

PRODUCT VERSUS PROCESS: A JUNGLE COMMUNITY CASE STUDY FOUR YEARS LATER OF TECHNOLOGY TRANSFER

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More than four years have passed since the collaboration with the Kichwa jungle community of Santa Rita in Ecuador. While designing and building the Cocoa Cabin, we were able to see how technology transfer took place. Based on this case study we will refer to the negative and positive impacts of the technology transfer system over time, acknowledging the differences between a product versus process approach. Comparing three specific points in time where technology transfer was implemented in: the Cocoa City (2010-2015), the Cocoa Cabin (2013-2014), Bolivar´ Lookout (2017), demonstrating how imposed technology leads to misuse or disuse because of lack of participation and understanding, and how technology development, when escorted by people and collaborative processes, leads to successful technology transfer.

Keywords: Participatory design, Endogenous, Empowerment, Knowledge transfer, Ecuador.

1 WHY TECHNOLOGY TRANSFER?

From the beginning of time, technology transfer has benefited the human conditions. “Within groups, apprenticeship was the main vehicle for knowledge transmission across generations.” (Gorman 2002). Though in contemporary times technology transfer has been focused on the product, the technology rather than the necessity, the real understanding of the idea or ideal behind it: knowledge transfer. “The cultural and political aspects of technology transfer are even more complex than the economic or technical ones. (...) Most often the introduction of a new technology will not meet with one kind of reaction, but with several at once; in other words, it will provoke conflicts within the importing society” (Headrick 1988).

Introducing a technology in a specific context if not understood may cause more problems than benefits, and probably cause dependence, in which case we should think about who is the real benefactor. “Economic hit men (EHM) are highly paid professionals who cheat countries around the globe out of trillions of dollars. They funnel money (...) from foreign "aid" organizations into the coffers of huge corporations and the pockets of a few wealthy families who control the planet's natural resources. They play a game as old as empire, but one that has taken on new and terrifying dimensions during this time of globalization. I should know; I was an EHM” (Perkins 2004).

This study will trace different periods and methods of technology transfer within a site-specific case study located in Santa Rita in Ecuador. Two approaches, product vs. process, will

be confronted through time in the community. This comparison will be illustrated by the use of construction detailing with two different ideological approaches, dependences vs. empowerment.

2 WHY ENDOGENOUS TECHNOLOGY TRANSFER IN OUR TIMES?

Decreased oil production, energy crisis, and global warming are facts that have negative global impact. Although Ecuador “has 4.6 billion barrels of proven oil reserves, with crude oil production of around 390 000 barrels per day” (EIA 2003), all this production is already presold to foreign governments. Therefore, one of the most challenging matters is to find a different income besides petroleum. It has been discussed in several studies that in order to achieve a more sustainable society, an endogenous thinking would be better than an exogenous one. Endogenous development is to be understood as “local development produced mainly by local impulses and grounded largely on local resources” (Picchi 1994). While exogenous approaches see development as continuous growth which in face of the energy consumption projections, mentioned before, might be disastrous. “Comparing monetary systems, an exogenous approach leads to an accumulation monetary system, where there will be shortage, competition, continued growth, individualism, power concentration and conquest or colonization, in the other hand, endogenous approach leads to no accumulation, sufficiency, cooperation, sustainability, dispersion of power, upkeep and maintenance” (Villacis *et al.* 2017). The difference between acting and thinking local may be the difference when dealing with a global energy crisis.

3 SANTA RITA, PACARI, AND THE ECUADORIAN GOVERNMENT

The Kichwa community of Santa Rita, located in the Ecuadorian Amazon, four hours from Quito the capital city, has a population of 700 inhabitants. It is where one of the finest cocoa from the world comes from. “The community is characterized by the ancestral planting of fine aroma cocoa, typical of the Amazon basin. The families of the community have been engaged in the planting and harvesting of this fruit for decades, which has allowed them to bring sustenance to their homes” (Ecuador Estratégico 2015). The Cocoa Village, highlights the symbolic aspects, history, and traditions and seeks to promote the product to the whole region. Based on this fact there where two different stands within the building process of infrastructure for the specific need of tourism. In one hand the Ecuadorian government agency - Strategic Ecuador, has managed the construction of the “Cocoa Village” (see Figure 1), a fragment of the Bio Route of Cocoa and Chocolate, making the community of Santa Rita the cornerstone of tourism development of Napo Province. The “Cocoa Village” project involves the construction of touristic infrastructure such as communal ranches, plazas, roads, trails, community areas, green areas and spaces for cocoa production” (Ecuador Estratégico 2015).

On the other hand, Pacari Chocolates collaborates for an extended period of time within the Santa Rita community building a relationship that runs from the familiar to the business. “Pacari means “nature” in kichwa language; a name chosen to evoke everything that chocolate represents: the best products from the earth, 100% natural. Pacari’s quality reflects the effort with every person involved in the continuous innovation, social responsibility, sustainability and direct business trade with small-scale farmers. This process has one principal player: the Ecuadorian *cacao fino de aroma* known as “Arriba Nacional” (Pacari Premium Organic Chocolate 2015). The collaboration, in this case, came from understanding the way cocoa is produced and commercialized, thus based on these facts find a way for both, the private sector and the community, to improve their productivity. The infrastructure, in this case, comes from the community and its partner’s necessity: a place to show and teach best practices in the cocoa

production and commercialization. When the project's base is technology transfer, it has a different means and end. See Figure 2.

We are going to describe three different construction processes, exploring the technologies and knowledge transfer behind the project, making an analysis of product vs process.

The Cocoa Village was first projected and left on standby for several years, in the meantime the Cocoa Cabin was built and when the project was finished the Cocoa Village started to be built. After a year of the completion of the Cocoa Village, Bolivar's Lookout was built.



Figure 1. Cocoa Village. (Government).

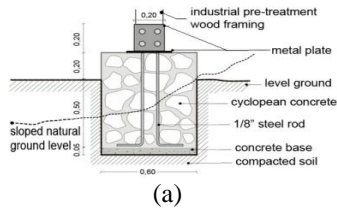
Figure 2. Cocoa Cabin, (Pacari, CLQH and Community).

4 COCOA VILLAGE: ECUADORIAN GOVERNMENT AGENCY

- Two years in the planning with almost no communication with the community, the Ecuadorian president suddenly demands the Cocoa Village has to be built and quickly.
- Foundations and slabs were poured concrete and metal plates. All materials and manpower are brought in from distant places. See Figures 3 (a) and (b).
- Wood was used for the structure, it needed to acclimatize and re-treated on site in order to be resistant to local pests and weather.
- The roofs of the Cocoa Village are zinc metal roofing and wood tiles. Zinc a material that has been used in low-cost houses in most areas of Ecuador because it is cheap and placed easily but it has a short lifespan. See Figure 4 (a). The wood tiles a foreign technology that the Builder himself did not guaranty. See Figure 4 (b).
- The contractor needs to assure the performance of workers so the building will be completed on time. The manpower from the community is only used as a complement to the main workers, not allowing a technology exchange but an employee-employer relation. Eighteen months of construction and the only interaction was the meals for the foreign workers.
- This project brings a strong sense of dependence because the know-how was not exchange and maintenance requires materials and assessment from outsiders.
- The Department of Tourism knew the buildings were oversized for this small town and sought for ways to justify the built infrastructure.
- "The Bio Route of Cocoa and Chocolate represents a large investment in terms of financial and human resources. In spite of that, until now it has not meant a significant increase in tourism or income to the community. Currently, Napo has a large offer of community tourism and a limited number of tourists. There is also a lack of links between the Cocoa Route and local and international tourism operators and a lack of information on the cocoa route in Napo (Cummins *et al.* 2016).
- The project is a 1.3 million USD investment, amount that comes from government earning off petroleum extraction. Currently, the government is receiving less income from petroleum. This means that any maintenance of the infrastructure will have to be

done with local funding. No matter how efficient the tourism and entrepreneurs are, the infrastructure is so large and complex that maintenance will be close to nonexistent.

- This space is used more for conferences rather than to attract tourists interested in cacao.



(a)

(b)



(a)

(b)

Figure 3. Foundations with concrete and metal plates.

Figure 4. Metal roofing and wood tiles.

5 THE COCOA CABIN

- The process began in 2013; Pacari starts organic agriculture, fair trade, and customer service workshops, and an anthropology study. As a result, the possibility for the community to generate agricultural tourism is feasible and Pacari sponsors the building of the Cacao Cabin. Creating a design team with Ensusitio, *Con lo que hay* Workshop (CLQH) of the Catholic University, School of Architecture of Quito, and the community.
- The work was with what the site gave us, the existing boulders as the foundation. Both, Cocoa Cabin and bridge were raised on the existing on-site boulders. As a result, the use of the existing rocks reduced the cost and length of the project. See Figure 5.
- The joint between the bamboo made both work as one, by drilling the stone and introducing a steel rod and unite both with an epoxy adhesive, (liquid stone). The bamboo was set over the steel rod and by filling the knot with cement making them bind.
- The structure was built with the wood and *caña guadua* (local bamboo), all bought from the local farmers. This system was developed on site by an engineer, the designers, and the community, taking in consideration what was available and what was required. By using the materials and a shared manpower the appropriate technology transfer is ensured because people from the community shared the conceptualization of this method is now capable of: maintenance of the structure, if needed, replicate or improve the detail.
- The roofing was made with toquilla straw, an endemic leaf used since early settlements in Ecuador. The process starts by knowing the specific moon phase for harvest to the correct placement of the toquilla straw. See Figure 6.
- The sense of independence and empowerment that this process leaves is very strong since the technology was developed on site, based on their ancestral construction knowledge and improvements were shared and mutually developed, then the community by themselves will be able to adapt, built, repair and even develop their own technology. A sense of collaboration and pertinence was created during this process.
- The design and construction team CLQH IV: FADA-PUCE were actually the first clients. They were the practice team on how to present the Cacao Cabin, how to prepare the meals, finding the topics and the essence of the tour. Developing the infrastructure and the tour pan in parallel made the project work as a whole.
- The \$21.000 investment by Pacari stayed 99% within the community, purchasing natural materials from the community and hiring local labor. Pacari brings constant international

tourism all year round, the community earns from the meals and guiding and a small percentage is set to pay off the investment, in two years one third is payed off, a win-win situation. Incomes are generated and Pacari promotes the Cabin, and they can show the world where it's products come from.

- The Cacao Cabin and its process have actually been one way to promote de Cacao Village itself generating additional income for the community.

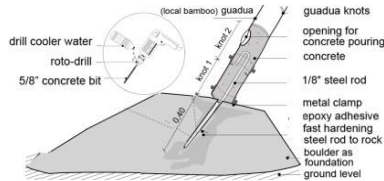


Figure 5. Foundation with local materials.



Figure 6. Toquilla straw roofing.

6 BOLIVAR'S LOOKOUT

Constant contact and visits to the community made it possible for inquiries to be resolved regarding maintenance and expansions, until we receive a phone call from the former community president, Bolivar, "Can you please send us the bits we used to drill the rock? We already have the rods, the epoxy but the bits are of poor quality here". It happens they are building a lookout and they had followed the process from the Cacao Cabin, the difference was that they were not using bamboo, but hardwood. They understood the system and applied it to the materials they had handy. Bolivar Alvarado as president of the community during the Cacao Cabin process actively participated in every step of the construction, learning the foundation system, and teaching us the work in toquilla straw for the roofs and all the bamboo and woodwork, all together with other members of the community. This way their own project was developed.

- In one of the trails to the cacao crops, two more boulders and a stream are passed, and this is a potential for a new lookout and a fishpond. See Figure 7.
- The foundations are big boulders, existing on site, and protect the structure from water.
- The structure is from locally harvested hardwood, resistant to local insects and humidity, anchored to the boulders with steel rods and epoxy as in the Cacao Cabin.
- The roof was made of toquilla straw, having a reinforced detail of the ridge, to protect the wood structure with a long eave. See Figure 7.
- All materials were harvested from the property. The investment was \$100. The process took three months.



Figure 7. Foundation of the bridge, roof structure of Bolivar's Lookout.

"There is now a community in Napo which makes elevated constructions supported on stones, without concrete. Sometimes it seems that what we do is useful, sometimes it seems like

we're good at what we do. Sometimes we do something," as commented by Gabriela of Pacari's relations.

By understanding the potential of what is on hand: boulders, wood, toquilla straw, the knowledge learned on the Cacao Cabin, and the view, a complementary project to the Cocoa Cabin was built: Bolivar's Lookout.

7 CONCLUSION

Four years after, the imposition of the Government of a large-scale infrastructure still overwhelms Santa Rita. The Bio Route of Cocoa and Chocolate, a national project, with a millionaire budget to build but built on a poor study of the scope and upkeep demands. The Cacao Village is struggling to have constant visitors. Roof leaks and needs urgent repair. And all they expect for this infrastructure is what the government brings their way. The government has to do the maintenance, which is logical but unreal and the income from the tours barely cover costs.

With direct knowledge exchange while building the Cacao Cabin, when more tourists keep coming, the surrounding are being rediscovered, new trails, new needs, and opportunities. The community can propose what to do next. They can feel the potential of the project that they built together with Pacari, and CLQH, because it keeps moving and inspiring new work. The Cabin has a new storage space, it has had upkeep, bathroom's and main roof have been rewoven, the material is handy and the community has the knowledge to work on their own.

- Processes oriented systems are often initiated based on necessity and evolve based on participation, on the other hand product-oriented processes mainly end up creating unnecessary dependence.
- Having a proper understanding and appropriation of the technology leads to the development and evolution of it by understanding the proper use.
- Although the process system can take more time to be implemented rather than the products system, in the long term the technology applied by process will support the development of communities avoiding dependence on maintenance and appliance of it.

Comparing both systems, knowledge transfer product vs. process, with the example of Bolivar's Lookout, processes is what creates independent and empowered communities in order to ensure their autonomous development, this achievement can be supported by technology.

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