

Pumping Life into Marginalized Communities

ETV's Technology Model

Innovations Case Discussion:
Emprendimientos de Tecnologías para la Vida

Emprendimientos de Tecnologías para la Vida (ETV) is a social enterprise whose development was based on the principles and activities of Fundación Gente Nueva (FGN).¹ Both ETV and FGN are headquartered in the city of Bariloche, located in a mountainous area of Patagonia, in Argentina. ETV produces and sells appropriate technologies throughout the country, specifically targeting underprivileged communities, primarily in rural and suburban areas. The organization's work strategy, described in this case, is based on networking with public and private organizations to reach potential customers.

ETV is currently marketing a product called a rope pump, which allows people to draw water from as deep as 50 meters and raise it up to 8 meters above ground level. Highly efficient, the pump can replace other manual extraction systems. ETV also produces motor-driven versions of the rope pump, and spinning wheels that local artisans use to spin wool.

ETV came into being to resolve a range of social issues, based on the understanding that most of the developments intended to improve the quality of life for people in isolated or impoverished communities never reach those people. They are left in the drawers of the technology experts, and at best win a prize for innovation. ETV's aim is to develop a sustainable system that will allow technologies to reach those communities more easily.

This concept was one of the primary motivations for developing ETV, although certainly not the only one. In fact, several factors converged to form the project.

A nuclear engineer by training, Gustavo Gennuso is a social entrepreneur. He is the Founder and Director of Fundación Gente Nueva (FGN) and of Emprendimientos de Tecnologías para la Vida. Through FGN he has co-founded ten schools in poor communities and initiated many social programs.

Let me begin this story by describing the ETV concept more fully and identifying four of the main reasons why appropriate technologies do not get to the people who need them.

Designers of technologies are often located far from those who will benefit from them. Designers often fail to consider the culture of the users. Technologies are designed primarily to achieve the best technical performance, and we tend to forget the relationship between person and product—or, more precisely, between culture and product. ETV seeks to change that dynamic. For example, our spinning wheels are made of wood, which honors the tradition in the region where the wheels are made and used. Although a metal spinning wheel would be easier to make and consequently cheaper, ETV still cannot gain wide acceptance for such a change.

People and groups are motivated to choose certain products. Knowing the interests and motivations of different cultural groups can help producers provide them with the technologies that will benefit them the most. Some groups' interest in improving their own quality of life is mediated by production (agricultural or artisanal, for example) and thus favors production-related technologies, however much the producers may believe they need other technologies. These groups reason that improving production will improve other aspects of their lives, and that therefore they need to start there. Some groups consider ETV's rope pump an improvement for the home, while others believe its primary benefit is for irrigation. Because of such differences in reasoning, ETV needs to know how to interact with the people it wants to reach in order to determine how to design its products.

Knowledge of the groups and their contexts determines design guidelines. Although this is a fundamental concept in technological production, too often it is not taken into account. Designers often lack information about the contexts of the people for whom they design their products. Consider a community that has no source of spare parts for the products its people buy. These people need products that do not break easily or that can be repaired easily. For example, FTV's rope pump stands on two wooden braces; based on our experience in the part of Patagonia where we are located, these braces can easily be replaced by anyone who has two pieces of wood appropriate for the purpose. But when we were installing rope pumps in the La Puna region, we were surprised to discover that wooden braces are rare because the only wood locals use is the wood of the prickly pear (a type of cactus), which cannot be used for a brace. Because of this oversight, the manufacturer had to travel hundreds of kilometers in search of braces. This taught us that even if a product seems to be universal, every community will add its unique characteristics. For instance, in certain areas in Africa, the structure around the rope pump must be covered up because of a local rivalry that leads people to cut the rope of their neighbor's pump as an act of provocation.

Developing a technology doesn't mean it is ready to be distributed or marketed. Innovators of appropriate technologies often feel that their prototype or initial design will serve as the final product. But this is a mistaken assumption, as a new design has a long way to go before it becomes a product ready for distribution. It

takes considerable effort to advance an idea from a prototype to a product ready for distribution, complete with interchangeable parts, spare parts, the possibility of compact packaging, etc.

THE DISTRIBUTION OF APPROPRIATE TECHNOLOGIES

The key issue with appropriate technologies is distribution. ETV has identified several distribution strategies emanating from wider concepts. Without invalidating any of them, ETV evaluated the characteristics of each of these concepts and then determined its own strategy. Some of the strategies include:

Do it yourself. There are technologies whose simplicity encourages organizations or individuals to “distribute” them by actually teaching local people, groups, or communities to make them on their own. In ETV’s experience, however, few people actually manufacture the products in question, and when they do they are usually of very poor quality. For example, these local people tend to be agricultural producers, so that is what they know how to do; they are not pump manufacturers. The poor quality of the products they produce results in people spreading a negative image of the pumps by word of mouth.

Continuing with the rope-pump example, each person who makes one is in fact making a prototype. Because they do not have the interchangeable parts, they use whatever materials they can find and may replace parts with bottle caps or pieces of rubber, etc. This creates the idea that the product can be made at very low cost; even those who promote this type of distribution say so. But this is a fallacy: this type of “distribution” has a very low impact in terms of the number of beneficiaries and the quality of the product. Furthermore, other people are discouraged from acquiring our pumps because they feel they are being ripped off when asked to pay the price of items produced on a real production line.

Local production. Some people promote production in small community workshops, an improved variant of the do-it-yourself model. Although this may seem to be a good idea because it develops local production capacity, few of these shops are really successful. The main problem is that people fail to consider that demand will be limited to the area of production, thus these workshops will not be financially sustainable. This approach does take into account the fact that people need training, not only for production but also for sales and distribution. However, training is not enough. Moreover, locally produced products don’t just sell themselves; they need to be marketed, which takes money.

Several other factors help explain why appropriate technology does not reach people. They have to do with work philosophies that lead to errors or misinterpretations, which in turn hinder the adequate distribution of appropriate technologies. Two of the most important factors are lack of knowledge and mistrust.

Lack of knowledge about what it means to produce and distribute a product. Technology experts—and even some NGOs—often do not realize how vital cost structure is to those taking on the production and distribution of an appropriate



Opportunities for Employment, and Pride. *Manuel had problems with addiction a few years ago and even landed in prison briefly. Today he is the chief operator in the manufacture of rope pumps. He is able to support his family, thanks to this work, but in addition—and this is key—he is proud of his work. He feels that he has something to give to others, and he can see the fruits of his labor. At ETV we know that it is workers like Manuel who make the difference.*

technology. They often fail to consider basic issues such as marketing, operational structure, taxes, packaging, etc.—and then they underestimate their costs. Consequently, the product is discredited because of its apparently high price while its true cost remains unknown.

Those who criticize ETV for putting high prices on its products include people at public institutions that have developed similar products. They think ETV's prices could be lower, but they forget that ETV must pay salaries; meanwhile, their own salaries are paid by the state. They also ignore other costs that the state pays for at public institutions, including the use of facilities and services.

Mistrust of those who sell technology in underprivileged communities. Here, let me provide an example. Many who buy rope pumps or spinning wheels are small agricultural producers, so it is striking that some are suspicious about the idea of “selling” technology to these people. Meanwhile, the consumers see it as simply another part of their economic activity and they understand it well, perhaps even better than those who advise them.

The analysis described above has helped shape ETV, which has often learned from the mistakes in these examples. As I said at the start, ETV is a social enterprise. Although this definition creates some ambiguity, as the category can include organizations with various characteristics, the company can still make three claims:

- The products and services ETV offers are directed at families in underprivileged communities in an attempt to improve their quality of life.
- ETV's workers are mostly young people who are at risk socially, and the company aims to gradually build a participatory structure that includes them.
- ETV has committed the company's earnings, after making necessary reinvestments, to the Fundación Gente Nueva's educational projects.

These ideas are embedded in ETV's vision and mission, which can be summarized as follows:

ETV's mission is to develop, produce, and disseminate technologies that will enhance the development of those living in underprivileged situations and provide access to the basic services that are indispensable to a decent quality of life, and to do so by operating a company that is socially, financially, and environmentally sustainable.

WHAT IS ETV DOING TO CARRY OUT ITS MISSION?

ETV set out to develop a product that would improve the quality of life for those whom society has neglected and generally forgotten. A critical component was that the product had to allow for the development of a sustainable business model. The resulting product was the rope pump. The pump can also be motorized, using clean energy such as solar or wind. Estimates from census data indicate that 270,000 families in Argentina draw water by hand; 27,000 of these are located in rural areas and the remainder in suburban areas.

ETV believed it was important to identify its target customers at an early stage in order to work with them most effectively. Our most challenging target was the rural sector, which was dispersed across the country and included geographical areas that are difficult to access. ETV took on this challenge, which it saw as reflecting both its mission and its principles, and because it offered an opportunity to provide solutions to a neglected market.

Reaching these small rural communities and families imposed conditions on ETV's products, and on our production, marketing, sales, and distribution channels. I cannot overemphasize how essential it was to ETV's decision-making to know the characteristics of our potential customers in the greatest possible detail.

THE ROPE PUMP

As shown in Figure 1, the rope pump is a system for drawing water manually from hand-drilled wells, reservoirs, streams, and all types of water sources. It can reach a depth of 50 meters and can draw water 6 to 8 meters above ground level. It is a

OPERATION

The rope pump is affordable, and allows water to be drawn from the well three times as fast as with a rope and bucket.

TECHNOLOGY

The unit is a rope that is made to turn between two wheels and has two pistons inserted in it.

BENEFITS

- Improves hygiene
- Reduces disease
- Reduces contamination
- Makes irrigation possible
- Can provide water for livestock

PISTONS

Made of plastic or Teflon and inserted in the rope.

MODELS

May be installed to gather water at ground level or to feed an elevated tank.

Soga: Rope

Canilla: Pipe

Pistones: Pistons

Pozo: Well

El agua sube...: Water rises through the pipe when trapped between the plastic pistons.

Agua: Water

Volante o roldana: Wheel

Manivela: Crank

Cañería de PVC: PVC pipe

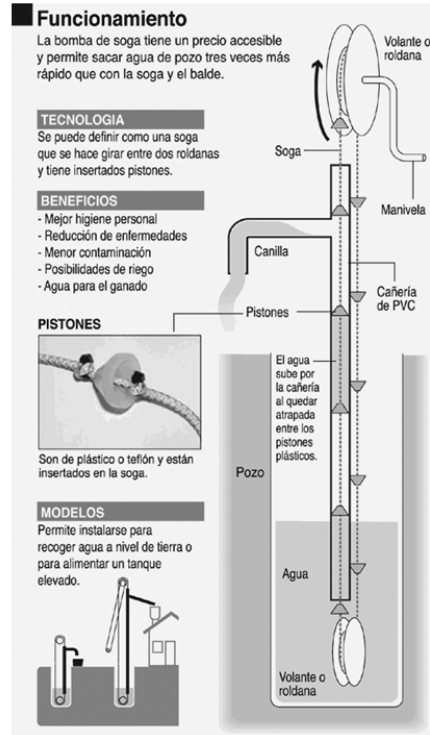


Figure 1. The Rope Pump

very old technology, adapted in the 1960s for use in Central America. ETV modified it for production and marketing in Argentina according to strict guidelines: relatively low cost, excellent quality, low maintenance. Rope pumps come in several types. The *petiza* (little one) pump has a water outlet 0.90 meters above ground level. The *jirafa* (giraffe) pump has a water outlet 6 meters above ground level. Both the *petiza* and the *jirafa* can be driven by a motor using either wind energy or batteries connected to a solar panel.

In developing and producing the rope pumps, ETV had to meet six standards:

Good quality. ETV's products had to be designed to last a long time and offer excellent performance, and they had to provide quality-control systems. These considerations were important not only to ensure that products would perform well, but also because the company respects its customers, who all too often had been sold poor-quality products because their main concern was low cost.

Low cost. Balancing low cost with good quality was a major challenge, but not an impossible one. It involved seeking out suppliers and developing production systems that could minimize the amounts of labor and wasted materials.

Ease of repair. Most of our customers do not have easy access to spare parts, nor do they know how to operate complex repair tools. Therefore we designed the rope



Doña Clementina's New Pump. *Doña Clementina lives in a place called Gualjaina on the plains of Patagonia, in a precariously built house many kilometers away from any other. She lives by raising sheep and a cow or two, and from the produce of her small farm, where, at great sacrifice, she raised her five children. She had been drawing water with a bucket and a rope for over 60 years. That's why she looks so happy now with her rope pump, which allows her to water the farm crops and have water inside the house. She complains because the water tank has been exposed to the sun so much that the water comes out warm, as she's used to "really cold" water. We showed her how she can have a direct water outlet without the water going through the tank, and she tells us that relatives have come from far away to see what this rope pump is all about.*

pump so that it can be repaired with very few tools, and the spare parts that users may eventually need are provided with the new pump.

Ease of installation. Ideally, products designed for people in remote areas can be installed by the users themselves. This requires providing handbooks geared specifically to them. All ETV rope pumps are delivered with an appropriate user handbook, which includes a telephone number that customers can call if any problems arise. Moreover, to be sure that help is available in all the regions where the product is sold, ETV trains local people—generally former customers—how to install the pumps.

Design that includes distribution. The product design must take into account that it will be shipped hundreds or thousands of kilometers via various modes of transportation. Therefore, designing a product that can be packaged compactly is as important as the packaging system itself.

Partnering with technology institutions. ETV believes it is important to partner with institutions that can bring specialized knowledge to its products. It must also persuade those partner institutions—generally government agencies—to devote part of their activity to technological developments that fulfill people's basic needs. The design of ETV's rope pump and spinning wheel, for example, involved technology experts from Argentina's technology institutes, which added great value to the designs.

MARKETING, SALES, AND DISTRIBUTION CHANNELS

Determining a strategy for marketing, sales, and distribution requires knowledge of our potential beneficiaries or customers, and the ability to infer general trends that will guide our actions and thus let us take full advantage of our potential activities. ETV is trying to reach people who are dispersed across a large territory, in a range of living conditions determined by where they live. ETV's approach has been to promote partnerships with public and private organizations. Most families or small communities have a relationship with some type of organization. In the vast area it aims to serve, ETV has encountered various types of NGOs, sales cooperatives, and public institutions; some are nationwide and others are regional or local (see Table 1). Before starting, it's important to be committed to the idea of these channels as the means for disseminating products. The next two steps are being responsible for sales, and being a distribution hub.

At ETV we have found that word of mouth is the most successful driver of dissemination, so we encourage our partners to use the marketing materials we have prepared. However, our primary focus is on getting our products operating in the public places where our partners are located so that potential customers can see them at work—for example, installing a rope pump in a school, community center, or some other highly visible spot. Initially we sent our partners free samples for this purpose, but we found that partner organizations were more likely to make a firm commitment if they shared the costs. In most cases, someone from ETV is present at the installation of the sample product to demonstrate how it is used, which creates enthusiasm among those who are watching.

Also, the organizations that sponsor these demonstrations usually process the purchases made by local families, so they become the sales channel for us. Although ETV proposes that the organizations keep a percentage of the sales and the organizations accept this arrangement, they also consider it a form of payment just to know they are providing a service to their contact families. Often the organizations that process the purchases also provide credit or otherwise subsidize their beneficiaries. ETV has sought out other financing options through microcredit

Clients/Beneficiaries	Channels	Financing
Group 1: Small producers	NGOs Public institutions	Not necessary
	Microfranchises	
Group 2: Subsistence producers	NGOs Public institutions	Necessary
Group 3: Communities of native peoples	NGOs Public institutions	No capacity to absorb
Group 4: Small rural villages	NGOs Public institutions	Partially necessary
	Microfranchises	
Group 5: City suburbs	NGOs Public institutions	Necessary
	Microfranchises	
	Businesses	

Table 1. Clients and the Channels to Reach Them

organizations working in the target areas; we put our partner organizations in touch with the microcredit organizations in order to strengthen their position.

Distribution is the major obstacle to reaching people with appropriate technologies. Therefore, ETV seeks to open two-way channels: to reach people with the technology, and to become “receivers” of their needs. ETV proposes to use as distribution hubs the same local organizations it uses for marketing and sales. From where it is located, ETV can reach Argentinean cities of over 10,000 inhabitants relatively easily. But the logistics and costs of distribution become more complex for the “final shipment”—from those cities to the final destinations in the field or in small communities. Still, we commonly find that the local organizations have fluid channels in operation for reaching customers. In fact, ETV has been able to add new products since it activated this two-way distribution channel, including the solar-driven rope pumps and the spinning wheel.

LEARNING

The strategy of developing partnerships with local organizations has turned out to be very powerful for ETV: it would be impossible for us to duplicate the logistics and marketing possibilities that each organization offers. For example, ETV has installed rope pumps in the province of Salta near a place called Embarcación, which is home to native Wichie communities. These communities are in the middle of inaccessible forests some 2,400 kilometers from where the rope pump is pro-

duced. ETV could not have reached them without its partner organization, Fundapaz.

We have also distributed pumps to several communities in the northern highlands of the Argentine Puna, which borders Bolivia and is 3,500 meters above sea level. We could reach these places only through the efforts of a women's organization called Warmis, which made the logistics and microcredit possible. In another area of the Puna, the rope pumps arrived through the work of a public institution, Instituto Nacional de Tecnología Agropecuaria. It mounted a rope pump on a small truck and visited local communities to demonstrate it and stimulate sales.

Although this type of partnership has great potential, ETV did discover certain issues in this strategy that made it more difficult to operate, and we feared it might extend to other situations. For example, the pump is directly linked to the issue of water. Although all of our partner or potential partner organizations recognize that water issues are a priority for their beneficiaries, few are directly involved in solving water problems; at most they deal with water-related issues such as agricultural production. Consequently, they direct the bulk of their time and effort toward their primary mission, while water and pumps run a distant second. As a result, ETV is seeing a slowdown in the rate of sales and their distribution is below expectations.

Faced with this reality, ETV has revised its strategy to help improve its marketing. Through our partnerships, we have gotten to know local communities and their people, which has allowed us to develop microfranchises. In agreement with our partner organizations, we selected people from the communities we serve to distribute and sell ETV products in their area. We train these people and provide them the materials they need. This approach allows us to reach more customers and stimulate demand. For example, families that were unfamiliar with ETV's products now request them from the partner organizations, which in turn help customers with the credit or subsidies they need to buy them. ETV has put together a catalog of products for these microfranchisees, which includes products from a couple of companies similar to ETV that produce farm tools.

In order to continue and increase their activities, ETV and companies like it need investors. No system of investors has yet been developed for social enterprises with ETV's characteristics. Although our company has been well received at investment meetings, our proposals are rarely a match with the investors' intentions, which are strongly based on direct profitability, including selling a company relatively quickly. Social enterprises like ETV can offer indirect profitability, but that requires creating a system of investors. Social enterprises like ETV may have low direct profitability, but it is vital to consider indirect profitability: the improved quality of life for the people being served. ETV and other social enterprises must find a way to calculate this indirect profitability so we can gradually build up a system of investors who will see indirect profitability as a direct contribution to society, one they would otherwise make through foundations or charities. This will enable them to make donations through their main area of interest, investment.

Pumping Life into Marginalized Communities

Diversifying our products remains a major challenge for ETV. To achieve this, ETV must intensify our partnerships with institutions of technological development, which will enable us to develop more quickly. In fact, the solutions to most problems mentioned in this essay have been developed; the challenge for ETV is to find those solutions and adapt them to our operation.

LOOKING TO THE FUTURE

ETV is still in its final stages as a start-up. About 300 families have benefited from its products, and over 20 public and private organizations are part of its network. Now we need to see the structure we have built facilitate a commensurate level of sales so we can achieve financial sustainability. ETV knows it needs to clarify the concept of social enterprise and to find a common language with other similar organizations so they can unite to promote a new sector, one that is moved by a different logic and needs different types of responses.

At this point, one of ETV's biggest challenges in expanding is to search for investors so it can reach out and diversify its products. The search for investors is an important activity for social enterprises. On the one hand it forces us to understand a new way of thinking. On the other hand it is opening us up to an investor market to which we are proposing a form of investment different from that of a traditional firm. This forces us to find points in common and to develop new investment concepts.

Beyond these considerations, the most gratifying thing about our work at ETV is to look straight into the eyes of someone who, after three turns of the wheel, sees water flowing through a pipe and into their home for the very first time. That look is proof that our efforts are worthwhile.

1. Literally, *Emprendimientos de Tecnologías para la Vida* means “technology entrepreneurship for life.” Its more subtle meaning in Spanish is “entrepreneurial activities that use technologies to improve lives.” Its parent foundation, *Fundación Gente Nueva*, which means “new people foundation,” is involved in education through its own schools and through community projects in impoverished communities.