v. 1, n. 1, 2021

Scientific Journal of Applied Social and Clinical Science

THE VALUE OF GARBAGE: THE CASE OF THE FUKUMOTO INSTITUTE

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Abstract: The case addresses the difficulties of sustaining a social business working on the creation and appropriation of value. Both are key factors for the success of the venture. In the creation of value, the destination of waste is crucial, while the appropriation of value involves how customers perceive the social and regulatory relevance of the collection and subsequent disposal of waste. It also shows the particularities of environmental concern with the recycling process, the search for solutions and the relationships between the actors involved, illustrating the complexity of putting into practice a law created more than ten years ago.
Keywords: Value Creation, Value Appropriation, Social Business, Waste Management, Case Study

INTRODUCTION

Concerned about the future of the Fukumoto Institute[1], Nelson[1] thinks about several projects and regrets the lack of resources, not only financial, but also people and infrastructure. The path taken 10 years ago was full of difficulties and Nelson is very proud of the Institute's achievements. After all, the Institute he helped found, whose environmental project had depended financially on his personal resources, has been self-sustainable for a few years. In addition, the Institute is technically recognized as a state reference for various recyclables and waste.

Although the protection of the environment has gained voice in recent years, it is still not possible to see the creation of value in recyclables. On the contrary, it is seen as garbage and as such, the lower the disposal cost, the better for companies. In Nelson's words: "We form partnerships with companies, condominiums, shopping malls, city halls and, on a monthly basis, the Fukumoto Institute will pick up waste to give it the correct destination. In this partnership, there is a financial contribution that is not relevant at all because when it comes to garbage it is just because it is the law. Otherwise they would continue playing in the Environment"

Nelson wonders how to make companies value the disposal of waste? In other words, how to generate value in something that society calls garbage?

THE START

"When I retired, I wanted to do something for society. My concern has always been with the quality of life of current and future generations. There are several residues that release heavy metals, chemicals and toxins into the environment. This has poisoned many natural resources, especially water... Even before [retirement], I would stop my car to pick up fluorescent lamps from dumpsters and garbage... broken bulb releases mercury vapor into the atmosphere and it returns as chemical rain, contaminating natural resources..."

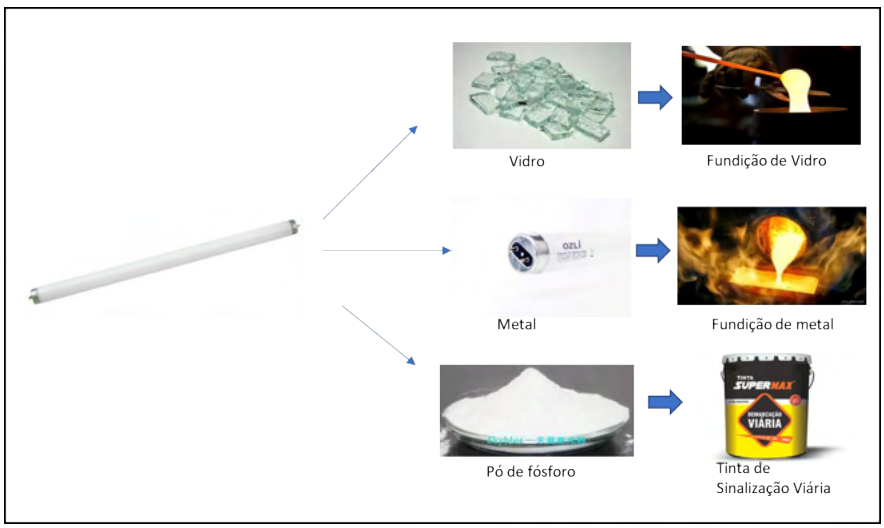
In the back of the Institute's headquarters, which was initially constituted as an association of Japanese immigrants, Nelson obtained permission to install a tent to store the light bulbs and seven other wastes[2]. "Since I know the environmental area very well, I had a lot of freedom to work on this project. And this freedom was granted by all directors [of the Institute]. When I talked about the project I intended to develop, I explained that when we do something in environmental terms, we are doing something for humanity.". But there were no financial resources, so Nelson decided to fund the project: "...we created this environmental action really seeking to collect and dispose of it correctly. I bought a small tent and little by little we started building this project, looking for waste. I collected the fluorescent lights in the street and took them to our tent. Over time, other waste also began to be delivered or collected"

By the end of 2009, Nelson had already defined the destination of other waste, but he didn't know what to do with the light bulbs: "...people started to get to know our work and take the light bulbs to our unit. So it started to accumulate, accumulate, accumulate... We got to have almost 300,000 fluorescent lamps in our tent, the biggest concern was that that tent would get up [with some wind] and spread all these bulbs..."

So a good friend built a machine for recycling light bulbs and donated it to the Institute. "He was in Japan several times and checked some equipment. Through his technical knowledge, he found a way to decontaminate the glass... And the machine he built does not release neither liquid nor vapor. "

This not only brought relief from concerns: "We had in financial terms, let's consider 300 thousand light bulbs, close to almost R$ 400 thousand in financial liabilities[3]. With this equipment, we were able to eliminate our financial liabilities and our environmental concerns", as well as reputation: "Yesterday I received a call from the Army Battalion saying that they changed [fluorescent] lamps to LEDs and had more than 100 fluorescent lamps and they asked if the Institute could collect. See how things are: the Army itself finds it difficult to dispose of the waste. This evolution of 10 years working, we reached an almost unthinkable level: to be a reference in the recycling of fluorescent lamps. This is a gain for the Fukumoto Institute, a gain for society, a gain for the Environment and a gain for public health."

To recycle, collection is just the first step. It is also necessary to separate the material and give the destination for each type of waste. For example, according to Nelson "the cigarette butt has more than 4,700 toxic substances among which more than 60 are carcinogens. So if it is disposed of inappropriately, it can contaminate the water, which even if treated, remains with many of these substances. We are being indirectly poisoned by a dropped butt, which can be recycled. It is used in hydro sanitation to contain erosion in degraded areas and road slopes"



Vidro = Glass Fundicao de vidro = glass casting Metal = Metal Fundicao de metal = metal casting

Pó de fósforo = phosphorus poder Tinta de sinalização viária = Road signaling paint

Figure 1: Fluorescent lamp recycling

Source: developed by the authors based on information provided by the respondent

Another example of collection and disposal is the partnership with Construtora NSW[1], the largest in the region. "We collect all waste from the NSW construction site. Then [each waste] is classified and weighed with a report issued for each collection to the construction company. We store the waste until it reaches a certain amount, then [this waste] is sent to the receiving companies."

In addition to giving the proper destination, there are several necessary licenses: environmental license by the State Secretariat for the Environment, license by IBAMA, transport authorization by IBAMA. It is essential that the company that receives the waste also has all the environmental licenses to close the cycle and enable the tracking of waste. Only then, the Fukumoto Institute can issue the certificate to its partners.

This entire cycle is defined by the National Solid Waste Policy (PNRS), Law No. 12,305, of August 2, 2010, and its regulation, Decree No. 7.404 of December 23, 2010. There is a shared responsibility for the life cycle of products and reverse logistics defined by the "individual and linked attributions of manufacturers, importers, distributors and traders, consumers and holders of public urban cleaning and solid waste management services, to minimize the volume of solid waste and tailings generated, as well as how to reduce the impacts caused to human health and environmental quality resulting from the life cycle of products".

LEARNINGS

The first customer, or partner, as Nelson always points out, was an important shopping center in the city, Shopping Palácio[1] initially deploying some butt collectors (called Papa Bitucas) and removing burnt out light bulbs and batteries from the mall. For the service, the Shopping started to contribute monthly.

As a result, the Institute began investing in waste collection containers. Several ideas were created, with investment in injection molds, but sales were small "We made a high investment and the market did not respond. So we stopped thinking about products."

"With the PNRS, companies, condominiums, malls began to worry because [they] are obliged to comply with [the legislation]. Today we feel that the Environmental inspection is demanding the PGRS (Solid Waste Management Plan). When they demand the PGRS, they want to know where you send the light bulbs, where you send the batteries, where you send expired medications. Then companies start looking for us. So it seems to me that 2020 is being a very small light at the end of the tunnel", says Nelson.

But the fact is that since the first partner, the number has increased, even as a result of partner companies: "When you have a shopping center like Shopping Palácio in your list of companies, it brings credibility. It is also true for NSW, a powerhouse, a renowned

Figure 2: Waste collectors and Butt Holders

Source: Figures provided by the respondent

construction company. So at that time, with Shopping Palácio, we had great credibility. In addition, there was a report [from the Institute] on TV, on national television. Thus, the Fukumoto Institute gained greater respect."

With the increase, including with companies and city halls in cities far from the Institute's headquarters, Nelson saw the need to increase transport capacity and, so, purchased a truck. But without neglecting costs "We collect waste from distant cities every month. We do all the logistical planning to minimize fuel, toll, meal and accommodation costs"

Six years after the start of activities, the tent was small. So Nelson began looking for another space. Then he ran into another problem: "As an Institute, there is a monstrous difficulty for you to rent. I managed to lease it through a real estate agency because she had several semi-detached shacks without being able to rent"

But the space is small: "today we are in a very cramped space. We have 195 square meters of [built] area. At the bottom, we built a mezzanine for the recycling and storage of light bulbs. Let's assume we've doubled the area. But it's still small, for what we dream of achieving. For example when waste arrives from NSW, the site is full. We have to have more space to work"

The organizational structure is also lean. The Institute has 6 duly registered employees, but almost all administrative work is done by Nelson. "in the financial part, I'm the one who coordinates. I issue bank slips, control receipts, make payments, go to the bank daily. I have to do all this work because I don't have enough money to hire a secretary, a structure."

Some services are outsourced. Nelson negotiated lower collection rates with Banco Sinco[1] (which is also his partner) and the latter issues a monthly report on the payment slips received. "Thanks to the good God, the default is almost nil. Because if you are there every month for the collection, the person is reminded that they have to pay the Institute."

The management and issuance of certificates is also done by third parties: "We have a company that consolidates all the collection. We currently generate a consolidated monthly report of all collections from each of the 80 partners. Based on this report, the company issues certificates for each partner. She also takes care of regularizing the environmental license, regularizing the Fire Department and Sanitary Surveillance."

The legal part is simpler: "there is a standard contract that is a term of adhesion to the Eco Waste Zero Program: Project Play Clean, Don't Pollute and Don't Contain the Environment. But there are companies that prefer their own contract, we are not opposed."

In relation to public bodies, there is the bidding process: "We forwarded a monthly [charging] proposal to the Municipality, and the Municipality makes a bidding process, disclosing it to companies operating in the area to see if there is a lower or higher price. [if we win] we sign the contract"

PROCEDURES

The Fukumoto Institute started with the intention of working with 8 residues, which Nelson understood would protect the Environment, especially water, and he knew, or at least understood what kind of destination it could give.

Recyclables such as paper, cardboard, newspapers, magazines, plastics, metal scraps, glass, frying oil are sold, but the value received is low "our focus is on hazardous, toxic and special waste, so this waste has a volume little. So the value [received] pays less than 30% of fuel costs {used to dispose of this waste]"

In the case of light bulbs, as the Institute does recycling, the cost of transformation (energy, operator, storage) is much lower

compared to sending it to recyclers. On the other hand, Nelson says that the glass, terminals and phosphorus powder resulting from the transformation are sold for very low prices. "A kilo of glass sells for R$ 0.08. Metal scrap has an insignificant amount [by weight]".

There are situations where the recipient gets payed for the waste. Expired drugs are sent to an incinerator which has a monthly contract with the Institute.

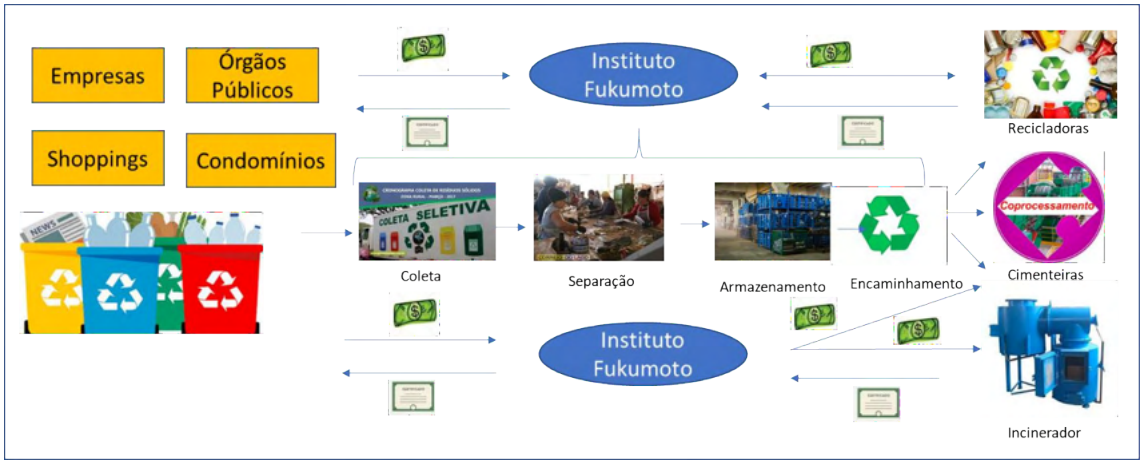
Contaminated waste is destined for co-processing in cement kilns, for which the Institute pays per kilogram of processed waste. Votorantim Cimentos' kilns, for example, have been burning, for years, various types of agricultural and industrial residues, from babassu coconut shells to old tires[4].

Cigarette butts are recycled by a company that, in addition to charging per kilo of butt received, also charges per certificate issued.

In the case of batteries, the Fukumoto Institute is a state reference in the collection by Green Eletron - Manager for Reverse Logistics of Electronic Equipment, founded in 2016 by Abinee (Brazilian Association of Electronics Industries), destined for Nexa (ex Votorantim Metais) in Juiz de Fora that reuses zinc[5]. The Institute does not pay for the destination, but neither does it receive any value.

All companies involved in the process receive or issue certifications to allow traceability in accordance with Law 12,305.

Many seek out the Institute, however, it does not always work out. "When looking for hazardous waste [on the internet], it goes



Empresas = Companies
Órgãos Públicos = Public Departments
Shoppings = Malls
Condomínios = Condominiums
Coleta = Collection
Separação = Separation
Armazenamento = Storage
Encaminhamento = Forwarding
Cimenteira = Cement mixing machine
Recicladora = Recycler
Instituto Fukumoto = Fukumoto Institute

Figure 3: Transaction Flow - Fukumoto Institute

Source: developed by the authors based on information provided by the respondent

to our website. There's my cell phone, there's my email. So they get in touch and we send them a proposal, usually with low values, R$100, R$150 and the contact gives up. So it's very difficult to work with garbage, especially dangerous garbage."

For other situations, Nelson understands that the Institute has an important advantage when dealing with companies with dammed waste. "This dammed residue is at the first moment. In the second, third month, she returns to normality. There are situations where you will have an amount of dammed waste that you will have to assume at the beginning. Few do that" In addition, often the dammed residue is fluorescent lamps. "And if he has 1,000, 2,000 light bulbs, how does he do it? This is a big difference: we are able to absorb these lamps. The operating cost for you to recycle a light bulb is very expensive if you pass to third parties. As the Imoto Institute has this advantage of recycling, this brings an advantage in the negotiation"

The case of Viação Cabral[1] is another example: "They created a battery collection project and placed a battery collector on each bus. The Municipal Secretary for the Environment had agreed with the owner of the company to implement the project on 100 buses. There came a time when they had more than 3 tons of batteries in the garage. The then mayor, when he found out how much it would cost to send these 3 tons of batteries for recycling, said that this environmental liability did not belong to the City. So Viação Cabral was left with the "hot potato" in its hand. What happened? We were looked for and these residues ended up in our tent. I had the job of separating brand by brand, size of batteries to have them recycled[6]. I don't know how many photographs I have on file that I sent to Guinness at the time."

Thus, as the number of partners increased, so did the types of waste[7] that these, the partners, wanted to dispose of. "Lubricating oil, for example, has the Department of Roads and Highways, which had lubricating oil stored. If you solve the collection and destination, then you start adding [value]. So you have to find solutions."

FUTURE PERSPECTIVES

The Institute has also been working on opening up other segments. An example is the restaurant segment "There are restaurants that ask for two weekly collections. We charge R$50 for each collection and [receives] recyclables. So if you make a route of 5 to 10 restaurants, you make R$ 500, R$ 600 and recyclable together."

A dream that Nelson wants to make viable involves composting. "We have a partnership with a swine farmer who has 5,000 heads of pigs. Instead of animal feed, he gives leftovers of food that goes through a whole treatment: heating, cooling and then falling into the trough. The raw material comes from restaurants and he does all the sorting, separation, sieving, drying, crushing and transforming into bran. So we would have two organic destination segments: compost and other animal feed. With that, you stop burying organic and you would end up with dumps"

Another great dream of Nelson is to implement the Program Municipalities declare war on Dengue. According to him, the number of cases of dengue, Zika and Chikungunya - diseases transmitted by the Aedes aegypti mosquito grew in 2019. In relation to dengue alone, more than 1.5 million probable cases were registered in Brazil, a substantial increase compared to 205.7 1,000 registered in 2018. According to data from the Survey of the Rapid Index of Infestation by Aedes aegypti (LIRAa), the South concentrates 50.1% of the breeding sites in garbage.[8] "We gave the mayors a notebook

with the program involving students and teachers of the state and municipal education network, the Commercial Association of the Municipality and the City Hall to implement a Waste Sorting and Treatment unit with the objective of zeroing the emission [of waste] in landfills"

"We have been working for over 10 years, always concerned about the environmental issue and human health. So we imagine that the public authorities that importing companies and manufacturers would come with this same concern. But that's not happening yet even though the law was enacted in 2010. Why? Because looking for post-consumer waste is expensive. There is also the cost of recycling. We have seen some progress, but it is very small. We have advances in the area of light bulbs, in the area of batteries, but they are still incipient compared to the harm they are doing to people and to the Environment," says Nelson.

Nelson knows that he was able to evolve in the solutions for waste destinations, but he does not see a similar evolution in relation to the value perceived by the partners and, consequently, in the price of their services.

"Will one day…" he ends with a look of hope, thinking about how to make customers value the service provided, as well as make new projects viable.

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RECOMMENDED BIBLIOGRAPHY TO SUPPORT THE CASE ANALYSIS

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NOTES

1. Fictitious names. The names of companies and individuals have been replaced to preserve anonymity

2. lamps, batteries, cell phone batteries, lighting reactors, expired medicines, cigarette butts, frying oil and electronics and IT. Source: Interviewee

3. The calculation was made considering that, at the time, recycling companies charged around R$1.50 to recycle each lamp. The Institute was not in the least able to afford this amount. Source: Interviewee

4. Source: https://www.poder360.com.br/opiniao/economia/lixo-tem-valor-lixo-e-energia- writes-xico-graziano/. Accessed on 25/04/2020

5. Nexa recycles only 1% of the zinc contained in batteries for technical reasons, but they are studying ways to increase their use. The slag from the furnace where the pile is processed is destined for the cement industry, closing the recycling cycle. Source: https://www.nexareport.com/2018/residuos/ Accessed on 25/04/2020

6. For battery recycling there is no need to separate by size or brand. The respondent did it for playful and aesthetic reasons. He wanted good photos to be generated to enter the Guinness Book of Records as the biggest battery holder. So far, the request has not been evaluated. Source: Interviewee

7. Fluorescent Lamps, Batteries, Cell Phone Batteries, Vehicle Batteries, Light Reactors, Expired Medicines, Cigarette Butts, Frying Oil, Electronics and Computers, X-Ray Plates, Paint and Solvent Cans, Styrofoam, Banners and Canvas Strips, Glasses. Source: Interviewee

8. Source: https://www.agenciadoradio.com.br/noticias/populacao-deve-ficar-atenta-aos-possveis-criadouros-do-mosquito-aedes-aegypti-aede192653 and https://www.unasus. gov.br/noticia/lixo-eo-principal-criadouro-do-mosquito-da-dengue-nas-regions-norte-central-west-e-sul Consulted on 04/18/2020

ANNEX 1

Financial Statement (i)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Net operating revenue	**6.400**	**31.670**	**46.524**	**61.320**	**77.454**	**113.960**	**123.840**	**142.999**	**165.461**	**189.636**	**209.893**
Product sales		5.000	3.000	1.500	1.800	2.000	1.500	1.200	0	0	0
Waste Sales	0	0	0	0	0	13.620	1.362	1.135	1.271	1.362	1.453
Services provision	6.400	26.670	43.524	59.820	75.654	98.340	120.978	140.664	164.190	188.274	208.440
Cost of Sales	**1.120**	**7.410**	**8.704**	**10.170**	**13.392**	**32.640**	**23.780**	**27.427**	**29.787**	**35.078**	**41.253**
Cost of Goods Sold		4.000	2.400	1.200	1.440	1.600	1.200	960	0	0	0
Cost of Waste (ii)	320	770	1.120	1.170	1.200	14.840	2.612	2.395	2.571	2.702	2.853
Cost of Services Provided	800	2.640	5.184	7.800	10.752	16.200	19.968	24.072	27.216	32.376	38.400
Gross Operating Income	**5.280**	**24.260**	**37.820**	**51.150**	**64.062**	**81.320**	**100.060**	**115.572**	**135.674**	**154.558**	**168.640**
Operational expenses	**9.400**	**42.800**	**47.840**	**59.900**	**68.360**	**108.700**	**124.760**	**140.420**	**144.740**	**147.380**	**151.400**
Selling Expenses (iii)	600	6.800	8.240	9.500	10.760	13.100	14.360	15.620	16.340	17.780	19.400
Administrative costs (iv)	8.800	36.000	39.600	50.400	57.600	95.600	110.400	124.800	128.400	129.600	132.000
Financial expenses	250	450	610	750	890	1.150	1.290	1.430	1.510	1.670	1.850
Net Operating Income	**-4.370**	**-18.990**	**-10.630**	**-9.500**	**-5.188**	**-28.530**	**-25.990**	**-26.278**	**-10.576**	**5.508**	**15.390**
Investment in Capital Goods (v)	**3.000**	**8.000**	**6.000**	**5.000**	**35.000**	**90.000**	**30.000**	**42.000**			
# partners	5	10	18	25	32	45	52	59	63	71	80
# residues	8	8	8	9	9	12	14	15	17	18	18

Table 1 - Income Statement – 2009-2019

Source: Prepared by the Authors

Notes

(i) Values only for illustrative purposes not corresponding to reality

(ii) Cost of waste includes not only waste sold, but also those that are payed for their destination (including any certificate cost)

(iii) It includes costs for logistics and issuing certificates

(iv) It includes payroll

(v) 2009 to 2012 – Expenses on molds and tools for products; 2013 – Vehicle acquisition;

2014 – Acquisition of a truck;

2015 – Acquisition of second vehicle; 2016 – Renovation of the shed

ANNEX 2

TEACHING NOTES

CASE SUMMARY

The case addresses the difficulties of sustaining a social business working on the creation and appropriation of value. Both are key factors for the success of the venture. In the creation of value, the destination of waste is crucial, while the appropriation of value involves how customers perceive the social and regulatory relevance of the collection and subsequent disposal of waste. It also shows the particularities of environmental concern with the recycling process, the search for solutions and the relationships between the actors involved, illustrating the complexity of putting into practice a law created more than ten years ago.

DATA SOURCE

Interview with the owner partner carried out on 04/09/2020. Fictitious names were given to preserve confidentiality.

EDUCATIONAL OBJECTIVES

To develop in the participants: (i) possibility of discussion about social business (ii) discussion about creation and appropriation of value (iii) alternatives for the appropriation of value (iv) familiarity with the recycling environment and (v) the search for analysis to trace correction routes and change strategies.

ALTERNATIVE SUGGESTIONS FOR CASE ANALYSIS

In 2006, Muhammad Yunus and his microcredit bank Grameen were awarded the Nobel Peace Prize. The Nobel Committee justified the choice of contribution made by creating innovative economic programs that lifted millions of Bangladeshi citizens out of extreme poverty. This recognition boosted the concept of social business (Tiscoski et al 2013)

Yunus et al (2010) positioned social business compared to conventional business and non-profit organizations as illustrated in Figure 4 and Table 2.

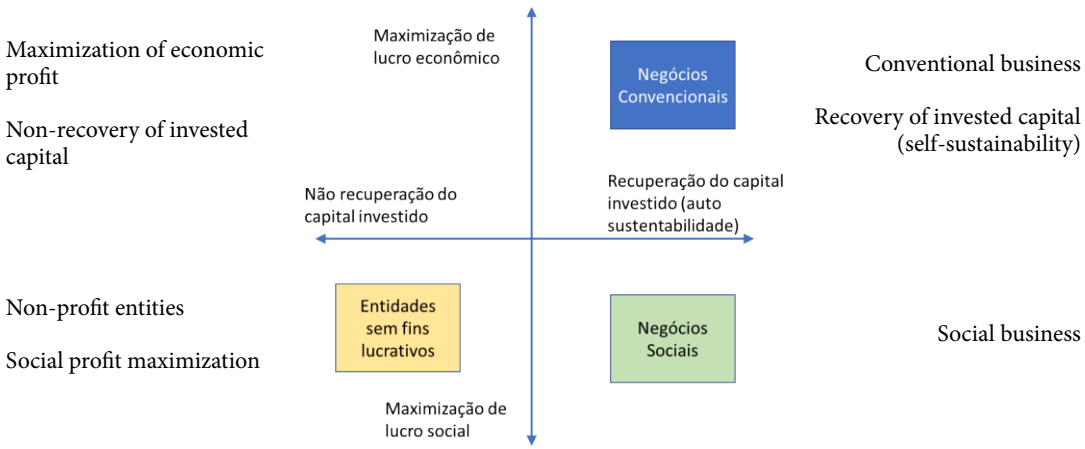

Figure 4 – Social Business vs. Conventional Businesses and Non-Profit Entities

Source: Extracted from Yunus et al – 2010 and adapted by the authors

Characteristics	Organization Type		
	Non-governmental organization	Social business	Conventional Business
Primary objective	Seek solutions to social issues and improve the community	Seek solutions to social issues and community improvements	Create value for shareholders/owners
Organizational structure	Usually made up of volunteers but may have employees payed	Comprised of payed employees	Comprised of payed employees
Managerial mindset	Be focused on raising funds to make projects viable	Even if your goal is different from a profit-maximizing company, you must strive for excellence in products and services	Search for differentiation strategies to make a profit
Resources	Basically Donations or Fundraising at events	Self-sustainable, all surplus is reinvested in the company, but the owners have the right to receive the money invested	Profits to generate surplus for reinvestment or for dividends to shareholders/owners
Investments	Usually coming from donations or resources that will not be recovered	Made by owners/ investors who are entitled to recover the money invested	Made by Owners/ Investors / shareholders who expect to maximize the amount invested

Table 2: Comparisons between organizations

Source: Adapted by the authors according to text in Yunus et al – 2010 Thus, the authors suggest:

1) Reading the case and articles recommended by the student before class
2) Analysis and discussion in groups of the case in the classroom
3) Discussion of the case in the classroom, coordinated by the teacher

Suggested questions for discussion of the case in the classroom
1) What are the Fukumoto Institute's business value creation sources?
2) What are the value appropriation alternatives?
3) What are the suggestions for change for business evolution?
4) How can the Fukumoto Institute's business model be characterized?
5) Can the Institute be characterized as a social business?
6) Can social values such as the preservation of the Environment be monetized?