ICH and 'Frugal Innovation': a Contribution to Development through the Framework of the 2003 *Convention*

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ABSTRACT

This paper endeavours to emphasise one particular vector of sustainable development from intangible cultural heritage: 'frugal innovations'. It discusses the potential of ICH to generate frugal innovations, contributing to improving communities' quality of life and enhancing the safeguarding of intangible cultural heritage. A type of innovation constrained by limited resources, frugal innovation means the development of processes, products or services reduced to core functionalities with optimised performance levels, addressing the needs of the bottom of the pyramid market. When implemented at community level, it aims to create a novel solution from the scarce resources available to respond to the needs of the communities concerned. This paper presents two case studies - the Indian *Mitticool*, and the Australian WALFA project - to illustrate the transformation of specific traditional knowledge into frugal innovations, and their impact on their respective communities. The analysis will build on the conceptual framework proposed by Soni and Krishnan (2014) that defines the dimensions of frugal innovation in terms of mindset, process and product. This paper then analyses the institutional framework provided by the 2003 *Convention*, especially its Chapter VI on 'Sustainable Development', to legitimise and leverage ICH-related frugal innovations, as well as to ensure that this transformation is fair and collectively beneficial.

Keywords

frugal innovation, *jugaad* innovation, sustainable development, indigenous knowledge, *Mitticool*, traditional fire management, Two Tool Kits, Traditional Owners, WALFA project

Introduction

The evolution of the international understanding of development, triggered by a shift in UNDP's conception of the term, brought the question of culture and its role into the spotlight.

> *Culture was implied in this notion* [of human development], *but it was not explicitly introduced. It was, however, increasingly evoked by several distinguished groups: the Brandt Commission, the South Commission, the World Commission on Environment and Development and the Commission on Global Governance* (World Commission on Culture and Development: 1995, p.8).

The logical next step was to mainstream culture into development policies and strategies.

In 1992, the World Commission on Culture and Development was jointly instituted by the United Nations and UNESCO to examine the link between culture and development and propose an international agenda. Therefore, the Commission focused its analysis on *how different ways of living together affect the enlargement of human choices* (World Commission on Culture and Development: 1995, p.24) and delivered its final report *Our Creative Diversity* in 1995.

Although the debate was clearly established, and despite political efforts backstopping the creation of the Commission, the reflection on culture and development was not translated into actions within the international development agenda, illustrated by the Millennium Development Goals (MDGs) (United Nations: 2015a). Following its mandate, however, UNESCO pursued the reflection and negotiated the adoption of three international instruments in the field of culture: the 2001 *Universal Declaration on Cultural Diversity*, the 2003 *Convention for the Safeguarding of the Intangible Cultural Heritage* and the 2005 *Convention on the Protection and Promotion of the Diversity of Cultural Expressions*.

The *Outcome Document* of the 2010 Millennium Summit once again brought the debate on culture and development into the spotlight of the international development community (United Nations: 2010). Two consecutive resolutions of the UN General Assembly on Culture and Development followed in 2010 and 2011, as well as innumerable debates, working groups, forums, meetings,

etc., at national, regional and international level, all emphasising the role of culture in development (UNESCO: 2013). Culture was recognised as both a driver and an enabler of development (UNESCO: 2012), and was included in the framework of the 2030 *Agenda for Sustainable Development* (United Nations: 2015b; UNESCO: 2017).

Contributing to this debate, the General Assembly of the States Parties to the *Convention for the Safeguarding of the Intangible Cultural Heritage* (6th Session, 30 May to 1 June 2016) recognised the importance of intangible cultural heritage (ICH) as a guarantee for sustainable development (General Assembly of the States Parties to the *Convention*: 2016). A dense chapter on 'Safeguarding intangible cultural heritage and sustainable development at national level' was therefore included in the *Operational Directives* for the implementation of the 2003 *Convention* (UNESCO: 2016).

This newly adopted Chapter VI on 'Sustainable Development' outlined the clear role of the safeguarding of intangible cultural heritage as both an enabler and driver of development, through the fostering of inclusive social and economic development, environmental sustainability and peace. In particular, it reminds us of the opportunity of taking

> *... full advantage of intangible cultural heritage as a powerful force for inclusive and equitable economic development, encompassing a diversity of productive activities with both monetary and non-monetary value, and contributing in particular to strengthening local economies* (UNESCO: 2016, pp. 69-70).

Intangible cultural heritage is therefore considered as a source of income generation and productive employment for the communities concerned.

The objective of this paper is to advance this discussion by reflecting upon the role of intangible cultural heritage as a possible driver of development through the fostering of frugal innovation. The reflection will build on two complementary approaches. The first explores the potential of ICH to generate frugal innovations, and the benefits of such innovations to the communities' quality of life and ICH safeguarding, based on the conceptual framework proposed by Soni and Krishnan (2014). The second justifies ICH-related frugal innovations through an analysis of the 2003 *Convention* and its operational directives.

For that, this paper will first outline the concept of frugal innovation, and then present two case studies - the Indian *Mitticool*, and the Australian WALFA project - to illustrate the transformation of specific traditional knowledge into frugal innovations. Finally, there will be a discussion on the possibilities offered by the 2003 *Convention's* institutional framework to legitimise and leverage such efforts, while ensuring a fair and collective beneficial transformation of intangible cultural heritage into frugal innovations.

Outlining frugal innovation: a concept in construction

When in 2010 *The Economist* published an article on frugal innovation (*The Economist*: April 15, 2010), a shift in the approach to innovation was initiated. The idea of frugality was not really new though. Soni and Krishnan (2014, p.31) reminded us that *frugality was a virtue of the ancient world when economic resources were deficient,* and cases of frugal innovations could be noted throughout the entire 20th century such as *Henry Ford's assembly line, and Japanese lean processes.* More recently, in 2006, Nissan-Renault CEO Carlos Ghosn employed the term *frugal engineering* when describing *Indian engineers' ability to innovate cost-effectively and quickly under severe resource constraints* (Radjou, Prabhu, and Ahuja: 2012a, p.1). *What is new today is the extent to which the practice is being understood as a means to solve longstanding problems and fulfil unmet needs* (Bhatti: 2012, p.9) in a situation of *growing concerns over sustainability and increased consumerism* (Soni and Krishnan: 2014, p.29).

In this vein, Radjou, Prabhu and Ahuja published in 2012 *Jugaad Innovation: Think frugal, Be flexible, Generate breakthrough growth*. From cases of improvisational innovation at grassroots level inventoried in several countries such as Brazil, India and China, the authors emphasised the economic opportunity for development represented by those innovations called *Jugaad*: literally an innovative fix; an improvised solution born from ingenuity and cleverness (Radjou, Prabhu, and Ahuja: 2012b, p.4). In an attempt to understand that phenomenon, the authors proposed six principles to characterise the concept of *Jugaad* innovation: seek opportunity in adversity, do more with less, think and act flexibly, keep it simple, include the margin, and follow your heart (Radjou, Prabhu, and Ahuja: 2012b). Briefly, *Jugaad* innovation may be understood as *an improvisational approach to solving one's own or others' problems in a creative way, at a low cost, in a*

short amount of time, and without serious taxonomy or discipline (Brem and Wolfram: 2014, p.4).

Radjou, Prabhu and Ahuja's *Jugaad Innovation* book had an important impact in both academia and non-academic sectors. Consequently, the use of a diversity of terms to qualify resource-constrained innovations arose in the scientific literature, such as 'Catalytic innovation', 'Gandhian innovation', 'Grassroots innovation', 'Indigenous innovation', 'Reverse innovation', etc., in addition to the above mentioned 'Frugal' and '*Jugaad*' innovation.

In the effort to define and differentiate all those terms, an active debate is ongoing in the literature. *Several concepts and frameworks* [to] *distinguish frugal innovation from other innovation types* (Weyrauch and Herstatt: 2016, p.2) have been proposed while the boundaries of the term 'frugal innovation' are still being negotiated.

A literature review conducted by Weyrauch and Herstatt (2016, p.4), however, attempted *to capture what is denoted by frugal innovation*. While encoding attributes, characteristics and descriptions associated with frugal innovation in the relevant literature, Weyrauch and Herstatt (2016, p.5) identified nine attributes which would qualify an innovation as frugal:

> *functional and focussed on essentials, considerably lower initial cost or purchase price, reducing the total cost of ownership, minimising the use of material and financial resources, user-friendly and easy to use, robust, high value and quality, scalable and sales of large numbers, and sustainable.*

Frugal innovation would therefore mean the elaboration of extremely cheap ecological processes, products or services, concentrated only on core functionalities with optimised performance levels (Gupta and Wang: 2009; Weyrauch and Herstatt: 2016), or, simply, making *new for less* (Zeschky, Winterhalter, and Gassmann: 2014).

Like *Jugaad*, frugal innovation has as its starting point the specific needs of the bottom of the pyramid market (Gupta: 2011). However, while *Jugaad* seems to be an improvisational attitude to innovation, the concept of frugal innovation implies a solid and serious frugal approach throughout the entire innovation cycle. It is a polycentric and holistic approach to innovation, in which top-down and bottom-up processes are in dialogue, *located at the*

interstices between technology, entrepreneurship and development aiming at producing durable and culturally sensitive products that offer high user value, whilst adopting flexible and interactive design, marketing and distribution processes (Pesa: 2014, pp.6 and 9).

The phenomenon of frugal innovation is therefore polycentric, susceptible to being originated by different types of actors and in different locations, as well as holistic, focusing on *the total innovation cycle, from idea to business model, marketing and consumption* (Pesa: 2014, p.6). More precisely, the phenomenon should not be captured as a monolithic entity but rather through its three different dimensions: (i) mindset or way of life, (ii) process or workflow, (iii) outcome (Soni and Krishnan: 2014).

 For instance, a rural housewife who prudently manages her budget to buy groceries for her family is exhibiting a frugal mindset; a carpenter who has very limited tools may exercise a frugal process in making beautiful furniture; and an innovator of the scooter-mounted-flourmill has actually created a frugal offering (Soni and Krishnan: 2014, p.35).

In this way, frugality could be expressed independently through these three different dimensions. However, the phenomenon of frugal innovation would necessarily involve a combination of frugal mindset, frugal process, and frugal outcome. On the other hand, other types of resource-constrained innovations would exhibit frugality through only one of these three dimensions, such as a frugal mindset for *Jugaad* innovation, a frugal process for frugal engineering innovation, or a frugal outcome for reverse innovation (Soni and Krishnan: 2014).

In addition to these three dimensions proposed by Soni and Krishnan, it is also crucial to understand which entity is at the origin of the frugal innovation. Indeed, *improvisation by a farmer in sowing the field is very different from creating a new product addressing a market* (Soni and Krishnan: 2014, p.35). It is therefore possible to distinguish three different types of frugal innovators: grassroots-level, domestic-enterprise level, or multinational corporation (MNC)-subsidiary level (Soni and Krishnan: 2014).

 An enhanced understanding of the dimensions through which frugality could operate (mindset, process and outcome) as well as of the existing types of frugal innovators (grassroots-level, domestic-enterprise level, or MNC-

subsidiary level) would certainly help the formulation of appropriate policies in influencing the phenomenon of frugal innovation (Soni and Krishnan: 2014).

While Soni and Krishnan's framework of frugal innovation will enrich further sections of this paper, the next section will treat, in particular, frugal innovation at grassroots-level in two case studies of traditional knowledge converted into innovations.

Transforming traditional knowledge into frugal innovations: case studies

Grassroots-level frugal innovators are individuals or a group of people who attempt to solve a given problem adopting locally available ingenuity, and in doing so create a novel solution (Soni and Krishnan: 2014, p.35).

Traditional knowledge, transmitted from generation to generation within the community concerned, could be at the origin of this *locally available ingenuity*. Traditional knowledge has already shown its value to address development issues, notably in rural areas. In agriculture and livestock farming, for instance, countless case studies confirm the sustainability and high productivity of traditional techniques, challenging even established ones (Pesa: 2014). Also, the Nuffic-CIRAN's journal *Indigenous Knowledge and Development Monitor*, during its period of publication (1993-2001), endeavoured to gather and present concrete cases in which traditional knowledge played a crucial role in sustainable development.

Thus, intangible cultural heritage may be considered as a viable source of innovation contributing to sustainable development. Even though ICH-related innovations are not necessarily frugal, often grassroots-level innovators possess a naturally frugal mindset (Soni and Krishnan: 2014). In addition, traditional techniques tend also to be cost-effective, user-friendly and easily communicated (Kolawole: 2001), common characteristics of frugality. Altogether, ICH-related innovations have a strong potential to be frugal, allying frugal mindset, frugal process, and frugal outcome.

Mitticool, the Indian terracotta-based refrigerator

Mitticool, a terracotta-based refrigerator, is a typical case of traditional knowledge converted into a frugal

innovation. *Mitticool* is a refrigerator functioning without electricity or any artificial source of energy. It responds to the needs of a multitude of customers in India who have no access to electricity or not enough money to purchase a standard refrigerator and afford its running costs (electricity consumption and maintenance).

Mitticool is based on the principles of water evaporation. It comprises two terracotta tanks stacked on top of each other. The upper one stores water while food (notably vegetables, fruit and milk) is stored in the lower one. Water trickles down the side of both tanks and takes away the heat from inside when it evaporates. Both tanks therefore stay cool, and the average inside temperature is about 15C° to 20C° less than the outside temperature. A small faucet is also available to provide fresh water for drinking.

Mitticool is a perfect example of frugal innovation, continuously cited in the literature as a concrete illustration of it (Soni and Krishnan: 2014; Weyrauch and Herstatt: 2016). It is also the case chosen by Radjou, Prabhu, and Ahuja (2012b) to initiate the narrative of *Jugaad Innovation*.

Mitticool was developed by Mansukh Prajapati, a potter from Ramakrishna Nagar, a village in the desert of Gujarat (India). The village, and surrounding area, was destroyed by an earthquake in 2001. While reading the local press about the damage caused, an ironic photo title captured Prajapati's attention: *Poor man's fridge broken!* A broken earthen pot, traditionally used to keep water cool, was pictured, triggering Prajapati's idea of developing *Mitticool*: using clay to make a real fridge for villagers, more affordable and needing no electricity.

Prajapati then started working on the development of *Mitticool*, with the support of the GIAN (Grassroots Innovation Augmentation Network) (Agarwal: 2015). While the *Mitticool* model was being improved, sales progressively increased in the village, then in India and finally at international level. *Mitticool* production eventually evolved from handicraft into an industrial process, employing many members of the community (Radjou, Prabhu, and Ahuja: 2012b).

The broken earthenware pot at the origin of Prajapati's idea was a *Matka*, a traditional earthen vessel used to keep water cold through the evaporative cooling technique. This cooling technique has been known in the Indian subcontinent since the Indus Valley Civilisation. The legend says that *When gods and demons were churning the ocean (sheersagar) for the divine nectar (mahamrita), an earthen pot emerged. This is believed to be the first pot (matka) created by potters* (Raipally and Agarwal: 2015, p.2).

Therefore, *Matka* constitutes an iconic component of Indian culture, and its use goes beyond the function of water storage. In rituals, and social and sacred ceremonies, for instance, *Matka* may have specific roles, and the presence of *Matka* is widespread in Indian houses (Raipally and Agarwal: 2015).

Mansukh Prajapati is descended from a family of master potters. As an indication of his family tradition, Prajapati means 'the trade of potter' in his region of Gujarat (Sikdar and Chaudhuri: 2015). The properties of the traditional knowledge related to *Matka* and the evaporative cooling technique were thereby well-known in Prajapati's family. Facing adverse conditions and moved by his *empathy and passion for his fellow community members,* Prajapati *conjures up an ingenious solution* to improve lives in Gujarat and beyond (Radjou, Prabhu, and Ahuja: 2012b, p.3).

Inspired by his expertise in making *Matka* and by his knowledge of the properties of evaporative cooling, Prajapati was able to apply a frugal mindset to transform scarcity into opportunity. The process of research and development remained simple, based on experimentation in a *simple open-air room with clay ... and an oven tucked away in the corner* (Radjou, Prabhu, and Ahuja: 2012b, p.2). The refrigerators were first made in his workshop as an artisanal craft. When production evolved to a more industrial process, frugality remained the *leitmotiv*. Prajapati improved his techniques and methods of working the clay to be more efficient and to save resources, and trained and employed people from his community. Finally, the product developed was simple, focused on core functionalities, extremely cheap and responding to the needs of the bottom of the market, and sustainable. Therefore, Prajapati's invention, *Mitticool*, combined a frugal mindset, a frugal process and a frugal outcome, as well as addressing the environmental and socio-economic needs of his community.

It is important to emphasise that the traditional knowledge of the principles of evaporative cooling is not unique to Indian culture. These principles were well

recognised in other cultures, such as in Ancient Egypt, and known in traditional Northern-African cultures as a *Zeer* (Raipally and Agarwal: 2015; Oluwasola: 2011). The traditional knowledge of these principles also inspired other similar frugal innovations such as the *Fridge for the Poor*, a pot-in-pot preservation cooling system, developed in Nigeria (Oluwasola: 2011).

Mitticool is an iconic example of intangible cultural heritage converted into a frugal innovation, but it is not the only one. A multitude of less famous illustrative examples constantly pop up around the globe, like the Western Arnhem Land Fire Abatement project in Australia.

The Australian Western Arnhem Land Fire Abatement project

In some cases, wildfires may not be undesirable hazards. Particular vegetation, such as savannas and tropical dry forests, are fire-dependent. In these special ecosystems, fire is an important and natural component for ecological balance and vitality (Hutto: 2008; Johnston: 2016). Thus, over the centuries, indigenous and local people developed sound knowledge about fire management, using fire as a crucial tool of land management. Traditional knowledge about fire management, however, faded out over the last century, mainly due to exodus, the decline of traditional cultures, and urbanisation, as well as active public policies proscribing lighting fires. Consequently, uncontrolled and vast wildfires multiplied across the globe (International Savanna Fire Management Initiative: 2015).

In Arnhem Land (Northern Territory of Australia), a territory covered by fire-prone savannas, Aboriginal people set up effective fire management strategies. Parts of the savannas were strategically burnt in the early dry season creating a mosaic of burnt and unburnt vegetation. The objective of this traditional practice was both to reduce fuel biomass (grass and leaf-litter) and to protect vulnerable and cultural resources from uncontrolled wildfires in the late dry season (International Savanna Fire Management Initiative: 2015; Russell-Smith et al.: 2013a).

Late dry season fires are more destructive than early dry season ones (Aboriginal & Torres Strait Islander Social Justice Commissioner: 2008). The mosaic landscape, resulting from the traditional fire management technique, hinders the progression of late dry season fires by reducing the total fuel biomass available and creating fire-

breaks, notably around important agricultural resources or cultural heritage (International Savanna Fire Management Initiative: 2015). The technique was used to protect, for instance, *vulnerable resources, such as discrete grassland areas reserved for fire-driven kangaroo hunting later in the dry season* (Russell-Smith et al.: 2013a, e61), or the rock art galleries (World Heritage Kakadu National Park), an outstanding memorial of Aboriginal people's interaction with the physical and spiritual world (Russell-Smith: 2017).

Traditional fire management techniques were, therefore, an important component of Aboriginal people's culture in the Arnhem Land. This was a *cleaning of country management*, making *countryside easier to move through*, [keeping] forests "open" and not choked with shrubs, [flushing] *out game*, [encouraging] *the growth of new grass that would attract and fatten game animals, and* [fulfilling] *cultural obligations* (Russell-Smith et al.: 2013a, e57 and e61).

European colonisation, however, fostered the exodus of Aboriginal people from countryside to towns and settlements. Distance from traditional lands, together with government's attitude against Aboriginal's fire management strategies, led to the decline of the practice and of the effective transmission of this traditional knowledge. Unpopulated and unmanaged landscapes were, therefore, predisposed to very hot, destructive, late dry-season fires (Aboriginal & Torres Strait Islander Social Justice Commissioner: 2008; Russell-Smith et al.: 2013a).

In the late 1990s, a group of Traditional Owners, concerned with the damage caused by uncontrolled late dry-season fires, started discussions with the authorities and with scientists, with the aim of *re-establish*[ing] *a more benign, patchier fire pattern on the* [Arnhem] *plateau* (Jacklyn: 2009, p.9), in line with traditional fire management practices. Such a dialogue was mediated by members of the younger generation who were committed to the safeguarding of their culture (Russell-Smith et al.: 2013a).

In 1998, therefore, the Arnhem Land Fire Abatement (ALFA) project was initiated with the financial support of the Northern Land Council (NLC) and the National Heritage Trust (NHT) (Aboriginal & Torres Strait Islander Social Justice Commissioner: 2008). The initial objectives were to re-engage *younger and older generations with their traditional lands, to build the capacities of*

Aboriginal rangers to implement a coordinated and strategic landscape-scale fire management programme, as well as to cope with unmanaged, late dry season, destructive wildfire problems (International Savanna Fire Management Initiative: 2015, p.21). Knowledge of traditional fire management techniques was adapted to compensate for a lack of enough traditional fire managers, combining traditional rangers on foot with incendiary helicopters (named the 'Two Tool Kits' method), with the support of satellite data (Aboriginal & Torres Strait Islander Social Justice Commissioner: 2008; Jacklyn: 2009; Russell-Smith et al.: 2013a). Modern methods were therefore used to emulate traditional techniques (Russell-Smith et al.: 2013a).

While the Two Tool Kits method was refined, researchers, mainly from Darwin Centre for Bushfire Research, emphasised the role of fire management in the reduction of greenhouse gases emitted by savanna fires (Aboriginal & Torres Strait Islander Social Justice Commissioner: 2008; International Savanna Fire Management Initiative: 2015; Jacklyn: 2009)[1]. In parallel, a multinational energy corporation was required by the Northern Territory Government to deliver an offset of 100,000 tonnes of carbon dioxide for the impact caused by a Liquified Natural Gas terminal. The occasion triggered a commercial arrangement between the company and the Traditional Owners, leading to the creation of the Western Arnhem Land Fire Abatement (WALFA) project (Aboriginal & Torres Strait Islander Social Justice Commissioner: 2008; International Savanna Fire Management Initiative: 2015). From 2000, therefore, the WALFA project included the *development of a savanna burning GHG emissions accounting methodology* (Russell-Smith et al.: 2013b, p.51), which became fully operational in 2006 (Aboriginal & Torres Strait Islander Social Justice Commissioner: 2008).

A 17-year agreement was concluded to offset the equivalent of 100,000 tonnes of carbon dioxide through the WALFA project. Operating over a territory of 28.000 square km, the WALFA project created employment opportunities in remote communities, furthered the transmission and safeguarding of the Aboriginals' traditional culture, and finally contributed to an enhanced biodiversity and mitigated some of the effects of climate change (Johnston: 2016; Aboriginal & Torres Strait Islander Social Justice Commissioner: 2008).

The WALFA project was therefore a genuine and positive innovation for community members as well as for the environment. Considering both the devastation of their traditional lands and the decline of their traditional culture, the Traditional Owners triggered a novel solution from scarce resources. Their frugal mindset, embedded in their culture, provided the opportunity to revive traditional methods of fire management. With the support of researchers and the government, traditional methods were improved, and the Two Tool Kits method developed, combining traditional rangers on foot and incendiary helicopters to emulate traditional methods.

Despite the use of helicopters and satellite data, the process remains extremely frugal compared to the financial and human costs related to fighting extensive late dry season wildfires in unmanaged territories.

Finally, the frugality of the outcome may be assessed through the 'cost of opportunity' of not applying fire management methods. Uncontrolled late dry season wildfires have an immeasurable impact on communities, economies and biodiversity. The Two Tool Kits fire management method prevents the seasonal occurrence of extensive wildfires. In addition, it creates jobs, encourages the transmission and safeguarding of traditional culture, and contributes to mitigating climate change by offsetting 145,000 tonnes of greenhouse gas emissions per year[2].

Like Prajapati's *Mitticool*, a combination of frugal mindset, process and outcome generated an innovative solution responding to the environmental, cultural and socio-economic needs of Arnhem Land's Aboriginal communities.

The success of the WALFA project sparked 65 spin-off traditional fire management abatement projects across Australia (Johnston: 2016), and leveraged a two-year *International Savanna Fire Management Initiative*, within the United Nations University's Traditional Knowledge Initiative, funded by the Australian Government. As a result of exploring the potential of indigenous fire management, this initiative assessed the possibility of implementing similar projects in other tropical savannas around the world (International Savanna Fire Management Initiative: 2015), such as in Brazil (United Nations University: 2015), Namibia and Venezuela (Russell-Smith et al.: 2013b).

Mitticool and the WALFA project are two relevant illustrative examples of frugal innovation derived from intangible cultural heritage. In both cases, a genuinely frugal mindset was applied to solve a given problem at community level, and to improve the quality of life of community members. The novel solutions thus developed materialised respectively into a frugal innovation product - *Mitticool* - and a frugal innovation service - the WALFA project. Therefore, ICH-related frugal innovations are not necessarily restricted, *a priori*, to a certain type of innovation.

In addition, both the frugal innovations analysed in this paper were originated at community level, whether by an individual community entrepreneur (*Mitticool*) or a group of bearers and traditional authorities (WALFA project). Grassroots innovators generally possess a frugal mindset (Soni and Krishnan: 2014) and, therefore are more inclined to develop frugal innovations. However, ICH-related frugal innovations are not necessarily developed at community level (Pesa: 2014).

The Engineered *Bahareque* housing may be a good example of ICH-related frugal innovation developed by non-community members. Triggered and supported by the International Network for Bamboo and Rattan (INBAR), an intergovernmental organisation, Engineered *Bahareque* is a methodology to improve traditional vernacular wattle-and-daub housing (*bahareque*) based on modern knowledge and techniques (Kaminski, Lawrence, and Trujillo: 2016). *Bahareque* type houses are found in many communities around the world, and are traditionally sustainable and resilient to natural disasters such as earthquakes (International Network for Bamboo and Rattan: 2016). Engineered *Bahareque* methodology innovation facilitates the construction of safer and more durable buildings which are less affected by fire, insects and rot, while providing community members with cheap, sustainable (made from local materials), thermally adequate and anti-seismic housing (Kaminski, Lawrence, and Trujillo: 2016; International Network for Bamboo and Rattan: 2016; Camino Solórzano: 2013).

A frugal mindset was, therefore, applied to developing a frugal solution to both housing and seismic issues in poor communities, where *bahareque* is a vernacular type of housing, through the development of a frugal house capable of being built by the beneficiaries themselves. However, and unlike *Mitticool* and the Two Tool Kits

method, Engineered *Bahareque* is a top-down innovation model. Thus, ICH-related frugal innovations are not confined to specific types of innovation or innovator. Hence, there is a need for a deeper analysis of the mechanisms and typologies underpinning the generation of ICH-related frugal innovations.

Leveraging ICH-related frugal innovation: the institutional framework of the 2003 *Convention*

The 2003 *Convention for the Safeguarding of the Intangible Cultural Heritage* offers a framework for dialogue and action in which States and communities may assert their rights. This framework recognises culture as a major dimension of sustainable development, and thereby, encourages the implementation of *vigorous public policies, capable of promoting intangible heritage at all levels*, as intangible heritage is identified as a living source [of] responses ... to the challenges of peace and sustainable development (UNESCO: 2016, v).

This potential of intangible cultural heritage, and notably of indigenous knowledge (IK), as both driver and enabler of sustainable development was already highlighted in 1992, during the *International Symposium on Indigenous Knowledge and Sustainable Development* (Philippines, 20-26 September 1992). The Symposium brought together anthropologists, scientists and development professionals to *share and discuss their findings and experiences relating to IK and its potential role in sustainable development. It pointed out that indigenous knowledge is a valuable resource for sustainable development* (Nuffic-CIRAN: 1993, p.1).

The notion of indigenous knowledge (synonymous with traditional or local knowledge)

differentiate[s] the knowledge developed by a given community from the international knowledge system. ... IK refers to the knowledge of indigenous peoples as well as any other defined community. ... Indigenous knowledge systems relate to the ways members of a given community define and classify phenomena in the physical/natural, social, and ideational environments (Nuffic-CIRAN: 1993, p.2).

This equates to what the 2003 *Convention* defines in Article 2(d) as *knowledge and practices concerning nature*

and the universe (UNESCO: 2016; Intangible Cultural Heritage Section: 2017). Indigenous knowledge is thereby encompassed within the dimensions of intangible cultural heritage.

According to Warren's definition established in *the International Symposium on Indigenous Knowledge and Sustainable Development*, indigenous knowledge provides *the basis for local-level decision-making. ... Communities identify problems and seek solutions ... capitalising on indigenous creativity and leading to experimentation and innovations* (Nuffic-CIRAN: 1993, p.2). This definition clearly illustrates the two ICH-related frugal innovation processes presented in this paper - *Mitticool* and the Two Tool Kits method - wherein frugal innovators built on their traditional knowledge to generate novel solutions responding to the needs of their communities. These innovations may therefore represent a sort of recreation of communities' intangible cultural heritage in response to their environment, their interaction with nature and their history, and contribute to foster their sense of identity while promoting the continuity of related practices as argued in these case studies. From that perspective, the process of community innovation from intangible cultural heritage might be inherent to the concept of intangible cultural heritage itself, as defined by the 2003 *Convention's* Article 2.1[3], and *Knowledge and practices concerning nature and the universe* seems to be the dimension of ICH most likely to generate frugal innovations. However, as mentioned above, further studies to develop a robust typology of ICH-related frugal innovations and innovators would be required to codify the relationship between intangible cultural heritage and frugal innovation.

Intangible cultural heritage has demonstrated the potential to generate frugal innovations. Mainstreaming this potential finds a legitimacy within the framework of the 2003 *Convention*. States and communities are encouraged to *exploit all of the opportunities provided by the Convention* (UNESCO: 2016, vi), which includes *training communities, groups or individuals in the management of small businesses dealing with intangible cultural heritage* (UNESCO: 2016, p.51) and the recognition that commercial activities may emerge from intangible cultural heritage. In addition, the *Operational Directives* of the 2003 *Convention* emphasise that those commercial activities may both contribute to the safeguarding of the related heritage, and to the generation of income for its practitioners. *They can contribute to improving the*

living standards of the communities ... enhance the local economy, and contribute to social cohesion (UNESCO: 2016, p.53).

Frugal innovations are by nature market-oriented, aiming to address the needs of those at the bottom of the market (Weyrauch and Herstatt: 2016). When carried out by community members, frugal innovations tend to respond in priority to the needs of the communities concerned (Soni and Krishnan: 2014), while respective frugal innovators are motivated by *the empathy and passion* for their people (Radjou, Prabhu, and Ahuja: 2012b, p.3). Both the ICH-related frugal innovation cases described in this paper generated commercial activities and income, enhanced the local economy, and contributed to safeguarding their respective intangible cultural heritage.

The roles intangible cultural heritage may have in generating income and sustainable livelihoods are more specifically detailed in Chapter VI of the *Operational Directives*. Encouraging communities to take *full advantage of intangible cultural heritage as a powerful force for inclusive and equitable economic development, encompassing a diversity of productive activities with both monetary and non-monetary value, and contributing in particular to strengthening local economies* (UNESCO: 2016, 69), Chapter VI appears to promote the leveraging of commercial activities which include those based on ICH-related frugal innovations.

Chapter VI goes further in recommending the necessity to respect communities' *choice of collective or individual management of their heritage* (UNESCO: 2016, p.70), and lists actions to be done with a view to generating income, sustainable livelihoods, productive employment and decent work at community level. In that sense, States Parties are encouraged to *foster scientific studies and research methodologies, including those conducted by the communities and groups themselves, and to adopt appropriate legal, technical, administrative and financial measures* (UNESCO: 2016, p.70).

Creating a favourable environment for the flourishing of such commercial activities is essential. Community-level innovators normally intend first *to solve their own problems, and any large-scale exploitation of the solution is incidental* (Soni and Krishnan: 2014, pp.38-39). They normally face strong challenges from the inception of the ICH-related innovation activity as it demands *a particular*

combination of skills, key individuals ... resources and supportive contextual factors (Seyfang and Smith: 2007, pp.595-596). Transforming the naturally frugal mindset of community-level innovators into frugal processes and outcomes requires access to information, institutional support, capacity-building and resources (Seyfang and Smith: 2007; Soni and Krishnan: 2014).

When inventing and commercialising *Mitticool*, Mansukh Prajapati benefitted from the support of the GIAN. With the purpose of supporting rural innovations, the GIAN operates as an incubator of grassroots innovations and traditional knowledge. GIAN first provided essential and effective financial support with excellent conditions that surprised Prajapati himself:

I said I would not be able to pay a high interest. He re-plied that he wasn't asking for interest. He wanted me to keep the money and repay it only if the refrigerator becomes a success, otherwise not. I couldn't believe it. Who lends money like that! He didn't even make me sign any papers. I was very happy to receive the money. He came into my life like God (Agarwal: 2015).

In addition to the funding, GIAN offered institutional and commercial support. It helped Prajapati to secure a patent, establish a trademark and company, and develop marketing solutions such as designing a website and creating attractive packaging.

Similarly, the Traditional Owners of Arnhem Land relied on the support of the authorities and scientists to develop the Two Tool Kits method and the carbon offset accounting methodology. Substantial funding and technical support were provided by the Northern Land Council (NLC) and the National Heritage Trust (NHT) in initiating the project. The Darwin Centre for Bushfire Research, on the other hand, provided scientific support to both enhance the Two Tool Kits method and develop the carbon offset accounting methodology.

These financial, institutional, technical and scientific forms of support acted as catalysts to convert these frugal mindsets into impactful and scalable ICH-related frugal innovations (Soni and Krishnan: 2014).

Scientific research, in particular, plays a key role in the identification and assessment of the opportunities offered by intangible cultural heritage (UNESCO: 2016).

IK specialists, for instance, in their effort to describe the actors involved with indigenous knowledge, identified the character of the Scientist among five other main protagonists[4]. Despite their caricature-like simplicity, these six allegories developed by IK specialists provide an interesting insight illustrating the relations and interactions in activity within the indigenous knowledge community. Scientists were recognised as the links between scientific and local knowledge, understanding, systematising and validating local knowledge systems (Nuffic-CIRAN: 1993).

The character of the Scientist, therefore, appears to be crucial to support community innovators in the systematisation and codification of ways of converting original traditional knowledge into an innovation. For instance, researchers from the Darwin Centre for Bushfire Research in Australia contributed actively to systematise the traditional fire management technique and conceive the Two Tool Kits method.

Innovative processes from intangible cultural heritage might sometimes lead to the systematisation of sacred or supernatural traditional knowledge. Sacred or supernatural practices are often underpinned by active natural, physical or psychological elements. Scientific research would help to isolate and categorise those active elements, such as *materia-medica* from plant or animal sources involved in supernatural healing practices (Nuwanyakpa et al.: 2000). The risk of de-sacralisation and, thereby, of de-contextualisation should in that case be carefully evaluated.

The multiplication of research activities, notably those involving the biological and genetic resources of communities, might be sensitive and involve the risk of bio-piracy and the dispossession of communities' heritage. This situation particularly applies to innovative activities resulting in the creation of commercial services or products. The allegory of the Capitalist, as described by the indigenous knowledge specialist, represents a potential threat to communities' heritage ownership and management. Motivated by his own profit, the Capitalist tends to consider communities' intangible cultural heritage as a resource to be exploited, notably in cases of seeds, livestock breeds and drugs (Nuffic-CIRAN: 1993).

The 2003 *Convention*, however, offers a framework favourable to communities in which ICH-related innovation

activities may be developed. The 2003 *Convention aims primarily to ensure respect for the intangible cultural heritage of the communities, groups and individuals concerned* as stipulated in its Article 1 (UNESCO: 2016, p.5). Chapter VI of the *Convention's Operational Directives* encourages States Parties to adopt appropriate legal, technical, administrative and financial measures to ensure the communities concerned are the primary beneficiaries of related ICH commercial activities and are not dispossessed of their own intangible cultural heritage (UNESCO: 2016).

The application of the 2003 *Convention* invites States Parties to act (and legislate) in favour of communities, taking on the role of the Political Advocate. One of the six allegories identified by IK specialists, the Political Advocate recognises the potential risks involved in the exploitation of communities' intangible cultural heritage by third parties, and strives for the protection of communities' rights. *Sanctions must protect the weaker against the intrusions of the stronger –for instance, by introducing patent rights for indigenous knowledge in order to prevent uncompensated expropriation by outsiders* (Nuffic-CIRAN: 1993, p.3).

As particularly specified by IK specialists, the introduction of patent rights may reveal itself as an efficient instrument to ensure communities are not dispossessed of their own intangible cultural heritage and are the primary beneficiaries of its use, research or adaptation. Accordingly, paragraph 104 of the *Operational Directives* of the *2003 Convention* invites States Parties to duly ensure communities' rights to their ICH, when for instance engaging in commercial activities, through the application of intellectual property rights, privacy rights and any other appropriate form of legal protection (UNESCO: 2016). The *Ethical Principles for Safeguarding Intangible Cultural Heritage* reinforce the scope of paragraph 104 in that sense. A collection of examples of good practice involving the safeguarding of intangible cultural heritage, the *Ethical Principles indicate that communities, groups and individuals who create intangible cultural heritage should benefit from the protection of the moral and material interests resulting from such heritage, and particularly from its use, research, documentation, promotion or adaptation* (UNESCO: 2016, p.114, point 7).

Finally, the 2003 Convention's Committee recommended that interactions with communities regarding their intangible cultural heritage *should be characterised by transparent collaboration, dialogue, negotiation and consultation, and contingent upon their free, prior, sustained and informed consent as stipulated in its Ethical Principles* (UNESCO: 2016, p.113).

The elements of the *Convention for the Safeguarding of the Intangible Cultural Heritage* presented above, its *Operational Directives* and *Ethical Principles* encourage States to ensure communities take the lead in safeguarding their own ICH. The 2003 *Convention* emerges thereby as an international instrument with the potential to help prevent commercial misappropriation and de-contextualisation that would affect the viability of the intangible cultural heritage concerned (Paragraphs 102, 116 and 117 of the *Operational Directives*), that could be triggered by the leveraging of ICH-related innovation activities.

Conclusion

The 2003 *Convention* recognises the interdependence between the safeguarding of intangible cultural heritage and sustainable development. Chapter VI of the 2003 *Convention's Operational Directives* stresses the role of ICH safeguarding as both an enabler and driver of sustainable development, notably by promoting inclusive social and economic development, environmental sustainability and peace. This paper has endeavoured to emphasise one particular vector of sustainable development derived from intangible cultural heritage: frugal innovations.

ICH-related frugal innovations constitute an opportunity for both sustainable development and the safeguarding of the related intangible cultural heritage. They also help to address the environmental, cultural and socio-economic needs of the communities concerned.

Further research, reflection and debate are necessary to clearly understand the mechanisms between intangible cultural heritage and frugal innovations, identify ICH-related frugal innovations and innovators' typologies, assess associated threats, understand roles, foster community-based entrepreneurship and formulate adequate policies, as well as to analyse interactions with other related international frameworks such as the Nagoya Protocol on Access and Benefit Sharing (ABS), especially with a view to ensuring a fair and collectively beneficial transformation of intangible cultural heritage into frugal innovations.

Acknowledgement

ENDNOTES

1 Wildfires represent 4% of total greenhouse gas emissions (Johnston: 2016). The Kyoto Protocol foresees prescribed fire as an accountable activity (International Savanna Fire Management Initiative: 2015).

2 The WALFA project offsets 145,000 tonnes of greenhouse gas emissions per year beyond the agreement concluded with ConocoPhillips. Credits in excess of this are sold in the Australian carbon market (International Savanna Fire Management Initiative: 2015).

3 Article 2.1: … *This intangible cultural heritage … is constantly recreated by communities and groups in response to their environment, their interaction with nature and their history, and provides them with a sense of identity and continuity, thus promoting respect for cultural diversity and human creativity…* .

4 The six allegories were described during the *International Symposium on Indigenous Knowledge and Sustainable Development* (1992). These allegories are the Scientist, the Development Agent, the Facilitator, the Conservationist, the Political Advocate and the Capitalist.

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