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CHEAPER, BETTER, MORE RELEVANT.

IS FRUGAL INNOVATION AN OPPORTUNITY FOR EUROPE?

While studying for a PhD at the London School of Hygiene and Tropical Medicine, Andrew Bastawrous set up a study of eye disease in Kenya. To reach the 5,000 people taking part in the study, he had to take 'effectively a fully staffed eye hospital, fully equipped with more than £100,000 of heavy and fragile equipment, to remote villages'.[1] He realised that this 'logistical nightmare' was preventing many people with blindness – 80 per cent of which can be cured or prevented – from getting help.

In collaboration with an app designer and researchers from the University of St Andrews and the Glasgow Centre for Ophthalmic Research, Bastawrous developed Peek - the Portable Eye Examination Kit. Combining an app and a piece of clip-on hardware, Peek turns a smartphone into a tool that can be used for retinal photography, check glasses' prescriptions and diagnose cataracts.[2] Patients can be diagnosed in their homes by non-specialists who can share the data with qualified eye doctors working remotely. And the whole solution is designed to be 50 times cheaper than examination in a conventional clinic.

By rethinking the ways that eye examinations can be carried out and developing a radically lower-cost, more efficient solution that provides as good, or better value for patients, Peek is a good example of 'frugal innovation'. This model of innovation springing from India and other emerging economies is now starting to find traction in the West. Fraunhofer ISI and Nesta are carrying out a study on 'frugal innovation and re-engineering of traditional techniques' for the European Commission. Here, we summarise some of the main points presented in our interim project report.

WHAT IS FRUGAL INNOVATION?

Search for 'frugal innovation' on Google Scholar and you'll see that interest in the concept is growing fast. While fewer than 20 articles featuring this phrase were published from 2006 to 2009, in the year 2015 there were over 500. In the course of this emerging discussion, the term has come to cover a broad range of examples, from localised 'grassroots' or *'Jugaad'*[3] innovations, like the Mitticool clay refrigerator or the Jaipur Foot, to novel processes in corporate environments that aim to accessing emerging markets, like GE's ultra-low-cost ECG machine.

While these various forms display notable differences, a joint essence can be captured by Pralahad and Mashelkar's phrase **'more value from less resource for more people'**.[4]

What's clear is that frugal innovation is concerned both with the outcome of innovation (what is produced, and who for) and the innovation process itself (how, and who by). Frugal innovation generates products and services that **provide radically better value for less affluent customers**, and by doing so, **can open up entirely new markets**. The concept of frugal innovation has its roots in developing and emerging economy environments where resources are severely constrained, so it is often associated with providing solutions for consumers at the so-called 'base of the pyramid'.[5] However, much of the more recent writing on frugal innovation focuses on its appeal to customers who are highly price-conscious, but not the very poorest. These customers make conscious decisions in favour of low-cost products or those that focus on core functionalities and satisfy basic needs without providing unnecessary additional features. Purchasing 'frugal' products is in these cases triggered by individual preferences and motivations.

Crucially, the aim of frugal innovation is to produce solutions that are **not only *cheaper* but *better***. This is achieved by focusing on users' needs and ruthlessly prioritising only the features of greatest importance to customers. In doing so, frugal innovation sometimes involves completely re-thinking a product or solution.

'Frugality' can be achieved in a number of ways. Common strategies include: 'de-featuring' (removing features from an existing product); improving robustness and sustainability to increase product lifetime; improving efficiency of production processes and supply chains; and making more efficient use of resources, for example through better design, by using waste products in a 'circular economy' model or by re-thinking how often hidden assets - including people - can be used. The innovation process itself can also be made more 'frugal' - for example, through crowdsourcing ideas rather than going through traditional R&D processes.

Frugal innovation can be applied to services as well as product development. Some of the most famous examples of frugal innovation are service models, such as **Aravind Eye Care** or **Narayana Health**, both of which provide very low-cost health services to low-income customers in India. As these examples – and many product innovations – show, business model innovation is also often an essential feature in a frugal solution. Narayana Health, for example, created a new micro-insurance scheme to enable poorer customers to access medical cover.

Since it starts from user needs, rather than availability of technology, frugal innovation does not necessarily produce technologically advanced solutions. Some, for example, simply involve ingeniously re-using existing technologies to provide new solutions. Also, with user needs at the core, frugal innovation may imply a new approach to innovation or an approach of 're-thinking' the innovation process.

Nevertheless, high tech and frugal are not mutually exclusive. Even solutions aimed at 'base of the pyramid' consumers are sometimes based on advanced technologies or technological processes. **Husk Power Systems**, for example, have developed new biomass gasification technology to extract combustible gases from rice husks. Meanwhile, there is considerable anticipation that new technologies (like organic photovoltaics) and production processes (like 3D printing) will open up many more opportunities for frugal innovation.

WHY IS FRUGAL INNOVATION BECOMING RELEVANT FOR EUROPE?

Frugal innovation has a strong association with developing and emerging economies, particularly India. In contrast, innovators in Europe (and other developed economies) are assumed to take professional pride in conceiving solutions that are among the most complex and technologically advanced. So how could the concept of frugal innovation be relevant for Europe?

First, frugal innovation could help companies reach new markets. For example, Western multinational corporations operating in emerging markets have tended to focus on serving 'premium' customers. To grow, they need to expand their customer base. There is a broad consensus in the management literature that Western firms will rarely be able to beat domestic competitors at the lowest ends of the market, but by adopting principles of frugal innovation they could reach the mid-market - the fastest growing customer segment. General Motors, Nokia, Procter & Gamble and Unilever have all successfully innovated new products for 'emerging middle class' consumers in China, India and beyond, while Siemens and Philips have reached new markets by developing low-cost devices for resource-constrained healthcare systems.

Yet Europeans need not only be providers of frugal innovation – they can be customers too. As the success of Renault-Dacia's low-cost *Logan* range shows, there is already some demand for frugal solutions in Europe, not only in emerging markets in Eastern Europe but among consumers in Europe's west, north and south. While increasing resource constraints are an important driver of demand, frugal solutions may also appeal to consumers looking for ecologically sound, 'ethical' products. We argue that rather than thinking of frugal innovation as applicable only to certain groups of consumers, it might be more helpful to think of it in terms of what economists call 'high elasticity of demand' - areas where, by crossing a threshold, a decrease in price (based on a more focused functionality) will lead to a high increase in demand.

Meanwhile, from a public policy perspective, frugal innovation could theoretically generate additional social and environmental benefits and help to tackle common challenges, from delivering good public services in conditions of austerity and growing demand, to promoting social and economic inclusion and ecological sustainability. However, as we define it, frugal innovation can take many forms, and does not always produce greener, cleaner, more socially beneficial results. The challenge for policymakers is therefore to explore how to promote frugal innovation in a way that maximises its potential benefits, and minimises its potential downsides.

The European context is of course very different from that in emerging economies. In India, for example, gaps in infrastructure and weak institutions have driven demand for frugal innovation, and helped it to take root. Stronger regulation, and difficulties in finding niches for innovation in well-developed institutional environments (such as Western healthcare systems), may make frugal innovation more difficult in a European context. However, innovation under constraint is a hallmark of the 'frugal' approach, and such constraints may spark innovation as well as, sometimes, hinder it. Indeed, many areas in China and India have now become more effectively regulated – yet frugal innovation still emerges, arguably stronger than before.

In fact, recent history suggests frugal innovation is not as culturally alien to Europe as one might assume. From the idea of 'productive tinkering' *(tüfteln)* commonly ascribed to Germany's Baden-Württemberg region, to innovation using scarce resources in Communist Eastern Europe, or Mrs Sew and Sew, the character used to promote a 'make do and mend' mentality during World War Two, traces of a frugal past can be identified across the continent.

WHAT NEXT FOR OUR PROJECT?

Our scoping study has twin objectives: assessing the relevance of frugal innovation to Europe and, more specifically, assessing how far advanced technologies[6] can be integrated in frugal solutions. After completing a literature review and exploratory interviews, which informed our interim report, our next step is to carry out ten case studies to explore market potential, enablers and barriers for frugal innovation in a range of different sectors relevant for Europe. These include cases focusing on:

- Water treatment
- Buildings and housing
- Organic photovoltaics
- Printed electronics as a platform technology for frugal healthcare applications
- Prosthetics
- Circular economy
- Frugal innovations for refugees and displaced people
- Frugal innovations on European markets
- FabLabs and makerspaces
- Universities as hubs for frugal innovation

We aim to draw out a set of concise recommendations that can help inform policymakers as they decide whether and how to promote frugal innovation.

ENDNOTES

1. http://www.insight.mrc.ac.uk/2012/09/24/studying-blindness-theres-an-app-for-that/
2. https://www.lshtm.ac.uk/newsevents/news/2013/peek_vision.html
3. Jugaad is a Hindi word that roughly translates as 'overcoming harsh constraints by improvising an effective solution using limited resources'. It describes a mindset of creative improvisation.
4. C.K. and Mashelkar, R.A. (2010) Innovation's holy grail. 'Harvard Business Review.' pp. 132-143.
5. The 'base of the pyramid' refers to the largest, and poorest section of the world's population. Depending on definitions, this accounts for roughly three to four billion people worldwide.
6. Including nanotechnologies, advanced materials, advanced manufacturing and processing, and biotechnology (NMBP) – Key Enabling Technologies covered by the European Commission's Leadership in Enabling Industrial Technologies programme).

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Fraunhofer ISI has been one of the leading research organisations in the field of innovation and innovation policy for more than 40 years, providing expertise to policymakers at national and European level, and maintaining long-standing exchanges with scientific partners in emerging economies.

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July 2016

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