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Towards sustainability through incremental innovation of a low cost product: the Nespresso case

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ABSTRACT

With the increase of the population, it is imperative to expand the production of goods and services to meet the needs of individuals. Aggressive production practices are destroying and diminishing the world's natural resources, without any consideration about its consequences and impact on future generations. In order to minimize this problem, organizations need to develop innovations, which focus on and address the economic, social and environmental dimensions, or Triple Bottom Line. This article presents a case study on Nespresso, and investigates their strategy of developing an innovative recyclable aluminum coffee capsule, and a closed-loop recycling process, with the purpose of meeting the Triple Bottom Line. Data collection was done through secondary data, video testimonies and public documents. The collected data was analyzed and validated using the Theoretical Framework of Sustainability. With the understanding of this case, it was sought to answer the following research question: **How can a low-cost incremental innovation contribute to sustainability in a gourmet coffee company?** The main finding is that a low-cost product with incremental innovation, designed to meet the purpose of the Triple Bottom Line and coupled with a value-sharing strategy, is capable of delivering economic, social, and environmental benefits.

Keywords: Sustainable innovation. Nespresso. Aluminum recycling. Triple Bottom Line.

Rumo à sustentabilidade por meio de inovação incremental de baixo custo: caso Nespresso

RESUMO

Com o aumento da população, é imperativo expandir a produção de bens e serviços para atender as necessidades individuais. A produção agressiva está destruindo os recursos naturais sem se preocupar com suas consequências e impacto nas futuras gerações. A fim de contribuir para minimizar este problema, as organizações precisam desenvolver inovações com foco nas dimensões econômica, social e ambiental, out *Triple Bottom Line*. Este artigo apresenta o estudo de caso Nespresso com o objetivo de entender sua estratégia de ter uma cápsula de café de alumínio inovadora, dentro de um processo fechado de reciclagem, atendendo aos propósitos do *Triple Bottom Line*. A coleta de dados foi feita por meio de dados secundários, depoimentos em vídeo e em documentos públicos. Os dados coletados foram analisados e validados utilizando-se o Quadro Teórico de Sustentabilidade. Com a compreensão deste caso, buscou-se uma resposta para a seguinte questão de pesquisa: **como uma inovação incremental de baixo custo pode contribuir para a sustentabilidade em uma empresa fabricante de café gourmet?** A principal descoberta é que um produto de baixo custo com inovação incremental, concebido dentro do propósito do *Triple Bottom Line*, agregado a uma estratégia de compartilhamento de valor, foi capaz de trazer benefícios econômico, social e ambiental.

Palavras-chave: Inovação sustentável. Nespresso. Reciclagem de alumínio. *Triple Bottom Line*.

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Introduction

The changes in industrial practices are primarily made by industry leaders (Kumpe & Bolwijn, 1994). These companies strive to remain at the top of the market, and are constantly searching for new ways to be distinguished from their competitors, and sometimes accomplish this through the creation of innovative and unique products (Kumpe & Bolwijn, 1994). Innovation is not merely a technological issue, it is also a social renovation that occurs by means of open policies, open communication, efficient supply chains and positive stakeholder perception, constantly changing the organizational procedures and processes. This is the *modus operandi* of innovative organizations in order to remain cutting-edge and separating them from the competition (Barbieri, de Vasconcelos, Andreassi, & de Vasconcelos, 2010).

The result of product innovation usually leads to changes in the manufacturing process. One of the benefits of improving manufacturing processes is organizational development. However, innovation takes time and consumes utilities and resources while under development. Due to this consumption of resources, innovations can sometimes drastically increase the company's Ecological Footprint, which is the measure of ecological space consumed to produce the innovation (Wackernagel & Rees, 1998). In response, organizations raise their level of social and environmental responsibility, to ease the concerns of the stakeholders and maintain a positive perception. This strategy not only improves the image of the organization but also aims to convert it into profit (Mosca, Tamborrini, & Casalegno, 2015). Barbieri et al. (2010) corroborate this observation by saying that participating in this movement is a competitive factor.

Increasing a competitive value by social and environmental responsibility can be a complicated strategy. For example, companies may increase costs in social and environmental actions without converting them into benefits, thus reducing profit. The real value of organizations is not created by simply making a profit and distributing it to others. Instead, it is the expansion of the value to the social and environmental dimensions, which creates a value share (Porter & Kramer, 2011). Sustainable innovative organizations practice this, and produce innovative processes and products based on sustainable dimensions in their *modus operandi*, thus obtaining positive results for the organization, society and environment (Barbieri et al., 2010) and meeting the Triple Bottom Line.

Nespresso, a Nestlé Gourmet Coffee division, joined this movement by launching an innovative aluminum coffee capsule. This product was developed to not only benefit the

organization, but also society and the environment. Brewing coffee is a simple process: hot water is passed over ground coffee beans. Traditionally, people use containers that require large volumes of water, significant amounts of ground coffee beans and disposable filters, which consumes natural resources and generates waste. Nespresso addressed these issues by developing the aluminum coffee capsule.

While it is still a coffee container, this innovation significantly improved the coffee brewing process and reduced waste. This is because the costumer can make only one portion of coffee (a cup), which reduces the amount of water and coffee used and does not require a disposable filter. Furthermore, the aluminum container is made from a material that is 100% recyclable, and can be recycled many times without too much loss. This is an example of an incremental innovation, which is described as a new feature and/or improvement to a product by an existing market and technology (Garcia & Calantone, 2002). Additionally, in 2003, Nespresso also launched the "Recycling at Home" program, which established a product life cycle that begins and finishes at Nespresso, and ensured that the aluminum and coffee were recycled properly (Latéle, 2014).

On the other hand, due to the greatness of the objective, some say that economic growth is not possible with sustainability (Barbieri et al., 2010). In this context, this study sought to answer the following research question: **How can a low-cost incremental innovation contribute to sustainability in a gourmet coffee company?** The objective of this study is to understand Nespresso's strategy of developing an innovative 100% recyclable aluminum coffee capsule that meets the Triple Bottom Line for sustainability.

With the intention of gaining a better understanding on the subject, this article is organized into five sections. The first section, which has already been presented, provided a short contextualization of Nespresso and the innovation process of the aluminum capsule. The second section deals with the theoretical background describing the fundamental concepts of innovation, sustainability and share value, and also a sustainable innovation by a share value in cup of coffee. In the third section, the adopted methodology is described. The fourth section exposes the case study Nespresso, describing the organization analyzes and discusses the results. In the fifth and final section the limits of this research and suggestions for future studies are presented.

Theoretical background

Nespresso provides an example of how an industry leader made an effort to not only increase the profits of the company, but also make a positive impact on social and environmental issues. However, to gain a better understanding of the present case study, the fundamental concepts of innovation, sustainability and sustainable innovation need to be described. Towards this goal, this section discusses innovation, sustainability and share value and sustainable innovation by a share value in a cup of coffee.

Innovation

In order to be distinguished among competitors, organizations have to demonstrate differentiation, or in other words a competitive advantage. These results come from the competence of the internal core and the dynamic capacity of the organization, which translates knowledge into innovative goods. However, commodity goods only have elasticity when the customer apprehend the sustained differentiated value (Brem, Maier, & Wimschneider, 2016). A good that aggregates value with a significant improvement is called innovation (OECD, 2006).

Not every invention will result in an innovation. To begin with, a business plan needs to be constructed in order to know if the invention can be implemented, or in other words, introduced to the marketplace. The moment the invention reaches the marketplace it is called an innovation. According to OECD (2006), innovation has four dimensions: product (significant improvements in the characteristics or functionality of the product or service), process (modification in how the product or service is produced with a significant improvement in the techniques, equipment and/or software), marketing (significant modification in the method, in order to give a new position or price for the product) and organizational (a new organizational arrangement). Other authors have suggested that innovation has to be targeted in a holistic way, by improving the product (P_1), improving the process (P_2), re-defining the positioning (P_3) and re-defining the paradigm (P_4) (Francis & Bessant, 2005).

Depending on the extent of the improvements made to an existing product, an innovation can be classified into one of two categories. If an existing product is significantly improved, simplified or modified, but still uses the same technology to deliver it to the market, then it is classified as an incremental innovation (Garcia & Calantone, 2002). On the other hand,

if an existing product is used to create a new product, and requires revolutionary changes in the production technology, then it is classified as a radical innovation (Dewar & Dutton, 1986; Garcia & Calantone, 2002).

Product innovation can occur by changing the material, components or other characteristics that improve the performance of embedded software, facilities, technical specifications and/or functional characteristics. (OECD, 2006). These improvements arise from new knowledge and/or technology.

Process innovation can also occur when a significant improvement to production or distribution method is implemented. It can also happen by introducing new techniques, machines and/or software, or through the improvement of auxiliary support activity (OECD, 2006). Normally, this type of innovation reduces cost and improves quality. Since, product innovation usually results in process innovation, management must take both into account when developing the business and/or strategic plan.

In order to develop an innovation, human and natural resources are required. Natural resources are not unlimited and human beings depend on nature to survive, and industry has a tendency to be overly aggressive, which can result in environmental damage. Thus, a fine balance among innovation, sustainability, and share value needs to be determined.

Sustainability and share value

According to ONU (2015), the global population growth rate is 1.8% per year, and in order to satisfy the needs of the population it is necessary for industries to increase the production of goods. However, the world's natural resources cannot support such demands, since these natural resources are not unlimited.

The primary objective of an organization is to generate profits, however, attaining this goal at any price is no longer acceptable. Environmentalists argue that companies need to take into account the impact their business practices have on society and the environment (Barbieri et al., 2010). This new view of the world requires organizations to be cognizant of their competences and inabilities in their production practices (Van Reijsen, Helms, Batenburg, & Foorthuis, 2015). Obviously, production is an essential part of life. However, products need to be manufactured that not only fulfill the needs of the individual, but also improve the quality of life of people and preserve the environment.

Impacts cannot be limited by offsetting the Ecological Footprint or corporate social responsibility actions (Porter & Kramer, 2011). Production must preserve the natural resources so that future generations can utilize them. This is the pillar for sustainable production, the Triple Bottom Line (Elkington, 1998). In other words, for an organization to be sustainable, it should operate in these three dimensions: social, environmental and economic. The key to being successful in the Triple Bottom Line is through sustainable innovation.

To satisfy the three dimensions of the Triple Bottom Line is not easy. However, when companies meet the Triple Bottom Line their brands become more respected by customers (those that are more connected with environmental issues), by individuals (that are sure the organizations respect their stakeholders) and by investors (as the value of the stock increases with these actions). It is not only necessary to develop new products, but also create new production models that go beyond the financial returns, and focus on social justice and environmental goals. This is how share value is obtained.

Share value is an economic model that makes a company be a partner instead of a provider. The integral profit maximization and the competitive environment bring the organizations and community together, to re-think in a collaborative way about how their intentions create value. Share value is a win-win model that promotes stakeholders to work in a collaborative manner. Share value needs to be incorporated into the organizational culture, which will lead to changes in the processes and realigns the entire structure of the organization (Porter & Kramer, 2011).

Sustainable innovation by a share value in a cup of

Achieving a competitive advantage through innovation is an integral part of vanguard companies. It is known that most attempts to create viable innovations fail to reach the marketplace. It is a laudable effort for companies to improve the community's quality of life and organizations through innovative products. However, when the development of innovative products and processes fail companies lose money and precious natural resources are consumed.

With the intention of being sustainable, organizations produce new products, services and businesses in the social, economic and environmental dimensions, combining essential characteristics such as innovation and sustainability (Barbieri et al., 2010). In this regard, innovation is the way an organization reaches sustainable development.

The new innovation strategy is designed to use less energy and resources, promoting productivity gains, better wages for workers and a better quality of life for the community. This means that innovative products have been created in the light of a sustainable development.

Nespresso, a gourmet coffee company, turned a cup of coffee into a tool for its strategy, and through this case study provides an example of how incremental innovation can lead to sustainability, by meeting the Triple Bottom Line. The company offers a cup of gourmet coffee that can be prepared in the customer´s home. Nespresso made this possible by creating a 100% recyclable aluminum one dose capsule of coffee as an incremental innovation.

Thinking about ways to reduce the Ecological Footprint, Nespresso created a product life cycle for a cup of coffee that begins and ends at Nespresso. In a sustainable way, the organization not only reduced the environmental impact, which provides a solution to the generated waste (i.e. aluminum and coffee), but also improves the social dimension by applying a share value strategy, inviting providers to redesign the value chain and enabling local cluster development (Porter & Kramer, 2011).

In order to determine if this is the correct direction, a performance measure needs to be tracked. An environmental measurement performance tool transforms concern into an environmental protection action (Van Bellen, 2004). One of the proposed tools for measuring environmental impacts is the Ecological Footprint. This technique consists of translating consumption and waste into a correspondent productivity area. In other words, the more natural resources used in production, the larger is the Ecological Footprint. As the Earth is finite, this technique shows that our natural resources are limited and that the planet is not capable of satisfying our desires. In a sustainable life standard, our life has to be limited by the natural capacities (Van Bellen, 2004). The Triple Bottom Line is another measurement tool (Elkington, 1998). It is based on three dimensions: economic, social and environmental, meaning that a sustainable innovation takes all three of these areas into account. Towards the goal of returning value to the organization, improving the quality of life for human beings, and conserving natural resources for future generations.

Methodology

This research is based on a case study, an empiric and deep investigation into the real context, with multiple sources of data that highlights major events in the research environment with a holistic view (Yin, 2015). It is a qualitative research of exploratory and descriptive

nature, aiming to clarify the concepts based on theoretical references. Data was collected from public documents (Goldstein, 2016), reports (Nestlé Nespresso, 2016a, 2016b, 2016d), video (Latéle, 2014) and articles (Brem et al., 2016; Matzler, Bailom, Friedrich von den Eichen, & Kohler, 2013) and then analyzed. Some of the sources of data come from direct observations and an interview (Yin, 2015), however, Nespresso does not allow their employees to be interviewed. The evidence from Nespresso providers, customers and employees was collected from their testimonials registered in the video and public documents. The case study chosen is unique, because the applied innovative method involves the coffee market.

Dimensions	**Variables**
Economic	Cost impact studies to support decisions. ROI (return over investment) and cost-benefit trade-off curves.
	Relationship with stakeholders and consumers in the process.
	Continuous search for excellence and better quality.
	Network of knowledge management.
Social	Consensus meetings in the process of decision and reflection for learning with experience and errors.
	Values, principles and beliefs shared by members of the company.
	Disassembly analysis.
	After-sales tracking (reverse logistics policy).
Environmental	Application and reuse of consolidated technologies.
	Reduction of energy and fuel consumption in the project and product life cycle.
	Use of the 3R's (reuse, remanufacture and recycle), prioritizing abundant and renewable natural resources.

Figure 1: Theoretical Framework of Sustainability
Source: Adapted from Martens et al. (2016)

Data analysis was carried out by utilizing the information obtained empirically with the variables included in the three dimensions, according to the Theoretical Framework of Sustainability proposed by Martens at al. (2016) (Figure 1). The Theoretical Framework of Sustainability was based on literature reviews and has three dimensions (economic, social and environmental), as well as variables to measure each dimension. It was used and validated as a means of evaluating the application of sustainability in innovative project development (Martens et al., 2016).

Case study

In this article, the Nespresso case study is explored to understand innovative strategies, while taking into account the dimensions of sustainability. Towards the goal of analyzing the

data in the scope of the Triple Bottom Line, the data were coupled with the variables associated with the Theoretical Framework of Sustainability (Martens et al., 2016).

Nespresso, the Nestlé Gourmet Coffee division, has already been studied as a successful and innovative marketing business model (Matzler et al., 2013) as well as a company that employed an effective strategy that generated a competitive advantage (Brem et al., 2016). The current study seeks to expand on the previous studies and examine another business view: sustainable innovation. The case study presented here is based on the Nespresso organization operating in Switzerland.

The leverage point that Nespresso used to successfully position it's new product was that an individual could easily prepare a cup of gourmet coffee at home (Nestlé Nespresso, 2016d). Given that the recycling approach is an essential dimension of sustainability, the development of the coffee machines and capsules were driven by this concept. The final products were a beautiful, functional and effective machine and an extremely innovative capsule constructed from 100% recyclable aluminum, a material that can be recycled many times without much loss. Also, to decrease the environmental impact, the product life cycle of the capsule and the coffee are considered. Based on this idea, in 2003, Nespresso launched the "Recycling at Home" program establishing a cycle that begins and finishes at Nespresso, ensuring that the aluminum and used coffee would be recycled (Latéle, 2014).

First, Nespresso provided used capsule collection points. Recycling points are located in Nespresso shops and other commercial locations. Additionally, Nespresso formed a partnership with a local courier that delivers new capsules, and at the same time collects the used ones for free. In order to maintain the sustainability, an alternative delivery system utilizes eco-bicycles, which not only preserves the clean air, but also generates more jobs for bicyclists. In Switzerland, courier services deliver 70% of the used capsules to the recycling facilities (Latéle, 2014). Nespresso designed the logistic chain together with the provider so that both companies could benefit from the arrangement and maximize the operational process (Latéle, 2014). The Nespresso delivery logistic chain is shown in Figure 2.

The used aluminum capsules are delivered by a courier to a recycling facility. Nespresso chooses the recycling provider and educates them about the aluminum recycling process. The provider is trained to have a clean and sustainable production line, and is provided with the information about which equipment to use. Based on this, the recycling facility constructs their own recycling line.

Briefly, the recycling process begins with a machine separating the aluminum capsules from the packaging material, and then the coffee is separated from the capsule. At that point, two distinct recycling processes occur: aluminum and coffee. The recycling facility sells the recovered aluminum so that it can be transformed into new aluminum products. This recycling process consumes 90% less energy than the bauxite extraction and transformation process. This process also benefits the local recycling facility, which is makes money for their services, and by selling the recycled aluminum (Goldstein, 2016).

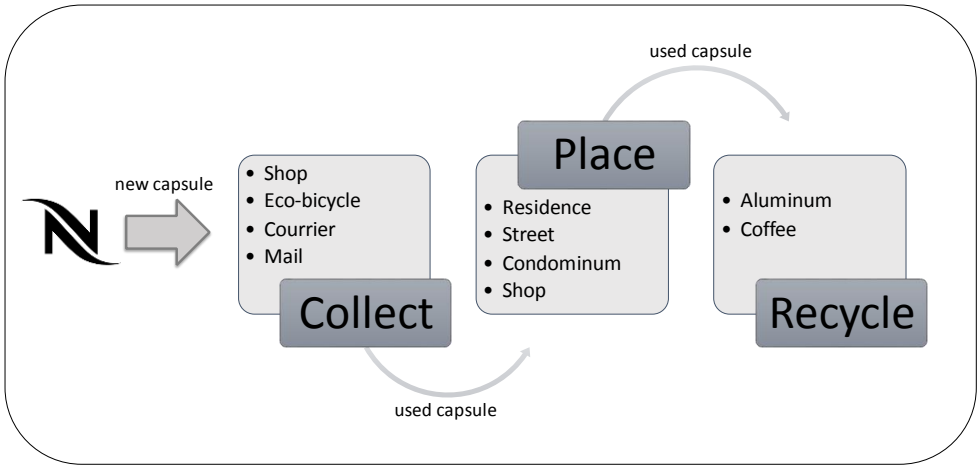

Figure 2: Nespresso delivery logistic chain
Source: Prepared by the authors

The second recycling process is based on the used coffee grounds encapsulated in the aluminum capsule, which can be used to produce two new raw materials. The more traditional one is to use the coffee as an organic fertilizer. During this process, the coffee is transported to a compost facility, where it will be degraded and transformed into organic fertilizer, over the course of four to six months. The primary benefits of this compost are to prevent soil erosion, improve soil microbial activity, enhance water uptake and retention and facilitate crop cultivation. As a result, the soil becomes lighter and it does not degrade, which means that the farmers only need to apply the organic fertilizer once and then plant their crops (Latéle, 2014). The overall goal is to organically enhance the life cycle of the soil, while at the same time reduce waste.

Another raw material that comes from coffee is bio-charcoal (bio-carbon). This process was originated by Indians from the Amazon a hundred years ago, and uses a pyrolysis process during which the coffee grain is burned at a high temperature (1300ºC to 1400ºC). It is considered a clean process because all of the energy and gas are re-used during the pyrolysis process. The result is a bio-charcoal three to five times more energetic than wood, and provides

another example of how this innovation re-uses the starting materials (Latéle, 2014). Ultimately, the coffee-derived bio-charcoal can be used as a fuel in the pyrolysis process, thus reducing the consumption of electric energy by the pyrolysis machine to almost zero. Such a design represents an almost perfect product life cycle, since one recycled product is used to create another product. The Recycling life cycle of the Nespresso aluminum capsule and used coffee is represented in Figure 3.

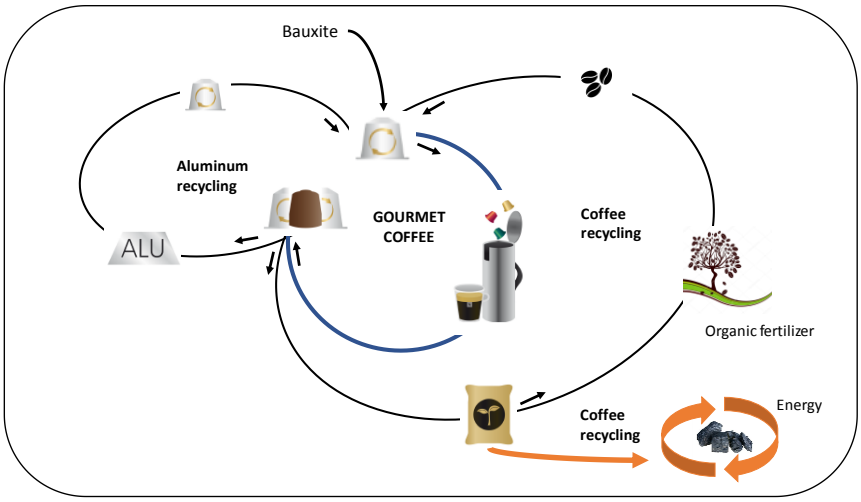

Figure 3: Recycling life cycle of the Nespresso aluminum capsule and coffee
Source: Adapted from (Nestlé Nespresso, 2016c)

Discussion

Brewing coffee is process that involves passing hot water through the ground coffee beans. The Nespresso aluminum capsule uses this same process but only makes one cup of coffee at a time, which saves energy, water, sugar and coffee. The amount of waste is also reduced because there is no need for a disposable filter, and the aluminum capsule can be recycled after it is used. A significant change in the potential of an existing product is a characteristic of product innovation (OECD, 2006), and improving the product is the first 'P' of targeting an innovation (Francis & Bessant, 2005). In this case, Nespresso incorporated a recyclable material that improves performance and enhances the product life cycle, and as a result represents an incremental innovation.

Nespresso also created a new relationship with their providers, through establishing a new logistic process, an innovative process, which integrated the logistic strategy. By innovating both the product and the process, Nespresso shared value with its providers, and

brought new value to all its business partners, which represents the second 'P' of targeting the innovation (Francis & Bessant, 2005).

Furthermore, the improvements to the aluminum coffee capsule provided Nespresso customers with the ability to prepare and drink gourmet coffee in their home. This created added value the product, leveraging a better marketing positioning, and fulfilling the third 'P' of targeting an innovation (Francis & Bessant, 2005). Being able to brew gourmet coffee at home also affords the customer with the opportunity to offer this beverage to visitors and guests, thus re-defining the coffee service paradigm and accomplishing the fourth 'P` of targeting an innovation (Francis & Bessant, 2005).

Nespresso combined brand association with social and environmental responsibility, in the new paradigm, to create added value. Analyzing the environmental impact, the creation of a perfect product life cycle decreases the Ecological Footprint. For example, the bio-charcoal that is re-used to produce the bio-charcoal, itself, helps to reduce the environmental impact (Latéle, 2014).

The Nespresso Global Reporting Initiative (GRI) (Nestlé Nespresso, 2016b) tracks the performance in sustainability and couples the GRI indicators to the dimensions of the Theoretical Framework of Sustainability (Figure 1), and from the results it is possible to determine to what extent Nespresso is adhering to the sustainability strategy.

The new product positioning was reached by an added value that leverages 85% per capsule gross margin (Brem et al., 2016), thus raising Nespresso's profits and satisfying the stakeholders. Gross margin also received a contribution from the reduced cost, due to the more efficient production processes. From 2009–2016 the carbon footprint per cup of Nespresso coffee was reduced by 19.4%. This reduction is due to the reduced consumption of several resources. For example, the total on site water withdrawal (m^3 per ton of product) that was reduced from 19.1 (2010) to 7.6 (2016), the total on site energy consumption (gigajoules per ton of product) dropped from 4.7 (2010) to 4.0 (2016) and the direct and indirect GHG emissions (kg CO_2 per ton of product) was reduced from 123 (2010) to 96 (2016) (Nestlé Nespresso, 2016b).

Nespresso also maintained a positive brand image, in the mind of the customers, which increases the likelihood that individuals will consume their gourmet brand coffee. In fact, the GRI (Nestlé Nespresso, 2016b) indicator provides evidence that the relationship between the customer and Nespresso is increasing, as the number of Facebook fans (in millions) increased from 0.2 in 2009 to 5.7 in 2016, indicating that relationship actions are increasing the

stakeholder interest in the brand. Furthermore, 85% of the customers consider Nespresso coffee a superior product, which is another good relationship indicator for Nespresso stakeholders. Further confirming that Nespresso is concerned about stakeholder issues, Alexandre Bolya, Technical and Quality Director of Nespresso Switzerland argued "*we pioneered capsule recycling to respond to a request from our customers*" (Latéle, 2014).

Attending to customers' requests, Nespresso has shown that it is committed to ensuring sustainability in the future, aiming to use 100% sustainable energy coffee, 100% sustainably managed aluminum and 100% carbon efficient operations, by 2020 (Nestlé Nespresso, 2016a).

The social dimension is not easy to measure, but the Nespresso case provides evidence that people's quality of life involved in this life cycle is improving. With regards to the Nespresso organization, the number of employees increased from 330 in 2000 to 12,000 in 2015 (Nestlé Nespresso, 2016a). The number of farmers enrolled with a quality program that enhance coffee production grew from 1,500 in 2005 to 71,216 in 2016 (Nestlé Nespresso, 2016b), thus improving the farmer's quality of life**.** Furthermore, the number of female agronomists involved in the Nespresso program grew from 0% in 2005 to 30% in 2016 (Nestlé Nespresso, 2016b), which is an indication that Nespresso is concerned about gender equity.

New jobs using eco-bikes and local businesses for the delivery and pick-up of new and used coffee capsules is confirmed by Gérard Valéri, Director of Ecomotrice Genéve SA, and Nespresso delivery partner, who said in a video interview "…*we have already created jobs and we are hoping to create even more jobs in the future*". In another part of the interview, he said that the Nespresso business model is allowing partners to "*make money*". Job creation by the possibility of making money is evidence that there is a social improvement in their lives (Latéle, 2014).

Values, principles and shared beliefs is evidenced in the testimonial of Dieter Bambauer, Director of Postlogistics Swiss Post when he said "*interviews and numerous discussions with Nespresso clearly shows that sustainable development and environmental responsibility play a major role within the company*" (Latéle, 2014). From this testimony, we can infer that there is a dialogue between Nespresso and its suppliers and a clear intention to disseminate the values of sustainability and environmental responsibility with its partners.

The maintenance of a close relationship with its partners demonstrates Nespresso's concern to follow the reverse logistics process, guaranteeing the control of the process and the final satisfactory result.

Re-using the aluminum and used coffee is the goal of the recycling process. The aluminum can be reused for other aluminum products and even for new aluminum Nespresso capsules. The used coffee can be used to create organic fertilizer, which is used to rejuvenate the soil, returning properties to the soil that have been depleted. The used coffee can also be used to make bio-carbon, a charcoal that is more energetic than wood, and it is used to produce the bio-carbon itself, a perfect life cycle enables the process to consume much less energy, as corroborated by Marc-Etienne Favre, director of La Coulette Composting, Nespresso partner for coffee recycle: "…*we don´t want too much energy in our machine. The machine consumes almost no energy, a very small amount of electricity. The only energy consumed by the system is the energy produced by the gas from the waste. The heat generated by the gas combustion allows us to create the pyrolysis process. It´s a really a perfect cycle at the machine level: as we enter the waste, it is heated by the energy from that very waste*" (Latéle, 2014).

The results from the data analysis has been presented and correlated with the Theoretical Framework of Sustainability (Martens et al., 2016). For each dimension variable, evidence is provided to confirm the adherence to The Triple Bottom Line. The Nespresso case presented adhesions in all dimensions, thus being in compliance with the Triple Bottom Line (Figure 4).

Dimensions	**Variables**	**Adherence**
Economic	Cost impact studies to support decisions. ROI and cost-benefit trade-off curves.	Adherent. 85% per capsule gross margin.
	Relationship with stakeholders and consumers in the process.	Adherent. Facebook fans (million) increase from 0.2 (2009) to 5.7 (2016)
	Continuous search for excellence and better quality.	Adherent. 2020 goal: 100% sustainable energy coffee, 100% sustainably managed aluminum and 100% carbon efficient operations
Social	Knowledge management network.	Adherent. Provider, consumer and Government in the receiving training and information about the Nespresso strategy, recycle program and recycle product application.
	Consensus meetings in the process of decision and reflection for learning with experience and errors.	Adherent. Made by knowledge network together with partners.
	Values, principles and beliefs shared by the members of the company.	Adherent. Not only by the company's members but also by provider's members and customers.
Environment	Disassembly analysis.	Adherent. By recycling the capsule process.

	After-sales tracking (reverse logistics policy).	Adherent. Bringing back the used aluminum capsule and involvement with partners.
	Application and reuse of consolidated technologies.	Adherent. Aluminum recycling process, coffee composting, Pyrolysis-process
	Reduction of energy and fuel consumption in the project and product life cycle.	Adherent. Site water withdrawal (m^3 per ton or product) that reduced from 19.1 (2010) to 7.6 (2016). Site energy consumption (gigajoules per ton of product) dropped from 4.7 (2010) to 4 (2016). Indirect GHG emissions (kg CO_2 per ton of product) reduced from 123 (2010) to 96 (2016).
	Use of raw material 3Rs (reuse, remanufacturing and recycling), prioritizing abundant and renewable natural resources.	Adherent. Aluminum for capsule, organic fertilizer to soil, biocarbon to pyrolysis process

Figure 4: Triple bottom line analysis.
Source: Prepared by the authors.

The results show that Nespresso's sustainability actions have increased profit margins, lowered production costs and reinforced a positive and impressive brand image (business value). The strategy of meeting the Triple Bottom Line has improved the quality of life and business of the commercial partners and the communities that surround them, since the environment has been preserved (sustainability). Inferred by the Nespresso case study, the company is a sustainable innovative organization because all of its operations are designed to manage resources. Thus, sustainable innovation has generated positive benefits by increasing the value of the company's business.

Final remarks

This paper analyzed the Nespresso case with the intention of answering the following research question: **How can a low-cost incremental innovation contribute to sustainability in a gourmet coffee company?** Nespresso exchanged the raw material of a low-cost product, the coffee capsule. This innovation provides Nespresso with the ability to create a perfect product life cycle where the product is produced and re-used or returned to nature. Bearing in mind the purpose of the Triple Bottom Line, through the incremental innovation of the coffee capsule, Nespresso was able to develop a product and process that generated financial benefits to the company, and social and environmental benefits that could be distributed to employees,

partners and the community. Blended with a strategy of share value, Nespresso leverages the sustainable impact covering Triple Bottom Line dimensions.

The scope of this study was limited to a case study in Switzerland, focusing on the innovation of a recyclable aluminum coffee capsule. Since Nespresso does not allow their employees to be interviewed, this study was based on available secondary public data, and was performed in a manner similar to other case studies about Nespresso (Brem et al., 2016; Matzler et al., 2013). Despite this limitation, this study is particularly relevant because this is the first time a Nespresso case study has addressed the subject of sustainable innovation and the preservation of natural resources. Sustainable innovative strategies are an inspiration for the practical application of the Triple Bottom Line strategy in organizations looking to increase share value and gain a competitive advantage.

A national agenda should be set up to motivate organizations to explore options that incorporate new materials with low environmental impact and to educate individuals about being more environmentally conscious with the intention of reducing the Ecological Footprint. This new way of doing business will bring more value to the organizations, and can be shared among the providers, thus giving them an opportunity to improve their business and the quality of life of the workers.

It is suggested that future studies investigate the same organization in other countries, with the intention of validating this model, since a portion of this strategy is formed by the local provider. Furthermore, supply chains in other countries may prompt Nespresso to make different arrangements. A second research direction may involve investigating the relationship and shared value between Nespresso and the coffee bean farmers, which may increase value in this chain.

Nespresso showed how to be an industry leader, by respecting the social and environmental dimensions, creating and sharing value, decreasing costs and leveraging the profit by being a sustainable innovative organization. The sustainable innovation, even in a low-cost product like a capsule of coffee, has brought value to the organization, and is an example that can be replicated in all business sectors.

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