URBAN-RURAL NETWORK TOOL FOR DESIGNING SYSTEMS THAT SUCCESSFULLY INTEGRATE COMPANIES AND COMMUNITIES TOWARDS SUSTAINABILITY AND RESILIENCE

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ABSTRACT

Based on the current state of affairs in relation to climate change and other environmental threats, it is now clear that our social, economic, and environmental systems are not prepared to respond effectively to these ever-increasing changes. One main reason for this, is that these systems often operate whether in centralized, or fragmented ways, failing to integrate urban and rural populations and their activities, leveraging on each other strengths in face of these issues. In response to this, the Urban-Rural Network Tool was designed and implemented in Lima-Peru. The results obtained from such experience, suggest that urban-rural networked systems, which are multi-layer, and risk-preventive, present favorable conditions for resilience and long-term scalable sustainability.

Key Words: Systems Design Tool, Sustainability and Resilience, Urban-Rural, Companies and Communities

1. INTRODUCTION

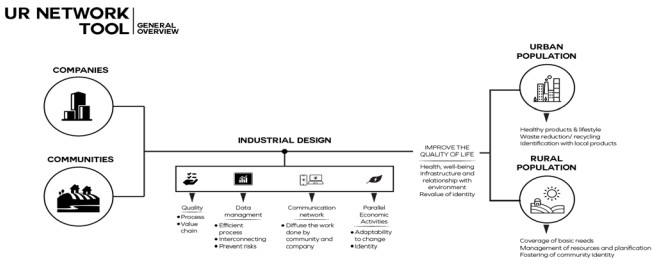
In Peru, the sudden change in sea currents and the raise of its temperature, a phenomenon known as El Niño, causes torrential rains followed by landslides, floods, the spread of plagues, and the loss of lives. All of this is caused by a semi-seasonal change of weather. However, the country's systems are not prepared for this, from housing to the effectiveness of government action. In the rural area, the price of several foods considerably rises as farmers lose their lands, and entire rural communities are even displaced. In the city, businesses in the short term are affected by the rising cost of primary goods. Over time, be it because of trend or true change of conscience, consumers are increasingly concerned about the origin of their products and their impact over local producers and the environment. As new small businesses are formed to satisfy this demand, old established companies are constantly searching for ways into this emerging market. Although it is not easy to develop a successful business model that articulates lasting relationships between companies and rural communities. Currently there are companies that are interested in investing, or that already have relationships with communities, but usually it is from an external, superficial approach, one-sided relationships, mainly for economic incentives (tax deductions) and social advertisement.

It is now clear the great vulnerability of our current system. The lack of a proper organization leaves the already fragile rural communities in a more vulnerable condition, and businesses with no clear incentives for cooperation. At the advent of climate change, this scenario could evolve into even greater consequences. Because of this, the creation of a methodological and conceptual tool for the design and development of a system that integrates companies and communities was argued as a possible solution for overcoming such issues. If an urban-rural enterprise is to be successful and sustainable it is necessary for the community and the company to be equally involved. This means establishing mutually beneficial goals and working together towards them. Also, the creation of a mutually supporting infrastructure will be crucial for adapting to ever-more challenging scenarios due to climate change, especially in the context of rural settings.

2. URBAN-RURAL NETWORK TOOL

The design of this methodological tool is based on the combined knowledge from the fields of Industrial Design and STS (Science, Technology and Society Studies). From Design, a Human Centered Design conceptual approach was employed, with the Double Diamond Methodology (British Design Council, 2005) as the basic structure for its development. Additionally, from STS, Susan Leigh Star's (1999) concept of *Infrastructure* was employed, which consists of a broader understanding of the term, encompassing not only material and technical aspects of it, but also its sociological and cultural implications and ways of manifestation. Taking from this premise we defined Infrastructure within Systems Design as a fundamentally relational element which provides support within a system, whose materiality exists in relation to the products and services organized in it by the actors involved. This definition opens a whole range of possibilities for the Design field. By conceiving infrastructure itself as an object of design (i.e. an element meant to be designed), similar to the treatment currently given to products and services. Infrastructure then, becomes a third main element to be designed within Systems Design, being the one that articulates products and services within a system, holding them together, as well as allowing for their smooth functioning.

Finally, going one step further, by employing Bruno Latour's concept of "Amodernity" used in Actor-Network Theory (1993), could be seen that, beyond the socio-technical quality of infrastructure as explained by Leigh Star, lies as well a socio-natural condition. From this lens, we could acknowledge its implications over people as well as, (simultaneously) over nature, and the environment. Thus, infrastructure in design could be approached as well as an active element within the system, causing real impact over people and the environment. Under this methodological and conceptual framework, the Urban-Rural Network Tool was developed as a means to tackle large scale organizational issues, social concerns, and environmental threats. As such, the tool structure involves four opportunity areas:



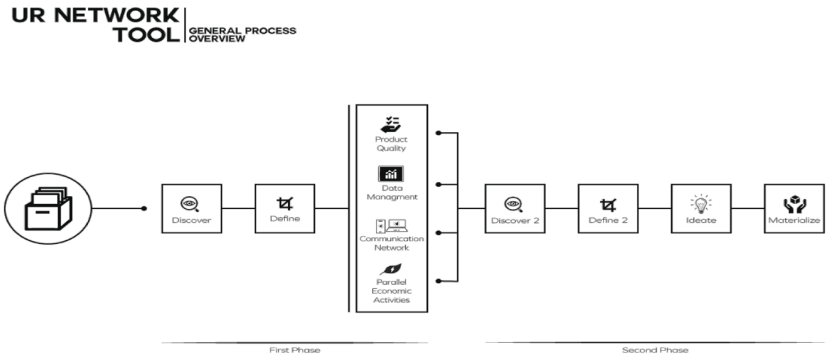
Product Quality, Data Management, Communication Network, and Parallel Economic Activities (see Figure 1).

[Figure 1] General Overview Graph

The general process is made up of two major phases (see Figure 2):

- The first phase is a general review and analysis of the company, the business model, the community and their relationship. It starts with discovering all main issues affecting the system within the four opportunity areas, and then, organize, and synthetize that data to generate a brief for each of these areas.
- In the second phase we expand our understanding of these areas, deepen into the previously identified major

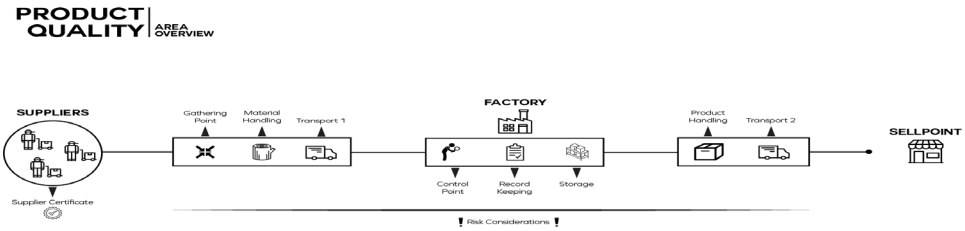
issues, generate possible ideas for solution, test and improve then, while progressively implementing them into the real context.



[Figure 2] General Process Graph

2.1. Product Quality

The goal of this area is to ensure that the product quality is up to the regulatory and business standards and meets/exceeds the consumer's expectations. In order to understand the scope and makeup of the area we have to look at the value chain of the business model. Product Quality starts even before the suppliers deliver the goods to the company. At this stage, suppliers should meet as well sustainable standards of quality and production, such as organic procedures, low-emission, zero-waste, and others. Since the supplier of the primary good is the rural community, the company has to work with them to achieve this goal. Then, to mobilize the raw materials to the factory/company, factors like gathering points, transportation networks and material handling should be considered. Inside the factory, besides the transformative operations of the raw material, also appear control points, record keeping and storage. Finally, in the distribution stage, distribution channels and product handling as well as final sell points should be

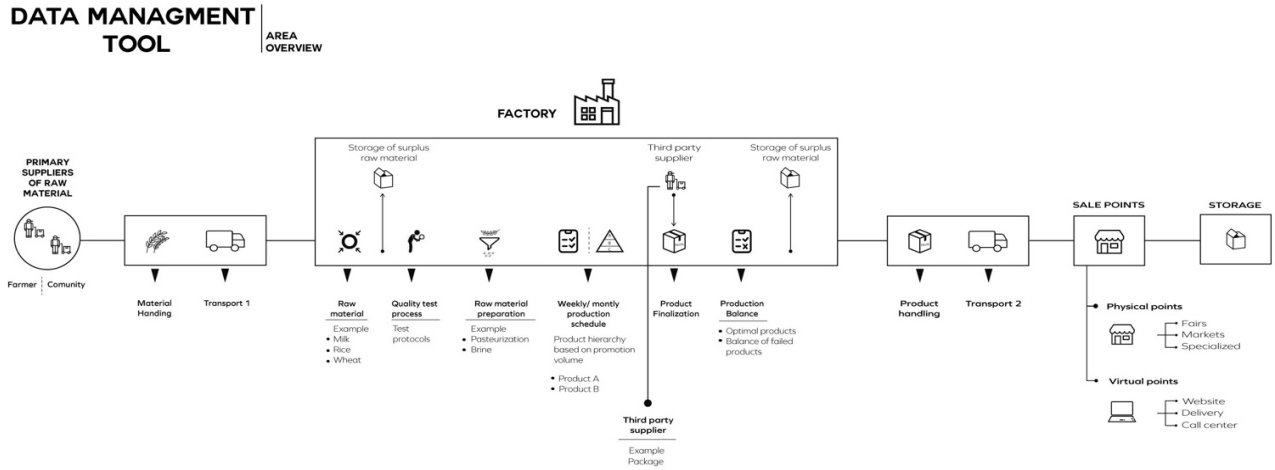


defined (see Figure 3).

[Figure 3] Product Quality Area Overview Graph

2.2. Data Management

The aim of this area is to structure the company´s processes to improve the flow of information flow between the internal and external areas. This structure will allow, in case of vulnerable situations (e.g. a natural disaster), to keep the system in good working order and evaluate prevention plans or risks depending on the information obtained



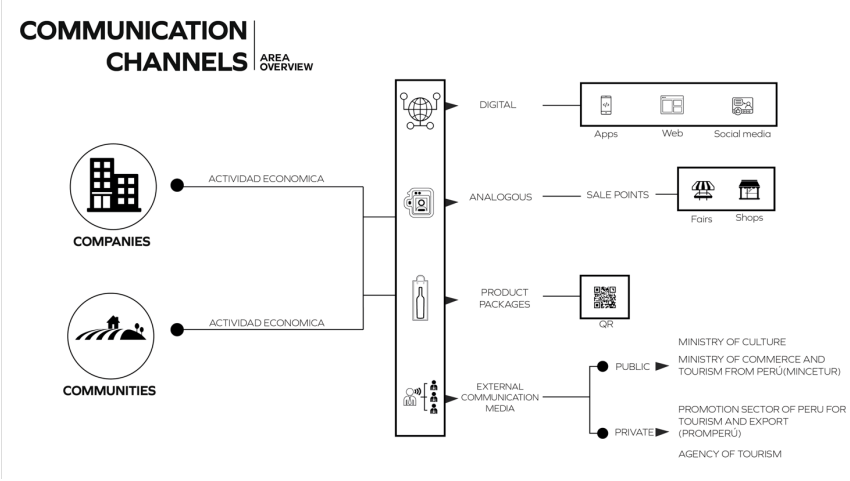
from the system itself (see Figure 4).

[Figure 4] Data Management Area Overview Graph

2.3. Communication Network

The goal of this area is to generate a brand identity that supports the company and the rural community, which could be used as broadcast channel for requesting aid from urban populations (mainly the company's consumers) in the event of a natural disaster affecting the system. It is important to understand that the broadcast channels are

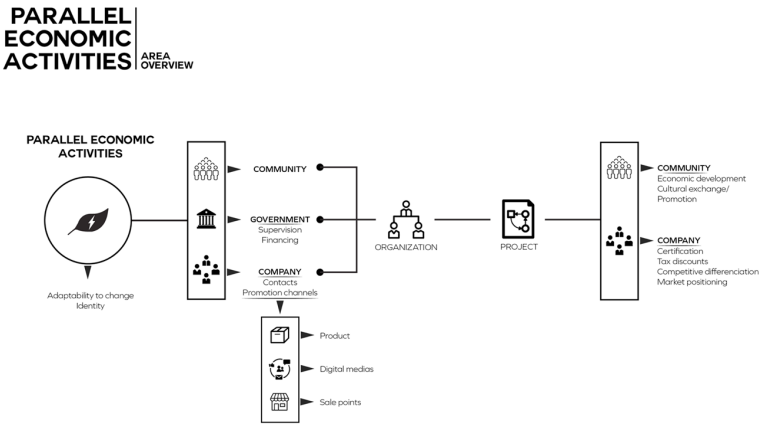
a fundamental part of the tool because they materialize the means by which the company is be able to promote, maintain, and develop the collaborative projects with the rural community while making their collaboration visible to mass urban consumers. The products and services generated by the company and the rural community are promoted in such as a way that the consumers can easily understand the whole production process, valuing the work of the local producers and the support given to them by the company. Such communication network generates added value and market differentiation to the company, and, in the event of a natural disaster affecting the rural localities, people in urban areas can be quickly informed, allowing the support to arrive on time (see Figure 5).



[Figure 5] Communication Network Area Overview Graph

2.4. Parallel Economic Activities

The goal of this area is to develop or redefine the infrastructure of an economic activity parallel to the main one already performed between the company and the rural community. This activity would be aimed towards supporting other systems like health or education for the rural community. This area contemplates the three entities that will be involved in all the process: the community who will be the principal beneficiary; the company who supports the proposal through subsidizing, motivating, promoting the results; and the government or consultancy who will be in charge of supervision. As this new economic activity rises, it is necessary to create a specific organization responsible for the administration, logistics and other activities that will be important to ensure the continuity of the project. As a result, the new parallel economic activity will benefit the community and company at individual and collective scales (see Figure 6).



[Figure 6] Parallel Economic Activities Area Overview Graph

3. VALIDATION

The Urban-Rural Network Tool was used to develop an integrated system for a dairy products company based in rural Lima called "Vacas Felices" which sells its processed products through different sell points throughout the Lima Metropolitan Area. This company has as milk providers families of farmers from the neighboring localities. The project development and main implementation lasted the entire 2017, while in 2018, periodical follow ups where made to keep track of their developments. Results show remarkably positive responses from both the rural community and the company, translated into direct benefits for the rural environment, the improvement of more sustainable behaviors and the creation of consciousness within consumers in urban Lima. Improvements in each of the four areas, allowed for 1) more competitive products increasing sells while reducing environmental impact, 2) significant improvement of trust relationships between farmers and the company thanks to more transparent and or-

ganized procedures and data management, 3) consumers in urban areas much better informed about the company's activities in collaboration with the local farmers, as well as an increment on the amount of people adopting more sustainable lifestyles through the company's promotional campaigns, and finally, 4) the creation of a new economic activity for the community, framed as "Experiential Organic Tourism" for people living in urban Lima to be able to visit the community for some days and experience an organic way of living, which, besides generating an additional source of income for the community and added value to the image of the company, also influences the young locals by making them more aware of the value their community has, which increases the possibility for them of staying and continuing with its development, ensuring its long-term sustainability.

4. DISCUSSION

From this initial experience, it could be proved that, in order to be truly effective in a long-term view, the system cannot be at odds with the environment and the context in which it exists. The tool focuses on this by contemplating multiple contextual factors such as the creation of sustainable processes inside the company (organic procedures, waste management, fewer emissions), the preservation of the rural communities' natural environment, the improvement of the relationships between the parties based on their installed practices, the promotion of a sustainable culture and lifestyle among consumers, and the redefinition of a business model which now works as a network, enabling and articulating additional economic activities based on the principles of circular and distributed economy. These factors were deemed as critical in that they collectively ensure the longevity of the community-company relationship, minimize its impact on the environment, and promote a sustainable lifestyle on the general public. Looking towards the following steps, at a larger global scale, this tool is initially framed as an academic resource for other design schools and organizations within the LeNS network, to be used by them in order to improve their own contexts and share the results with the network. The Urban-Rural Network Tool is meant to be used and replicated in any context with a similar setting where companies and rural communities are working or could work together, its final goal is to foment good practices and, by doing so, create economic stability and sustainability, even in adverse conditions. Finally, in a long-term perspective, the impact of the tool is expected to increase progressively as the model is applied and replicated in more contexts worldwide, gradually changing current practices towards more sustainable ones.

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