

It Isn't Easy Being Green: Operationalizing Environmental Sustainability

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There are many perceived obstacles facing a company when trying to include sustainability initiatives into their operations. These perceptions range from the belief that the company cannot afford the initiative to that the initiative will be criticized by outside stakeholders who view it as nothing more than “greenwashing”. Using a hierarchal approach, the following paper presents a roadmap that allows businesses to not only financially afford green initiatives but ultimately embeds a mindset of sustainability into the culture of the organization.

Keywords: environmental sustainability, operational hierarchy

INTRODUCTION

The triple bottom line states that businesses should have operational responsibility for generating profits, protecting the natural environment, and positively impacting society. It was first described by John Elkington in 1994. In 2011, the Sustainability Accounting Standards Board was formed to create “ESG” standards focused on accounting factors related to a company’s impact on the environment, society, and corporate governance. Other similar attempts to account for these factors include Social Return on Investment, Full Cost Accounting, the Environmental Profits and Loss Approach, the Total Societal Framework, and others. (Elkington 2018).

Virtually every business has a sustainability initiative as part of its corporate strategy (Hackenberg, 2019). Often the initiative addresses a particular aspect of the operation leaving other areas untouched. This creates charges of “greenwashing”, defined as misleading consumers regarding the environmental practices of a company (firm-level greenwashing) or the environmental benefits of a product or service (product-level greenwashing) (Delmas & Burbano, 2011). This definition implies that “greenwashing” is an intentional act of deception. Often times, however, an accusation of “greenwashing” results from the

company focusing on specific aspects of its operations while critics look at alternative aspects or at the operation holistically. The lack of a systematic approach to measuring sustainability initiatives, as indicated by the various approaches mentioned above, especially those related to the environment, exacerbates the “greenwashing” charge as well as creates erratic and inconsistency operational processes.

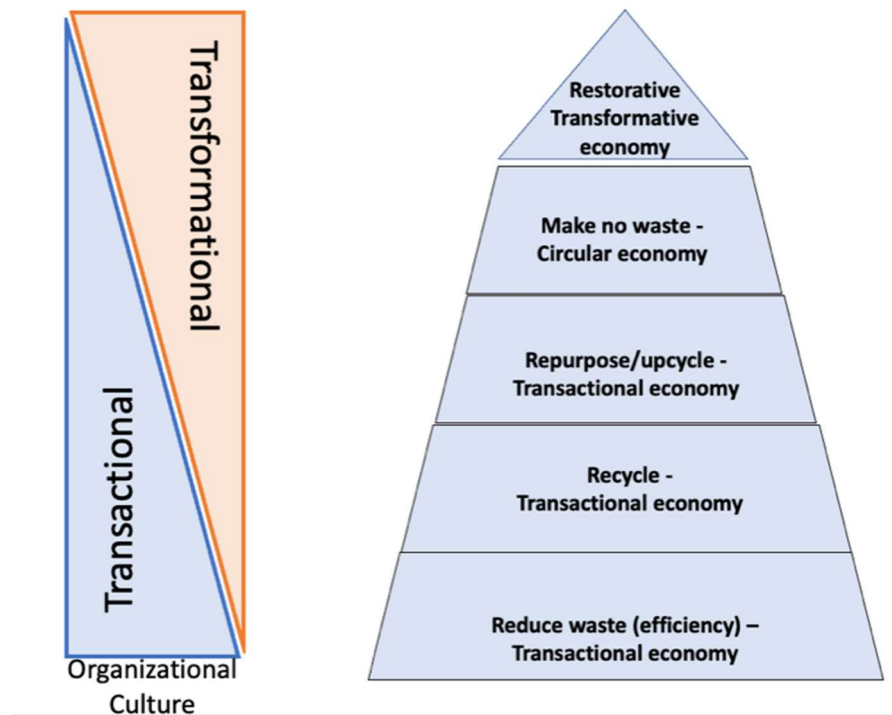
The following paper offers a systematic approach to operationalizing environmental sustainability initiatives. This approach uses a hierarchal methodology addressing initiatives from the easiest to initiate to the hardest.

A HIERARCHAL APPROACH TO OPERATIONALIZING ENVIRONMENTAL SUSTAINABILITY

In 1943 Abraham Maslow, in his paper *A Theory of Human Motivation*, created a hierarchy of physical and emotional needs that served to motivate humans. The use of hierarchies has been frequently used since then to describe an additive approach to achieving a high order objective. For the purpose of this paper an analogous hierarchy is provided to establish operations that are both environmentally sustainable and incrementally obtainable given the organization’s current financial viability and cultural willingness.

At the base of the hierarchy are transactional strategies that allow a business to see more immediate benefits from their sustainability initiatives. The higher levels of the hierarchy describe transformational strategies that can enhance the creation of an organizational culture of environmental sustainability in terms of both operations as well as in innovation. In total, the hierarchy allows a company that has not considered sustainability initiatives to begin the process of “becoming green” while defending themselves against charges that they aren’t “green enough”. The hierarchy recognizes that the journey to achieve an environmentally sustainable operation or, as Ray Anderson the founder of InterfaceFLOR once said, “to climb Mount Sustainability” (Anderson, 1999), is long and must be completed systematically.

FIGURE 1
HIERARCHY OF OPERATIONALIZING ENVIRONMENTAL SUSTAINABILITY



Level 1 – Efficiency

Amory Lovin (1990) first coined the term “negawatt” in describing that the most valuable watt of energy, both financially and environmentally, is energy that is not used, or more appropriately, not used in the production of value. The concept of the “negawatt” can be applied more broadly throughout an organization’s operation to simply ask, “is it necessary”, thereby creating “nega” awareness. Implementing a “nega” awareness has been described as simple common-sense, and yet there are multiple instances where companies report significant financial benefit by simply recognizing the waste in current operational practices and then eliminating that waste.

Ray Anderson, in his book *Confessions of a Radical Industrialist* (2009), described how InterfaceFLOR generated over 450 million dollars in operational savings by taking advantage of “low hanging fruit,” some of which was identified using “nega” awareness. Similarly, in a video first produced for Green.TV, Miller Brewing talks about employee “energy reduction teams” in their Milwaukee brewery. In their review of brewing operations, the teams questioned why the brewery kept all their operations running (lights, air conditioning, etc.) during the three-day Labor Day weekend when no activity or people were in the building. Mike Lozano, the Utilities Unit Manager at Miller, describes a financial windfall that came to the brewery by simply shutting down the power during those three days (Sustainable Development - the Miller way, 2008).

These “common-sense” solutions were often not considered for two reasons. The first was a lack of interest by top management, which subsequently resulted in a lack of awareness on the part of employees on the floor. This is the true benefit of having “nega” awareness as the base of any environmental sustainability initiative. It produces direct tangible benefits to the company while also reinforcing and rewarding awareness at the grassroots of the organization, where initiatives can become embedded in the organization’s culture. As such, creating appropriate rewards to incentivize the cultivation of “nega” awareness among front-line employees is a parallel practice, along with cultivating a culture of “nega” awareness at the top, which can reap benefits.

Biomimicry has become a critical new tool in developing more efficient processes that increase the value of “nega” awareness. Biomimicry looks to nature and natural processes as a guide to creating products and systems that utilize all resources in a sustainable and restorative manner (Benyus, 1997). The use of nature in innovative product design has enhanced performance in existing products.

For example, Tokaido Shinkansen redesigned their bullet trains to mimic the beak of a kingfisher bird and saw a 15% improvement in energy usage (Biomimicry Institute <https://asknature.org/idea/shinkansen-train/>). Whale Power Corporation used tubercle design technology inspired by humpback whales to create wind turbines that can operate in extremely low wind velocity (<https://asknature.org/idea/tubercle-technology-blades/>). Interface FLOR used the randomness of nature to design popular carpet tile “patterns” (which, in fact, are not patterns at all). This “random sameness” along with the development of glue-free flooring inspired by the gekko created a product line that was not only highly popular in the marketplace but also allowed damaged or soiled tiles to be replaced while maintaining the design integrity of the entire carpet surface. Combined, the biophilic design and non-toxic adhesive has removed tens of thousands cubic yards of traditional wall-to-wall carpet from landfills (https://www.interface.com/US/en-US/design/biophilic-design/Biophilic-Design-en_US).

Therefore the notion of “nega” awareness, can range from common sense thinking that simply eliminates the use of resources to cutting edge innovation and technology. All that is required is an awareness of inefficiency and waste, a commitment to reducing such waste, and an openness to seek out new solutions beyond common practices.

Level 2 - Recycle

There are several ways in which a company can reduce the impact of waste within their organization and in the environment. The first, as described in Level 1 of the hierarchy, is to reduce the production of waste within existing operations. This is done by creating a culture of “nega” awareness throughout the organization.

Level 2 in the hierarchy recognizes that the extant manufacturing and operational procedures in place for most companies will create waste that “nega” awareness will not prevent. Companies can implement two operational approaches to reduce the impact of that waste. The most commonly practiced is recycling programs.

The Oxford Dictionary defines recycling as the “action or process converting waste into reusable material”. Virtually every organization has instituted programs to promote recycling, usually in the form of bins with the recycling logo (♻️) proudly displayed on the side. Staff, customers, and strangers are requested to place items that they normally would throw away into a recycling bin. The determination as to what is recyclable and what is not is left to the discretion of the person making a contribution to the bin. While the intention is laudable and there is some benefit in removing product from landfills, too often the result of such initiatives is more “feel good” than real environmental impact.

Many things that are placed in bins for recycling will ultimately go into landfills due to contamination that makes extraction for recycling too costly. Additionally, increasing resistance from developing countries that traditionally accepted waste has created new barriers to recycling. China’s refusal to accept any but the cleanest waste from the U.S. is a recent example of the changing attitudes of developing countries regarding waste, recycling, and economic development (Profita, 2017; Semuels, 2019).

Moreover, waste that is sent abroad to be recycled often ends up being incinerated or processed with methods that result in the release of additional toxins into the environment (Royte, 2019). The end result is that recycling, while being of some benefit, does not have the outcome companies would like as an environmental sustainability initiative. Without careful consideration, planning, and preparation, businesses may claim that they are green because they recycle and almost immediately be charged with greenwashing.

There are, however, several critical benefits associated with having a recycling program for an organization. The first is that some waste does get recycled. It is also another way to reinforce the culture of sustainability that began as companies started to reduce the creation of waste through “nega” awareness. Finally, it also makes it easier to take the next step, which looks at waste generated during business operations less as something that needs to be disposed of, or as a commodity to be sold, and more as a material that can be used in new ways, new processes, or for new products. Recycling, if allowed to evolve, will add innovation to the environmental sustainability initiative and, in doing so, set the stage for companies to advance to level 3 of the hierarchy.

Level 3 – Repurpose/Upcycling

Repurposing and/or upcycling have at their core the generation of value beyond what is created by simple recycling. The Cambridge Dictionary defines repurposing as, “the use of something for a purpose other than its original intended use” while upcycling is “the process of transforming by-products, waste materials, useless, or unwanted products into new materials or products”. They are the natural extension of recycling, and more importantly, they add creativity and innovation into the environmental initiative.

If you were to “Google” the term “repurposing” you would see websites describing hundreds of repurposing ideas for waste material. These ideas range from turning a ladder into a bookshelf (https://www.boredpanda.com/creative-reuse-upcyclingrepurposingideas/?utm_source=google&utm_medium=organic&utm_campaign=organic) to the creation of fine art (<https://www.hometowndumpsterrental.com/blog/25-awesome-examples-of-artistic-repurposing-of-junk>). These simple examples of upcycling are now starting to give way to upcycling innovations that can create new products and create value for companies and their customers (DesMarais, 2015).

As mentioned previously, “upcycling” considers waste as base material for new products or services. For example, in 1993 Nike introduced the Reuse-A-Shoe program which took end of life shoes and turned it into “Nike Grind” a material that has been used in sports fields and running tracks, as a building material in the Nike Retail stores, in fleece sweatshirts and other apparel, as well as in new Nike and Converse footwear (Ecobahn, 2021).

Small producers like Husk Power, which was established in 2008, take bio-waste, originally rice husks, and convert them into electricity using a biomass gasifier. Originally created to provide electricity to power deserts in India, the company is now looking at expanding its power systems to other undeveloped countries

as well as to developed countries wishing to have a distributed power system as a secondary or primary energy source (Dewan, 2019). In addition to generating power, some waste can be used as a food source for livestock (spent beer brewing grain as animal feed - Colby, 2016) and as “superfoods” (coffee cherry as a superfood - Festa, 2015).

While repurposing is probably as old as the creation of waste, upcycling is beginning to be recognized as a way to expand product lines without expanding supply chains. Most importantly, as companies implement repurposing and upcycling initiatives, they are also unleashing innovation throughout the organization. Some of the initiatives will prove unsuccessful, which then will require management to determine for themselves whether operationalizing an upcycling waste strategy as part of an environmental initiative and sustainability program is a critical element in the strategy and organizational culture of the firm. If management elects to absorb the lessons of failed ideas, then they are positioning the company to become a knowledge-based company and the culture itself will become more transformational in its operations and thinking. The stage is then set for companies to move to level 4 on the hierarchy, which considers how products are created. Design expectations will include adding more additive manufacturing processes into production, which reduces waste, as well as end-of-life strategies that will allow products to be more completely repurposed or upcycled with whatever remaining waste being recycled.

Level 4 – Make No Waste – The Circular Economy

The circular economy is a systemic approach to economic development designed to benefit businesses, society, and the environment. In contrast to the ‘take-make-waste’ linear model, a circular economy is regenerative by design and aims to gradually decouple growth from the consumption of finite resources. – Ellen McCarthy Foundation

Unfortunately, the current industrial policy that promotes consumption and waste as described by the McCarthy Institute as the “take-make-waste linear model” was first articulated by Victor Lebow in an article in the *Journal of Retailing* (1955) and has become embedded deeply into the foundation of industry. Lebow, in 1955, stated that, in order for U.S. industry to continue to grow, Americans would need to consume and discard products at “an ever-increasing rate”. He advocated that products must be “built to break” instead of “built to last”.

Planned obsolescence of products has been a topic of economic and academic discourse since the early 1930’s (London, 1932). Since the 1950’s, product design was based upon planned obsolescence with articles in industrial design and other journals discussing how quickly a product could be designed to break down without greatly impacting customer satisfaction (Beder, 1998). Marketing also created a sense of perceived obsolescence, especially for products such as fashion, where changing styles lead to enhanced consumption and produce waste. (Meyers, 2014). Today, technology incorporates planned and perceived obsolescence in promoting new technology that has performance enhancements, often unnoticed and unneeded by the general market, as being critical for a “full customer experience” (Jackson, 2020). Therefore, the implementation of a business paradigm that endorses the development of a “circular economy”, as described by the McCarthy Foundation, will require not just the implementation of a few initiatives to prove to others that the organization is indeed “green” but rather the transformation of the extant organization at its foundation.

Level 4 of the environmental sustainability hierarchy shifts business operations from recognizing and mitigating waste created by business operations to designing operations where unused resources are not discarded as waste but rather utilized in the creation of additional value for the business. This critical change from response to design turns an organization’s sustainability actions from a transaction focus centered around the implementation of specific sustainability initiatives to a transformative process where sustainability becomes embedded in the organizations culture.

The creation of a circular economy, where there is no waste of resources, requires the recognition and implementation into the business of several overlapping principles as described by thought leaders

throughout the world. Some of the more influential concepts for the development of a circular economy are:

- *Natural Capitalism* – The recognition that economic value creation is dependent on natural resources that are available in finite amounts and therefore must not be wasted in a linear manufacturing process (Hawken, Lovins & Lovins, 1999).
- *Cradle to cradle manufacturing and resource utilization* – Cradle to cradle is defined as a design and production process where product end of life does not translate into waste but rather the creation of new value for the firm (McDonough & Braungart, 2002).
- *Biomimicry* – The utilization of natural process as inspiration for product and industrial operations design, including the circular nature of ecosystem dynamics, where waste from one organism becomes the fuel source for others (Benyus, 2009).
- *The Blue Economy* – Described as the change in the business paradigm of maximizing profitability from a single core competency to a business paradigm that views business as a portfolio of activities each of which can generate value to the firm and create multiple benefits to society and the natural environment (Pauli, 2017).
- *The Performance Economy* – Described as a response to the linear approach to manufacturing and consumption (where value is maximized by the rapid consumption and disposal of products) to an approach where the value of the product is sold while ownership of the product is retained by the business. The retention of ownership creates additional value streams when the product is returned and repurposed as new products or as components of new products, ultimately reducing the amount of remaining product to the smallest amount possible for recycling to base materials or discarded as waste (Stahel, 2010).

The circular “economy” in nature is holistic and has occurred over billions of years of evolution. For a business or industry to become circular, evolution must be replaced by innovation and commitment. Companies that wish to be circular must also expand that viewpoint to include their supply chain and all direct and indirect stakeholders impacted by its effort. For this reason, being circular is easier to conceptualize than put into practice, especially if it is treated as a mandate from c-suite executives.

Like any complex system (Meadows, 2008) true and lasting organizational change is evolutionary. For this reason, it is impossible for an organization to change its operational practices overnight from the linear production/consumption model to one where the design and manufacturing process requires the creation of value from all of the resources utilized by the firm. It requires a transformation in thinking at all levels regarding the purpose of the business and how success is to be measured.

Even if committed to completely by everyone in an organization, the conversion of a business from a linear product consumption model to a circular value consumption model in a “whole-cloth” manner is for most, if not all, companies too disruptive to be possible. Parts of the circular economy such as decisions as to who owns the product and ways to sell the value of the product are being practiced today by business both large and small.

Paul Hawkin, in his book *The Ecology of Commerce* (2010), like Walter Stahel (2009), described a counter business philosophy to consumption and consumerism that proposed instead of selling the product, companies should retain ownership of the physical product and sell the benefit of that product. Hawkin proposed that when companies own the product and sell the benefit it is in their best interest to design the product to last as long as possible in order to maximize revenue streams and profitability. He offered the leasing of automobiles as a crude example of the model for selling benefits instead of products. The history of leasing transportation began with horse drawn buggies in the 17th century. Today it represents 31% of the car marketplace in the U.S. While the concept isn’t truly reflective of a circular economy, because the vehicles follow the same end-of-life and junking process as traditional car sales, it does show that there are many instances where the marketplace is open to the notion that having the benefit of a product does not require owning the product.

InterfaceFLOR has been active in reducing the waste of their carpet manufacturing since 1995 when Ray Anderson began “Mission Zero” (Anderson, 2009). An integral part of the plan was to create business

models where the company sells the benefits of carpet through leasing rather than selling the carpet itself. To accomplish this, Interface redesigned their carpet tile to be easily replaced and with basic designs that would not look different whether part of the tiles is new or five years old.

Today, companies like *Lime* and *Bird* rent scooters for one-way short urban travel, replacing the need for travelers to utilize, or even purchase, a transportation vehicle like a car or motorcycle for their private use. Others, like *Rent the Runway* and *Haverdash* offers memberships where people have unlimited access to clothes in the current styles. Once worn, consumers can then return the clothing for new outfits. Streaming services such as *Apple Music* provide members with almost unlimited music for a membership fee eliminating the need to buy music media such as cd's, tapes, or records. In all of these examples, the customer is buying the benefits of the product while the service provider or manufacturer is retaining ownership.

It seems that more and more products are shifting the burden of ownership away from the consumer and to the manufacturer or service provider. Profitability is therefore enhanced when multiple consumers are able to access the benefit from the same product, which in turn reduces waste. This shift also creates a corresponding shift in attitudes towards waste and consumerism. Waste will not be correlated with growth and increased profitability but rather with lost opportunity and lower profit potential.

Companies will be transformed from extractors of value with a large waste footprint to value creators with little or no waste footprint where virtually all parts of the industrial process can be monetized. The company will be transformed into a knowledge-based company that looks for value in all aspects of their operation. Innovation will come from all areas of the organization and the value-chain and the organizational culture will transform into one having a circularity focus throughout the company.

A circular economy, however, is based on the concept of zero waste. It does not address the waste that has been produced and accumulated in the 500 years of industrialization. This will require business to consider the final level of environmental sustainability. Creating value with the existing waste in landfills, in the oceans, and in the air. The transformation of a company will be complete when it commits to finding ways to develop a restorative economy.

Level 5 – The Restorative Economy

Paul Hawken discussed the possibility of a business whose industrial processes go beyond creating zero waste to actually cleaning the environment with each unit placed into the market (Hawken, 1994). This notion is the antithesis of the prevalent strategy of value extraction and waste creation, which ultimately is disposed into the commons. The disposal into the commons is often referred to as “collateral damage”, an unfortunate outcome associated with manufacturing and economic development policies of the past 500 years.

Restorative manufacturing extends the philosophy of recycling and upcycling (McDonough & Braungart, 2013). A shift away from the notion of repurposing to creating a process that uses waste as a primary, cost-effective resource in the manufacturing process. Often this requires a multi-disciplinary approach to innovation and product development. The collaboration between engineering and biomimetics is creating new approaches to product design and manufacturing. Many of these new manufacturing processes are in prototype or pilot operations. The critical difference in these processes is that they benefit the environment with each unit produced rather than lessen the damage to the environment. One such company that exemplifies both the meaning and potential of restorative manufacturing is Calera in Moss Landing, California.

As InterfaceFLOR is considered one of the founding institutions for industrial sustainability, Calera may someday be considered a founding institution for restorative sustainability. Calera seeks to capture CO₂ emissions from powerplants and other sources for use in the creation of calcium carbonite, an alternative component to limestone in the making of cement and, ultimately, concrete. The calcium carbonite created by Calera's process can replace up to 15% of Portland Cement and, in doing so, capture CO₂ at two to four times the rates that the process releases. Therefore, the environmental benefit of the Calera process increases the more it, or other calcium carbonite precipitation processes (CCP), are utilized.

Adding to the environmental benefit of using CCP, is the financial benefit provided to the producers of concrete. The CCP that is part of the Calera process utilizes flue gas from power generation plants (particularly coal powered plants) as a base material. This creates a viable alternative for power plants and other producers of CO₂ to carbon sequestration, a costly reparative solution to the collateral damage caused by power generation. Another advantage is a reduction of political risk a concrete producer faces, first as it relates to environmental regulatory oversight and second, and more recently, due to the current obstacles being placed on trade.

For example, to make Portland Cement in California usually requires importing limestone from Canada, which is then pulverized and heated in a kiln as part of the cement creation process. The Trump U.S. administration has created uncertainty and risk to any cross-border supply chain. Accessing local waste streams shortens supply chains and thereby produces savings in logistics and eliminates cross-border supply chain risks. These innovative processes create “collateral benefits”, the unintended positive benefits in the manufacturing process (Bechtold & Steiner, 2014).

Finally, as these new restorative processes are being conceptualized and developed it cannot be ignored that the disruptive nature of a restorative manufacturing process probably generates resistance from existing manufacturers and therefore requires substantial justification as both a restorative and economic solution. As companies move towards more inclusive accounting of production costs the justification becomes easier to make. Still, in most instances these processes, and concepts, are in pilot development.

APPLYING THE HIERARCHY

The described hierarchy attempts to address the many ways that companies can implement environmental sustainability initiatives. The hierarchy describes a process that is both orderly and additive which will increase the potential of more immediate positive financial benefits and the development of a culture that inspires and supports innovation and broader sustainability initiatives. A paper by Barnett & Salomon (2012) quantitatively showed that as sustainability initiatives become embedded into the culture of the firm there was a corresponding increase on return on assets and profitability. This increasing return exceeded what companies were generating prior to the implementation of these practices as these sustainability initiatives became “embedded into the organization’s culture”.

Additional benefits include increased innovation that occurs throughout the organization. Ray Anderson stated in his book Confessions of a Radical Industrialist (Anderson, 2009) that once he challenged InterfaceFLOR to produce carpet tiles without waste, the company generated significant savings which funded all of the future initiatives the company undertook to reach the summit of “Mt. Sustainability”. These verified savings proved to Anderson that the narrative that sustainability was a financial burden to a firm was a ‘false choice, our profits at Interface are up, not down’ (Anderson, 2011). Anderson also discussed that, in addition to increasing profits, the innovations that were created in response to the challenge generated over 100 process improvement patents.

These sorts of successes come from a collection of small, positive achievements each building upon the other. The hierarchy attempts to describe a process for progress for companies committed to becoming more environmentally sustainable. The levels represent steps in a process, many of which can be taken concurrently, that move from common sense to transformative thinking in how a company operates. The hierarchy also allows companies to message their “green” initiatives in a controlled manner thus lessening the risk of being accused of greenwashing and increasing the potential of inspiring all in the company to do more. While “being green” may be forever an unattainable goal for most companies, being greener is well within every company’s reach. It simply takes a map and a commitment.

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