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A Business Effort in Favor of Sustainability, the Case of Combustibles Ecologicos De Acatic Sa De CV

Mariadel Refugio Carmona Peña¹, Cándido González Pérez^{1*} & Ana Gabriela González Anaya¹

¹ Centro Universitario de Los Altos, Universidad de Guadalajara, Avenida Rafael Casillas Aceves 1200 Tepatitlán, Jalisco, México

* Cándido González Pérez, Centro Universitario de Los Altos, Universidad de Guadalajara, Avenida Rafael Casillas Aceves 1200 Tepatitlán, Jalisco, México

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Abstract

In this work we present the case of a company born from an individual dream that has made its way to success from one of the most unsuspected activities: recycling. Against all odds, in our globalized world that prioritizes the generation of economic wealth to the detriment of natural resources, an ingenious initiative emerged that has turned bad into an economically enviable business. In the most diverse daily uses of factories, agriculture and even homes, the recycling of hazardous materials is generated. Against all logic and with a persistence worthy of recognition, an artisan company was founded in a rural population that has transcended regions and above all archaic thoughts that privilege profits over everything else. With the passage of time, the artisan work was transformed to become an industrial company that generates great resources with the paradox that it has become a business to avoid environmental pollution when the latter is the result of excessive economic growth.

Keywords

sustainability, recycling, technological development

1. Introduction

The main partner of the company Combustibles Ecológicos de Acatic S.A. de C.V. Heriberto de la Torre Padilla, began with the sale of fuels, while he was artisan bricks producer, in the town of Acatic. It's a places that has characterized since the middle of the last century as one of the main manufacturers of bricks for construction, tile and roof bricks. In his beginnings as an entrepreneur, the idea of inquiring about the sale of alternative fuel arose, at that time what was being done had no comparison with its current level of manufacturing. They used it to burn furnaces and many "pirate" producers who

sold contaminated oil proliferated. This oil was not treated, which was a good business for them because a large number of producers consumed them.

His first task was to investigate how they did it and he discovered that previously in Mexico, due to ignorance or lack of information, the oil was thrown away and the large producers who did something for nature, sent it to Germany. There they recycled it and of course, they charged for receiving it. So, while looking for information, he found that there was a company in our country that was a pioneer, it was called ILUBSA, with national income but partnered with Italians. He investigated how they started, got information that one of the owners went on a research trip, so that's where the idea was born. This was in the late nineties. After those events, Heriberto de la Torre got into everything related to oils, he learned everything about the treated oil. It is a very simple process, he tells in the interview, because the oil itself is a fuel.

The process consisted of removing the humidity, the water. It was decanted and filtered and an additive was added so that it had a flash point similar to the one it had when its use began. That was like a dream for him, he thought that he really could do that. At that time he didn't have any financial resources. He didn't have the money nor the knowledge, both necessary ingredients. He began to work informally because he was completely unaware of the government authorizations. At first he had problems with the authorities because he did not have the permits. The truth is that the authorities themselves were unaware of the processes (Don Heriberto relates). For everything, the beginning is the difficult part, when they caught his attention, to a certain extent they were right because he did not have the documents that would protect him as a producer of alternative fuels. But everything was to know and to learn, that was the obligatory principle that helped him to overcome.

An unwritten but easy to verify rule, is that the treated oil was better than the one that had not been modified. With a correct process, impurities are eliminated and the effect of polluting factors such as sulfur is reduced, an element that by the way, with the advances that Don Heriberto was making in the knowledge of his object of work, he could know that it contained very low levels and that was good news. Knowing that he could not have enough knowledge and sometimes not even the necessary knowledge, he found himself in the need to hire a manager and says that this was of great help:

When I started to get more in-depth, -he says, -I hired someone to inform me about the characteristics of the oil. He, you can say that he opened my eyes in this matter, but the truth is that there were more important people that I met for the transformation process. Let's say that manager gave me about 15 percent of what I needed, but it was very important of course because I was starting from scratch. Nobody has everything that is needed in this job, you cannot count on a magic wand. The manager was like a component to get me environmental permits, special studies, but many more fields were needed. Several authorities intervened, the municipality one with the use of land, the state one as a collection or storage center, and the federal one in the field of hazardous waste (the latter already in relation to transformation).

2. Method

The results that we present come from a qualitative research in the area of social sciences. It is based on the analysis of a company whose *modus vivendi* is the treatment of agricultural and industrial waste in western Mexico. The origin is not older than three decades in time and the participation of two people has been fundamental for its operation and success in an area that had a localized origin in a micro-region. The company has expanded and serves clients in a third of the Mexican Republic.

The theoretical perspective that was used in the research is the sustainability theory. The oldest backgrounds of this conception go back to the postulates of the French economic current known as the Physiocracy, from the 18th century, where the main postulates established that economic growth should be based on respect and care for the land. Even the roots of the word physiocracy mean: government of nature (López et al., 2016, pp. 441-442). With the appearance in that same century of the Industrial Revolution, a new economic system was born that has dominated the globe: capitalism, and with it, a free market logic that has put relations between the population on the razor's edge. and nature (Martínez & Martínez, 2016, p. 124).

We have chosen the sustainability theory because it is the way in which nature can be transformed in a respectful way, without damaging the environment. It is based on the premise that it is feasible to cohabit with natural resources by adequately using technological advances in the face of new challenges. With the use of new materials, the transformations can become harmful and this is where recycling actions and proper treatment of the substances must be carried out. A real sustainable development model requires protecting society, its cultural heritage, tradition and national identity as well as ecosystems and their diverse species of flora and fauna, which play an essential role in maintaining ecological and socio-economic processes (Martínez & Martínez, 2016; p. 140. Alvarado, 2017, p. 15; Olaguez-Torres et al., 2019, p. 2; Bermeo-Paucar, et al., 2018, p. 30; Bermeo-Paucar et al., 2018, p. 35).

3. Research Results

In the nineties of the last century, the State did not grant permits for the production of fuels and according to the interviewee, the tragedy that took place in the capital of Jalisco: Guadalajara in April 1992, motivated the authorities to modify the policies in the field of hydrocarbons. That year, without currently having a report fully endorsed by the government agencies, kilometers of the drainage pipes of the second largest city in the Mexican Republic were filled with gasoline. This unleashed a series of explosions while the streets were saturated with houses and people, causing the death of hundreds of inhabitants and the destruction of houses over several kilometers. Without ever having accepted the guilt of the company Petróleos Mexicanos (PEMEX), there was an urgent need to collect waste from all forms of fossil fuels such as gasoline, diesel, naphtha and toluene.

Originated by those changes, -Don Heriberto says- it was where we fit in with the company we started. At first they were cautious about those permits, not just anyone could get them. When I started, I didn't

have a penny, I was broke; I never thought that starting the procedures would be so difficult. I couldn't imagine all the obstacles that there were, everything that I would have to go through, but mainly because I never wanted to skip stages. Something that was completely clear to me was that in 2003 when I got my first permit from the collection center it was that I always had to do things right, legally. Everyone I talked to told me that it was going to be necessary for me to bribe people in order to get the help that I needed. I can absolutely assure you that in this case it is not true, the permits do not cost, they are free, I wondered why no one can get a permit. I had been told that in the whole country only about four authorizations had been granted. When I proposed to obtain the authorizations, it was said that some companies that were doing the same, although to a much greater extent than mine, should have workers from SEMARNAP on their payroll. I do not know anything of that, nor do I believe it. Analyzing what I did, I think that nobody had the need to do what was discussed. They gave me the authorizations very soon, I don't know if it was because they saw me as a small business, but the paperwork was never complicated. It took me about four years to get my first authorization (that was between 2001 and 2005), when I obtained the federal authorization, I was the only one to get it in that year, throughout the country.

They had instructed him to take special precaution in the existence of a type of oils that were very polluting: the polychlorinated biphenyls. It is the type of oil that was added to electrical transformers until before the eighties. It is a retardant that had the function of preventing them from catching fire when they came into contact with lightning in a storm. That was its usefulness, it delayed a fire. If a person comes into contact with these biphenyls, it causes thyroid problems, it can cause cancer.

Those oils were banned since that decade throughout the world, not just in Mexico. You can still find them because there are those who, for some reason, keep very old electrical transformers. That in particular was one of the dangers that Don Heriberto took special care to take in high regard. They had always warned him to watch out for pollutants, but especially to have the ability to detect the most dangerous ones. The vast majority of oils are of mineral origin and it is very common for people to have frequent contact with them, for example mechanics work daily their working days in contact with the oils used in cars and nothing happens. For some other people, when they have contact with some type of these oils, nothing happens to them. The vast majority had the same retardant system and contain biphenyls, except those already mentioned that come from transformers.

When they give you the first authorization, -Don Heriberto says- the first thing they tell you is that it is totally forbidden to collect this type of oil." When they are collected, it is necessary to carry out a study beforehand to know how many particles per million they have of biphenyls. It is assumed that by this time there should be none of these liquids, but there is always the surprise that some may appear. If some person kept some type of these transformers or starters, there could be the danger of their existence, but since studies are always carried out before receiving the liquids, one is obliged to have them destroyed. Before that process was done only in Texas, in the United States, and there is still nothing here in Mexico for this destruction process.

The company that Don Heriberto started encountered difficulties with potential buyers because they were people used to buying cheap, regardless of whether the oils were polluting. Very few were aware of the use of treated fuels and preferred to purchase the so-called “burnt oil” because it had a cost of three hundred pesos per “tambo” (metal container with a capacity of 200 liters). It was less than the one transformed. He did his best to explain to them that by using a liquid to which additives were added, he was winning because the degree of combustion required was greater, but that was not seen by people who had learned all their lives to burn brick with fuel without industrially improving. Don Heriberto for his part, in addition to being a seller of oils, was also a brick producer and always used the hydrocarbon that he tried to commercialize, because he considered that it was the most beneficial economically and in its dealings with the environment.

He has naturally committed himself to what is known as sustainable development, which consists of “satisfying our current needs without compromising the ability of future generations to satisfy theirs” (Martínez & Martínez, 2016, p. 127). That line has continued to the present day. Although Acatic does not have a distribution that could be considered acceptable, it is proud to mention that there are tequila companies that are located in the Guadalajara Metropolitan Area and sell their merchandise without any restriction. It even has among its client portfolio companies that produce food for human consumption that require boilers and that are also located in Guadalajara and its surroundings. The company has grown gradually:

Our company has a group of people who collect used oil, -he explains in detail-. Our area of work covers several states of the republic: Zacatecas, Aguascalientes, Guanajuato, Querétaro, Michoacán, Colima, Jalisco, Nayarit and Baja California Sur, we are talking about virtually half the country. Once the problem we have faced from the beginning I think it was the permits, we went to the second one, which has been the logistics. How to solve what has to be done with waste, how you have to treat it. There is no advisor that tells you from start to finish what you have to do. There is no hydrocarbons advisor in Mexico who will explain the entire process to you. Pemex is a monopoly but they hire many engineers from outside the country. The chemical formulas for how to make all fuels are really the hardest. If you were to ask me what the keys to success have been in companies like the one I lead, I would say they are research, perseverance and honesty. Those three together, it's not on the money, it's on the job. When I started I had no resources but that was not an obstacle to growth. I say that the strongest problem that can be faced is within one, is the attitude, overcoming that, the rest is accommodated. And of course, with a focus, you should always think if you don't know something, someone does. And another thing, common sense: you have to look for those people who are going to tell you how to do it because no one is going to come to you.

Although he started alone, he has always believed that he should associate with other people. In this regard it has had great successes and at the same time serious difficulties. The main achievement has been that he found an environmental engineer trained at the Instituto Tecnológico y de Estudios Superiores de Occidente (ITESO), with whom he has tasted the honeys of success for many years.

They are clear that environmental care must be taken care of by many actors as established by Martínez (2016, p. 124) and Alvarado (2017, p. 21): governments, businessmen, universities and international organizations.

Both partners have accompanied each other in big plans and have brought them to reality, they respect each other a lot and provide support without restrictions, in their opinion, that has been the key to their great achievements. It was clear to Don Heriberto from the beginning that it was essential to have professionals in two specific areas: chemistry and the environment; of the latter he found his partner, and of the former they have hired staff throughout the society. To work with hydrocarbons and their transformation it is certain that standards must be known and met, otherwise failure is certain.

Also, from the beginning, both partners have planned to invite a third party to take over the administrative-accounting; It has become clear to them that one is in charge of everything environmentalist, another of the operations and sales, but they have always felt the existence of a void in the desk work area. “The environmental issue is complex because it encompasses many aspects of reality that occur simultaneously and with interrelations not fully understood, it requires transdisciplinary work to be able to address it” (Martínez & Martínez, 2016, p. 126).

Opportunities have been given, almost twenty years ago they invited a person to fill that profile, someone who would be one hundred percent involved in the company and who, like them, would take charge of a third part, the aforementioned administrative. But the results were not as expected, neither for the two of them as partners, nor for the person who had joined, so they decided to take a few steps back and start looking again. They have supported the partnership perfectly although always in their talks they consider that they need a third partner to balance the functions and to raise the standards and profits. They have not found the right person. There was another opportunity to incorporate a partner with those characteristics but it did not work either. In view of the results, they have tried to make the most of what they can do between the two of them:

In environmental matters we hit the nail on the head because we registered a patent there at ITESO—he states-, we did an investigation of how to extract fuel from the vapors; we own 85% and ITESO the remaining 15%. We still maintain an area of research because that is one of the parts in which we have benefited. We had RENIECYT which is a registration number in the CONACyT (Consejo Nacional de Ciencia y Tecnología), that is granted only to companies that do research and which can be verifiable. All the time we have had a budget assigned to research. Companies are always innovating, for example the paint companies make new lacquers and new pigment agents because they have better quality, but that also generates new pollutants. Our role is to work to neutralize these new pollutants, all negative processes must be reversed. Everything comes out of nature, but new formulas are being generated that cause new results, it comes by logic. For example, arsenic is a heavy metal of natural origin, mercury too. All hydrocarbons of fossil origin are also natural.

I started alone, at first I was looking for clients, then my wife helped me, there were two of us. It was when I had the brick workshop, it ended at six in the afternoon and from that time, my wife and I

would start selling oil, sometimes until eleven at night. We started completely from scratch. Here in the factory we sort: there are certain wastes that we can treat, others we cannot. For example, one that everyone knows are lithium batteries, we cannot treat those ourselves, we have to send them to Monterrey, and there is only one place where these batteries are delivered. Why is lithium polluting? Because it is an energy insulator and when someone consumes it, it can go to the brain and stop thinking because the brain's process is through energy; they would stay like zombies. It is said that this is the pollution that comes from the future because lithium is used more and more in electric batteries, currently that of cars that do not use gasoline and that there is going to be more every day. Finding a way to recycle lithium is of capital urgency.

Today there is only one confinement that is located in the north of the country, in Monclova, Coahuila. My business is that I charge to receive it and deliver it to the confinement center, where it is also charged. My profit is that I charge more than what I pay and what it costs me to take them there. What I started with the oils treated for the brick makers, I still have, but let's say that just for history, it represents almost nothing in proportion to what we do here in the factory. Many producers always preferred to use bad oil, even the bricks were stained. One day when I went to buy pork rinds I noticed how they cleaned the butter, poured water on it, I asked the butcher what he did that for and he told me that it was so that the butter would come out pure, then from there I came up with a way to eliminate impurities in the oil would be adding water to it, and yes, with that change, let's say artisanal, we managed to improve the process; that's where the idea was born. But we have already advanced a lot with our laboratories, we can already determine which oils stain, it is no longer necessary to do that type of home test. With the use of our laboratories we can already determine which oils are not suitable for burning in the brick workshops at Acatic.

When they receive a substance of any kind, the first thing they have to do is classify it. Then, analyzes are carried out in the laboratories that the company has, but at the same time they must send those samples to certified laboratories assigned by the state (Fernández, Tapia, Fernández, & Carrasco, 2017). Everything, before unloading the vehicles. With the experience they have accumulated and through the performance of their own analyzes, they already know what is appropriate, however, it is an obligation that the standards set to wait for the results of the external laboratory in order to continue with the process. According to specialists (López et al., 2016, p. 440), an ideal world would be made up of societies that reduce the consumer desire for natural resources, since this does not exist, the most important task is the recycling of waste from both production and consumption, or, in short, seeking to use only renewable energy sources as pointed out by Alvarado (2017, p. 24, Díaz-Ojeda & Aguiluz-León, 2019).

Table 1. Sales Ratio (in Tons)

Month and year	Solids	Oil	Water	Total (in tons)
October 2019	66,037	390,933	437,117	894,087
November 2019	212,841	963,473	918,814	2'095,128
December 2019	182,357	850,538	945,747	1'978,642
January 2020	115,715	895,696	1'116,440	2'127,851
February 2020	113,219	860,098	1'080,384	2'053,701
March 2020	151,356	1'180,733	1'060,781	2'392,870
April 2020	137,856	914,014	365,570	1'417,440
May 2020	215,416	880,953	441,060	1'537,429
June 2020	135,136	940,395	580,504	1'656,035
July 2020	118,758	1'148,006	594,980	1'861,744
August 2020	104,771	610,536	660,294	1'375,601
September 2020	93,702	723,452	617,279	1'434,433

Before receiving any type of substance, -Don Heriberto says-it is necessary to classify it. We have enough types of laboratories for our work. Before receiving we must do an analysis. It may be that we charge or that we pay, but every substance that reaches us is previously studied. We must classify, we must analyze, and in the case of liquid substances, we must characterize. All this is done before in order to unload a vehicle. The authorities oblige us to have an internal laboratory and require external analyzes with a laboratory certified before the competent authorities. We cannot be judge and party.

Every month we are taking samples and analyzing them in their laboratory. They are delivered to a laboratory that is private but that has a federal permit that must also have the certifications that require them. In short, that private laboratory takes samples of one hundred percent of the substances we receive and although we obtain our results from the laboratories themselves, as a rule, they must do their job and then we compare it, but 100 percent samples are always obtained. In particular, in the case of water, an analysis is carried out to verify that we are complying. What would happen if we did not comply? We would get in serious trouble. They could cancel the authorization they gave us. For due compliance, we must comply with what an outside laboratory they chose tells us. We do our thing but then they do the analysis and tell us if we are doing well or if we made a mistake.

The things that we receive is a very extensive list-he adds-, being liquid, the analysis we carry out is of the PH, it must be three points down. If it falls above that point, it is still a hazardous waste. It is also analyzed that it should not contain heavy metals. As for solids: energy-saving light bulbs, cables used in computers, cell phones, batteries, and cooking oil (all this is generated in homes), we all generate hazardous waste (Bermeo-Paucar et al., 2018, p. 30). Even the lacquer that ladies use to paint their nails,

are hazardous waste. A company, if it is for example a tequila company: laboratory reagents, lamps (some are mercury vapor), the solvents they generate, fuel remnants, tank sludge, paint buckets.

Farmers use laboratory reagents, pesticide containers: poultry farmers: all the containers of what they consume, paints, thinners, pesticides. None of this should be thrown away, much less burned, because a long time ago it was thought that burning would prevent contamination. But it doesn't, it is even more dangerous. The plastic in which these substances were used as pesticides for example, cannot be recycled, especially the red ones that are already prohibited in many countries of the world (in our country their use is still authorized). When a container that contains these contaminants is used, the residues that remain are named traces, they are very bad. For example, if a woman is pregnant and has contact with it, the child is at risk. It is assumed that an adult is not so much. Although it can cause leukemia, but are they already banned in most countries of the world.

In short, all companies generate pollutants, be it metallurgical, agricultural, tequila, etc., even, as we have already seen, we also generate hazardous waste in homes. We are authorized to collect anything that is dangerous. Here the use of language is important, a substance is considered waste when it is used. For example, what is contained in energy saving light bulbs is legal to purchase and distribute because they have a specific use, they are considered hazardous waste once they have stopped being used either at home or in a business. If we talk about gasoline when it is new it is a dangerous material, when it is already used, it is considered as waste. And so, in oils it is the same. When new, they require a type of transportation permit. When it is already used, you need a special permit from the Communications and Transportation Secretary to take it from one place to another.

Each waste is assigned a form of transportation; they vary according to their origin. Each transportation must have a bill of lading and a safety sheet in the event that a truck overturns. Everything is classified to avoid contact with these types of waste. The legislation on which we rely is the same as in Canada and the United States. All the codes that are used are the parameters under which we abide by. For example, a pesticide has a small skull and it comes with a square that has lines, there always comes a number.

If we buy something that has a small diamond, it comes with four colors: yellow, blue, red and white, these colors each have a meaning, for example, blue means health and has a degree of danger, it is measured from zero to four. For example, if one is marked, it means that it is slightly dangerous, and thus it goes up to four, which in that case is considered a very severe danger to health. If someone sees that the color blue has the four, it means that it cannot be touched with the hand (what damages is irreversible). The same applies to the four colors: red is flammable (for example gasoline and diesel are grade two or three; four means that it can ignite with the sun, with some type of contact). There are reagents, when one is going to take an X-ray, you can see that a yellow box appears that contains a number, and special products (blue). Well, based on all this, you must have the safety sheet that must be in the transport vehicle because if an accident happens one day.



Figure 1. Illustration 1 CRETIB from the Environment and Natural Resources Secretary (Note 1)

For example, there are substances that ignite with water, transporters and traffic officers must have had special training because imagine that you spill one of those liquid and for now they add water to supposedly to extinguish it, it is like adding fuel to the fire; for that there is a type of foams and special powders. Personally, I am not an environmental engineer but we have learned it in constant training, it is our obligation to attend to this area because it is a priority in our work. For example, we have just concluded one that we had with those from the Civil Protection area of the State Government. We are certified as a clean industry; These documents are issued by the Procuraduría Federal de Protección al Ambiente (Profepa) and I can say that it is one of the most reliable Mexican certifications, it is the only certification accepted by the United States and Canada in this area.

Fifty people work directly in the company and we employ another eighty indirectly. The laws are changing as well as the pollution parameters, you must always be up to date, including new pollutants are also changing. The company of Don Heriberto and his partner started with the oils because the sale to the brickyards was marking them that way, but then they went for the solids, all that is dangerous. There are four: explosive, reactive, corrosive and toxic. They have three areas: one is the recycling of

oils and produces fuel, another is the collection of dangerous garbage (any garbage that is considered delicate, they can collect it). They concentrate it in one place to neutralize it or send it to a co-processing to transform it, and the third is the treatment of hazardous waste water. It is known in the professional field as CRETIB because it stands for: corrosive, reactive, explosive, toxic, flammable and biological-infectious. The negotiation already has a third federal authorization that was granted by SEMARNAP for the treatment of water that is characteristic of becoming hazardous waste. In the country, very few companies are dedicated to this.” I think there are only three of us in the whole country,” Don Heriberto affirms.

4. Discussion

With this presentation it is shown that entrepreneurship has no limit since it is possible to innovate in adverse conditions and with limited means. The work carried out by two partners of a company that deals with the treatment and recycling of hazardous waste has been titanic, but it has shown that persistence is the main quality that the people who are in charge of the businesses must cultivate. The work trajectory of two people for three decades has created jobs, has fostered the well-being of many families and has made a part of the environment more livable.

The recycling of more than two million tons per month has made an enormous contribution to the environment and to society in general. There is an urgent need for the proliferation of companies with these characteristics, unfortunately their existence is restricted to negligible quantities at the national level when pollution levels have been increasing hand in hand with technological advances. Finally, with the advancement of daily life, we have realized that the greed for economic profit is always above the protection of the environment, national and international companies and the different levels of government leave the obligation in the background. to ensure social welfare. It does not echo one of the maxims of ecology: that we must leave a world, but a better one, at least similar to the new generations.

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