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Frugal Innovation: How Meager Resources and Idealistic Goals Lead To Sustainable Development

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Abstract:*Business organizations traditionally have had profit maximization as their main goal. Amongst the many market segments available, companies would identify the most profitable segments and would focus their resources towards serving these segments. The problem with such an approach is that it not only leads to inequality in the society but also exploits the resources at a rapid pace. However on the positive side, there are many significant business opportunities that arise from the need for creating socially valuable products and services. The objective of this study is to analyze how frugal innovation leads to sustainability. In this research we assume that frugal innovation leads to socio-economic growth and hence is the key driver of sustainable development. We have presented few case studies on frugal innovations and we have found out that a combination of meager resources and idealistic goals eventually lead to frugal innovation, which delivers sustainable development. We found that availability of meager resources and pressure on cost reduction forces organizations to innovate and create socially valuable products. We found that high quality products and services and affordable prices are not mutually exclusive and can co-exist. We found that frugal innovation is not limited to small companies only, but some of the biggest companies also practice frugal innovation.*

Keywords:*frugal innovation, idealistic goals, meager resources, socially valuable products, sustainability, sustainable development*

I. Introduction

The term, sustainable development, was popularized in "Our Common Future", a report published by the World Commission on Environment and Development in 1987. Sustainable development seeks to meet the needs and aspirations of the present without compromising the ability to meet those of the future (United Nations 1987). Sustainability delivers long-term business success while contributing towards economic and social development, a healthy environment anda stable society (Mani, Thorpe, Zollinger 2002). Limited availability of resources, social inequality and the need for a sustainable future has shifted the focus of business organizations from mere profitability to sustainability. In fact the need for sustainable development has opened whole many business opportunities, which are commercially viable and profitable too. Many socially responsible organizations, irrespective of their size and market standing are trying to reach to society at large by offering product and services, which solve the needs of the society and yet are profitable. These products and services are the result of a combination of a firm's limited resources (material, financial and institutional) and ambitious goals.The resources that a firm can utilize can be scarce in absolute terms (e.g. a small company with limited financial and material resources), or relative to total available resources (e.g. a big company unable to use its vast resources due to pressure on cost reduction for creating an affordable healthcare device). In both the situations the net resources available for a firm to utilize are very scarce.The poor people cannot afford expensive products because of their limited purchasing power, yet they want good quality products which meet their needs, so there is a need for offering high quality products at affordable prices. Such an approach where a firm uses its limited resources for achieving stretch goals gives birth to the idea of frugal innovation. In this paper, we will analyze how the application of frugal innovation can open many new business opportunities, which promote a sustainable development of present as well as future generations.

II. Problem Statement

For any modern economy to sustain its growth over the long run, the economic growth has to benefit all the sections of the society irrespective of their socio-economic position. The growth however should not come at the cost of resource degradation (financial, material and environmental), as it will compromise the growth of future generations. So there is a need for managing economic growth without compromising on socio-economic equality and environmental degradation. Unfortunately in India the economic prosperity is limited to rich people only with India's top 10% rich controlling nearly 30% of India's wealth (Oxfam International 2014).Poor people have limited purchasing power, yet they want good quality products. The solution lies in offering products and solutions that are low cost and are socially valuable. In this paper we will find out whether frugal innovation can be a major step towards sustainable socio-economic development.

III. Scope

The scope of this paper is limited to socio-economic dimension of sustainable development. This paper analyses frugal innovations, which essentially delivers socio-economic value. This paper does not cover the environmental dimension of sustainability.

IV. Objectives

The objectives of this paper are as follows:

1. To find out the key organizational factors which drive frugal innovation.
2. To determine the role of frugal innovation in delivering sustainable development.

V. Assumptions

We carry this study with the following assumptions

1. Meager resources and idealistic goals lead to frugal innovation.
2. Frugal innovation is the key driver of sustainable development.
3. Both small as well as big companies practice frugal innovation.

VI. Literature Review

It may be possible for an economy to register a high rate of economic growth for a while by continually fuelling in larger inputs; which may, in turn generate a variety of persistent imbalances jeopardizing long run growth (Pandit 2002). As per data released by (Oxfam International 2014) in 1994, the top 10% of India's population and the bottom 40% controlled the same portion of India's wealth– around 25%. By 2010, India's top 10% controlled nearly 30% of India's assets, and the share of the lower 40% declined to 21%. These figures clearly indicate the growing economic inequality in the Indian society and that there is a need for a sustainable and socially inclusive growth.In per capita terms adjusted for purchasing power, India's public expenditure on health is $43 a year, compared with $85 in Sri Lanka, $240 in China, and $265 in Thailand. In terms of GDP, India spends only 1.2%, compared with 1.5% in Sri Lanka, 2.7% in China, and 3% in Thailand. Out-of-pocket spending—69% of total health expenditure—is among the highest in the world and much more than in Thailand (25%), China (44%), and Sri Lanka (55%). (Debroy, Tellis and Trevor 2014). These figure indicate that the quality of healthcare facilities in India are very poor, as there is very low government spending and very high out-of-pocket spending on health. This calls for frugal innovations in Indian healthcare through which majority of people can be provided affordable yet quality healthcare facilities. Less than 5% of the 2 million Indians, who need a heart surgery, actually get it. The majority of the country's estimated 63 million diabetics and 2.5 million cancer sufferers haven't been diagnosed, let alone treated. Seventy percent of India's 12 million blind people could be cured by a simple surgery—if it were available to them (Govindarajan and Ramamurti 2013). There is a clear need for providing affordable, high quality and commercially feasible solutions to problems of the society at large. Yet this business opportunity has not been actively pursued by business organizations. The worlds largest companies have not been able to unlock the potential of emerging markets. Leading companies in the developed world earn just 17% of total revenues from emerging markets, even though these markets represent 36% of global GDP. By 2025, annual consumption in emerging markets will rise to $30 trillion, up from $12 trillion in 2010, and account for nearly 50 percent of the world's total, up from 32 percent in 2010 (Atsmon, Child, Dobbs, and Narasimhan 2012). These figures show the kind of business opportunities emerging markets have to offer. However winning in emerging markets calls for a completely different approach. Consumers in emerging economies look for socially valuable products and services.

VII. Defining Frugal Innovation

The Merriam-Webster Online Dictionary defines "frugal" as "characterized by or reflecting economy in the use of resources".Frugal innovation is the ability to generate considerably more business and social value while significantly reducing the use of scarce resources. More than a strategy, frugal innovation is a whole new mindset, a flexible approach that perceives resource constraints not as a debilitating challenge but as a growth opportunity (Radjou and Prabhu 2013). Frugal innovation responds to limitations in resources, whether financial, material or institutional, and turns these constraints into an advantage (Bound and Thornton 2012). Frugal innovation results in dramatically lower–cost products and services, which create social value. Frugal innovation is more important for emerging economies like India, where financial and institutional constraints inhibit the inclusion of the poor in the growing economy. From medical devices to cars to household appliances, the development of low-cost alternatives to aid poorer communities can be the key deriver of sustainability.

VIII. Research Methodology

The vicinity of study of this paper is of conceptual nature making use of secondary data. The paper is of descriptive nature. This research paper is based on in depth analysis of few case studies on successful frugal innovations in India. We have presented some case studies, which offer in depth understanding of business models based on frugal innovation.

IX. Developing The Theoretical Construct

9.1 Delivering Sustainable Development Through Frugal Innovation

Innovation as a concept has become the critical factor in the recent years for the Indian government. The President of India has declared the next 10 years as the 'decade of innovation' for the country (Kumar 2014). Frugal innovation has the power to solve major sustainability problems of the modern economies. Frugal innovation is the ability to generate considerably more business and social value while significantly reducing the use of scarce resources (Kumar 2014).However having scarce resources is not a good enough reason for a firm to practice frugal innovation. The firms also need to have idealistic or stretch goals, which are essentially based upon social causes.

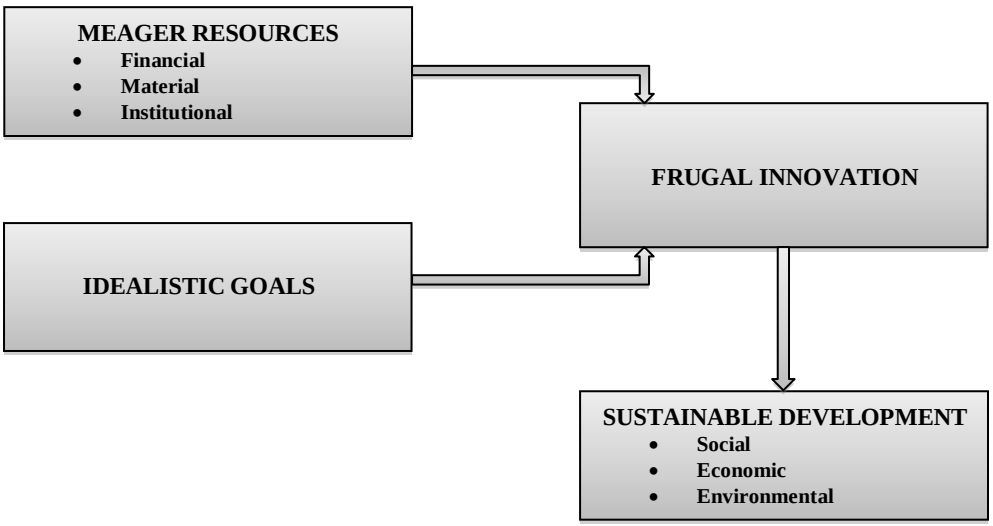

Figure 9.1: Conceptual Framework for sustainable development achieved through frugal innovation.

In Fig 9.1 above, we proposefirms, which have scarce resources (material, financial and institutional) at their disposal but have idealistic goals are best poised to practice frugal innovation. Idealistic goals can be equated with stretch goals suggested by (Hamel and Prahalad 1993). Stretch is a misfit between resources and aspirations (Hamel and Prahalad 1993). Firms, which have stretch or idealistic goals, don't see resource scarcity as a constraint for achieving their goals. Such a combination of idealistic goals and meager resources force these firms to innovate and the result is a socially valuable and sustainable solution. As we will see in the following case studies, all the firms, which practice frugal innovation, have meager resources at their disposal yet they have stretch goals.

9.1.1Narayana Health

Despite the pressing demand and constrained supply, a few relatively new Indian hospitals have devised ways of providing world-class health care affordably—and to scale (Govindarajan and Ramamurti 2013). These hospitals serve both the rich and the poor. Serving both segments produces synergies: the wealthy pressure the hospitals to achieve high quality standards, and the commitment to serve the poor applies constant pressure to lower costs. The combination of these segments results in a model that is both high-quality and ultra-low cost (Govindarajan 2014).Narayana Health, a cardiac hospital in Bangaloreis one among such hospitals that has used process innovation to achieve frugal innovation and eventually deliver sustainable development. The hospital makes proper utilization of its resources, whether financial, material or human resources. Being essentially an entrepreneurial venture, Narayana Health has limited resources in absolute terms. However the hospital is driven by a social cause of taking affordable and quality cardiac care to Indian masses, which is highly idealistic considering its limited financial and material resources.So how does the hospital actually achieve its idealisticgoal?Narayana Health works on a hub-and-spoke model and ensures that its physicians do only their core jobs. The hubs perform sophisticatedsurgery and spoke facilities focus mainly on diagnosis,

routine treatment, and follow-up care. This has helped the hospital to achieve high physician productivity. Each surgeon at Narayana Health performs from 400 to 600 procedures a year, compared with 100 to 200 by U.S. surgeons (Govindarajan and Ramamurti 2013).Narayana Health's 30-day post surgery mortality rate for coronary artery bypass procedures at its Bangalore hospital is below the average rate recorded by a sample of 143 hospitals in Texas (Govindarajan and Ramamurti 2013). The hospital charges an average of $2,000 for open-heart surgery, compared with $20,000-100,000 in America, but its success rates are as good as in the best American hospitals (Economist, 2010).Narayana Health is a prime example of how frugal innovation can deliver high quality services at affordable prices. Although the hospital has meager resources but it's idealistic goal of taking high quality and affordable cardiac care to Indian masses has resulted in many process innovations, which are very frugal in nature. Indeed this has resulted in a sustainable social development in the field of health care.

9.1.2 Aravind Eye Care System

Started in year 1976, by Dr. GovindappaVenkataswamy with 11-bed facility and four doctors, Aravind Eye Care System today is the largest provider of eye care services in the world. It performs almost 350,000 eye operations in a year – 60% of them are delivered at low or no cost (Vickers, Rosen 2011).In an interview to (Health International 2011) Dr. AravindSirinivasan, director of projects at Aravind Eye Care System said the founder had an idealistic goal of eliminating preventable blindness in India by providing high-quality, high-volume, compassionate eye care to all. We provide care to those who can afford to pay market rates and then uses the profits to fund care for those who cannot. Each fully paying patient cross-subsidizes the care of three or four others. Business results suggest that despite offering high quality eye care services at ultra low cost, the business model of Aravind Eye Care System makes a lot of economic sense. For instance, the company has paid for all its expansion projects from its profits, even though two-thirds of its patients receive free or subsidized care. Similarly, Aravind doctors each perform from 1,000 to 1,400 eye surgeries a year, compared with an average of 400 by doctors in the United States (Govindarajan and Ramamurti 2013). With the help of frugal innovation, Aravind Eye Care System has taken affordable eye care to masses. This has not only helped the company to achieve its social goal but also to create a sustainable business model in the field of health care.

9.1.3 Chotukool

The gap between the urban rich and rural poor is seen across industries in India. For example in urban India about 48% of all households have refrigerators. On the other hand, in rural India, only 8% of households have refrigerators (Indian Brand Equity Foundation).An ultra low-cost refrigerator, Godrej Chotukool is a result of deep consumer insights, use of suitable and sustainable technology and a mission beyond the profit.Researchers discovered that many rural families stored just a few food items at a time, which meant that conventional fridges were far too large for their needs. Another observation was that many villages had sporadic power supplies, which meant that food in traditional refrigerators was likely to spoil (Ernst & Young 2011). ChotuKool consumes less than half the power consumed by regular refrigerators, and unlike the normal refrigerator that has 200 parts, the ChotuKool has only 20 parts. Priced at INR 3,250 or US $69 it costs almost 35% less to acquire than the cheapest category of refrigerators available in the market (Williams, Omar and Rajadhyaksha 2012).The example of Chotukool is testimony to the fact that frugal innovation is not only practiced by small companies but some of the biggest companies like Godrej Appliances also practice frugal innovation.A company with a turnover of INR 2000 crore in FY 2013-14 (Moneycontrol 2015), Godrej Appliances definitely has abundant resources in absolute terms. However the firm has very scarce resources available for disposal because it has an idealistic goal of taking refrigeration to masses at very affordable prices. Huge pressure on cost reduction forces the firm to innovate frugally. Chotukool is an example of solving the twin problems of resource scarcity and cost control. Not only has this frugal innovation helped take refrigeration to rural households at very affordable prices but also helped to save a critical resource like electricity. Even though the primary goal of Chotukoolis driven by social development, it has resulted in environmental sustainability as well by conserving a critical resource like electricity.

9.1.4 Tata Swach

Water is the essence of life, yet 75% of the rural population in India does not have access to safe drinking water (Dhanaraj 2011). Launched at a starting price of INR 749 in December 2009, as a result of a joint effort of the Tata Chemicals Innovation Centre and the Tata Research Development and Design Centre, the Tata Swach water purifier makes use of rice-husk ashand nano-silver particles to render water clean and fit to drink (Tata Review 2011). Tata Swach does not require running water or electricity, which makes it very suitable for rural households where both these necessities are very scarce. Tata Swach, set a new benchmark of INR 30 per month of operational cost for a family of five members (Kumar 2014).Tata Swach began its journey as Sujal, Rice Husk Ash (RHA) that could filter about 85% bacteria, but fell short of World Health

Organizationstandards. The project was revived when Ratan Tata, impressed by the simplicity of the filter, took personal interest and encouraged the team to develop a low-cost water purifier that would also meet international standards of purity (Dhanaraj 2011).The innovation of Swach has to be seen in the context of the social cause that surrounds access to fresh and pure drinking water, which is one of the fundamental human rights. People in the villages preferred to boil water and use primitive purification techniques to purify it. They could not afford to have a water purifier, as its cost was more than their paying capacity. A deep desire to fulfill the most basic need of safe, clean drinking water was what pushed theTata Chemicals Limited team to develop a water purifier that had innovations on both product and process fronts. The first major innovation in Swach was, using the silver nanotechnology for purification. The second innovation was using'production grade rice husk'. The third innovation was the application of an automatic defect proofing mechanism in the product design (Kumar 2014). By making use of scarce resources for achieving a highly idealistic goal of taking clean water to rural India, Tata has proved how frugal innovation can help in sustainable socio-economic as well as environmental development.

9.1.5 Sarvajal Water ATM

More than 140 million people in India drink water contaminated by bacteria, chemicals, and other pollutants. Many of these Indians live in remote villages where it is not economically feasible to build infrastructure to filter water (Woody 2013).Nearly three-fourths of all diseases caused in India are due to water contaminants. Despite that, one in eight Indians still lacks access to clean drinking water (Economist 2013). India ranks 120 out of 122 countries on the quality of potable water. Each year, water borne diseases impact 37.7 million people, 75% of this being children. 21% of communicable diseases in India are because of unsafe water. Only 47% of Indian households have a source of water within the premises, about 36% of households still have to fetch water from a source located at a distance at leasta 100 meters from their houses ((Desai 2013).In 2008, Piramal Foundation started a for-profit project Sarvajal meaning "water for all" in Sanskrit to provide safe and clean drinking water to Indian householdswho live in the remotest of villages. Since transporting water to these communities from external sources was not a feasible option, Sarvajalstarted an integrated water purification service that purifies and monitors the quality of local water sources for local consumption, creating local jobs and income in the process (Jewell 2013).Sarvajal is a low-cost, solar-powered, self-contained water vending machine that stores clean water and can be re-filled by the nearest franchisee.Customers buy water from the water ATMs by paying through prepaid cards that can easily be recharged. Customers pay a nominal fee, which is kept lower than alternatives. The ATM's water is purified centrally using reverse osmosis. These ATMs are owned by local franchisee entrepreneursand the pay per use model helps the entrepreneurs maintain the equipment (Desai 2013).Sarvajal has succeeded in providing safe drinking water to approximately 190 villages,with close to 1-lakh customers being served on a daily basis (RP 2013).

9.1.6 General Electric Electrocardiogram Machine

Heart disease is the number one killer globally, and 60% of cases are from India. Electrocardiogram (ECG) testing is the first step in early detection. With power outages and an acute shortage of health care professionals in many parts of India, General Electric developed ECG machine MAC 400, which is priced at one-third that of imported ECG systems of similar quality. The machine is battery operated and easy to use (Wharton 2010). MAC 400 is not only the cost advantage but also portability and robustness to work in an environment with power fluctuations and dust. The cost advantage was achieved by creating a smaller device that retained only key functionalities. Standard and commercially available subsystems were chosen, e.g. a standard, off-the-shelf charging system used for mobile phones was used instead of a custom-made power supply system and more commonly used printer systems were chosen, like those used for bus ticketing systems (Ramdorai, Herstatt 2013). This miracle of compression sells for $800, instead of $2,000 for a conventional ECG, and has reduced the cost of an ECG test to just $1 per patient (Economist, 2010). By making a highly affordable ECG machine for solving social problem, General Electric has proved how even some of the world's biggest firm's can innovate frugally for delivering long-term sustainable development. Surely General Electric does not have scarce resources in absolute terms, however its idealistic goal of making heart care affordable to masses forced the firm not to use its resources at will, so as to manufacture an ultra low cost and high quality ECG machine.

X. Conclusion

This research paper provides ample evidence to prove that a combination of meager resources and idealistic goals lead to sustainable development. The case studies presented in this paper show how small companies with a mission to serve the society can transform their goals into profitable business opportunities. Not only small companies, but some of the multinationals like General Electric actively pursue frugal

innovation in emerging markets like India that help them to create socially valuable products and yet derive economic profit.Frugal innovation can help India solve twin problems of socio-economic inequality and resource scarcity. With India being the world's second most populous country, its financial and material resources are always scarce with respect to its population size. Wealth has primarily been concentrated to rich at the cost of rapid utilization of resources, hence compromising the growth of future generations. Frugal innovation has the power to solve India's sustainability issues. It can help the country to have a sustainable growth, which is socially inclusive.

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