

Centre for Frugal Innovation in Africa Working Paper Series



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This is a publication of the Centre for Frugal Innovation in Africa (CFIA), a research centre within the strategic alliance between Leiden University, Delft University of Technology and the Erasmus University Rotterdam in the Netherlands. The CFIA studies frugal innovation in relation to economic transformation. Our aim is to identify the conditions under which frugal innovations are more likely to improve the lives of consumers and producers at the Middle and Bottom of the Pyramid.

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1. Introduction

This draft paper, written at the request of DG Research and Innovation, offers building blocks suggesting where and how frugal innovation could be integrated into EU policy. It focuses on possible connections with the 'Mission-Oriented Research & innovation' program (Horizon Europe) that is presently being designed by the DG Research and Innovation.

Section 2 builds on the EU scoping Study on frugal innovation and the reengineering of traditional techniques (2017). In addition, this study introduces three key types of frugal innovation processes, driven respectively by firms, NGOs and local communities. This section also shows how these three distinct processes link up with different parts of the EU policy agenda.

Section 3 explores how a frugal innovation angle could enrich some of the main EU policy instruments and also raises the idea that a more fundamental rethinking of future innovation trajectories might be needed to effectively address global challenges.

Section 4 raises two questions for further discussion.

2. Frugal innovation: definition, main actors and diverse policy domains

This section builds on the excellent EU scoping Study on frugal innovation and reengineering of traditional techniques, carried out by Fraunhofer and Nesta (2017). They define frugal innovation as: “the process of innovating in conditions of constraint, to produce solutions that are substantially more affordable than alternatives, and accessible to a broader range of people, while also meeting user needs as – or even more – effectively” (p.5).

This operational definition already recognizes that frugality is a relative concept. This becomes even more important to keep in mind when looking at some of the other more normative dimensions that are often discussed in relation to frugal innovation. Frugal innovation processes ideally make optimal and careful use of resources, avoid waste, reduce material use and increase the use of renewables. Especially when also creatively combined with 4th industrial Revolution technologies that deliver tailor-made solutions at very low marginal costs, frugal innovation is increasingly linked to debates on the circular economy and sustainable development.

Yet another entry point is how community-based frugal innovations, i.e. innovations whereby community members aim to creatively address common challenges with locally available means, link to policies on ‘Science with and for Society’. These community-based frugal innovations, based on local experiential knowledge and ingenious improvisation, can enhance local agency and self-confidence and have the potential to contribute to more inclusive development and enhanced social cohesion. Given this wide-ranging variety of entry points, this paper aims to provide clarity through identifying three distinct types of frugal innovation processes: firms which develop frugal innovations to make profits and penetrate new markets; NGOs and social enterprises which develop frugal innovations to help marginalized communities; and community members who develop their own frugal innovations to address their own bottlenecks.

First, frugal innovations produced by firms (large and small, international and local) seeking to capture the rapidly growing global market segment of ‘relatively poor and new middle class’ consumers at locations all over the world. The firms that drive these frugal innovation processes would normally have a for-profit motivation, that can be combined with various levels of awareness and action in terms of their social and environmental responsibilities. In this first type, frugal innovation is a means of enhancing competitiveness and developing new business models for longer term company growth by European multinationals and SMEs in Europe and perhaps especially in emerging economies. It links to the Ensuring Europe’s global competitiveness agenda, the Mission-Oriented Research & Innovation program and ERDF.

Second, frugal innovations developed and implemented by NGOs and social enterprises that aim to address major societal challenges, ranging from using drones to supply medicines in remote rural areas in Africa, to mini-grid electricity and water facilities or 3D printing facilities to provide spare parts for local agricultural machinery. This second type of frugal innovation links clearly to, for example, the EIC Horizon Prize for ‘Affordable High-Tech for Humanitarian Aid’.

Third, frugal innovations developed by citizens to address local constraints and deal with acute scarcity. These innovations usually do not have a for-profit motivation. Rather they are based on the intrinsic motivation of community members to deal with their own problems. Such initiatives ‘from below’ range from informal community initiatives to make

movements, prosumer organizations, community-based energy corporations, Do-It-Yourself movements etc. While such innovations may well be initiated by one or a few persons in a community, the innovations generally benefit the broader community. They often become co-owned and are then further developed collectively. These processes relate to the EU policies on resilience, inclusive development and social cohesion, among others in the SwafS program and the Societal Challenges relating to 'Inclusive, Innovative and Reflective Societies'.

The main actors mentioned above do often collaborate with one another, such as when firms and NGOs apply jointly to award granting programs for humanitarian aid, or when NGOs work with communities to jointly address local bottlenecks. At the same time, it is important to recognize the differences in motivation. While communities develop these innovations for themselves to cope with adverse conditions, firms (co-)develop frugal innovations to make profits and NGOs (co-)develop frugal innovations with funding from private or public donor agencies to address societal challenges. Nevertheless, selective collaboration among these different actors is much needed. It is increasingly recognized that successful innovations are not developed in one location by one type of actors, but through interactions between different types of actors in different settings. Therefore, stimulating such interactions is an important element in policy instruments aiming for innovation. The next section looks at the various instruments.

3. EU policy instruments and frugal innovation

The following listing and discussion is not exhaustive. It is meant to facilitate a follow-up discussion with staff from DG Research and Innovation to select the most relevant policy domains for a possible further elaboration.

3.1 Ensuring Europe's global competitiveness

A variety of successful frugal innovation examples in Europe, like the Dacia car, show the potential market demand for frugal solutions. However, as also noted as one of the key findings from the EU scoping study by Fraunhofer and Nesta (2017): “There are clear trends that point towards greater demand for frugal solutions in Europe. However, it seems that often, customers are still hesitant about choosing frugal solutions due to the negative image associated with ‘buying affordably’.” (p.7). This hesitation can be at least partially addressed by means of only offering public support to frugal projects: “(that) aim not only at achieving low prices but on proven quality and limited environmental footprint.” (p.7). This hesitation might be seen as important in some sectors like energy provision, and among consumer groups that are experiencing downward social and economic mobility. Nevertheless, for most relatively poorer and new middle-class consumers in and outside of Europe such hesitations are much less important, which is one of the reasons why markets for frugal solutions are booming.

European MNEs and SMEs are engaged in a ‘fight’ for these relatively poorer and new middle-class markets with firms from, for example, China and India. The new middle-class markets are the fastest growing market segment in the global economy. These consumers are both price and quality conscious, looking for high functionality at relatively lower cost. In principle, European MNEs and SMEs are well positioned to offer products and services in between the A-brand high-end markets and the low-end dominated by Asian producers. European MNEs that consciously target these markets seem to be able to develop successful frugal solutions using their own staff, who learn from their more locally based supplier and distribution networks, and from selectively working together with NGOs. However, European SMEs are finding this much more difficult. Another key finding from the Fraunhofer and Nesta study (2017) is: “Most smaller firms face considerable challenges in the attempt to launch technology-based frugal solutions in emerging markets, and many have failed in the process.” (p.7).

The niche for European firms is not to engage in a ‘race to the bottom’ on price, but to develop frugal innovations that offer: “customer orientation, credible quality, durability and sustainability. In the best possible case, European savviness can help realize all three of these requirements whilst, at the same time, and by means of clever branding, motivating customers to pay a small price premium *within the frugal range*, i.e. below a price-threshold that makes a solution with that functionality affordable. Successful European frugal innovations might be positioned as ‘second-cheapest’ options: remaining accessible and affordable, while retaining quality and avoiding a ‘race to the bottom’ on price (p.9).

In short, this booming market potentially offers great opportunities for European firms. While MNEs seem to be able to become successful in these markets, if they consciously target them, for European SMEs targeted public support seems warranted and desirable. Positioning European SMEs as future sustainability leaders at the higher-end of the frugal range will require significant and strategic public support, so as to enable quality and sustainability standards for frugal solutions to be met. To start with, serious research efforts will be required to establish under what conditions European SMEs are more likely

to become commercially successful sustainability leaders in this booming market segment.

3.2 Mission-oriented Research & Innovation

The EU has adopted Mission-oriented research & innovation as one of the pillars for Horizon Europe, and the DG Research & Innovation is presently designing this program. Mazzucato (2018) defines these thus: “Mission-oriented policies are systematic, public policies that draw on frontier knowledge to attain specific goals or big science deployed to meet big problems” (p.4). She mentions some examples of possible missions, for example ‘100 carbon neutral cities by 2030’. These missions are not only to enhance the quantity of innovation output but also the quality as related to the *direction* of technological innovation. The argument here is that a frugality lens will be instrumental in helping to achieve such missions. With a frugality lens one focuses on the need to reduce technical over-engineering in combination with ensuring that low-income citizens and customers are included in new innovation systems. These two elements will allow for more inclusive and sustainable ways to address global challenges like climate change and an aging population. Moreover, such more frugal innovation strategies will also offer higher functionality at relatively lower costs, and address the global issue of overconsumption of unsustainable goods and services through incentivizing more frugal consumption patterns. A frugality lens is also a means to recognizing and giving space to localized co-creation processes that empower citizens. This means opportunities for all three types of frugal innovation processes discussed in Section 2. After all, a central feature of the mission-oriented approach is to involve various actors across sectors to cocreate in achieving the missions that have been defined.

The Mission-Oriented Research & Innovation approach identifies 5 key criteria for selecting missions (1. Bold, inspirational with wide societal relevance; 2. A clear direction, 3. Ambitious but realistic, 4. Cross-disciplinary, cross-sectoral and cross-actor innovation, and 5. Multiple, bottom-up solutions). Frugal innovations are most likely to play an important role in relation to criteria 4 and 5. The 4th criterion focuses on ‘Crossdisciplinary, cross-sectoral and cross-actor innovations’. In order to achieve successful frugal solutions, firms, NGOs and communities need to selectively collaborate to achieve the desired synergies.

The 5th criterion, ‘Multiple, bottom-up solutions’, is a clear invitation to create space in the mission-oriented research and innovation agenda for polycentric and community-based frugal innovations. The increasing importance of digitization will further enhance the importance of more spontaneous and localized community-based frugal innovations, and reduce the likelihood that successful innovations can be ‘planned’ top-down. In order to mobilize the creativity of firms, NGOs and communities to engage in societally relevant frugal innovation, some incentivizing instruments could be helpful.

Firstly, for firms this has already been discussed above under the section on ensuring global competitiveness for European SMEs in capturing the relatively higher-end markets of delivering frugal solutions, with accompanying sustainability standards. Secondly, for NGOs, working with firms and/or communities, some examples of incentivizing instruments already exist, like the EIC Horizon price for Affordable High-Tech for Humanitarian Aid. Such awards can offer a useful entry point for professionally organized NGOs and firms. Thirdly, to think of ways that can stimulate and strengthen local community attempts at frugal innovation, and to find ways to connect such often ‘invisible’ innovators with other innovation actors on the basis of mutual respect for each other’s knowledges. A frugality lens can assist in empowering such ‘under the radar’ innovators and in connecting them more systematically to achieving the objectives of the

specific overall mission. This in itself could be a major contribution to the success of the mission-oriented research & innovation program.

In addition to the two main policy instruments discussed above, somewhat different but related frugal innovation opportunities exist in, for example, the European structural and investment funds, and the EU partnerships with Africa. These will be briefly introduced below.

3.3 European Structural and Investment Funds

The ERDF has a lot of scope for so-called reverse innovation interventions. Reverse innovation refers to frugal innovations that have proven to be successful, in, for example, Africa, among poor consumers, and which could, with adaptations, become successful innovations for marginalized communities in less-developed regions in the EU. Examples of this form of intervention range from such areas as offering banking services through mobile money facilities using SMS text messages without the need to own a formal bank account, to decentralized grid facilities run by local residents with the use of solar panels, to the development of frugal portable versions of expensive medical equipment, otherwise only available in larger hospitals. These innovations can offer profitable business models to EU firms, and offer improved satisfaction of consumer needs. A key challenge with reverse innovation is to overcome the perception that marginalized citizens in the EU are fobbed off with second rate solutions, while more affluent fellow citizens enjoy much more sophisticated public services.

The ESF and CF offer complementary opportunities to stimulate community frugal innovations as ways for local people to enhance their resilience and self-confidence, also strengthening a sense of inclusion and belonging. This can be combined with the search for more sustainable consumption and production practices through a better understanding of what can be learned from small-scale alternative movements that live and produce frugally, like the organic and slow food movements. This can be part of a broader agenda on stimulating research and experimentation to develop viable alternative local development trajectories with more sustainable production and consumption patterns as well as forms of active citizenship to strengthen democratic processes.

3.4 EU-Africa partnership

The recently published report ‘An Africa-Europe agenda for rural transformation - Task Force Rural Africa’ (2019) focuses on developing higher value-added activities in African agriculture, with key roles for new technologies and for multi-actor collaboration. A frugal innovation lens can be instrumental in operationalizing exchange and mutual respect among various types of knowledges – for example, experiential local knowledge about climate change versus codified scientific knowledge. Experiences from various countries can complement each other. For example, South Africa and India signed an MoU on joint grassroot innovation initiatives in 2016, to enhance the exchange of knowledge on frugal production and consumption practices. While the EU can bring in various kinds of technical and economic expertise into such collaborations, it might simultaneously learn from experiences in other countries.

The above illustrations are put forward as examples of how frugal innovation might enrich EU policy domains. We look forward to discussing these and other options with staff from DG Research and Innovation.

4. Way forward

Frugal innovation thinking ranges from how local communities creatively deal with acute scarcity on the basis of experiential knowledge to formalized innovation processes in European firms to successfully penetrate new middle-class consumer markets. It would be, in our view, fruitful to discuss how to most effectively integrate these various perspectives into which parts of the EU policy agenda?

The other important broader question that would seem to merit discussion, is the extent to which a drive towards more frugal solutions can be integrated into the present policy instruments, and/ or whether a more radical re-thinking of innovation trajectories around reducing technical over-engineering and more pro-actively involving low-income citizens and consumers is needed in order to deliver effectively when addressing the grand challenges?

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