Sustainability from Consumers to Manufacturers

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Abstract
This article questions the premise that operations and supply chains have the biggest role to be sustainable to improve the environmental sustainability. Consumers' psychology to replace a working product with a newer model, and firms' efforts to encourage that mindset are more responsible for environmental damage than sustainability in operations and supply chains.

Keywords: Sustainability, Marketing, Supply Chains.

INTRODUCTION

Current wisdom on environmental sustainability in manufacturing says that the best way to improve sustainability is to focus on making supply chains and operations environmentally sustainable. This article challenges the above premise and suggests that some fundamental changes in thinking at corporate leaderships are required to effectively bring about a change in environmental sustainability of organizations.

The environmentally sustainable development is defined as "the development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987). The best way to leave our commons for the future generations, while achieving sustainable development is by cutting down consumption. This article argues that greater emphasis needs to be given to various stakeholders, in addition to supply chain management (SCM) and operations, for addressing the challenges of environmental sustainability. The stakeholders to be included in discussions for sustainable development are (i) consumers who eagerly waits to replace a perfectly working product with a newer model with very little changes, (ii) marketing professionals who lure consumer to replace a perfectly working product with a newer models as frequently as possible and (iii) designers who design products for a very short lifespan. The terms "frequently" and "very short lifespan" are relative and their definition would vary based on products. It has been detailed in examples later in the article. Similarly, sales and marketing function has been referred to as marketing because marketing prepares the ground for sales to execute the plan. This article will explain, how the decisions and actions of these stakeholders have much bigger impacts on the environment than those of SCM and operations for producing those items.

Fundamentally, the interests of marketing and SCM functions are not well aligned on sustainability. The challenges of bridging this gap between SCM and marketing functions to

improve organizational sustainability have been discussed by many authors (Brindley and Oxborrow, 2014; Chan et al., 2012). These authors believe that better collaborative approach is required between SCM and marketing functions for improving overall sustainability of organizations. This has been endorsed by two case studies on new products development (Pero and Lamberti, 2013). Pero and Lamberti have shown the possibility of improving organizations' performance on sustainability through better collaborative approach between these two functions. Reduce, re-use, rework, refurbish, reclaim, recycle, remanufacture, reverse logistics have been suggested to reduce environmental impacts of supply chains (Srivastava, 2007). A reduction in use of resources at the origin is the best means of minimizing environmental impacts in operations/supply chains, while marketing works on maximizing consumption at the other end.

The end consumers of a product or a service are considered the most important element for the growth/expansion of any business (Yani-de-Soriano and Slater, 2009). The authors suggest that growth in consumerism has led to the over use of marketing. Marketing has an important role as a facilitator in educating consumers about the characteristics of products so that they are able to make informed decisions. However, their role has become a tactical tool to lure consumers in replacing products often. The marketing department of an organization is expected to generate a pull towards new products, increase the sales volume and hence, improve the top line. The roles and responsibilities of marketing in improving sustainability of an organization has been discussed with little consensus (Jones et al., 2008). Authors found some very divergent points of views such as "marketing and sustainability simply cannot be reconciled" and "marketing can contribute to the development of sustainable consumption". We believe that latter approach is possible if organizational leaderships are willing to re-evaluate their strategy and re-model their business around sustainability.

Market research and product design functions are constantly engaged in evaluating consumer needs, identifying unfulfilled needs, and designing products to fill the void. The role of designers is more challenging. They have a huge challenge (i) to design new products that meet customers' unmet need sooner than completion and (ii) to decide between longevity of a product and accommodate future changes in technologies. Mayyas et al., (2012) have discussed various options for improving sustainability throughout its lifecycle in automotive design. The issues and challenges of managing changes in technology have been discussed in literature (Gaimon, 2008). Technological changes in some of the areas, such as electronics and telecommunication were very rapidly, in the last decade. Such rapid pace of changes in any area causes additional challenges for designers as well as for marketing.

Among all these rapidly changing technologies, SCM and operations functions were entrusted with the role of reducing costs and environmental impacts for organizations. In order to minimize the environmental effects, a delicate balance among design of a product, marketing a product besides sourcing and manufacturing is required. Designing a good product includes a long useful life without any failures. Marketing a new product must include educating customers to use their existing products for its complete useful life. A review of available academic literature on sustainability in marketing highlights some of these challenges (Chabowski et al., 2011). Educating customers to continue to use a year old product, which does not have some features of the latest version will affect the sales revenue for an organization. This requires a re-thinking in business models, and a strong and committed leadership to make this directional change as it goes against their mandate to expand the market continuously even in mature markets.

This article develops a theory among these competing priorities and examines these issues in various functions in corporate organizations. The remaining sections provide the details about the

methodology, discussion, and conclusions. The discussion section provides two real life examples. However, we would like to make it clear that the names of products/brands used in examples are only for academic illustration purposes without any direct or indirect intended benefits or damages to any organization, group or individual. The next section will discuss the theory for this conceptual article.

THEORY DEVELOPMENT

The competing nature of priorities among various functions in an organization and the environmental impacts of their decisions are shown in Figure 1. The dotted lines indicate the path that leads to higher environmental impacts. The figure shows a vicious circle for marketing, product development, organizational leadership, financial stakeholders and SCM. Financial investors are primarily interested in higher returns on their investments and organizational leaderships are under tremendous pressure to continuously improve the net profits. The net profits can be increased by either increasing sales volume (keeping the prices same), increasing unit price of the product (keeping the volumes same) or reducing the supply chain costs. A combination of the first two options, i.e. increasing sales volume and unit price is suboptimal decision between the two and has not been discussed for the purpose of focus of this article and space. The option to increase prices is limited by the purchasing power of consumers and by the prices of competing products in the market. Therefore, the other two options, i.e. adding a feature and making minor changes in a product and reducing supply chain costs are given importance. Adding a feature or making minor changes while keeping the life of a product relatively shorter ensures that customers will buy these product frequently. In the process, the biggest responsibility to reduce environmental effects of producing a product is transferred to SCM and operations functions.

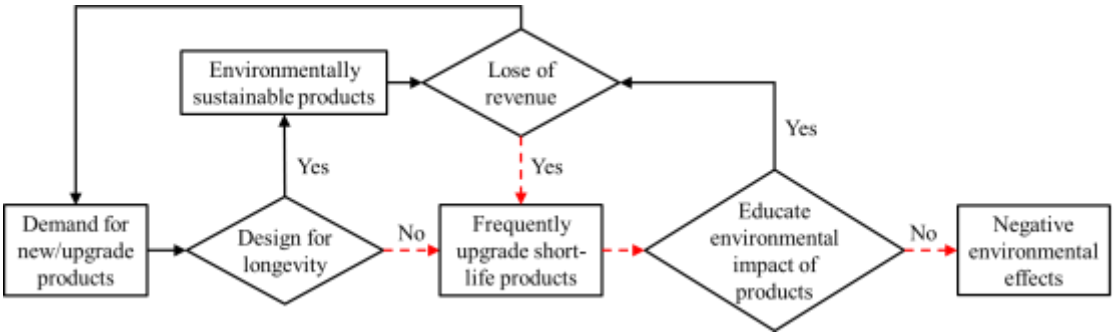

Figure 1: *Current decision model*

We believe that today's consumers feel compelled to discard many products after a short use (or singe use in many cases) due to some extremely successful marketing campaigns. Some products require replacements very frequently or after single use for hygiene purposes, for instance disposable hypodermic syringes. In the case of disposable hypodermic syringes, the objectives of marketing function, organizational objectives, customers' needs and the environmental needs were well aligned. We understand and support such campaigns. However, for most of the other consumer products, these objectives do not appear to be so well aligned.

The responsibility of improving sales volumes or selling a product with higher margin lies with marketing function. Marketing function is also responsible for sharing the activities related to an

organization's corporate social responsibility (CSR) with various stakeholders including customers. Here, CSR is used as a generic term which includes environmental sustainability. Marketing walk a tightrope to share the CSR initiatives while luring customers to buy their new products frequently. Their focus, for obvious reasons, is on the latter and the majority of discussions on environmental impacts are limited to boardrooms and annual meetings.

Designing a product requires knowledge of technology, competing products and a sense of creativity. Designing a product that lasts longer, takes time and hence, more expensive than designing a product with cosmetic changes, which lasts for a shorter duration. It is relatively economical to make cosmetic changes in a product, i.e. design a product with a short life which can be manufactured at low cost. However, the environmental effects of manufacturing a product with a shorter life compared to a product that lasts long are not proportionately reduced. In other words, the overall cost and environmental effects of designing, prototyping, testing/evaluating, productionizing and marketing a product does not proportionately depend on the longevity of a product. We will discuss this with some examples in the next section.

SCM is at the receiving of product design and marketing decisions. SCM professionals do their best to meet design specifications in quantity projected by sales/marketing to fulfil the market demand at the least possible cost. They outsource manufacturing to developing economies to reduce the cost as a strategy. This reduction in supply chain costs is a trade off with an enormous increase in emissions in manufacturing (Gurtu et al., 2016) and additional emissions in transportation (Gurtu et al., 2015). While on the surface it appears that nations or organizations have reduced their own emissions, in reality they have increased the global emissions as a result of outsourcing to developing economies (Gurtu et al., 2016). The reasons for increases in global emissions due to manufacturing in developing economies are (i) the use of conventional sources of energy, (ii) the use of non-clean technologies in energy generation, (iii) the use of inefficient technology in manufacturing and (iv) an absence or lack of either environmental laws or a will to enforce it. Therefore, SCM professional do have an important role in sourcing at the least cost, while minimizing emissions.

Consumers buy items without the proper knowledge of global environmental impacts of manufacturing these items in various countries. Adding the origin of manufacturing country does not tell a lot about the total emissions because different parts of a product are made in different countries. In the majority of cases, consumers have little choices in buying an item from an environmentally friendly country. In some rare cases, wherever these choices are available, the price differences are prohibitive for a common person to make a buying decision for an identical product at a much higher price because (i) there is no cost attached to the excess emissions and (ii) the information about excess emissions is not available to consumers. In the absence of this information, a large number of conscious consumers tend to buy affordable items. Many organizations, which were committed to environmental protection, were systematically pushed over a long period of time by competition due to the price advantages of sourcing from cheaper destinations that do not used environmentally friendly technology. As a result, SCM teams of the majority of such organizations ended up outsourcing their products from environmentally unfriendly destinations, which further lead to increasing the environmental burdens.

The explanations above, show the complex and intricate nature of organizations and competing internal priorities among various stakeholders. These stakeholders have externally imposed priorities to choose between consumers' needs, environmental needs and competitions' move. Among all these internal and external competing needs, SCM professionals are expected to reduce the environmental impacts of products, while reducing cost. In the next section, we shall discussion

these challenges with some examples of products. We would like to make it clear that these products/brands have been chosen for academic illustration purposes only without any intended benefit or damage to any organization, group or individual.

DISCUSSION

The intertwined nature of conflicting needs and interests have been highlighted in the previous section. Now let us discuss a few examples from the real world to examine, how these decisions effect the profitability of an organization and the environment. The first example is of smart mobile phones and for the purpose of illustration, let us consider Apple's iPhone. Apple revolutionized the market with the introduction of its first generation touch screen iPhone in 2007. In the last 9 years since the launch of its very first iPhone until 2015, Apple has come out with 9 upgraded models. Some of the newer upgrades were significant and some were cosmetics. Irrespective of the nature of the changes in the newer models, consumers were inclined to buy newer models every year due to advertising. Apple is a top technology company and surprisingly spends more than double the money on sales and marketing than on product development annually (Figure 2).

Despite the increase in research and development (R&D) expenses over the last three years, marketing expenses are still more than double of the R&D expenses for the top most technology company, which is also the top fifth organization among the fortune five hundred organizations ("The Fortune 500," 2015). Being profitable for a corporate organization is neither bad not optional, rather it is essential. "The goal of a manufacturing organization is to make money" (Goldratt and Cox, 2004). Nonetheless, taking care of environment is more important and a shared responsibility of every organization. Within an organization, it is the responsibility of every single functions. Making products, which have lower environmental impact is as important as designing products, which have lower environmental impacts. One of the ways environmental effects can be reduced is by extending the life of a product in the design stage rather than designing it to be replaced every year or that lasts for only one to two years.

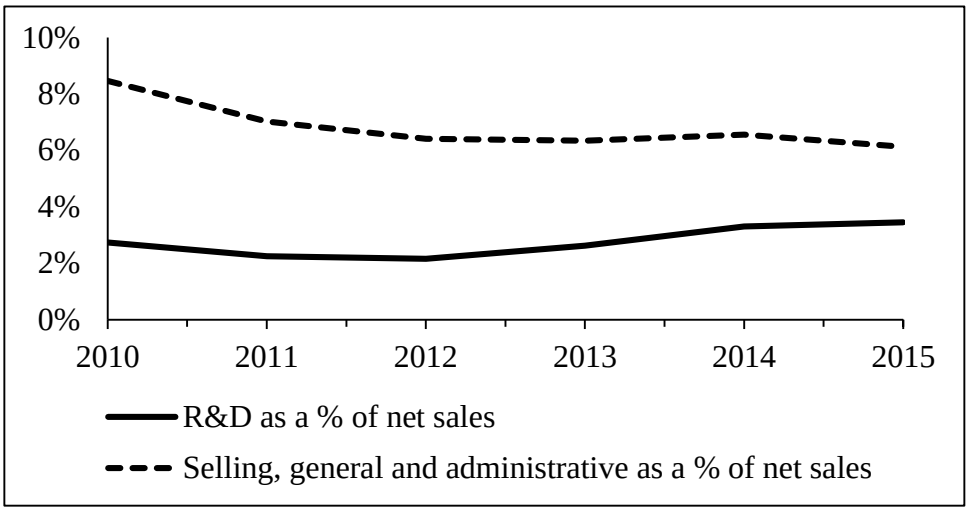

Figure 2: *Apple's marketing and R&D expenses ("Apple Investors," 2015).*

Many consumers exchange their perfect working phones with the latest models of phones every year, due to advertisements of the latest models. While advertising about the features,

organizations conveniently forget to mention the environmental impacts of these products. The old phones are refurbished to be resold or some of their parts are reused and the rest recycled. However, had the customer kept the old phone, there would not be a need to refurbish a working phone in the first place. Refurbishing a phone is better than recycling it, however it comes with certain environmental impacts. If we examine the practice of replacing a product about 4 decade back, one finds that products were not replaced unless it was worn out or broken beyond repair. The practice of getting a product repaired as long as it can be repaired and used, not only reduces the environmental footprint, but also provides jobs to small entrepreneurs rather than corporations. With an increase in the habit of frequent replacements and/or buying products that can be used only once, the skill of repairing is going extinct.

Recently, Apple and a major telecom service provider ("Sprint," 2015) have launched a scheme to lease iPhones (iPhones forever), where a customer will have the choice of replacing/upgrading one's iPhone anytime a new upgrade is available without any additional burden of an upgrade fee. There is no upfront fee and the cost structure of the scheme supports replacing the phone anytime an upgrade is available, which is generally once a year. The concept is similar to leasing a new car for 3 years and replacing it. The difference is that a leased car is not available for automatic upgrade, whenever the next version is available or every year. However, phone leasing, similar to car leasing, requires that the phone be returned without any damage whenever an upgrade is available. This clause facilitates upselling insurance plans and protection covers to cell phone-leasing customers! The organization must have ascertained the financial viability of this scheme and it must be more profitable than selling phones and telecom services. Nonetheless, ascertaining the impact of this scheme on the environment in long run is in question. The majority of consumers are likely to replace the newer version every year. The used phones would be refurbished/reconditioned, batteries will be replaced before reselling, repackaging will be done and a lot of reverse logistics and forward logistics activities will take place. All these will further burden the already stressed environment. Without this scheme, a vast majority of consumers are unlikely to replace their phone every year because of either an upfront portion of the cost of a phone or the monthly payment towards the cost of the equipment. The consumers are likely to be inclined towards this scheme because of an attraction of using a new phone every year. Apparently a more affordable cost structure with an insurance plan provides no worries of the cost of repairs during or after one year. Nevertheless, the basic question of reducing the negative environmental effects from the operations of an organization rests with the SCM and operations team, while marketing/sales and design work with little considerations to environmental factors of universal importance.

The next example is from a well-established organization making a single use (or a few times use and throw) safety razors. In the past, people used to buy a safety-razor only a few times in one's entire life and used replaceable blades. In many instances people bought a razor once in their entire lifetime because there are neither any moving parts nor anything which will wear out. These safety razors were made of one material either stainless steel or brass, which is easier to recycle without separation. Blades on the other hand were very economical and made of stainless steel, which is relatively easy to recycle as compared to razor cartridges, which are made of stainless steel and plastic. Not only were these blades at a fraction of the cost of modern blade-cartridges but also lasted a very long time. There were small hand held equipment to re-sharpen these blades as well, much like a tool for re-sharpening kitchen knives, which extended its life.

Contrast this old technology, which is still prevalent in many parts of the world, with the latest multi-blade-cartridge technology. Marketing teams of Gillette and other safety razor

manufacturers have done a wonderful job of promoting disposable safety razors without educating customers about the environmental impacts of buying and using such products (Garetti et al., 2012). These cartridges are made of more than one material usually plastic and stainless steel. It is hard to recycle a product, which is made up of multi-materials. The different materials have to be separated before recycling. That makes the separation of materials from a modern single or multi-blade cartridges complex and hence expensive. The razors and blades from the past are still available in the United States but the younger generation does not know if any such product exists because Gillette does not advertise such products at all and on the other hand spends a lot on advertising for different models of blade-cartridges. Gillette also comes out with some variation of the cartridge every couple of years and spends a lot on advertisement for promoting the new products. As an example, Gillette Sensor Excel was replaced with Gillette Fusion Razor. It was then subjected to ridicule as some comedy shows made fun of Gillette by saying that Gillette will replace the four blade Sensor Excel with a five-blade-razor and Gillette did exact the same thing with its five blade Gillette Fusion. After sometime, Gillette Fusion was replaced with Gillette Fusion Proglide. It is hard to find any difference in the actual quality of shave between sensor excel, fusion and Pro-glide. Figure 3 is Proctor & Gamble (P&G)'s R&D expenses, and advertising expenses. The advertising data for Gillette alone are not available, but one can get a sense of direction about advertisement expenses. It should be noted that the figure shows advertising expenses and not the selling, general and administrative expenses as was case with Apple. P&G's selling, general and administrative expenses are about 3 times the advertising expenses. The advertising expenses of P&G are three time more than their expenses on R&D.

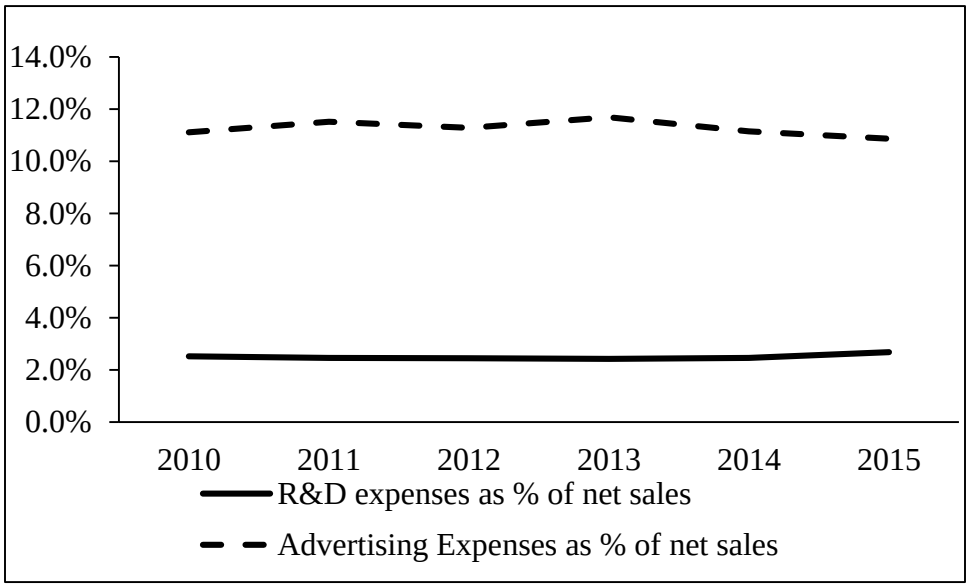

Figure 2: *P&G's advertising and R&D expenses ("P&G Investors," 2015).*

It is important to mention that P&G has separate page on CSR and sustainability on investors' website. However, none of their advertisements for their cartridge razor blades ever mention the environmental impacts of any of their products to customers. P&G advertises to promote sales. Highlighting the negative environmental effects of their products in advertisements will be counterproductive. Similarly, Apple has an "environmental responsibility" page on their website

but they as well never advertise the negative environmental effects of replacing their products every year or every couple of years. This goes back to the dilemma of marketing discussed earlier that sharing the environmental effects of a product will lead to a loss of sales revenue. That is why these advertisements do not have any mention about the environmental effects. These two examples are to illustrate the problems and challenges in dealing with environmental issues in corporate organizations. Authors would like to reiterate that these two examples were chosen for ease of illustration purposes only. There are numerous other products which follow the same path. However, due to space constraints, the examples were limited to these two products/organizations. The next section will describe some limitations and potential future research, and conclude the article.

CONCLUSIONS

The discussion in the previous section highlights the dichotomy of sustainability in various functions of an organization and hence, the challenges of managing it. On one hand, CEOs and board members have to delight investors by increasing profits year over year (or quarter over quarter) and on the other hand they have to show a reduction in environmental impacts of their business to consumers. It is walking on thin ice. No matter what a CEO wants or tries, investors' interests trump the rest. Therefore, it would make a lot more sense to consumers if the manufacturing, international transportation and life-cycle emissions were printed on each product similar to the nutrients label on edible items. This will help consumers in making conscious choices. Many electronics items, such as LED lights, mention the equivalency of incandescent lights and how much saving in energy usage happens over a year as a result of switching to LED lights. Another example of such label is energy star rating for electrical/electronic items. A similar approach on environment will be extremely helpful to consumers in making well-informed decisions when buying/choosing consumer products. These products may publish equivalent greenhouse gas (GHG) emissions in manufacturing, international transportation, usage and disposal. To calculate equivalent emissions in usage, some reasonable assumption can be made, similar to hours of use in calculating the savings from an LED light. In the absence of any guidelines on mentioning emissions on consumer products and a lack of marketing efforts in educating consumers on the effects of their buying decision on the environment, SCM/Operations continue to minimize the negative effects on the environment, while other equally important functions ignore this aspect of business. SCM can do their part but it is not sufficient to bring down the environmental effects of a product. Consumers have to be educated and marketing has a bigger role in that than simply advertising about features of new products. Similarly, it is also important to design consumer products in such a way that it has a longer and more useful life.

One of the limitations of this analysis is the lack of availability of data for advertising and R&D for products of an organization. The advertisement and R&D figures are combined for the entire organization making it hard to assign the exact amounts to a product. This makes it harder to compare with other products in the same organization or with similar products from other organizations. However, there is one striking similarity in consumer advertising that is the approach. This approach avoids mentioning environmental impacts of products in any advertisement for any product. In the absence of this information, consumers are unaware of the negative impacts of their buying decisions. Government, consumer groups, industry organizations and non-government organizations (NGOs) should set some guidelines for adding environmental

factors on products and in advertising. This will facilitate consumers in making informed decisions about their choices and buying habits.

This research can be extended in many ways. Estimating the effects of including environmental impacts in advertisements on the profitability of an organization is one of the possible extensions. Challenges of setting up regulations and guidelines for including environmental impact in consumer products is another possible research extension.

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