (2) scalability or proof of concept. This leads to a typology of four kinds of innovation that social innovators recognize as motivating them. The typology consists of (1) efficiency-driven innovation, (2) user-driven innovation, (3) challenge-driven innovation, and (4) socially driven innovation. These four kinds of innovations lead Bhatti and colleagues (2018: 69) to reach the observation that frugal innovations aim to overcome development shortcomings in the past. This implies, from an institutional perspective, that frugal innovations are process or systematic changes to ideas about how development can be achieved in specific social contexts.

The second model focuses on frugal innovations that put the motivations of the first model in the context of resource constraints and institutional voids. Social entrepreneurs produce frugal innovations inspired by the resource constraints of their potential customers – for example, low affordability – as well as the resource and institutional constraints and voids they experience in designing, developing, producing, and selling the frugal innovations. Social entrepreneurs report that they use technology to deal with resource constraints, social innovations to address affordability constraints, and institutional innovations to address institutional voids (Bhatti et al., 2018: 108). Schumpeterian innovations have a strong technological component and are profit induced. Social innovation focuses on creating value that is more social. Institutional innovation is concerned with introducing new practices, norms, and regulations. Social entrepreneurs are expected to combine these three types of innovations in order to generate profits as well as social value by taking into account local social values.

The attempt to provide a theory of frugal innovations emerges from the integration of the two models – motivations and context – and leads to the conclusion that frugal innovations can be expected to show up at the intersection or overlap of technological, social, and institutional innovations aimed at overcoming resource constraints and institutional voids while providing social transformation.

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An important difference with Schumpeterian innovations is that Schumpeterian innovations are driven by profit alone, and it is assumed that the resources required to innovate are available and under control. If Schumpeterian entrepreneurs and large corporations cannot control the resources, they run into resource constraints that often can be an impediment to going any further due to uncertainty, that is, the expected negative consequences for profits (Prahalad and Hammond, 2002). Social entrepreneurs innovate to achieve their aim of creating more value that is social in an economically sustainable way. Profits are necessary for social entrepreneurs, but they are not the main goal of the enterprise. This allows for room to experiment and provide opportunities to deal with resource constraints within the innovation process and affordability constraints as an outcome of innovation (Bhatti et al., 2018: 114).

3.4. CONCLUSIONS AND PROPOSALS FOR FUTURE RESEARCH

This chapter has examined the concept of Frugal Innovations and some theoretical notions that can be used to analyse and understand it from an innovation, economic, and socio-entrepreneurial perspective. Frugal Innovations' main characteristics are defined by resource constraints. This differs from 'standard' innovations in terms of the intensity and the number of constraints that define it. 'Standard' innovations are also constrained by scarce resources, but these are present at the input side of the innovator or the innovating organization. For example, increasing energy costs can lead to innovations to make production processes less energy intensive. Frugal Innovations are characterized not only by constraints on the input side – that are much more extreme than in case of 'standard' innovations – but the output side is also constrained. In low-income countries, customers experience strong constraints on their consumption patterns and quantities. Many potential users of frugal innovations in low-income markets are in what is often called the Bottom-of-the-Pyramid and have to live on less than a couple of dollars a day. Cultural and social differences provide constraints on the usability of innovations. Through design/redesign and development-specific characteristics as well as new business models that address these constraints, it is possible to produce frugal innovations that fit the preferences of BoP users.

Some theoretical observations have been sketched out along two lines: (1) existing innovation in theoretical thinking based upon Schumpeter, and (2) a new conceptual approach focusing on innovation in resource-constrained environments, taking into account the specific new elements of frugal innovations.

With regard to the first approach, using existing theoretical thinking, this chapter combines Schumpeter I and II, and pleads the case for polycentric innovation. This relates to a value chain in which domestic and/or foreign multinational enterprises cooperate with local innovating firms or start-up entrepreneurs/innovators in order to design/redesign and develop products, processes, and systems geared towards the resource-constrained circumstances in which BoP customers live. This is a static picture. Recent extensions in modelling Schumpeterian innovation processes can be found in what is called the Comprehensive Neo-Schumpeterian Economics (CNSE) approach. CNSE goes beyond technological innovation, aims to take into account uncertainties in socioeconomic systems, and hence can provide insight into economic transformation in a dynamic analysis.

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The second approach proposes two innovation models. The first model provides a conceptual approach based upon inductive research concerning social entrepreneurs in low- and middle-income countries, which leads to a typology of four kind of innovations. These are (1) efficiency-driven innovations, (2) user-driven innovation, (3) challenge-driven innovation, and (4) socially driven innovation. The second model shows that frugal innovations occur at the intersection between technological innovations, social innovations, and institutional innovations, which are aimed at overcoming resource constraints and institutional voids while providing social impact or transformation.

A future research agenda provides two routes. The first route is working out of comprehensive Schumpeterian models where surprises or serendipities can occur. The second way is working further along the lines sketched out by Bhatti and colleagues (2018) and focuses on empirical testing of these models in order to provide them with a broader validity. Furthermore, the role of socio-entrepreneurial networks and how these can contribute to frugal innovations is particularly relevant here.

NOTES

1. For a more critical view on resource constraints, see Pansera (2018) and Chapter 4 by Pansera in this *Handbook* which emphasize that resource constraints might be the result of social construction. For example, power distribution, religion, gender, caste, etc., influence the availability of and access to resources for different individuals and groups within society.
2. We are aware that other theoretical perspectives might exist as well, and therefore our choice is far from exhaustive.

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