



Product Lifetime Extension Case Study: Neptuno Pumps

Company name: Neptuno Pumps ([website](#))

Sector of activity: Engineered Centrifugal Pumps Manufacturer; Industrial Sector

Implementation area: Global operations in Chile and Peru (headquartered in Iquique Province, Chile)

Business strategy for product lifetime extension: Remanufacturing

Remanufacturing

According to the *European Remanufacturing Network*, to remanufacture is to return a used product to at least its original specifications and performance with a warranty that it is equivalent to or better than that of the newly manufactured product. It involves disassembling, cleaning, restoring and replacing components and testing the individual parts and whole product to ensure that it meets original design specifications. From a consumer and regulatory viewpoint, the remanufactured product is considered the same as a new product.

History | Context

Neptuno Pumps was created in 1972 and quickly became prominent in Latin America's circular economy business sector. The company designed an innovative pump system focused on the efficient use of resources, such as electricity, which are usually wasted in industries, accounting for 30% of total energy consumption on an average industrial site.

However, 90% of pumps are operating at low efficiencies worldwide, wasting millions of dollars in energy and emitting millions of tons of carbon dioxide every year¹.



Figure 1. Neptuno Pumps' machinery

Through the waste of materials from the Chilean mining industry, Neptuno Pumps saw an opportunity to develop a unique and innovative business model which focuses on energy efficiency, remanufacturing, and repair. This business model was not yet widely known in Latin America and could enable the production of new high engineering products with lower resources consumption (Figure 1).

Instead of extracting raw materials, the business model proposes the recovery and reuse of processed materials in new production processes, keeping them in circulation by extending the product's lifetime for as long as possible and protecting the natural resources from scarcity.

Within a circular economy model the process begins already in the design thinking phase, where decisions – such as which materials to choose and how to use them – are made and allows the use of reused materials during the

Source of information: 1 *World Pumps Magazine*



elaboration of products. A vertical integrated business model² facilitates the implementation of a more circular operation since it is much easier to do so when most of the company's design, manufacturing, repairing activities are integrated.

Therefore, the company also took advantage of the technology applied to design the products and the reverse logistics model already existent in Neptuno's supply chain, which allowed the implementation of a more efficient model.

Through remanufacturing, Neptuno Pumps works to recondition and improve products that are no longer functional, and optimizes their efficiency by repairing or replacing components in order to offer same-as-new products and satisfy the customers' needs.

Remanufacturing a product reduces, on average, the emissions of greenhouse gases (GHG) by 60%, avoids about 70% of the waste generation from materials and lowers costs of production by 30%³, in comparison with traditional manufacturing processes.

About 60% of Neptuno's pumps are manufactured with recycled materials and the systems' design provides a product lifetime 1000% more extensive. This represents a 1 million Dollars annual saving per single pumping system that combines remanufacturing with circular economy, due to reduction in the consumption of resources.

Barriers

Neptuno Pumps is still a growing company, and one of the biggest challenges towards the implementation of a new business model not entirely known or accepted around the world is the competition with large multinationals. Bigger brands can catch the attention of those who are willing to buy a remanufactured product more easily, due to their strong marketing campaigns and large network of contacts.

The company also faced some challenges to implement their shift from manufacturing energy efficient pumps to a more complete circular model involving reverse logistics, repair and remanufacturing: at first, not all stakeholders (internal and external) believed that a small size industry could offer an effective circular economy business model. To work around this issue, Neptuno developed a few pilot projects and measured its results, in order to make its benefits tangible to businesses and communities.

There was a second issue, related to internal structure. Different departments of the company started to get involved in this activity, which was not yet entirely consistent and solidified, and it took some time to define clear roles and responsibilities. The company then changed the cultural organization and worked to make employees realize that they were all working together to achieve the same goal.

Partnerships

Due to the recent rise of the fourth Industrial Revolution, where technology and communication are in the spotlight, companies must understand that connectivity is essential to run a successful business.

That's why Neptuno Pumps' business model does not focus only on customer relations, but also on creating partnerships with organizations they consider relevant to the company's growth.

Communication is fundamental to stand out in this direction and the contribution to circular economy can make the company a reference on the subject, drawing the attention of other organizations.

Having an entrepreneur mindset means thinking beyond your company. Neptuno believes that social media is very important to communicate the company's positive results and publications of success cases that include business benefits data by international organizations can also help them stand out.

The Center for Innovation and Circular Economy is one of Neptuno's partners that brings solutions to help business transition towards a circular economy in Latin America and enable companies to share the positive results and impacts of their work.

Source of information: 2 *McKinsey Quarterly* | 3 *Neptuno Pumps*



Results

In one specific project, in Antofagasta, Chile, upgrading the pump systems with new custom engineered energy efficient equipment brought great economic and environmental benefits, reducing energy consumption by 15%, thus saving US\$ 579,033 per year, and reducing 3798 tons of CO₂. Furthermore, this innovation allowed the reuse of valuable assets such as the vertical motors and other old pump components, as well as recycling material from old worn pumps to produce the new equipment, offering a low-cost and fast turnaround, delivering the project in four months, with a payback period of just one year and with invaluable benefits for the surrounding communities and the environment⁴.

Neptuno Pumps was the first Latin American company to be selected Runner-Up in the Circular Economy Enterprise Award, chosen and supported by The World Economic Forum, because of its innovative circular projects and the inspiration they represent to community in adopting principles of the circular economy.

Their circular economy model was also selected as one of the most sustainable solutions in the world by Sustainia, creator of the first global map of sustainable solutions that help meet the UN's Sustainable Development Goals.

Next steps

Even though Neptuno Pumps is constantly looking to mature and advance their business model, improvements can still be done to contribute even more with the company's growth, and circular economy overall. For instance, investigating new materials that can maximize the products' lifetime is one of the next steps to be taken, associated with better design options that can improve the pumps' functions.

Testing and implementing new technology is another step in the path to develop the company's business. The Internet of Things is a powerful connection tool that can help companies better seize the circular economy's potential and even further engage consumers in a 'products as services' context, and through blockchain the communication between companies and consumers is improved by providing transparency and sharpness to the information delivered.

By providing information about the benefits of remanufacturing, it is possible to create consciousness among industrial clients, so they can take into consideration the supply chain of companies they are willing to buy from, and end consumers, in order to allow them to make better consumption choices based on sustainable production processes. It can also contribute to the sustainable development of the industry sector even in places where there are pretty much no investments, creating more business with environmental awareness already rooted in their missions and values.

How to get involved?

Everyone can contribute to a more sustainable engineering infrastructure. Consumers have a double role, both when deciding what to consume, looking for more durable products depending on their design and raw materials, but also when choosing products from companies that address key issues of the value chain, passing through raw material extraction and labor relationship, and that allow an adequate end-of-life management of the product, ideally extending its life or reinserting it into the chain.

The Long View Report

This case study is related to *The Long View Report* in two main aspects:

- Consumer information and education, since consumers' awareness about the benefits of

Source of information: 4 *World Pumps Magazine*



products' durability can increase adherence to this model, and Petar Ostojic (Neptuno's CEO) works with lectures and other movements to increase consumers' awareness about circular economy and the importance of extending product lifetimes.

- Alternative business models, stimulating the sale of refurbished products in face of the lack of consumer acceptance of this type of product.



Open Source perspective: enable and support consumers to extend the lifetime of their products

Consumer education and information

The promotion of the development of (for instance) product buying/use guides, or consumer awareness/marketplace campaigns, can increase the understanding of product durability, induce a positive consumer attitude towards product maintenance and repair, and encourage consumers to hold companies to account.



Closed Loop perspective: enable manufacturers to retain full responsibility over their products in order to extend product lifetime

Alternative business models

Stimulating the acceptance of alternative business models (the shift from 'owning' to 'using' products) in the Business-to-Consumer market, includes addressing privacy and other liability issues pro-actively