Design & Territory: Emergencies and Conflicts

Nélida Yaneth Ramírez Triana
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Academic Editors

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Content

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Germán Ferradas German Ferradas is a young architect from Argentina who graduated from the Faculty of Architecture, Urbanism and Design (Faud) in Cordoba, Argentina. He has been part of the school's official assis-

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Manuela Celi Manuela Celi initiated her research trajectory during her Ph.D., focusing on diverse knowledge facets related to design, their utilization, and translation into skills within learning systems, with a specific emphasis on Metadesign. As an associate profesor at the Politecnico di Milano, her research deepened into design and advanced design processes. Recent investigations center on Design, Future Studies & Anticipation, and she was principal investigator in the FUEL Erasmus plus project for Polimi (www.fuel4design.org). With a theoretical orientation, her transdisciplinary research explores the nexus between design and the humanities and social sciences through the Humanities and Design Lab. Over the past decade, she has particularly examined the production of culturally rich intermediate design products, such as trends and scenarios, alongside studying the interplay between design and anticipation. In fostering a symbiotic relationship between research and education, she introduces innovative content into didactic contributions and initiates experimental activities for students aligned with foundational research. Manuela Celi's scholarly impact extends to publications in esteemed academic journals like Futures, The Design Journal, DIID – Disegno Industriale Industrial Design, The Design Management Journal, and The Strategic Design Journal. Email address: Manuela.celi@polimi.it

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He has extensive experience in Research Projects with emphasis on Forest Resources Technology, for the use and valorization of timber species in the Amazon. He worked for ten years as a teacher in Higher Education courses in Design, in which he participated, in addition to activities teaching, research and extension practices, aimed at strengthening and developing the design in the region. He also has experience in Ergonomics and Design and Manufacturing of products with various natural raw materials. Currently Works in entrepreneurship initiatives in the design and promotion of related businesses with the local creative economy. In addition to working for eight years, the role of creative director in his company focused on the production of books manually, relating the use of traditional manufacturing techniques to new demands of this type of artifacts. This experience, which also allows her, as a researcher, exercise the study of this market and the relationships that guide the characteristics and preferences between industrial and artisanal products of this nature. Email address: mirella.sou@gmail.com

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Stefania Varvaro Graduated in Architecture obtained a PhD in Interior Architecture at the Politecnico di Milano, where she is a contract lecturer holding an Interior Design course toghether with a Built Enviroment Conservation course. She carries out her university research activity at the Department of Architecture and Urban Studies as a research fellow in the field of urban and architectural interiors, built environment, and cultural heritage enhancement with specific interest in the transcalarity and multidisciplinarity of the project. She has worked on the constituent elements of the architectural project as operational and thought tools, in the didactic work, through the assigned research topics, in seminar meetings and in collaboration with a scientific group (coordinator prof. G. Ottolini) dedicated to deepening the Interiors in the Architect & Almanac from an idea by Renzo Piano. In the field of open spaces, particularly linked to the presence of water courses, the research has produced feasibility studies, publications and exhibitions. Some of them financed through participation in Fondazione Cariplo tenders has been developed through extensive analytical mapping, preparatory to the definition of river requalification master plans, where man and his measuraments always find a specific match. She worked in her

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Presentation

Design and Territory compiles different approaches related to the appropriation of design by communities, their identity, and their affectivity with the environment. Design is subject and action; it works from several disciplines in configuring spaces, objects, systems, communication, and strategies. The territory promotes dynamics that constitute the interaction systems of people and communities.

The interrelations between design and territory allow its study from multiple perspectives. The interaction between people and objects, images and spaces, shape multiple realities in the territory, where the local, the regional, and the global overlap and interrelate, giving rise to different forms of perception and valuation of experiences. The text compiles 17 approaches/interpretations of this relationship, channeled from inter-institutional collaboration and academic networks; these approaches focus on diverse contexts, moments, and geographies, with visions from the periphery and the center, presenting courageous and sensitive interpretations of the territories explored; and are organized in four parts:

Part 1. Space. Integrates design proposals focused on developing projects or actions from architecture, urban planning, and the configuration of social space.

Part 2. Culture and Identity. The studies focused on identity processes established in the knowledge and actions of people in the territories.

Part 3. Collaboration. This part centralizes the design proposals directly applied to the territories, from work between designers with people, groups, or institutions to solve or develop problems in specific territories.

Part 4. Learning. It compiles research where design is related to the community through pedagogical actions and teaching-learning scenarios; with this, the transformation of the territory is sought based on the transformation of the people.

The book *Design and Territory* contributes to the study of the role design plays in different territories and outlines its role as mediator, planner, catalyst, mitigator, and promoter of different human dynamics.

The book's richness focuses on the variety of approaches, projects, solutions, and proposals to understand emerging scenarios in design from knowledge, practices, or processes in different contexts through the creati-

ve and suggestive integration of humanistic, technological-productive, artistic, and cultural knowledge.

This compilation results from the collaboration between the Design Research Group (GUIA) of Universidad Nacional de Colombia-Palmira, the Department of Advanced Design of the University of Bologna, and the Department of Architecture and Design of the Technological Institute of Monterrey.

The Latin Network for the Development of Design Processes is a group of researchers, university professors, students, and entrepreneurs, of Latin language and culture who are committed to the study of design processes; this group meets periodically in a forum conceived as an International Thematic Conference to debate, discuss and exchange their work, findings, and experiences. The Network, founded in 2008 with the manifesto "Carta di Torino" and under the direction of Professor Flaviano Celaschi, aims at inter-institutional collaboration and academic, scientific, and cultural exchange of its members from 15 countries around the world, mobilizing more than 500 international speakers in the multiple editions of the forum.

Introduction

Territory establishes a direct link with space. It refers to the environment itself, as well as to the region or geographical point and the relations of cooperation, study, or conflict between people.

Part I explores the relationship between design, **space,** and territory from six perspectives: the reuse of space, the security of open spaces, the generation of housing with a sustainable approach, pedagogical practices focused on the management of space, the urban design of mobility plans taking into account the landscape with water sources and the urban study of Latin American cities constitute a selection of approaches where the places of study, areas, focus, practices, and methodologies make up a broad panorama in which design is a catalyst, support, and mediator.

In the study of the relationship between **territory and space**, Marco Borsotti, in "Reinventing Railway Embankments, New Form of Urban Inhabiting," presents a comparative study of adaptive reuse of disused railway infrastructures with innovative design practices, where design is a catalyst that defines new states of perception of the urban identity of the places involved. In "Vitality or fortification, designing open space in Palmira, Colombia," Sabina Cárdenas proposes a vital model focused on open space, free of fortifications or barriers in terms of public space; it is a study of the territory and people's perception of safety, which studies dimensions of the environment such as human density, use of transitional spaces, cleaning and maintenance, and lighting, among others. Marcelo Aguilar and Marleny Cardona, with "Manufactured housing, design for social and human welfare and development," address the manufacture of housing with a sustainable approach and present a model of identification and definition of the elements that brings together the disciplines of Architecture and Industrial Design.

In "The Water Potential in the Design of the Territory. Three Cases Compared", Michele Ugolini and Stefania Varvaro present the comparison of three cases where the territory is related to the environment, proposing and redesigning the sustainable mobility network, emphasizing multifunctionality and interdisciplinarity and using water as the axis of the landscape. Concluding Part I, Daniel and Germán Ferradas propose with "Design in Chaotic Territory Collective design of public space in Latin America" the study of chaos in urban design in Latin America, and with "Chaotic design", they propose open and collaborative tools as an alternative to traditional urbanism.

Identity and culture are defined by what we do and who we are as human beings. The practices, objects, and places that make up the different territories are essential to the culture. The second part moves between proposals that interpret the territory from cultural practices such as handicraft products, food, and the manufacture of adapted products. It continues with a reflection between the environment and consumption to finally make an approximation in understanding the link between food production, rurality, and armed conflict.

Andrés Sicard and Fabio Fajardo, with: "Design of food as a space of creativity and cultural interchange", approach the new field of food design in Colombia, from the creation of new dishes and their presentation at the table, supported by some traditional Colombian practices, and reflect on the relationship between food and cultural identity in the communities.

From the application of historical analysis Maria Astrid Rios in " Adaptation as a Stage in the Production and on the Product Design in Colombia. A Reflection based on the Experiences of Bogota's First Factory of Pottery, The Salman Industry and the Metal Industries of Palmira", addresses aspects of the local manufacture of products with an adaptation of foreign forms and designs. Diego Echeverry proposes a reflection on the habitat, territory, environment, art, and culture concerning the consumption scenario in "Design and Territory: Culture and Environment. Observations about the Interdisciplinarity and the Interculturality in Industrial Design.". Finally, this second part closes with Nathalia Valderrama, who develops the " Links between Food, Armed Conflict and Rural Development Learnings from the Colombian Case" and tries to advance the understanding of the dynamics of Colombian society.

Collaboration is determined by the development of a project among multiple people, communities, institutions, or different organizations. Part III focuses on the design developed jointly by several actors in the territory. It explores the application of new methodologies in projects with communities, cases of collaboration between universities from different countries to develop projects in a specific territory, as well as collaboration between groups from different countries to develop actions for companies and proposals to develop ventures focused on design management.

Design methods are applied to analyze and evaluate the dynamics and practices in the territories and interpret the reality of the communities to propose changes and develop models that help existing companies or allow the formulation of new business possibilities supported in the territory. Manuela Celi documents the search for greater impact of design to

understand and solve problems in collaboration with communities, under the ideation and development of frugal innovation in "Discovering the frugal attitude of Social Innovation. Bricolage as activism" (in the framework of the European project Simpact).

Lucas Ivorra Peñafort presents a study where two universities (Australia and Colombia), a company, and the plastic packaging industry are articulated in sustainable collaborative projects in "Mapping Emotional Connections to Foster Engagement in Sustainability Projects. A Case in the Plastic Packaging Industry in Medellín (Colombia)". In the context of implementing the peace process and post-conflict in Colombia, Diana Castelblanco presents "Design Solutions to Confront Excessive Tourism Development. The case of Colombia's Caribbean Sea Flower Reserve and the Benefits of a Collaborative Team- Based Approach?" focused on the construction of responsible and sustainable tourism practices in the Colombian Caribbean. Finally, Eduardo Naranjo and Sonia Rojas in "Business Strengthening Model Acunar. A Proposal from Design" exposes how this design knowledge transfer program (focused on design management) allows the creation of enterprises with a university approach to society.

The **learning** process is the focus of the final part, which gathers studies focused on methods, practices, or products resulting from design processes that respond to specific territory characteristics.

Karla Mazarelo, Almir Pacheco, Mirella Vieira, and Claudete Nascimento present the process of carrying out academic work in a subject where wooden products are designed based on Amazonian legends in "Appreciation of Regional Identity and Culture in the Teaching of Amazonian Wood Products Design". Miguel González, Boris Villamil, and Keidy Perea, in "Impact of Teaching Materials in Learning Geometry", focused on product development for geometric spatial thinking in territories vulnerable due to poverty.

Ximena Flechas and Daniel Reyes with "Creative Industries as a Vehicle for the Projection of the Territory. The Case of Abacko" address the topic of creative industries, analyzing a digital learning spin-off, inviting to explore the links between creative industries, design, technology, and new narratives, and promoting scenarios of action and interaction in the territories. Finally, Johanna Merchán Avenia, in "Proposal of a Methodological Tool Inspired by the *Heliconeacea* Family", studies the native flora of Colombia and proposes suggestive elements for the formal development of production systems as a strategy for the generation of identity based on shapes and colors of the environment.

Introduction

Acknowledgments

Part I. Space

Reinventing Railway Embankments. A New Form of Urban Inhabiting

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Often in our cities, the decommissioning of architectural structures connected to the collective mobility infrastructure is particularly problematic, both for their volumetric consistency and for the objective difficulties of the redesign. However, if we applied the innovative practices of adaptive reuse, we could let them play the part of fragments of hypertext ready to be associated and dissociated through individual or collective choices of connection. This paper illustrates a research project focalized on mapping and analyzing the main international case studies about the requalification of urban environments characterized by the presence of disused railway infrastructures to verify how these, despite their architectural conformation, initially constituted an apparent limit to the development of new forms of habitability, instead, have revealed the ability to become significant places for an alternative development of their context. Often the triggering of these virtuous processes of reactivation comes from collective initiatives, a spontaneous expression of new forms of approach to public policies, practices of social innovation, and shared activism. A methodological analysis carried out through a critical reading of some paradigmatic examples of regeneration of railway embankments allows, therefore, to identify different alternative strategies adopted to achieve a positive shift in the perceived metropolitan structure in the areas affected by their presence, the result of which has defined new states of perception of the urban identity of the places involved.

Introduction

Adaptive reuse has existed since time immemorial. The reuse of caves as domicile and animal pets as clothing is an early instance of man's resourcefulness. The same resourcefulness is evident in today's-built environment when we extend structures that can no longer accommodate their program of use or give another life to materials through recycling. Such a project of reuse, born of common sense and economy, is referred to by many names today: refurbishment, renovation, rehabilitation, remodeling. They are serviceable and respectable and provide for the quotation spatial needs of society. (Wong, 2017, p. 6)

Reinventing Railway Embankments. A New Form of Urban Inhabiting

The great phenomena of urbanization and industrialization of the recent past have caused massive concentrations of new buildings, according to a logic almost exclusively linked to the pure monetization of the land value, without particular attention to its conservation and the implementation of sustainable and reversible systems. Today, this indiscriminate land consumption is paradoxically accompanied by the exponential increase of portions of land already built but now underused or even abandoned. These are building systems linked to rapidly changing socio-economic dynamics, especially under the pressure of the relentless waves of economic crisis. It is a vast patrimony of buildings expelled from the daily dynamics of use in a context of unplanned abandonment. it is quickly destined to become highly problematic subjects for their environmental impact and for the social tensions they generate.

This widespread condition represents one of the greatest design challenges of the contemporary world: faced with these phenomena of accelerated obsolescence. It is necessary to define new activation strategies and return to the community of these places. Strategies that can reconcile new sustainable economic models with renewed policies of social participation to define the final objectives and methods of implementation to generate innovative architectural approaches. In other words, a new awareness of the value of this "already built" heritage, both in terms of historical sedimentation and consumed resources, is needed to look at disused buildings as opportunities for a sustainable and conscious redesign characterized by a flexible and innovative use, sensitive to the phenomena of socio-economic and cultural reorganization of the urban scenarios in which they remain.

Referring to Marc Dumont's reflections on urban globalization:

> The model of the cohesive city explodes (...) to the advantage of "in layers" forms of its spaces. (...) The pieces of old cities play the part of fragments of hypertext always ready to be associated and dissociated through individual or collective choices of connection. (Dumont, 2010, p. 135-136)

These "fragments of hypertext" represent an important opportunity for shared design. The designer assumes the role of mediator and catalyst of bottom-up instances, local economic balances, and potential new attitudes: a design consciously attuned to the nature and urgencies of the territorial. In this way, can be launched virtuous processes of requalification, which are often triggered by spontaneous initiatives, whether "planned" or "differently planned," with the active involvement of urban categories formally alien to the official dynamics of economic and political planning of the urban fabric,

but engaged in first person by the need to overcome strategic impasses and reach the availability of new housing opportunities, whether residential, aggregative, or productive.

> If a catalyst for the infinite place could be identified, it would be always an encounter between individuals and a place in which they see the potential. The most common example is a pre-existing, abandoned site. Previous activity on the site has ceased and nothing remains, but an empty building, available—at least in terms of the imagination (Encore, 2018, p. 17).

These architectural practices of adaptive reuse of disused architectural complexes trace new paths for converting situations of apparently irremediable conflict into moments of reflection on social and economic inequalities, activating processes of renewed territorial identity.

> The final characteristic that we believe make these infinite places important is that they encourage new types of sociability. They often come about as a result of a particular vision. Individual to start with, but only existing thanks to the input from others. (…) They have many coexisting interests, so that shared governance is a necessity. (…) Finally, the potential is encouraged by availability. And it is sometimes spatial opportunities that stimulate social innovation. (Encore, 2018, p. 19)

Living Railway Embankments

Among the many types of architectural structures in a state of decommissioning, those connected to the collective mobility infrastructure could be more problematic, both for their volumetric consistency and for the objective difficulties of redesign. Although emptied of their specific functions over time, many of their constituent architectural elements still belong to larger structural supersystems, making them "physically" necessary.

This is typically the railway embankment case. These are, in fact, "hard" infrastructures, built during periods of intense development of the railway transport system, with an original tendency to settle on the crowning suburban spaces of large urban centers, towards the heart of which were projected some approaching lines.

These presences have a profound effect on the landscape, influencing the design of the urban fabric. The sediments of these railways are generally made at ground level, but, especially in larger and more congested cities,

often overhead, doubling the different levels of mobility and generating interference in the location of their structural load-bearing elements. The latter, intended to support the elevated rail traffic plan, represents these infrastructural systems' most evident urban legacy in their different forms (from the sequence of pillars to the embankments). Alongside and, above all, beneath them, they have often found hospitality, various activities, and sometimes real alternative spontaneous and temporary forms of housing.

A research project was developed to map and analyze the main international case studies about the requalification of urban environments characterized by the presence of disused railway infrastructures to verify how these, despite their architectural conformation, initially constituted an apparent limit to the development of new forms of habitability, instead, have revealed the ability to become significant places for an alternative development of their context.

New use configurations have been introduced at some railway embankments, capable of radically changing their perception and social destiny, as they had progressively become places of abandonment. Often the triggering of these virtuous processes of reactivation comes from collective initiatives, spontaneous expression of new forms of approach to public policies, practices of social innovation, and shared activism. Therefore, the request for social attention has often been accompanied by the capacity of the public administration to act, showing itself capable of opposing even the "underground" orientations of private speculative interests. A methodological analysis carried out through a critical reading of some paradigmatic examples of regeneration of railway embankments allows, therefore, to identify different alternative strategies adopted to achieve a positive shift of the perceived metropolitan structure in the areas affected by their presence, the result of which has defined new states of perception of the urban identity of the places involved.

The research, still in progress, has identified some international reference projects, which have been analyzed and compared through desk and field research and, where possible, direct contact with institutions and designers, according to some fixed parameters, such as:

- the historical evolution of the structure and the causes of its decommissioning.
- the architectural conditions of the structures before and after the realization of the project.
- the economic development models adopted and their dynamics (public, private, mixed, and planning practices planned, concerted, shared, etc.)

- the socio-economic outcomes of the actions undertaken and implemented and their effects on the urban context.

The main case studies dealt with so far are *Im Viadukt Zurich*, *London Bridge Station*, *Station F. Halle Freyssinet Paris*, *Ventura Centrale Milan* , *Stadtbahn Viaduct Wien*, *Koganechō Keykyu Yokohama* , *Promenade Plantée Paris* and *High Line New York*.

Here, for the sake of synthesis, we will only mention the three most significant cases in terms of architectural results and social outcomes achieved, as well as the methodologies adopted, one spontaneous and shared (*High Line*), one programmed and institutional (*Promenade Plantée*) and one "semi-participated" (*Koganechō Keykyu*).

The High Line of New York, United States of America (USA)

The reputation of the High Line in New York (USA), a linear park located in Lower Manhattan, built on the site of an elevated railway system, is well established, with an estimated tourist flow of about 5 million visitors per year (Huebner, 2019, p. 2). The High Line does not simply offer a suggestive "green" overhead walk next to the large urban buildings. However, it is a place of entertainment and meeting activities, acting as a catalyst for the need for aggregation and socialization (see Figure 1.1).

Its history is well known: the original route, a steel elevated structure, was created to eliminate from the streets the dangerous presence of goods traffic, connected to the numerous manufacturing companies and warehouses in the West Side of Manhattan. Active from 1934 to 1980, its fate followed the rapid decline of these activities. With its definitive closure, the High Line became an "absent" presence, forgotten by the inhabitants, colonized by nature, and destined to be demolished. It was also perceived as an element of depreciation of the value of the surrounding areas. Its reconversion process results from an exemplary dynamic of opinion movement that started "from below" in an unorganized way but quickly equipped itself with innovative tools for comparison, dissemination, and proactive project proposals, in antagonism with the dominant speculative dynamics.

Two ordinary citizens—writer and journalist Joshua David and marketing consultant Robert Hammond—convinced of the High Line's historical identity value and social potential of the started a voluntary process

of collective awareness, creating the non-profit association Friends of the High Line. Their first tools are intuitive: a site, a logo, some surveys of the structure, and many meetings that have achieved the goal of changing the negative opinion on the structure, revealing its spontaneous poetic park (documented by a famous photo reportage by Joel Sternfeld). The increase in public attention strengthened participation in the Association, whose voice also begins to reach the city and state of New York administrative centers of power. A fundamental tool for comparison will be the realization of feasibility studies aimed at demonstrating that the conversion of the High Line to a park would have been economically sustainable and advantageous, with positive effects in the long term. In 2003, with great success, the Association launched an open competition of ideas. "It was just captivating people, creating ideas, unusual ideas, creative ideas, innovative ideas of what you could do up here" (Zambelli & Pessoa Alves, 2012, p. 24).

Figure 1.1. High Line, New York (USA), Before, During, and Current State
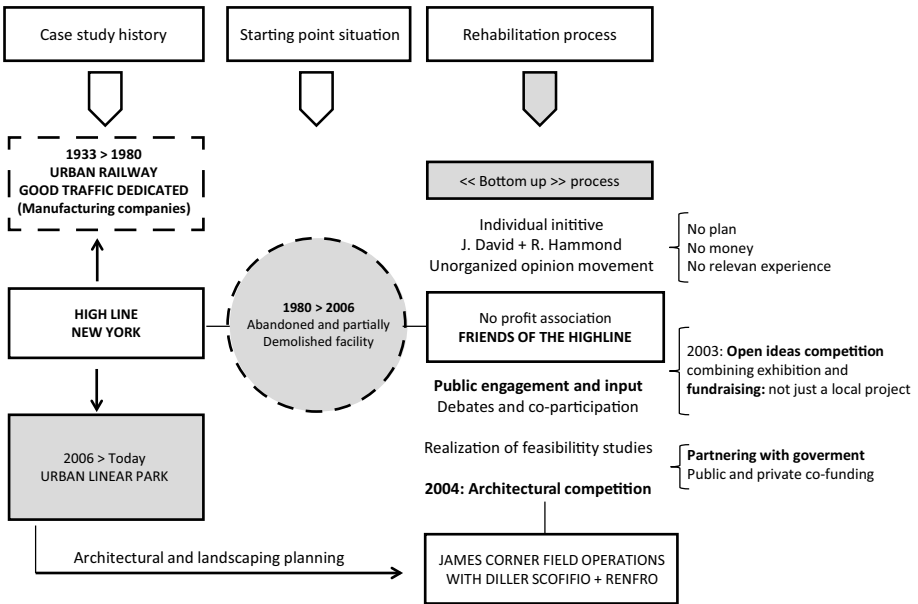
Source: own work.

The following year, a second competition, this time operational, was won by James Corner Field Operations and Diller Scofidio + Renfro. They will be explicitly asked by the Association for a joint design action with the resident community, according to a "Community-Based Planning" methodology. This long-shared path of mobilization and openness towards non-speculative urban design approaches, which involves resident communities, public administration, and private investors, finally materializes a project that embodies a progressive collective awareness . This awareness, first and foremost, creates opportunities for identity cohesion and real interaction in the construction of a vision of the city as an evolutionary system of its historical, architectural, and social memory.

The Promenade Plantée of Paris, France

The Parisian project for the recovery of the Paris-Vincennes line, a connecting route between the city center and the suburbs, which became obsolete in the 1970s due to the opening of faster lines, was the precursor of the very idea of transforming the great urban barriers of rail transport infrastructure systems. Invaded by vegetation and causing the collapse of the surrounding land value due to its state of abandonment, it becomes a source of urban degradation. Its redevelopment process presents an implementation model of public intervention as part of the general recovery plan of some marginal areas of the city activated in the late eighties by the *Atelier Parisien d'Urbanisme*, a non-profit association created in 1967 by the municipality of Paris.

The railway line has characteristics: a section consists of a railway viaduct that, over time, has become an integral part of residential and production buildings, while a second section lies below the road level. Its redevelopment, which lasted almost a decade, takes on the theme of the symbiotic relationship between the existing building, the architectural context, and nature as the founding principle of the master plan of intervention, defined by Jacque Vergely and Philippe Mathieux.

The Promenade Plantée today aims to maintain a balance between elements of permanence and transformation through the physical stitching of the different heights characterizing the structure, read as superimposed sediments able to define coordinated levels of urban habitability. Above, a pedestrian walk in the continuity of the greenery reaches its privileged autonomy, while below, the large arches of the embankment become showcases of the arts and crafts, with a mix of craft and art workshops and meeting places (Figure 1.2).

Figure 1.2. Promenade Plantée, Paris (France), Before, During, Current State

| Case study history | Starting point situation | Rehabilitation process |

1859 > 1969
URBAN RAILWAY

PROMENADE PLANTÉE
PARIS

1969 > 1988
Abandoned facility
Scheduled
demolition

2003 > Today
URBAN LINEAR PARK

Public intervention
Implementation model

general plan for the recovery
ofsome marginal areas of the city

Scheduled demolition

No profit association
Atelier Parisien d'Urbanisme
(municipality of Paris)

continuity and permutation
as focus of the intervention

Upper-level: tree-shaded cycle
and pedestrian walk

Ground level: arts and craft workshop

Social redevelopment of whole
neighborhood
Availability of finance
Long time realization

Architectural competition
Exchange of property from Ville de
Paris to SEMAEST
Mixed economic society with public
mission

Commercial upgrading
Cultural and liesure activities

Architectural and landscaping planning

(Promenade Plantée + Viaduc des Arts)

PHILIPPE MATHIEUX
JAQUES VERGELY
PATRICK BERGER

Source: own work.

Keykyu Koganechō, Yokohama, Japan

The case of Koganechō (Yokohama) presents unique and distinctive factors that have led to the redevelopment of the area below the elevated railway belt. Koganechō, always characterized by small and medium enterprises and wholesale distributors linked to the activities of the port of Yokohama, which faced a severe economic and social crisis during the Second World War. The elevated railway, one of the few structures that survived the American bombings, became the makeshift refuge of many dispersed people. In contrast, in the immediate post-war period, its proximity to the new base of the American occupation army favored the establishment of numerous illegal activities, from the black market fed by goods stolen from the base to drugs and prostitution. This last "business" becomes, finally, the one that identified the district.

In 2000, a precise tightening of the government's policy to combat the prostitution phenomenon, accompanied by local movements of protest against the widespread urban decay, led to the closure of all Koganechō sex shops, causing, paradoxically, a radical emptying of the area, with hundreds of small, abandoned businesses. The neighborhood associations that had undertaken the first protests are active and searching for a new urban identity for the neighborhood, capable of repopulating many abandoned buildings according to economically and socially sustainable strategies. So, through some small outdoor events, which aim to involve the population and the local media, begins a process that can be defined as "semi-participatory."

This process assumes collaboration between local government agencies, police, and the non-profit association Koganechō Area Management Center (AMC), starting from a centralized political public order initiative. AMC plays a central role in selecting and managing environmental requalification practices, with its predominant vision of the new territorial identity and direct control of the space, albeit in a strongly shared and mediated manner. AMC identifies artistic action as the fundamental trigger for urban regeneration. Even before the work of art itself are the presence of the artist and his prolonged interaction with the resident community that is placed at the base of the most important opportunities for aggregation. The artistic presence is intended, therefore, as a "social substitute" that saturates the urban voids and redefines them with its capacity for cultural attraction, according to a practice whose greatest limit is probably the cancellation of the memory of the recent past, tolerated, to the limit, as a possible reminiscence filtered by the sensitivity of the artist. It is undoubtedly a successful model, able to build new community awareness, establishing a solid principle of change in perception of the relationship between inhabitant and place along trajectories whose evolution shapes a renewed idea of belonging. The artistic intervention as a tool for urban reconversion is also useful to intercept financial and organizational support at the city level, allowing the creation of the Koganechō Bazaar. This art festival uses the daily spaces of the city as its stage. Architecturally, the process of redevelopment materializes with the construction of some small but significant new buildings that have "colonized" portions of empty spaces below the elevated structure of the Keihin Express railway line, owned by the Keikyu Corporation, giving space to social, artistic and exhibition activities that consolidate the availability of collective places of reference (Figure 1.3).

Figure 1.3. Keykyu Koganechō, Yokohama (Japan), Before, During,
and Current State

Case study history

Starting point situation

Rehabilitation process

1895/1905 > today
URBAN RAILWAY

KEYKYU KOGANECHO
YOKOHAMA

1905 > today
Operating facility

2008 > Today
KOGANECHO BAZAAR
FESTIVAL
+ new cultural buildings

Architectural planning

<< Bottom up >> + public
Mixed model

area with a high prevalence of
drug and prostitution market

No profit association
**Koganecho Area
Management Center**

Identification of the
artistic intervention as a tool
for urban regeneration

Small-building contruction
For social, artistic and
Exhibition activities

CONTEMPORARIES, STUDIO 2A,
WORKSTATION, KOIZUMI ATELIER,
NISHIKURA A.D. OFFICE

Neigborhood associations protets activities
End of 1990s: large-scale renovation Project
of railway infraestruscture (private company Keiku)
2005: repression of the prostitution market
Fast area abandonment process

2008: Koganecho Bazaar conception
Events, installation, interventions
Inside shops, participatory projects
and artist residence

Political-administrative concertation
Between local goverment agencies, police
and citizen association

Source: own work.

Conclusion

In many cities, urban wastelands and vacant structures suddenly metamorphose into exuberant places. After city planners and the real estate market have failed in their initial attempts to develop them, these sites become the setting for clubs and bars, start-up firms and art galleries, migrant economies and informal markets, recreational activities and nightlife. InCeed, it is often precisely here that innovative cultural production and a vibrant public sphere are to be found (Urban Catalyst, n.d.).

The sediments of the great transport infrastructures innervate the anthropized territory, deeply marking it and often acting as almost insurmountable limits, which generate marginality. Reinterpreting them as inclusive spaces capable of producing attractiveness for the community around them, restoring them (or even "inventing" them) to conditions of full habitability is nevertheless possible. However, it requires careful reconnaissance of the real vocations of use

from the territory itself. These indications must be configured in socio-economic models capable of finding new ways of "profitability," no longer calculated only in monetary terms, but above all as social repercussions capable of enhancing what is defined as the human capital involved and involved.

Figure 1.4. Case Studies Comparison
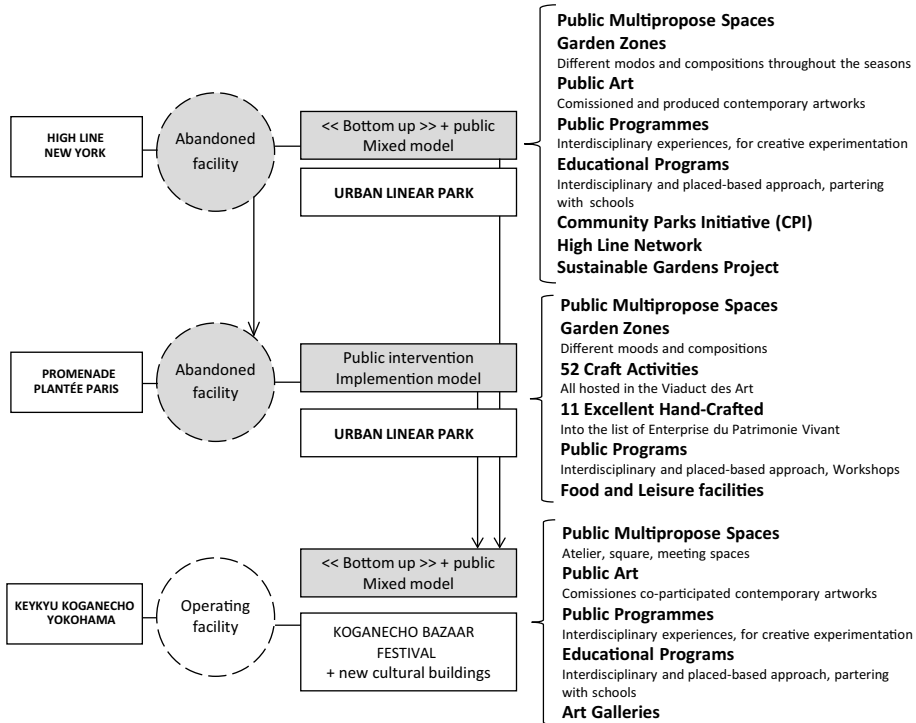
Source: own work.

The three case studies briefly analyzed here present two different socio-political approaches: the Parisian one is a public initiative concerning both strategic choices and budget availability. At the same time, the other two are based on mixed forms of "bottom-up" participation, able to tune in with the city's administrative policies (Koganechō) or even to modify and attract them to new positions (New York). In New York and Paris cases, the railway structures are both disused and are "reinvented" as new urban green arteries, sort of elevated ecological walks, which detach themselves from the daily chaos of the "ground floor" and become an opportunity to attest new aggregating and identity activities.

In Yokohama, the "ground floor" itself has been reinvented as a free interstitial space to be redefined by introducing new, small but significant, architectural presences and, above all, able to become real social places. The High Line and Koganechō are the primary expressions of a city mobilization able to organize itself autonomously and to propose itself as an alternative model of territorial governance, while the Promenade Plantée is the result of the state's ability to express itself through its Podies of redesigning the territory, capable of intercepting and organizing new economic potential.

In all these cases, the architectural intervention defines the qualitative and recognizable criteria for redesigning these places, demonstrating their unsuspected ability to adapt to new functions, completely open to citizenship: from the impassable to the permeable and the habitable. Together with many similar projects carried out or planned in various parts of the world, they demonstrate the validity of an approach that looks at the social rethinking of railway embankments and their economic sustainability (Figure 1.4).

The case studies examined show that these complex, inflexible, and even cumbersome places, especially in the presence of shared design actions on all phases of redevelopment, can become new engines of urban sociality, revolutionizing the pre-existing territorial conditions of socio-economic inequalities, defining new quality standards of the urban environment and its livability and initiating processes of reconstruction of the identity of these places, which from obstacles, are transformed into "urban catalysts." As noted by Juliet Davis, the "urban catalysts," in fact " (…) are involved in the production of 'artifacts' and/or constitute 'events', (…) their role is to initiate and/or accelerate change, (…) their 'reactants' constitute existing situations and their pasts, and that they may be more or less transient" (Davis, 2009, p. 305).

Note of the Author

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Vitality or Fortification. Designing Open Space in Palmira, Colombia

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The issue of safe open space in Colombia is barely questioned in national politics. However, when it comes to design, the national and local governments use the fortified model, which promotes using physical barriers to establish the limits of the site, the utilization of cameras, and the additional workforce. Thus, increasingly, there is a growing number of advocates inclined toward the Vital Model, which validates the idea that security in open places relies on activating public life because people are an inexhaustible source of security (Jacobs, 1961). The vital model is an alternative to the fortified model, which promotes enclosure as the only means of maintaining safety in open spaces. This article is based on a study in Palmira, Colombia, to measure people's attitudes. regarding the correlation between safety and vitality inherent to open spaces. The findings are directed towards sustainable urban renewal processes and aim to build a baseline that allows for measuring the impact of these renovations in terms of safety. For the most part, non-intrusive observation combined with semantic differential to measure attitudes was used to prove the hypothesis which states that places with higher vitality are the ones that foster better attitudes towards safety. The cues of the built environment, also called environmental cues, that most improved people's attitudes towards safety in Palmira's open spaces were human density in given spaces, usage of transitional spaces such as front yards, typology in *cul-de-sac*, cleanliness, and maintenance, lighting in park borders, absence of physical barriers, and the lowering of the number of police patrols in the area.

Introduction

The issue of safe open space in Colombia is rarely questioned in national politics, and when it is debated, it is generally approached based on policing strategies, including additional staffing, fencing, and cameras. In Colombia, the national government has provided resources for renovating open spaces, which must be safe to guarantee their use. These resources have been granted to municipalities with priority status in the National Policies for Safety and

Citizen Coexistence; Palmira, currently ranked the seventh most dangerous city in the world, is one of these municipalities. Policies for Safety focuses on addressing the contexts in which the transgressions occur. However, the question arises of how to design safer open spaces.

Theoretically, the design of safe urban spaces depends on certain social and environmental cues inherent in the built environments, which influence how people act and react within a given space. The use of these spaces is directly related to people's attitudes have toward these cues (Jorgensen *et al.*, 2012).

These cues depend on the theoretical model to which it is adhered. Architecture has two dominant positions: "vital" and "fortified." The fortified position (Caldeira, 2007) responds to the situational theories of criminology. The cues they offer for safe spaces are the usage of physical barriers to establishing the limits of the site, in other words, the "enclosure"; the utilization of cameras; increased workforce; and the predominant use of the space by only one specific group to be able to identify aliens. Its foremost architectural representatives have been Crime Prevention Through Environmental Design (CPTED) (Jeffery, 1977) and the theory of defensible space (Newman, 1973). While this theory has been the most used in architecture when designing safe spaces, it has its critics due to the limits and confinement it produces and the issues of sustainability it raises. Thus, increasingly, a growing number of advocates are inclined toward the Vital Model.

The Vital model validates that security in open places relies on activating public life (Jacobs, 1961; Virilio, 1977; Diez, 2008). This hypothesis suggests that an attitude towards safety increases when there are "eyes on the street" (Jacobs, 1961, p. 36) or when there is greater informal social control in the given space (Sampson & Raudenbush, 1999). This perspective is validated because people are an inexhaustible source of security (The Project for Public Spaces, 2000). This research opts for the Vital City model due to greater sustainability and its ability to bridge the gap between vitality and safety in open spaces.

Methodology

The studies that correlate vitality and security (The Project for Public Spaces, 2000; Gehl & Svarre, 2013) suggest establishing a pattern of people's behavior in open spaces, which Carnap (1966) calls "recurrent casualty." The pattern of behavior allows us to understand where people are more likely

to sit, which places within the open space are more commonly visited, and which activities could occur. This pattern helps design space considering how people react to a certain place. To establish the pattern of behavior, security, and vitality were measured.

Security was measured using the semantic differential (Osgood *et al.*, 1957; Iglesias, 1990) to understand the affective significance of the urban open spaces studied, such as the meaning assigned to a certain place. Semantic differential measures people's reactions to words or concepts and grades them on a scale. To build the instrument, an exhaustive list of bipolar adjectives taken from other similar investigations regarding safety was generated (Fisher & Nasar, 1992), with opposed words such as safe or dangerous, protected or exposed. The instrument was administered to a pilot group. The adjectives were then selected according to their frequency of occurrence, and the scale was constructed with seven values that maintained the direction of the continuum. The sample sizes were determined for each space applied to the differential, factoring in a 90% confidence interval with a 10% margin of error.

A systematic analysis of scientific journals between 2000 and 2013 regarding safety and open space was done to determine the variables of vitality. Variables were selected according to their frequency of occurrence and grouped into Argan's proposed urban typology classification in dimensional and relational typologies (Argan, 1984); six variables were identified.. The six vitality variables were measured using non-intrusive observation protocols developed by Gehl Architects (2013) and the Project for Public Space (2000), which has studied the public life of open spaces. Non-intrusive observation (Webb *et al.*, 1996) was used to document behavior that would have been modified had the subject of the investigation known that he or she was being observed. This type of observation allows the researcher to record conduct essential to the investigation, which cannot be obtained through verbal reports. Furthermore, a non-intrusive observation was chosen because the research being done was community-sensitive and direct questions regarding safety might have been rejected.

The observation protocols for each variable were administered in a pilot space and adjusted according to Palmira's context. To avoid the tendency to codify according to a certain theory or to overvalue one particular stimulus over another (Goodwin, 2010), researchers were precision trained in operational definitions; observation hours were established to ensure these always occurred at the same time; and during field trips, information was compared among researchers to make sure the data matched; and to reduce the possibility of sensorial deficiencies due to fatigue or attention or memory

selectivity among observers (Anguera, 1978). To guarantee the validity of the data collected, two different protocols were used: both obtaining the same result Webb *et al.* (1996). In this way, the proposition was confirmed by two or more independent evaluations.

An analysis was made of 1,653 index cards and observation protocols developed to measure the vitality variables and the results of the semantic differential. Based on the results obtained from the differential, the variables of the vital model were correlated. Most results were presented numerically in dispersion graphs (X and Y), expressing correlation coefficients (Pearson r) between vitality and safety operational variables. Some results were shown on maps or pictures that replicated what researchers had observed.

Results

Six vitality variables were studied from the dimensional and relational typologies established by Argán (1984): 1) Building and population density by area; 2) Uses of space about facades are also understood as transition spaces or interfaces; 3) Street design, size, and height of buildings; 4) Street furniture, cleaning, and maintenance of the site; 5) Visibility (light); 6) Presence or absence of fortified elements (fences, cameras, number of police patrols).

In the city of Palmira, the density of population by area (r = 0.82), transition spaces or interface (r = 0.82), the typology in *cul-de-sac*, cleaning and maintenance (r = 0.96), and visibility along the perimeters (r = 0.90) were all environmental cues that most affected the attitude towards the open space in terms of security. Building density, size, height, and street furniture remained neutral. As for the elements of the fortified model, the greater the number of patrols in the area, the greater the negative attitude toward security, which produced a negative correlation (r = -0.80). Furthermore, the low correlation between enclosure and safety (r = 0.26) showed that number of bars on gates, doors, and windows did not create a greater feeling of security.

Discussion

Dimensional typology studies building density in green space, the density of people in parks, and types of use. Regarding building density concerning green space, research has been oriented to see whether houses in the suburbs with large green areas are perceived as safer than compact and dense city buildings (Katz *et al.,* 1994; Town & O'Toole, 2005). In this research, building density

was homogeneous because it was not comparing urban and suburban areas. When the population density by area was correlated to safety, the coefficient obtained was r=0.65. This result confirmed the hypothesis that the density of people is associated with their attitude toward safety (The Project for Public Spaces, 2000; Gehl & Svarre, 2013).

Types of use were divided into housing, commerce, mixed (commerce and housing), and street vending. The results indicated that in Palmira, housing was the use that most affected the attitude towards security (r = 0.82). In contradiction to the proposals made by groups like New Urbanism (Katz *et al*., 1994), formal commerce obtained only r = 0.13, while mixed (commerce and housing) obtained r = 0.35. In both cases, the correlation was almost non-existent. One possible explanation offered by Gehl (2013) is that attitude depends on the activation of the border at the first-floor level, which means the possibility of people coming in and out of places, in which case, formal or mixed trades like street vendors, either close or disappear after working hours, while the use of transition areas such as front yards of homes, maintain a vital border by making it seem as though the place is being used and therefore, more secure, in other words, had a higher "interface."

Relational types are related to street and park design. Street design is focused on types of streets, and park design entails the relation of height and park size, street furniture, cleaning and maintenance of the site, and visibility or light. When the safety-dependent variable was related to the street design (Cooper-Marcus & Francis, 1998), it was found that the paths in cull de sac were perceived as safer than those which connected; and, as the paths further connected, the space was perceived as even more unsafe (Armitage *et al.*, 2010). Carmona *et al.* (2010) maintain that the culls de sac benefit social space for they are specially designed for pedestrian use, thus limiting car traffic; this allows for greater interaction among residents while increasing the possibility of social control of the space. According to the prevailing theory, this generates a better attitude towards safety in the place. Unlike space in movement as produced by motor vehicles, social space is generated on sidewalks and parks where interaction among people is likely to happen. That is why vitality can be present only in social space.

In the United States of America, many studies were conducted on the size and height of buildings related to security (Newman & Franck, 1982; Newman, 1995). This research concluded that four-story buildings or lower were safer than higher ones because height diminishes the reaction capacity of people if they see someone in distress. These studies also mention that people feel safer in smaller parks than in very large ones because of the

increased opportunity for interaction with neighbors (Hillier, 2004). The studied areas were all similar in height, impeding the possibility of contrasting the results. Regarding size, results were inconclusive in that size did not affect the perception of security. What was learned from this result is that regardless of the size or height, what does provide a better attitude towards security is the opportunity for natural surveillance, "eyes on the street" (Sampson & Raudenbush, 1999; 2004). When measuring park furniture, it was expected to find that better-equipped parks in terms of places to sit, play, and eat would be perceived as safer, but this did not happen in the studied parks.

Cleaning and maintenance obtained the highest correlation about security in Palmira, with a near-perfect correlation coefficient of $r = 0.96$. Hunter (1985) defines incivilities (garbage, broken glasses, abandoned cars) as the place's lack of care or deterioration. Sampson and Raudenbush (1999; 2004) will claim that incivilities are due to the lack of social control of the space. The latter affirms that when there are high levels of informal social control, or as Jacobs calls them, "eyes on the street," incivilities and crime diminish because this means that the residents themselves are able and ready to react to a situation or threat in conditions of social cohesion and trust. On the contrary, unclean space is a sign of social control because no resident would act in a neighborhood where the rules are confusing or where there is no trust among themselves. In order to have a positive impact on safety, social control must be informal (resident motivated), not from formal institutions such as the police. These results would explain why some spaces obtained neutral scores despite being clean and cared for; and why some spaces were perceived as not secure despite municipal efforts to keep them clean.

The correlation between light and security was found to be more related to the activation of the borders during non-working hours (after 5:00 p.m.) rather than the amount of light in the space. In order to prove this, the cone of light was measured in terms of the time range of each space; the correlation was $r = 0.26$. The amount of light was then measured again, this time at the borders (sidewalks) after working hours, in which case the correlation increased to $r = 0.90$. This result coincides with that stated by Gehl (2013), who argues that the presence of light allows for a better interface or active use of the borders, creating a better attitude towards security. This research showed that spaces with low light could be perceived as secure, as Boomsma & Steg (2011) affirm, provided that the lack of light is present in the center of the space; however, the sidewalks must be well-lit, thus increasing the use of the streets, and consequently improving the attitude towards safety (Gehl, 2011; Gehl & Svarre, 2013).

For the correlation between fortified elements and security, patrol and square meters of barred fences were measured. Cameras were not analyzed, for they were not found in any studied spaces. Following the fortified model, the greater the number of barred fences, cameras, and police presence, the better the attitude towards security because the presence of these causes people to feel better looked after. The Vital Model, however, posits that, to the contrary, the greater the strengthening of these objects, the more negative people will feel towards security; the presence of these objectives makes persons feel that their security has been threatened (Coaffee *et al.*, 2009). These authors explain why many governments have set aside these "hard" measures in favor of "soft" measures. These last are invisible to the unsuspecting, like the "tiger traps," which consist of low-density concrete which would collapse under the weight of a tank or car which wants to cross, thus trapping it in a pit, hence its name. Although these soft measures are restraining, they still require that city security be considered from another angle.

In the case of patrols, a negative correlation of $r = -0.80$ was obtained: the greater the number of patrols in the place, the more diminished the attitude towards security. Thus, the attitude diminished, given the greater police presence predicted by Vital City. When attitude was measured regarding the number of square meters of barred fences, the result was $r = 0.26$, indicating no strong correlation between the number of barred fences and the attitude towards safety. Again, as predicted by Vital City, space can be completely fenced in and yet not be perceived as secure.

Conclusion

Even though the ideas of enclosure and fortification prevail, creating enclaves and enclosures for those who seek to shelter among battlements (Virilio, 1977; Mitchell, 2003; Bauman, 2005; Davis, 2006), today in the design of the safe place, more than just a few choose architectural alternatives which combine safe space with vital space as presented in this research. The theory of Vital City salvages used and lived in open space as a sustainable solution for the city of today (Jacobs, 1961; Whyte, 1980). This theory recognizes that there is an inexhaustible fount of security within the vitality shared by those who daily traverse the place(Gehl, 2011). Vital City states that a better attitude towards security is obtained when public life is activated in urban spaces under the auspices of "eyes on the street" (Jacobs, 1961, p. 36); exerting social control over the place. Vitality is consequently understood as a fount of security.

With the results obtained, it was possible to state that, as the Vital City theory suggests, urban open spaces that generate a better attitude towards security have characteristics of the Vitality pattern. As such, the design of open space in the city of Palmira could include considerations towards the density of people by area, uses given to transition spaces, typology of streets, absence of physical incivilities in the space, lighting the borders or perimeters, the absence of physical barriers and fortified elements, for these, were all the cues which most impacted the attitude towards security in this context.

Measuring these variables also contribute to constructing a baseline that will help the municipal government measure the impact of future renovations of urban open spaces in this city. In the case of fortification variables, it was demonstrated that there is little association between the enclosure and a better attitude toward security. A given space can be perceived as insecure despite being fenced, having cameras installed, and having a police presence.

The results indicated that according to the hypothesis set forth by this research, there is a definite correlation between vitality and attitude when it comes to safety. The verification of the correlation between security and vitality opens the doors which allow for a different city to be imagined, one in which the community's actions are privileged. A city where the citizen is no longer conceived of as a passive victim at the mercy of the delinquents but as an agent of change, able to control the future of his or her neighborhood. In terms of public policy, it involves a shift towards more sustainable alternatives such as those proposed by Ciudad Vital.

Hopefully, this research for the city of Palmira can be replicated in other similar cities in Colombia. These expanded results could be used by governments, architects, or those interested in creating urban designs, incorporating security based on the Ciudad Vital models as an alternative to the fortified models. In this way, an alternative for the design of open spaces for a more sustainable and inclusive perspective could be offered.

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Manufactured Housing. Design for Social and Human Welfare and Development

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Chapter 3

Manufactured Housing (MH) is an instrument of transformation of the territory (techno-biological system), which man uses to sustainably rebuild the ways of living; the PFH seeks to understand the consumer product in divergence with the concept of Construction and Prefabrication. The identification and definition of the design elements to manufacture the housing, in addition to the generation of knowledge in the discipline, complements the integration of concepts and environmental and social theory in a product of primary need that should facilitate the improvement of the quality of human life: welfare and health.

Qualitative research focused on the product and object of design: Manufactured Housing in Colombia, within the framework of Sustainable Development and the Environment, was developed to approach the object of housing from the perspective of industrial design.

The study identifies a list of design determinants applicable to the creative process and an instrumentalized response aimed at their professional (housing object design), technical (industrial production), and social (product for Social and Human Development SHD) applications.

Introduction

The research is based on Sustainable Development Studies. The main objectives are 1) To Study Housing as a Design Object, 2) To analyze the relationship of Housing Design with Human Well-being, and 3) To analyze the relationship of Housing Design with SHD.

The design indicates the path to innovation. One way to innovate is to rethink the convenience (SHD) without crashing with the culture (rescue), preferring the best (quality of life) but avoiding mistakes. The intervention of industrial design in housing exceeds interior design and transcends the urban dimension.

Housing is a design object that requires in-depth research, and in industrial design, there is a lack of formulations, methods, identification of elements, and specific theorization in this field; this is an opportunity to contribute to the strengthening of the disciplinary exercise and thus improve the response that the designer or the design team brings to society and the territory.

The role of industrial design is to develop better processes for communication (social sensitivity), for the product (quality of life of the user), and for the environment (environmental sustainability); from this approach, some questions are planted: What does the discipline of design requirements to achieve proposals directed towards manufacturing? (Cardozo, 2013). Moreover, what design elements must be considered when designing housing? To answer these questions is required to identify the elements that facilitate the design of a housing product, with a design ecological and positive, for responsible and respectful manufacturing with a sense of environmental sustainability.

Vogler (2015) states that Manufactured Housing is an approach opposed to the constructive tradition, paradigmatic morphology, and little innovation of conventional housing in Colombia; and exposes that housing manufacturing in Colombia is not regulated, but similar considerations would be applied to the manufacturing of industrial products (mostly standardized), making feasible the manufacturing of MH under sustainability criteria. In this manner, the object "Housing" will have respectful use of ecological resources, with supporting technologies for design, planning, and control, optimization of manufacturing, and less impact on ecosystems, to achieve a house with all the necessary elements to be ecological and sustainable.

Well-being is not a medical solution, but a way of life and links housing as a "key" factor for healthy living, and through its design, fears, insecurities, distrust, inequality, illness and dislike for monotonous or recurrent architecture are eliminated (De Garrido, 2013). 33 BIP-VIP projects demonstrate the benefits of MH through innovative designs and with the application of 4R: rethink, recover, reuse, and recycle (De Garrido, 2015).

Other innovative proposals are cargotecture, printed housing, and aquatic and aerospace citadels. Cargotecture is the use of maritime cargo containers to inhabit (Kotnik, 2013) and shape habitable spaces. Additive manufacturing is a fully automated process with many applications, including on-site housing printing and the application of unique morphologies (Sarakinioti *et al.,* 2018), unconventional, and thereby (EU-OSHA, 2017) promoting a safer, healthier, more satisfying, and waste-controlled working environment.

Sensitivity in the use and exploitation of living space is changing, and reductionism is a trend and necessity (Schmidheiny, 1992), which added to the verticality of cities, proposes novel scenarios in terms of how it will be built, but above all, how will housing be materially provided? (Vivanco, 2017). The design of cities in the sea (Ko, 2015) and aerospace cities (DuVergne, 2017) is due to the unavailability of land to build on and the saturation of large contemporary cities; these housing units are designed to inhabit, resist and make human life safe in a non-traditional environment.

Housing as the Center of the Study

Traditionally, a house is built on-site, where a "forced relationship" is established between a series of parts constructed and the terrain. A prefabricated house (set of pieces) is formed by assembling components, although these depend on the land for their assembly and structuring. In contrast, manufactured housing (standard product) depends mainly on industrial manufacturing assembly processes and terrain. Like a product, housing requires development with the same technical rigor with which a car or an airplane is currently made (Vogler, 2015); as an object, housing design requires technology, precision, and details that provide the best conditions of functionality, aesthetics, ergonomics, and habitability. The quality of the product is not the same as the quality of life generated by a product; housing must provide a quality of life whose "notion of humanity passes through the concept of dignity and respect" (Cardona & García, 2018, p. 101).

In this regard, Manrique (2016) states that we live in "a contemporary reality that demands alternative approaches and a more integrative and pluralistic vision"; for current housing, from the perspective of industrial design, an environmentally and socially improved transformation in favor of current and future generations is achievable.

A formula is proposed to address this challenge:

$$\text{Housing} = \text{House object} + \text{SHD objective}$$

Kliczkowski (2013) describes that a "sustainable product ensures the highest level of welfare and development of citizens and also allows the highest degree of welfare and development of future generations, and its maximum integration into the life cycles of nature" and where the role of the designer is to rethink their social responsibility and empower themselves

to project: housing for habitability (Constitutional Court, Sentence T-585 of 2006), decent housing (Constitutional Court, Sentence T-487 of 2011 and T-683 of 2012) and housing for a more sustainable environment and future (UNDP, 2018). More so when environmental, social, and economic conditions are not yet symbiotically integrated.

The housing sector is relevant in the economy because of the social, political, economic, and environmental impact that its realization requires. If, as proposed by Bermejo (2018),

> "the widely dominant paradigm is anti-scientific, arrogant (contrary to the planet), typical of underdeveloped beings. (...), it becomes necessary to replace this unsustainable system with another that contributes to living in harmony with nature where a technology is an instrument to achieve sustainability". (Bermejo, 2018, p. 27)

The best characteristics for residential environments are obtained thanks to new production technologies, materials development, and logistic chains. The future is promising with greener, more responsible, regulated, and better-designed markets, and this requires products that protect human health and the environment and non-polluting processes or factory models.

Contributions to Latin American Environmental Thought

For Gámez Básten (1999), the so-called "rationalist current" was configured as a doctrinal paradigm, using concrete in all types of surfaces superimposed with nature (pedestrian paths over rivers, gray surfaces over ancient groves, high facades contrary to the green landscape). The acceptance of this style by Latin American governments and societies contributed to the fact that in Latin America Environmental Thinking, Housing is linked to the Cultural Order but not to the Ecosystemic Order (Romero, 2016).

The mix between the cement industry, urban renewal policies in cities, and the lack of rigor in the application of environmental regulations facilitated the imposition of this model of housing construction in Colombian cities; society accepted it as a cultural paradigm in the absence of options and houses made with other materials (prefabricated and accessories) are the result of the search for technical and economic alternatives, rather than product quality, and are perceived as low quality and a solution for low-income markets.

In Colombia, recent governments have developed social housing construction programs characterized by notable defects in space, ventilation, roofs, and networks that do not save water or energy; unfortunately, despite the construction of thousands of these types of housing, innovative solutions are not implemented due to deficiencies in the limits, control, and surveillance of the state.

The Colombian state promotes initiatives such as Resolution 0549 of 2015 of the Ministry of Housing, City and Territory, where "the guide for water and energy savings in buildings" is adopted (Departamento Nacional de Planeación, 2019). On the other hand, the issuance of the Colombian Technical Standard (NTC 6112 of 2016, Colombian Environmental Seal) of the Ministry of Environment and Sustainable Development establishes environmental criteria for the design and construction of buildings with use other than housing; however, the environmental issues are still not a priority in the housing market; Valdovinos *et al.* (2018) exposes that "is estimated that the construction sector is responsible for consuming 50% of natural resources, 40% of energy and 50% of the total waste generated in the world."

Despite this, the housing sector can also become a saver of natural resources, fewer emissions, and waste disposal (Consejo Colombiano de Construcción Sostenible, 2011), and to achieve green design must be implemented. An Ecological Design "meets the needs of users at any time and place, without compromising the welfare and development of future generations" (De Garrido, 2010, p. 12).

Social and Economic Thought

Social Thinking in Housing design should allow the individual's adaptation, capacity, Integration, and latency to the environment and vice versa (Rodríguez de la Rosa, 2015). However, it is increasingly difficult to achieve these qualities to facilitate the life of the inhabitants, this is a result of 1) the reduction of the area of occupation by the family nucleus (overcrowding, inadequate services, and insufficient housing); 2) the current social models that encourage independence and autonomy of individuals (more walls, more internal divisions); 3) the lack of studies on cultural characteristics that link, integrate and develop individuals in their spaces (not all individuals and groups react similarly to stimuli); and 4) the economic model aims to constitute the standardization of habits (with unpredictable results of individual and social behavior).

Echevarría (2006) states that "the designer requires mastering "strategic thinking and communication (...) in a dramatically unstable context (...),

seeking an "integrating vision," with a Meta-object approach (a conceptual and theoretical, holistic, systemic whole, with environmental and design thinking). The traditional approach prioritizes the needs of roofing, shelter, and housing (basic functions) over aspects such as the life cycle of the materials that constitute it, the impact of production, and the impact of housing on the environment and the health of the occupants (transcendent functions).

If there is sustainability, the process will be more environmentally responsible. Consequently, it has generated greater welfare for the human being, both in the direct use of the product and in the production process. However, current housing product quality standards are oriented to comply with a minimum or acceptable level for the inhabitants; however, which quality standards measure human welfare in housing? as states, with economic and technical parameters. Figure 3.1 shows conventional housing as a product of the environmental, social, and economic system of thought.

Figure 3.1 Unsustainability and Non-Well-Being of Housing in Colombia

In LATIN AMERICAN ENVIROMENTAL THINKING, housing is linked to the cultural order but **not to the ecosystem order** (Romero, 2016)

Conflict for space

Resource conflict

Non adaptation

Not ecological

Traditional construction methods in Colombia

No Well-Being

Product TRADITIONAL HOUSING

In SOCIAL THINKING, housing should allow the **Adaptation, Capacity, Integration and latency of the individual to the environment and vice versa** (Parsons, 1995)

Non - inclusion

In ECONOMIC THINKING, the housing market is abstracted from the community and the biosphere (Diaz, 2011)

Denaturation conflict

Source: own work.

The manufacturing processes optimize the transformation of raw materials with energy and water consumption control. It also ensures control of emissions, spills, and waste; the use of skilled labor guarantees the metrological precision of parts and components, achieving time accuracy; by applying these criteria in the manufacture of a house, it is possible to achieve shorter times than those required for a conventional concrete and brick construction.

Concepts

Housing–Design Object

Housing is an object in itself. It results from a provocation (need) and an ideal (occupation and enjoyment). It is the product of material and commercial development. It is a pretext for the cultural representation of modernity, and its attributes denote socioeconomic status and reveal the individual and family growth of the owner (s). It empowers and enriches the builder and the Bank that supports pro-purchase indebtedness. It is a turn argument in each political campaign to invoke the reduction of the housing deficit and influence voter awareness.

It is a study field to generate alternative ways of building, manufacturing, reusing materials, and living; all these are work scenarios of industrial design (Alvarado *et al.*, 2014).

Manufactured Housing (MH)

Manufacturing Housing (non-definitive denomination) is an alternative proposal to traditional building activity, and it corresponds to the theoretical exploration from the discipline of industrial design to address aspects that today generate concern: ecology, sustainability, corporate responsibility, product quality, and by-products related to the housing sector.

Connects the concept of Housing: a) with the environment (culture and infers territory); b) with the assurance of the quality of life of the occupants (health and wellness); c) with the planet (environmental sustainability); it is the temporal response that research offers: a mixture between the material and the related to human interaction; interaction, which is also defined, requires the exploration of the technical and the behavioral, the human and the social, the architectural and ecological.

Sustainability

Sustainability is a commitment to human development and social stability (De Garrido, 2014b), improving the quality of life of people and communities, and optimizing the use of available resources (consumption, maintenance, functionalities, and prices).

Environmental respect and sustainability are tendencies that will modify market perception and affect ecosystems. Sustainability is a bet and not a

requirement for states, corporate or social (European Union, 2017). The reality of environmental degradation and lack of resources obligated to a change in the social, economic, and political system (Martínez & Martínez, 2016).

Human and Social Wellness

Society has a direct dependence on the territory and indirect with the economic (exchange); therefore, Human Well-being (HW) should be interpreted as the state reached by individuals and communities; it is the result of a balanced and holistic strategy toward life and contributes to establishing a new paradigm of the material and therefore of the enjoyment of individuals (De Garrido, 2013).

Habitability

Habitability is understood as the disposition of the elements of the environment and distribution of the nearby space so that users interact and make their lives more comfortable, which are the basic arguments for traditional architecture. Approaches to environmental characteristics built to deal with emergencies and catastrophes are based on design concepts such as Ecodesign and Life Cycle (Ros García & Sanglier, 2017).

Structuring

It integrates several subsystems that adapt to each other and constitute the object's geometrical basis and structural form. It is crucial in buildings due to the material's complexity and reflected in the seismic resistance.

Prefabricated

It is a housing alternative that is conformed for fabricated pieces that include walls or roofs; in the market, it is called a Prefabricated House; it has the connotation of lightness, lower cost, ease, and speed of installation. Earthquake resistance is a permanent concern in the design of these houses (robustness after assembly).

Cargotecture

It is understood as building living spaces based on disused maritime cargo container structures. The advantages in terms of sustainability offer this type

of building are earthquake resistance, consumption reduction of energy and emissions, and suitability.

It is a new scenario for design work, characterized by incorporating new types of structures to create livability products.

Methodology

Descriptive-qualitative research was developed; the qualitative approach sought to find relevant elements (variables, factors, and aspects) for the design; the descriptive approach sought to describe phenomena, characteristics, and realities through semi-structured interviews based on the experience of the key actors.

The key actors comprise occupants and owners; experts in sociology, architecture, civil engineering, and industrial design; academics, researchers, manufacturers, and builders; public officials and industry leaders. Table 3.1 lists the number of stakeholders involved:

Table 3.1 Technical Sheet of the Key Actor Categories

		Categories		Region, Companies, Organizations
Related to use	5	Geographic Area	11	Populations of Colombia
Related to design	6		10	Departments
Related to laws	2		4	abroad
Related to social research	2			
Related to design research	2	Government representation	5	Alcaldía Municipal of Palmira, SENA and Universidad Nacional de Colombia.
Related to market research	2	Private representation	13	Educational entities: Universidad Gran Colombia and Universidad Politécnica de Valencia.
Related to technical, technological or university training	4			National companies: Sociedad Colombiana de Arquitectos, SIOC s.a., Sabel Ltda., Prodesa s.a.
Related to manufacture	3			Companies abroad: XNS Technology Group Inc. (Seattle, EEUU), Studio L5 (España) y Fundación GIZ (Alemania).
Related to building sector	3			

Source: own work.

Four relevant phenomena were identified: a) design is not a science. It lacks disciplinary and material rigor (both in Construction and Design); b) sustainable manufacturing is possible if tools and instruments for the application of sustainability criteria are available and implemented; c) Social and Sustainable Development (SSD) can be achieved through opportunities to enjoy the quality of life, and d) symbiosis between nature and material means is necessary since Environmental Sustainability prevails over social and economic sustainability, the enjoyment of well-being depends on it.

The conclusions are integrated through systems thinking (holistic and relational analysis), design thinking (disruption and new imaginary), contextualization (sensitivity and vulnerability of the public concerning the housing product), and the reference system (users, usability, trends, and qualities of the environment).

Results

The ethnographic tour provided points of coincidence concerning the proposed objective. Through triangulation, three categories related to the MH were obtained: Well-being, Manufacturing, and Sustainability (see Table 3.2, categories, interpretation, and contributions of the key actors).

Table 3.2. Categories, Interpretation, and Contributions
of the Key Actors (made authors)

Research categories	Housing Product
Meanings of housing	**Interpretation of Housing as a product ...**
Origin / Motivator	material goods to achieve emotional and physical stability.
Class Differentiator	of pragmatic, semantic, and symbolic sensibility: social class differentiator / Gap
Property / Material goods / Urban goods	of urban planning, exchange unit, and socio-economic stratification module.
Family nucleus concentrator	Housing–a space that fosters relationships, communication, and interaction.
Occupation / Usage habits / UX	of Practical Aesthetic and Symbolic Sensitivity: a family-centered environment conducive to child and youth development, adulthood, and old age.
Housing manufacture	**Interpretation of Housing as a product ...**
Product Design, Manufacturing Input	of Industrial Design (100% manufacturable).

Value Chain, Life Cycle and Process Quality	of the corporate ecological strategy
Environmental Management	that enhances the human capacity to control environmental impacts.
The concentration of Manufacturing Capacities	of technological and industrial capacity.
Sustainability	**Interpretation of Housing as a product ...**
Ecology as a corporate and business strategy	of environmental thinking, systems thinking, corporate ecological strategy, and technical-productive sensitivity.
Consumption of sustainable products	of environmental, business, political, and social sensitivity:
D4S	of environmental, creative, technical-productive, and organizational sensitivity.
Political and urban strategy	of political and social awareness means for urban dynamics and renewal.
Social Innovation	of environmental, social, and political sensitivity: an environment conducive to social cohesion.

Source: own work.

Figure 3.2 shows a map of the elements of industrial design that contribute to the sustainable manufacture of housing in Colombia. The identified elements are related: six (6) vectors: environmental thinking, feasibility, morphology, ergonomics, communication, and market; six (6) points of intersection or encounter between vectors; 10 groups of aspects related to design, 40 sub-groups of design elements and 205 design elements applicable to housing.

Conclusions

Design is essential for planning and responsible use of the planet's resources. Design is due to experience, use, and consumption. Consumption is a culture of freedom (Julier, 2015). "The notion of freedom translates into social and human development" (Cardona & García, 2018, p. 101) and influences the social and political understanding of the responsible use of the planet's resources while adapting to human needs. Design is a strategy for human adaptation.

   The main aspects identified are:
   a)   Theoretical. Insufficiency in the specific theory of industrial design.

b) Technical. Lack of design instruments for the materialization of manufacturing

c) Productive. Lack of inputs for industrial planning and production under conditions of environmental sustainability in manufacturing.

d) Market. Acceptance of product that contributes to environmental and social sustainability and the increased demand.

The opinion of key stakeholders was identified: 1) uncertainty, pushing design, and extreme creativity create prejudices in public (concerns related to earthquake resistance, durability, acoustics, temperature, maintenance, and safety); 2) an increasingly manufactured urban landscape is perceived and, above all, is expected to be increasingly sustainable; 3) there is an increase in proprietary knowledge, technology transfer, optimization of supply chains, and improvement of the industrial organization's value chain.

Housing is a product not restricted to a specific territory; aspects such as materials (their life cycle, level, ecological order, and ionization), paints and finishes (their breathability, ease of maintenance vs. durability, emissions, and toxicity of pigments and binders), ventilation systems, energy consumption, sound insulation and thermal (asbestos and fibers that become suspended particles and dust), treatments and derivatives of wood and textile coatings, are critical issues to study their possible and potential damage to human health (De Garrido, 2014a, p. 58).

The proposal of technological and aesthetic implementation (manufacturing) may collide with the paradigm (s) of the Colombian media regarding the affordable, the available, the logistically close, and the regulatory possible. The paradigm breaking is inherent to the design, it is its goal, and the construction model of the conventional house is a paradigm that must be overcome.

The wellness of the human being exceeds the physical, metabolic, and social. Perhaps the term "Meta-housing" is adequate to continue this study. The goal is not Aristotelian but superlative (that goes beyond). The term is aimed at overcoming the Product (the materialized), goes beyond the Object (relationship with the user and the environment), and seeks to be consistent with human experiences: sensations, emotions, enjoyment, yearnings, and possibly imaginary, in general factors that stimulate, reduce or amplify the living of the human being (Punset, 2005; De Garrido, 2010).

Figure 3.2. Integration of elements of industrial design that contribute to the sustainable manufacture of the product Housing in Colombia
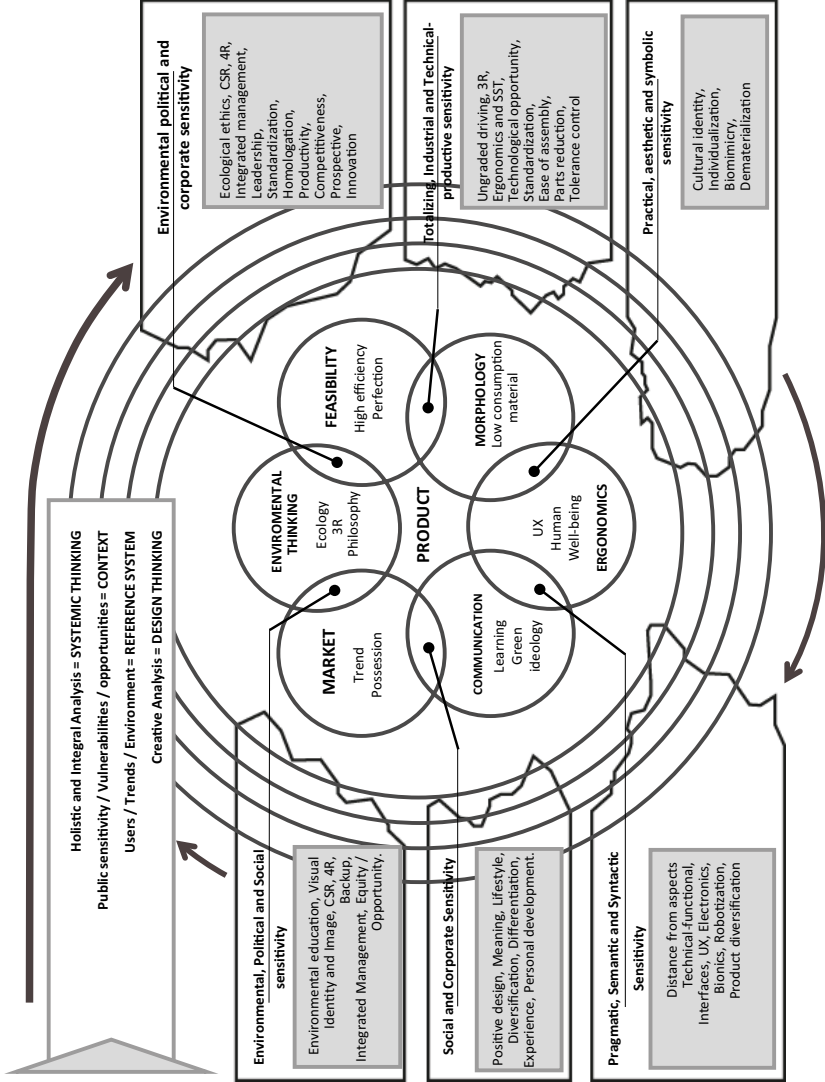
Source: own work.

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The Water Potential in the Design of the Territory. Three Cases Compared

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This chapter develops an analysis on three design experiences carried out as a research group within the Department of Architecture and Urban Studies of the Politecnico di Milano following the positive outcome of participating in three tenders funded by the Cariplo Foundation on the territory of the Lombardy Region.

Starting from different requests and contexts, the projects find a common matrix in enhancing the potential of a territory related to the environment, through the recognition of ecological corridors, rivers, parks, and protected areas as a new connective system of territorial relation, in containing the consumption of soil, in proposing and redesigning a network of sustainable mobility, in underlining the historical features of the landscape as elements of essential identity.

The research were an opportunity to redesign pieces of territory through the water. While responding to different requests and referring to different contexts, the three projects find a common goal in enhancing the territory's characteristics. The watercourse is recognized for its ecological value as an environmental connector and for designing around it the promotion of ecosystemic instances, limiting soil consumption and tracing sustainable mobility networks, highlighting historical features of the landscape as essential elements of identity.

Multifunctionality, interdisciplinarity, and transcalarity are the keys to understanding the three projects that work around the theme of water.

In the first case, it is a fluvial redevelopment masterplan that assumes the Lura River as a resource for landscape enhancement and the containment of environmental degradation in the traversing stretch of Saronno town. Attention is paid to the fruitive aspects; public open spaces are defined, and a cycle-pedestrian path which, together with the torrent, constitutes an element of connection between the city and its periurban green areas.

The second case also structures a river redevelopment masterplan as a system of actions to enhance the open spaces in the Livescia River sub-basin. The purpose of the ecosystem recovery of the fluvial corridor and its continuity offers the opportunity to combine three municipalities, identifying critical nodes and valorizing the existing ecological realities.

The third case is a feasibility study for a new waterway, Canale Dardo, between the Villoresi Canal and the Naviglio Grande, as a concrete opportunity to create a naturalistic, hydraulic, and landscaping ecological connection. Through the renewal of degraded periurban areas, the promotion of ecosystem values strongly compromised, and the attention to the quality of the anthropic and natural landscape, the study is interdisciplinary thinking on the insertion of new infrastructure.

Introduction

Designing a territory shows a particular affinity and usefulness in its being associated with the theme of water. The scientific literature on the subject underlines the value of green-blue infrastructures. Water is an undeniable potential, offering design ideas for urban public spaces, open spaces, and landscapes. However, the most current and necessary interest in sustainable contemporary planning is given by the possibility of enhancing the virtuous symbiosis that, through the project, can derive from the relationship between green infrastructure and water. The opportunity to work on: ecological processes, biodiversity, the protection of what the regional planning already maps, recognizing an environmental value is created, developing ecological corridors, protected areas, community interest areas, and also working on territorial criticalities and fragilities. The exponential increase in urbanization, the end of a heroic industrial period, and the political gaps in environmental management have left profound signs in the territory.

Green, open, permeable spaces are residual (Clement, 2005) and destined to be absorbed in the urbanized areas that aggregate each other along the main connection arteries. In the same way, the natural watercourses, which should have a protection zone, have been used by industrial systems, diverted, and forced into covered concrete and artificial beds, wasting the ecological potential.

The contribution, centered on the role of water in the development of green infrastructures, regards different contexts: the torrent and its redevelopment in the urban fabric as a possible reconnection of a river park; the torrent and its connective capacity to recover and enhance the open spaces of its sub-basin; the possibility of assigning an ecological-naturalistic and fruition-landscape (not specialist, not functional) value to a new waterway.

All three experiences are research funded by Fondazione Cariplo following the positive outcome of a competitive tender and were carried out by a multidisciplinary research group of the Politecnico di Milano led

by Michele Ugolini. The three works had the support of the bodies involved in the specific territorial study and obtained positive and concrete effects on the urban planning of the interested municipalities.

The peculiarity of these experiences lies in the fact that they simultaneously have been able to range over a wide array of themes with a strong interdisciplinary approach. As a feasibility study, the works could respond to regulations or laws defining and delimiting their field of action without responding to regulations or laws defining and delimiting their field of action.

Breaking the rigid planning sector with which we usually act (traffic plans, cycle-pedestrian mobility plans, recovery plans, municipal regulatory plans, etc.) was possible by spacing and mixing various investigation and project levels and layers. Another peculiarity is that of subverting the relationship between plan and project by inverting it: to have used design exploration as an element capable of verifying and suggesting the assumptions necessary for planning.

These two starting methodological conditions (which we set ourselves as a working group) allowed us to start an effective multidisciplinary path with potential coordinated relapse capacity on the various planning levels.

Moreover, it made the planning choices more impressive. In the river redevelopment Masterplan of the Lura torrent in the stretch of the crossing of the inhabited area of Saronno, the consequence took place directly on the definition of the Territorial Government Plan (PGT), which has resumed directly, giving it mandatory and regulatory value, the definition of specific areas of transformation along the Lura torrent, called ARU (areas of urban reorganization and redevelopment along the Lura as urban redevelopment area. In the second experience, one of the most significant effects is linked to the semi-abandoned industrial area called Bombix from the early 1940s, located in Cadorago. The local PGT provided for the complete demolition of this considerable architectural interest site to replace it with a modest and anonymous subdivision plan of residential buildings. In this case, the design prefiguration allowed us to verify the possible spatial and organizational alternatives. It showed that the safeguard of the leading architectural features of the industrial plant was compatible with a transformation of the area and with a multiplicity of new functions to be inserted, which will allow revitalizing the place and preserving its memory and identity. It also showed that from an environmental, ecological, and landscape point of view, it is possible to recover the confluence between the Lura and Livescia streams in the open air. These prefigurations have become mandatory through a specific variant of the PGT and have been collected in a specific plan that regulates the vast Bombix

The Water Potential in the Design of the Territory

area in a completely new way. The study was the possibility verification of bringing the confluence between the two streams, Lura and Livescia, back into the open air. Landscape, environment, and river ecosystem can rediscover that lost symbiosis. This specific proposal has been included in a special plan that regulates the Bombix area and constitutes a variant of the master plan.

About the Dardo project, the feasibility study will be acquired by the administrations of the eleven municipalities involved, whose territories are affected by the passage of the new canal, safeguarding them from the risk of other future and different transformations, ensuring the ecological connectivity linked to the design of the new waterway.

Methodology

Recent projects belonging to a shared contemporary panorama can confirm the different values of water: the potential to perform ecosystem and ecological services, to transform and reconvert large portions of urbanized territories, abandoned and polluted, to mitigate the fragmentation of the territory, opposing the isolation of still environmentally relevant parts.

It is worth emphasizing an interesting aspect that a waterway manifests in its being considered a potential green infrastructure: its unidirectional development, "passing" conformation, and "crossing" different territories. These characteristics allow us to immediately set up a multi-scale design that exploits the "binding" force of the water presence: the territorial one, with the benefit deriving from non-sectoral planning and not linked to administrative boundaries, the detail one linked to the study of places and the definition of the most suitable ecological strategies. Another important theme is the need to conceive a green infrastructure and the territorial transformations connected to it, based on ecological-environmental values, with specific attention to the implementation time, framing them within a medium and long design period. The ecological and water aspects linked to the morphology of green infrastructure are synergistic to be considered potential routes of territory use. On the one hand, it is associated with sustainable mobility planning; on the other, it suggests an informed and guided touristic way of exploring the reference context. These analytical and design features define the need to shape a multidisciplinary and multifunctional project in which the ecological, hydraulic, and user-friendly connective value expresses the importance of a non-sectoral and non-specialized thought. The need for the project to establish efficient relations between urban space, rural context, and natural resources is highlighted.

All researches are based on the study of the actual planning tools, from the regional to the municipal scale, of the landscape protecting and safeguarding tools and the projects in the areas concerned. Moreover, a direct survey allowed us to verify the context to which the torrent is related. Further attention was paid to the historical transformation of the territory, starting from the first available documents useful to read the context through maps and historical land registers to understand its changing and the origin of its structures and signs, identifying elements of permanence and invariance, for this which has changed over the past four centuries, as seen in Figure 4.1.

Figure 4.1. Mapping the historical transformation of the territory from 1721 to 1980 following the existing cadaster maps: changes and permanences
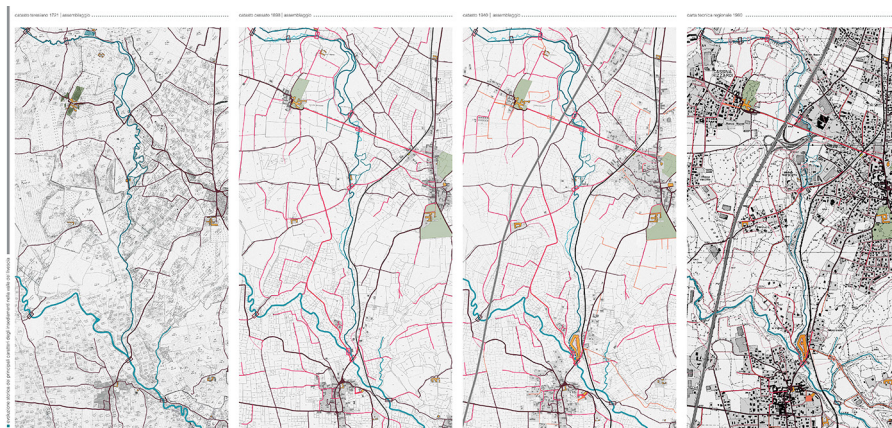
Source: own work.

Green system projects related to the presence of water required analytical thinking on methods of approaching water, on the possibility of reaching the torrent, on the role, the physical and dimensional consistency of the banks, on the vegetational presence –declining a physical, visual or denied access–, mapping fenced areas, public and private areas, as seen in Figure 4.2.

Multifunctionality, Interdisciplinary in a Trans-Scale Methodological Mutual Link

The possibility to transform a waterway in a green infrastructure means to consider, according to Benedict and McMahon a multidisciplinary approach.

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The connectivity intended as ecological issue is a long-term sustainable strategy. A balance between conservation and development.

The projects presented represent, methodologically, constant comparison with the context in which they are inserted. We assume the territory rich in signs stratified over time in continuous change, with its potentials and criticalities. Designing acquires a directing role of knowledge and disciplines that necessarily intersect in the process of transformative strategies. The project has the catalyst and unifying role of this articulated process of knowledge.

It is an interpretative and analytical procedure of knowledge never as a priori but in continuous evolution with the development of the project in a constant back and forth. Designing a new waterway or redefining an existing one, whether natural or artificial, requires a trans-scale and multi-objective project, as it entails configuring a relationship system. A waterway interfaces with the specificities of hydraulic engineering, mobility, the landscape, the environment, the ecosystems it passes through, agriculture, and the social and historical context. The constitutive territorial scale of the waterway is welded to the detailed one, and all the intermediate scales in the transversal and punctual definition of its section and the reconfiguration of the contextual specific relationships: efficiency of the irrigation system, qualification of agricultural open spaces, new paths for sustainable mobility, enhancement of the natural and anthropic landscape, development and protection of ecosystems through the creation of wetlands, integration and selection of vegetation, improvement, and creation of habitats, protection of fauna through the identification of guide species and introduction of barriers and faunal passages, protection, and implementation of ecological corridors, to mention some concrete actions.

According to the Schiaffonati words,

The Italian context sees a prevalent approach to the design of infrastructural systems that is titled towards engineering logics, […] Accordingly, the mitigation project seems to refer only to what surrounds the infrastructure and turns into a mere cosmetic operation. (Schiaffonati, 2016, p. 17)

and it is true, considering the artificial waterway obviously, but also a river, intended as a hydraulic and hydrogeological matter.

To complete the method framework, it must be added that the design process with which all three projects are structured consists of several phases:

- The first phase of elaboration and co-planning aimed at defining a shared vision. In this phase, some project hypotheses

were investigated through interviews and audits of various technical and institutional actors (municipal administrations and specific offices, water resources, agriculture, urban planning, public bodies, parks, and protected areas, etc.) and the associative world from which the first ideas emerged.

- The second phase of interaction with the East Ticino Villoresi Consortium leaders, one of the leading institutions governing the irrigation and reclamation of agricultural land in the Lombardy Region.
- The third phase of actual interdisciplinary project development involved structured personnel and professionals from different curricular backgrounds.
- A fourth phase of the elaborated project hypothesis presentation and dissemination to the municipal administrations, the Bodies, and the Associations through a Services Conference, which has acquired useful contributions for the subsequent phase's development of elaboration of the work.

Lura as New Livable Urban Water Line in Saronno

The study area is located in Italy (Lombardia region), within the territory of Saronno municipality, in Lura Park, which stands between the cities of Milano and Como.

A particular methodology was studied with which the sequence of open spaces was identified, in the belief that enhancing a river within an urban context could constitute a form of natural regeneration and offer the opportunity to design habitable and welcoming places facing the water.

Generally, the peri-urban and urban areas near the rivers are destined to assume ever greater importance related to sustainable city development, reducing pollution, improving energy balance, and unifying landscape design. The research's general objective is to demonstrate how a system of open urban and peri-urban public spaces located along a river can be urban quality generators as well as landscape, environmental and ecological ones and how their continuity can restore a river corridor. The master plan aimed to guide the Park into the city through the river; the project proposes a virtuous and long-term integration between nature and artifice, between outdoor living places and places where the stream and its ecosystem draw the edges within which the man and his actions can enter.

The methods are multiple: the re-classification of urban spaces according to their eco-systemic potential (core areas, green corridors); the selection of additional surfaces potentially related to the green infrastructure functions; the definition of technological solutions and materials (artificial and natural) for their environmental recovery (impermeable surfaces, horizontal and vertical, bare soils); the provision of management practices of green spaces (urban gardening, urban agriculture, urban farming) consistent with producing new, artificial, nature conditions (Regillo, 2016, p. 16).

Figure 4.2. Mapping the water system, kind of banks, the relationship between the river and the man
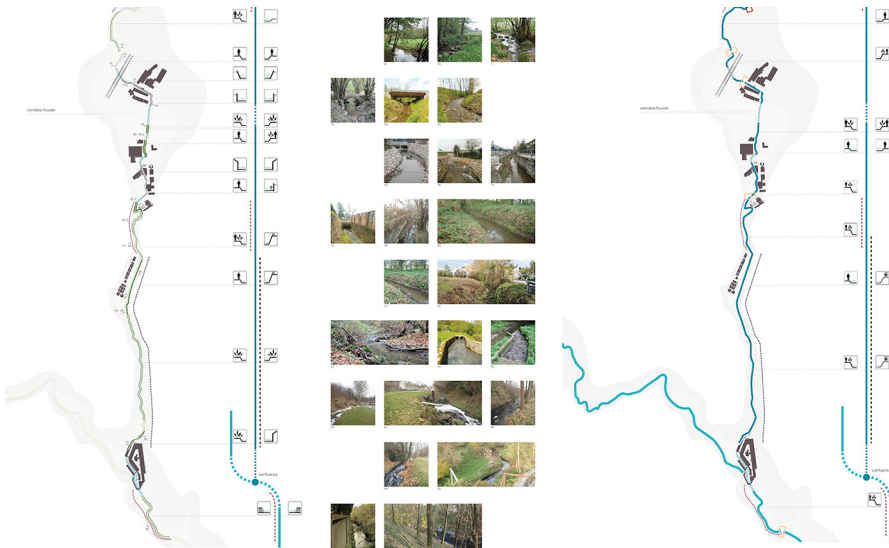
Source: own work.

From a naturalistic point of view, the Lura River ecosystem crosses the Municipality of Saronno from north to south. In the Park, it is particularly heterogeneous and rich, while in the highly urbanized sections, the watercourse is impoverished, being forced between concrete walls or, for some stretches, completely underground. In this way, the river's self-purifying capacity and the function of ecological corridor between areas of high biodiversity are altered. Therefore, the inhabited center currently represents an element of ecological fragmentation where it is necessary to urgently intervene to redevelop the degraded areas and safeguard the interconnection gates still

present along the river and in the peripheral areas. The need to evaluate the functionality of the ecological corridors, untouched by the urban expansion of the last decade, emerges, establishing fundamental strategies of protection and strengthening in those areas exposed to the risk of artificialization to guarantee the continuity of the green system of the Lura Park, in defense of maintaining a balance in terms of compatible environmental loads.

The masterplan has defined a new design of the Lura waterfront in the 4 km crossing Saronno town, renewing the river-city relationship, improving its accessibility and its recognizability, constituting a continuous system of urban green and open spaces with multipurpose features, reachable and usable thanks to an integrated network of routes for slow mobility. As seen in Figure 4.3, some guidelines have been outlined that can assume the overall homogeneity features of the spaces and, at the same time, to grasp, reveal, and define, up to the small scale of the furnishing project, the peculiarities that each area proposes as its own, reinterpreting time by time the theme of the relationship with the river, as a possibility of places differentiation.

In some situations, where it was possible, pedestrian and cycle paths along the riverfront were proposed, directly related to the artificiality of the stream banks and the city that overlooks it, with the natural condition of the riverbed and its water.

Figure 4.3. Some guidelines for overall homogeneity

Source: own work.

The Water Potential in the Design of the Territory
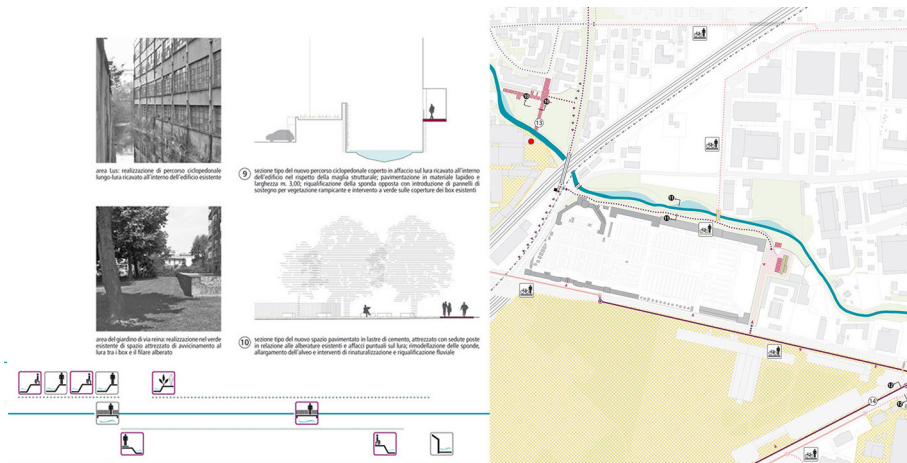
It has yet to be renounced to face the subject of the river, even in its most difficult degradation conditions. In some cases, the river was covered underground, bringing it to light and significantly changing the character of the surrounding places. In other cases, it was not possible to recover the open physical condition directly, even symbolically recalling its presence with signs of water on the surface. Sometimes, where it was not directly accessible, the design work was carried out proposing the recovery of privileged points of view from which it was possible to look at the waterway, catching the opportunity to give back to city green areas or urban squares qualified.

They are spaces in which the intervention aims to realize a new and different connection between the historic center and the river, the periphery and the park, to obtain another way of living and inhabiting public spaces. Therefore, the future of these areas is not entrusted to the simple safeguard from the building but to the recognition and consolidation of high public and social value as well as landscape and ecological value, studied in detail as seen in Figure 4.4.

Redevelopment Master Plan of Livescia River

Containment of landscape degradation and land consumption in the valley of the Livescia River are among the objectives of the master plan, starting from a study and mapping of all the open spaces of the municipalities crossed by the Livescia torrent. Together with this, the aim was to create a shared strategic scenario for the redevelopment and enhancement of the open areas of the sub-basin. The study was co-funded by the Cariplo Foundation, supported by the Como Province and the Lombardia Region, D.G. (General Direction) Environment, Energy and Sustainable Development, in partnership with the Municipalities of Cassina Rizzardi, Cadorago, Fino Mornasco.

The research takes part in the "Olona-Bozzente-Lura River Contract," aiming to the eco-systemic recovery of the river corridor.

Some specific in-depth studies have been prepared: one on the confluence of the Livescia stream and the Lura torrent within the former industrial area Bombyx in the Cadorago Municipality, discovering it and enhancing its contextual peculiarities for years covered by the now-abandoned factory; one within the Municipality of Cassina Rizzardi, on Villa Porro Lambertenghi and the relevant open spaces as a historical sign of the territory linked to the Livescia torrent.

The main aim of the research was the protection and continuity of the river corridor. By identifying some critical nodes, actions were promoted,

within the redevelopment masterplan, to report the centrality of the issue of safeguarding watercourses in the policies implemented by local administrations. A supra-municipal design reading has allowed us to highlight some critical issues, such as the welding of urbanized parts, the construction of essential infrastructures such as the A9 motorway, a new and invasive articulated road network, and to draw up a whole project for the river areas protection. The torrent and its natural and landscape potentials have represented a lively engine capable of triggering a system of relationships of paths, re-developable areas, buildings, or open spaces to which an identity needs to be reassigned. The waterline of the Livescia becomes an opportunity to design its valley belt and the whole neighboring or connected territorial system.

Figure 4.4. Designing open public spaces along the river
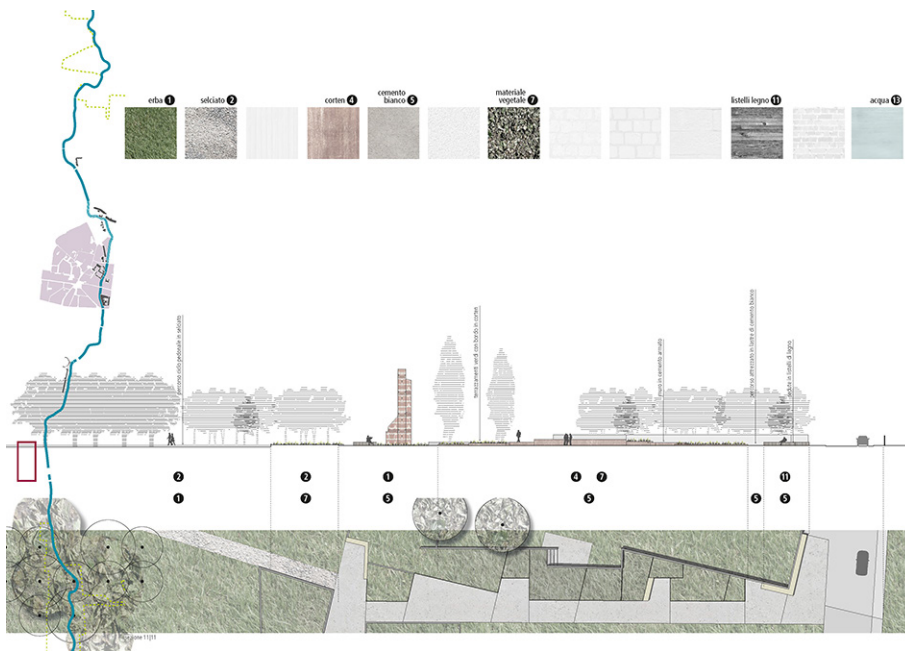
Source: Graphic elaboration by the authors

The mentioned objectives relating to all urban and periurban residual open spaces and especially in the river area, fall within the specific interest of the Territorial Development Framework Agreement of the "Olona-Bozzente-Lura River Contract," which provides the redevelopment of water and

river areas through complex and multi-purpose projects. It was a matter of restoring naturalness and space to the river, making it the central element of the urbanized territory, enhancing the characteristics of the context by the fruitive aspects, and establishing connection elements with the various ecological realities present or planned. The need to evaluate the functionality of the ecological corridors that have remained intact since the urban expansion of the last decade has therefore emerged, by establishing protection and enhancement strategies in those areas at risk of artificialization that are fundamental in the continuity of the Lura Parco green system, in defense of maintaining wide gaps in the built environment and a consequent balance in terms of compatible environmental loads.

In setting up a green infrastructure around the environmental recovery of the Livescia valley, the node of the confluence of the two rivers, Lura and Livescia, of which historical maps reading made it possible to trace the shape and the characters, in their naturalness, was particularly important until the early twentieth century.

In the last fifty years, the two torrents have undergone substantial modifications and a progressive loss of that natural character of which they could still be witnesses. The urbanization of the 40s, with the construction of the Bombyx industrial complex, captures an economic potential in exploiting the valley terminal, the presence of water, and the railway line. On the other hand, the natural landscape of the Lura and Livescia valleys changes completely at the base of the hill on which Cadorago stands, covering a conspicuous stretch of the river and their confluence. The area enclosed by the sides of the valleys, by the presence of the railway and the road that connects Lomazzo to Fino Mornasco, is one of the most complex, heterogeneous, and articulated nodes along the Livescia. The Lura and Livescia streams have a fundamental role in defining the ecological and environmental heritage of the territory and, in the consequent mapping of the Province Coordination Territorial Plan (PTCP), as a tool for protecting and safeguarding the Como landscape.

The emerging aspects of the provincial ecological network fundamental elements are the Lura torrent, classified as Second level biodiversity source acting as a hinge of the ecological system that is articulated from the north, in the Bulgarograsso territory, to continue in the Lomazzo territory heading south and branching eastwards, towards Cermenate through the passages defined as ECS (Second Level Ecological Corridors). The area has a naturalistic-environmental-landscape interest of strategic importance because even though it is an urbanized area, it is part of a territorial context to be pro-

tected related to the two torrent ecosystems. A safeguard theme for restoring ecological continuity is reopening the two streams in the now-buried section below the Bombyx plant. As seen in Figure 4.5 and Figure 4.6, all the requalification interventions are in the masterplan framed within this design mode.

Figure 4.5. & 4.6. Transforming the node of the Bombyx industrial site: before and after discovering the confluence of the rivers
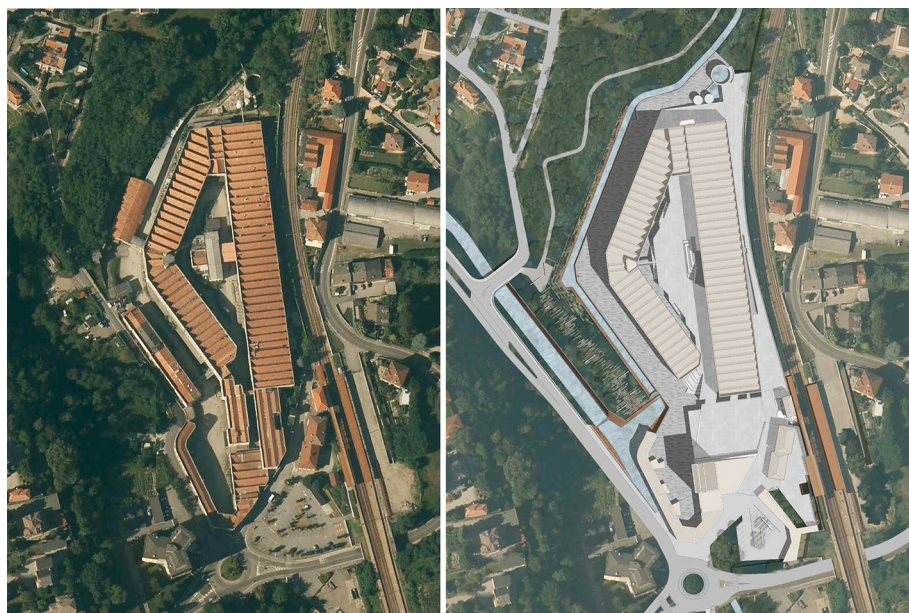
Source: Graphic elaboration by the authors

DARDO Working Waterlines. An Ecological Hydraulic and Fruitive Connection between the Villoresi Canal and Naviglio Grande

The work is a feasibility study for designing a multifunctional, naturalistic, ecological, hydraulic, and publicly usable connection, selected within a funding call of the Cariplo Foundation dedicated to the theme of "ecological connections." The proposal was selected and was developed in close collaboration between the Consorzio di Bonifica Est Ticino Villoresi, an important institution for the irrigation management of the water system of Lombardy (Navigli) and Politecnico di Milano, in particular a research group of the Department

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of Architecture and Urban Studies. The occasion arose to solve the need for water in the southern areas of Milan, essential to maintain its agricultural vocation. The main purpose was to design a large portion of the territory through the water, drawing a 21 km long DARDO Canal between the Villoresi and the Naviglio Grande ones, also outlining a new ecological corridor with an average variable section of 300 meters, where we developed, in addition to a hydraulic connection, a connection for the public fruition that innervates the territory by gathering its broad potential.

The Naviglio Grande, the oldest of the great Navigli system and, since the Middle Ages, source of the agricultural and commercial wealth of Milan and its territory, still maintains a fundamental irrigation character. Through time, in the long flow of its waters from Ticino to the heart of Milan, it acquired an important ecological and environmental value as well as a public one, linked to leisure and tourism to discover the landscape features of the periurban agroforestry system. The Villoresi Canal, conceived by Eugenio Villoresi and completed at the end of the nineteenth century, is the last of the great Navigli system. It was built essentially for irrigation purposes and is still the backbone for the irrigating of the agricultural land in the north of Milan. With its 86 km, it runs in the west-east direction, coming from the Ticino waters (Panperduto dam) and reaching up to the Adda river, flanked by a cycle path that connects the system of the Lombardia river-parks transversely and making the canal, as well as a powerful hydraulic infrastructure, also a precious ecological and environmental connection, a landscape way, framing in the green V'Arco Villoresi system. The primary aim was to confirm the multifunctional nature of the connection in all design choices derived from multidisciplinary analysis, as seen in Figure 4.7.

Figure 4.7. Three-way of reading the territory
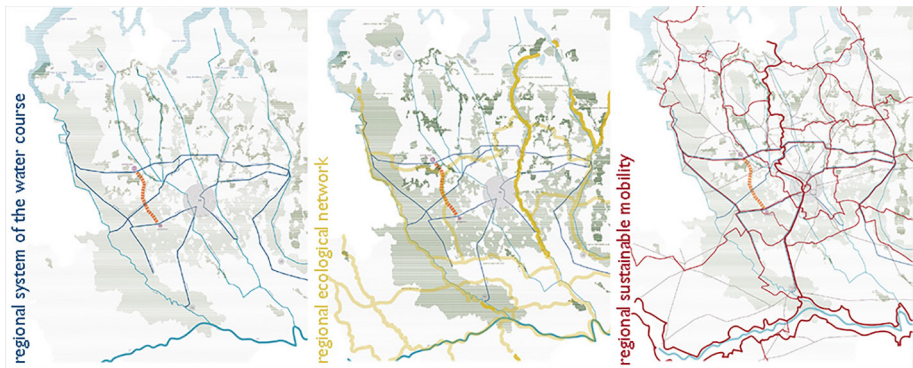
Source: own work

More specifically, we tried the following:

- to strengthen the system of Regional ecological connections between the territories located to the north-west of the city of Milano and those to the south-west;
- to counteract the intense soil consumption in environmentally prized but already infrastructured areas in Milano's west part.
- to support the important agricultural vocation of the southern territories of Milano, giving enough water.
- to link the important and crowded cycle paths of the Villoresi Canal and the Naviglio Grande (green-blue ring) and to extend the network of local routes in a north-south direction.
- to connect the Eurovelo 5 route (London-Brindisi) to the west of Milan with the Vento Eurovelo 8 (Cadiz-Athens) route: from Como to the Villoresi Canal and from the Naviglio Grande up to the Naviglio Pavese and the Po River.

Despite being an intensely built place, the studied territory is dotted with important naturalistic areas. These protected areas represent a series of different environments, and they can support and attract various animal species (permanent, migratory, nesting). Implementing effective ecological networks occurs by reconstructing multifunctional green infrastructures associated with agricultural areas.

The project defines a wide and long ecological corridor (DARDO) that runs on one of the main paths of the Ecological Regional Network. Inside this corridor, the project's buffer is pinpointed with an average width of 300 meters (length 21,5 km) to favor the reconstruction or the permanence of environmental unities. Hedges and rows–linear elements of vegetation–together with masses and wooded strips are an outstanding presence in the agroecosystem.

As well as constituting a path for animals that shun open spaces, they are shelter systems for organisms moving through the surrounding matrix, represented by cultivated fields. Above all, the narrow corridors are frequented, by the typical open spaces or margins species. At the same time, hedges can host the species most closely related to shady environments and generally a richer and more complex living community.

In the project buffer, defragmentation interventions, such as under-ground passages and mitigation elements for the fauna, concretize the continuity of the green in the presence of transversal infrastructures. The conformation

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of the wetlands and the introduced basins includes banks with gentle slopes and steps of different depths easily colonized by wild flora and fauna. These habitats favor the reproduction of the amphibians and are suitable for nesting and feeding of flora and fauna.

The DARDO project buffer is associated with a section profile canal that fulfills all three connections within itself: the ecological-naturalistic, hydraulic, and public-usable ones. The section, as seen in Figure 4.8, proposes, along the entire length of the canal, also in correspondence with new bridges, two shrub bands of ecological continuity drawn by different widths and a permanent band of ecological continuity for fish characterized by a *savanella* as a smaller riverbed during the winter months. Here, some stones are placed to constitute elements of slowing down the current, allowing shelter for the fish. The higher jumps, which characterize the course of the canal, are equipped with ascent stairs also designed for fish. All the new bridges along the secondary roads, farm routes, and pedestrian/cycle lanes are equipped with animal passages to ensure ecological continuity in the east-west direction.

The new waterway alternates between stretches of trenches, and pensile stretches and runs for a long time following the traces of the existing canals and only partially on new lands. From the hydraulic point of view, it is important to underline how the multifunctional methodology allowed set up the water flow of the new canal to revitalize the historic irrigation system of the springs, called 'fontanili,' no longer active due to the lowering of the groundwater level caused by the processes of urbanization that led to a high-water intake and by the construction of the North West Canal (Canale Scolmatore di Nord Ovest, CSNO).

Figure 4.8. Section containing the multidisciplinary approach
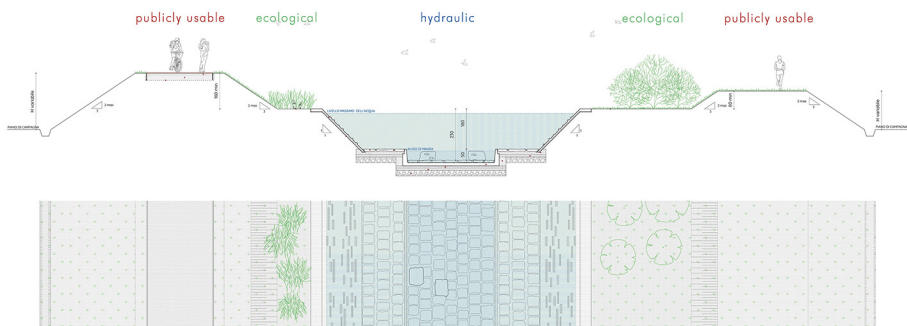
Source: own work.

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Design in Chaotic Territory. Collective Design of Public Space in Latin América

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Is chaos a bad thing? Latin America is chaotic. From native civilizations to present modern states, our territory was the center of many political disputes. The result is a constant cultural, economic, and social palimpsest. That superposition reflects directly on our territory in both chaotic but participative and democratic ways. Is chaos the reflection of a compromised population? If that is correct. Should Politicians work from the daily chaos to develop the territory as a constant field of action? Collective design methods in terms of public politics are powerful tools to approach a real solution to everyday problems in Latin America. By taking advantage of the actual chaos and working on genuine needs, "Chaotic design" proposes open and collaborative tools as an alternative to the outdated and canonical traditional urbanism.

Is chaos the way to real democratic public politics?

Introduction

Urban space is the field of action of human beings. Here is where the production and consumption of products and services interacts with people creating a social collective contruct. This is the center of all actions and is subject to their life scenarios' construction and deconstruction factors. Many factors, like geography, politics, society, economy, and technology, affects it. This factors are not frozen, vary all the time and differ from every individual, making the urban space a collective social construct, a field of action in constant change. This aspect cuts across humanity, and Latin America does not escape from it. Latin America presents particular aspects influenced by the presence of biculturalism or polyculturalisms accentuated by massive migration movements from ruralities to urban centers, social inequality and new comunication technologies that make cultural niches even more fragmented and contrasting. This is where chaos appears, and it is the state that must be present in its interpretation.

Methodology

This work is approached from a theoretical analysis of the Latin American historical context in constructing its territory. It is based on characterizing the current state following its material manifestation in our continent. This concludes and poses challenges for designers and authors of public policies. We discuss possible architectural approaches to those problems via a selection of some transcendental writings. This aims to know not only the latest theories but also those thoughts that molded the actual research of the discipline. The selection criteria were based on its representative analysis of the historical cosmovision and its disruptive comment. As well as the contemporaneity, this research provides multiple approaches to the state of the art. The reader is the one who judges and decides. That action and its critics are the real expected results of this paper.

Results and Discussion

Chaos is a long-standing vector. Being able to rethink the territory and the public policies that manage it by accepting its existence is an inescapable social commitment. Latin America has been characterized by the struggle and the superposition of cultures from the continent's domination to the present. With dissimilar social constructions (from family to community order) and conflicting religious aspects (from polytheism to monotheism), the various natives were induced to renounce their values. This was immediately reflected in its territory. The preexistence was modified and whipped by the logic of the power of the day. That power determined the root of the destiny of Latin America. The development of the times brought intercontinental and rural migrations. These movements went to large metropolises and urban centers with industrial and technological developments. The devastating result is an expanded metropolis with high polarization of social actors and territorial fragmentation. The contemporary city thus presents a pattern characterized by networks and nodes stressed by chaos. In this context, the solution to socio-territorial problems must understand the metropolis not as a finished product but as overlapping chaos. Chaos is a tool for democratic interpellation between citizens, the territory, and the region's state. This new paradigm brings us closer to an actual city, accepting the permanent presence of conflict and taking daily management as a fundamental point of cohesion of Latin cities. With this eclectic story based on the struggle between actors,

Latin American culture was configured as a constant chaotic palimpsest with the same result in its material and social manifestation (Figure 5.1). Suppose chaos reflects social tensions and diversity, is this necessarily negative?
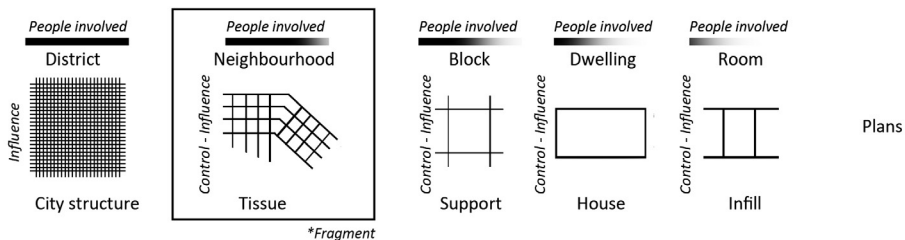
Figure 5.1. Palimpsest configuration of Latin American cities

*1 Natives

*2 Colonization

*3 Migration

*4 Overlap

Latin American Chaos
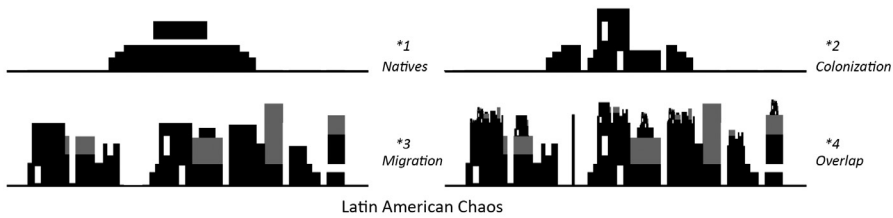
Source: German Eduardo Ferradas

Design in Chaotic Territory proposes plural views to problems between fragments. Working from the state in the search and interpretation of conflicts proactively becomes indispensable to apply measures that work from the specific problems that affect each fragment (Figure 5.2) and strengthen the social impulses that led to that chaos. From this perspective, chaos is incorporated as participation in a framework of order and results in new forms of urban organization that imminently result in new management units to which the state must respond through public policies (Figure 5.3). This approach to Latin social problems is based on the role of the state as a provider of an institutional framework for its correct development. These measures must be accompanied by looks contemplating the decomposition of old paradigms to construct new contemporary consciousness with collective intervention as the axis. The importance of applying policies that contemplate the individual as an active actor lies in generating greater belonging.

Figure 5.2. Urban Fragment definition

People involved — District — Influence — City structure

People involved — Neighbourhood — Control - Influence — Tissue — *Fragment

People involved — Block — Control - Influence — Support

People involved — Dwelling — Control - Influence — House

People involved — Room — Control - Influence — Infill

Plans

Source: German Eduardo Ferradas

Design in Chaotic Territory

Figure 5.3. New Collective Management Units in response to chaos
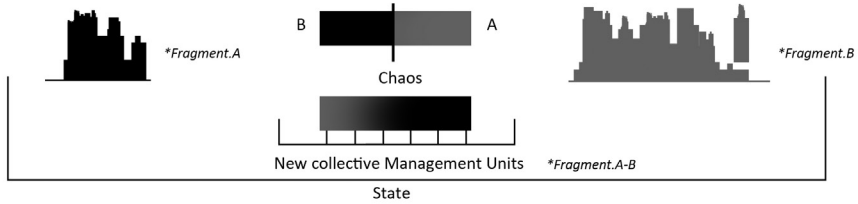
Source: German Eduardo Ferradas

How should designers work from the daily chaos to develop the territory as a constant field of action?

If the city is conceived as a changing field of action, public space must be understood as its material expression. To work on daily chaos, it is necessary to be able to generate open-source structures. Understanding infrastructure as equipment and equipment to support chaos is the basis for generating public spaces citizens can challenge. For true incorporation of chaos as a significant and representative element of contemporary plurality, it is necessary to shed old totalizing dogmas. The project aim needs to change; it can no longer be a mechanism of chaos control as some modern architects, as Adolf Loos (2016) intended with their thoughts embodied in "Ornament and Crime" or with "A house is a machine for living in" concept from Le Corbusier in "Toward an architecture", where functional rationalization and aesthetic minimalism they enunciated in pursuit of a supposed cure of "perversions" and human misfortunes in an ideal of "modern man." "Humanity is healthier today than ever; there are only a few sick people." (Adolf Loos, "Ornament and Crime"). This idea transcends architecture and directly extrapolates aesthetic values to social distances from contemporary reality.

In 1980 Nietzsche said that god died as an abstraction to explain the end of an era. That death of god implied the death of multiple social contructs such as meaning, morals, and reason. The death of God implies the end of meaning, morality, and the reason that modern architectural references like Loos wielded. This rupture of concepts, also developed by other thinkers such as Karl Marx and Sigmund Freud, incorporates notions of freedom and autonomy of humanity both over their bodies and through their territory. The development of science thus incorporates chaos. Nietzsche considers these consequences as liberating rather than debilitating. Neither God, nor meaning, nor morals, nor reason constrains us. We are free to live as we please, to make our lives what we please. We are the authors of our destiny. We are

authors of our chaos, and it does not cure chaos caused by external enemies and worldly perversity. When there is no author, the story does not have a point. When there is no author, there can be no story. If God does not exist, morality becomes illusory, and moral judgment becomes mere interpretation, which corresponds to personal taste.

> The seeming failure of the urban offers an exceptional opportunity, a pretext for Nietzschean frivolity. We have to imagine 1,001 other concepts of the city; we have to take insane risks; we have to dare to be utterly uncritical; we have to swallow deeply and bestow forgiveness left and right. The certainty of failure has to be our laughing gas/oxygen; modernization our most potent drug. Since we are not responsible, we have to become irresponsible" (Koolhaas, 1995, p. 2).

In this framework, where both stability and change are realities in the contemporary built environment, we approach to rethink the discipline around open structures. This reading embodies rupturist theories, where the concept of the author of the work is diluted to make the architectural fact a community construct. Thus, the modern obsession with originality and self-reference is rejected. The "Theory of the Supports" elaborated by John Habraken in his book *The Design of Supports* (1974) and the concept of *Open Buildings* by Frans van der Werf in his book *Open Ontwerpen* (1993) are clear examples of territorial explorations for community design from the field of architecture. These incorporate the idea that the design process intervenes and directly challenges various actors and constantly varies with the evolution of the times. This translated matter is reflected in the generation of structures where the rigid support is limited to the elements whose modification is unfeasible by technical terms, leaving the architectural space freed to the community's work (Figure 5.4). However, how are the actors coordinated to provide joint action and avoid the imposition of the strongest? Coordination and organization become essential points here. These new organizational and management units.

Figure 5.4. Designer's way to approach chaotic design

Source: German Eduardo Ferradas

Design in Chaotic Territory
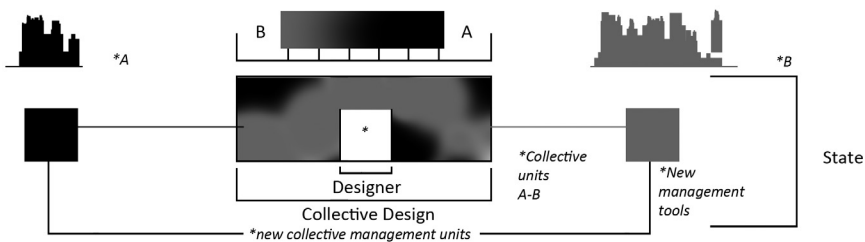
The main tool used by those working in an open building way is organizing the design process and building on "environmental levels." This principle developed by Habraken in "The Structure of The Ordinary: Form and Control in the Built Environment" (Habraken, 2000) represents the revelation of the multiple territorial levels involved in urban processes and determines their degree of participation and interaction.

These concepts are found in contemporary Latin American unprecedented territorial field of action. In a territory characterized by the superposition of layers in a marked cultural and economic social palimpsest, the generation of structures supporting collaborative design under social cohesion becomes state policy.

Conclusion

Is chaotic design the way to real public politics in Latin America? "The modern myth is absurd. The architect never designs on a blank sheet" John Habraken. The idea that the built environment is a product of an ongoing, never-ending design process in which the environment transforms itself is the real deal to archive a responsive contemporary urban territory. Designing from the new paradigm of the contemporary territory makes the task of rethinking design from the chaos that Latin America as a continent has moved and installed essentially. Understanding and understanding its genesis is the starting point for real public policies that contemplate the individual and the community as active actors of their territory. Taking advantage of the actual chaos and working based on genuine needs, "Chaotic design" proposes open and collaborative tools as an alternative to the outdated and canonical traditional urbanism.

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Part II. Identity and Culture

Design of Food as a Space of Creativity and Cultural Interchange

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This chapter presents an activity developed around food design at the Communitary Workshop for Design and Innovation (TaDIC) in Colombia. Taking advantage of the richness of the gastronomic culture of the region, and the traditional culture that surrounds it, we presented as a design activity for a diverse group of people organized by teams, the challenge of creating new dishes, incorporating some of the traditions and knowledge from other regions of the country. The work teams comprised people from the city of Tumaco and others from different places in Colombia. The challenge also consisted of elaborating a proposal for the presentation of the dish and the way it was going to be served. This activity was limited by budget restrictions and the gastronomic resources that were available in the region. As a result of this exercise, they elaborated ten dishes that incorporated traditional knowledge from different places in Colombia, which evidenced great creativity in how they presented and served them. It is found that through the design of the object food, it is possible to promote the interchange of identity and culture of the people, enabling an incredible explosion of creativity in a short time and with minimal resources.

Introduction

Gastronomic richness in Colombia is widely known for its biological diversity of fish and shrimp, flavors incorporated with fruits, condiments, and herbs available in the territory, and for its traditional ways of preparation of food (Ordóñez, 2012). All of it constitutes the cultural identity of knowledge, experience, and traditions surrounding the Pacific kitchen and has influenced other regions of the country (Mincultura, 2017). The Food Design allows prioritizing not only the food but also the fact that it carries all the knowledge, experiences, and cultural tradition that gravitate around its preparation or transformation. Moreover, it is a field that allows incentive people innovation and propose alternatives for the use and consumption of food in a more sustainable way (Reissig and Lebendiker, 2019).

This year we developed the city of San Andres of Tumaco, the *Communitary Workshop for Design and Innovation* (TaDIC), from the 27th of July 12th of August. At this workshop, around one hundred people participated and comprised a very diverse group. Ten work teams were confirmed, each in charge of a different problem from the communities of Tumaco. As one of the practical exercises of the workshop, we proposed a food design activity. In this way, the design exercise presented in this document had as objectives: to contribute to the reinforcement of the creativity capacity; to strengthen the union of the teams; to share as a collective between all the participants, and to explore the cultural richness of the Colombian Pacific region. The design challenge starts before arriving at the workshop, with the prior recognition of the richness of the territory regarding the food. As a result of this exercise, we evidenced that the design of food is an excellent activity to share culture and identity, to understand the *taste* of others, to empower and promote creative capacity, to enable the interchange of knowledge and experiences without fear and selfishness, and to enable the intercultural dialogue through the joy of, not only sharing but also of making and serving food and taste it in community.

The teams were invited to do a sightseeing tour of the emblematic Tumaco places where diverse typical food of the region is offered to achieve a direct approach to the ways of preparation of the food. Walking around the city of Tumaco is possible to find sources of inspiration, such as the wonderful *arepas* (corncake) filled with meat and egg or a soup in the middle of the street being offered to the public for its consumption. Figure 6.1 shows a typical poster that is possibly found walking around Tumaco. Moreover, the offer of popular places for eating traditional food, that everyone is referring to like the ones you *must go* to eating and tasting. For the people to enjoy, for example, the taste of the *encocados* (coconut-based sauce*)* with seafood or the meats condiment and of course the traditional candies. We must recognize that there are many resources inside the territory. For example, coconut it is abundant, so people *live* and feed from the coconut. The coconut is traditional within the Tumaco kitchen and widely used in famous coconut sauces. Shredding, straining, and obtaining coconut milk were some of the proposals for this challenge as part of the preparation. For that, the strength of the coconut sauces emerges as a potentiality of the territory. As we will see, it is not absent from the design exercise and is introduced with some variations. Finally, the diverse expressions of the delivery and the sale of these products at the beaches confronted us with the dignity and quality of the persons in charge of street food selling. The way the locals use the different

food resources in the territory is a source of inspiration and evidence of the people's creativity in a determined culture and context.

The food design activity is aimed at designers, creators, and innovators working on the territory with communities to exalt the immaterial patrimony of the people they work with. For the persons that inhabit the territory, the exercise is a way to potentiate their gastronomic culture, and by exchanging ideas using design with foreign people, it is also intended to promote innovation. In general, we pretend to show that the strength of innovation can also be found in the dialogue with tradition that exists in the communities. Next, we will describe the methodology of the design challenge implemented at the Tadic. Afterward will present some of the results of the exercise. Finally, we will analyze the activity within the interchange of identity, knowledge, and experience between diverse groups, which, in our perception, strengthens the cultural heritage surrounding food preparation.

Figure 6.1. An example of a typical food poster in the territory, which is an inspiration source for the use of resources and preparation for the proposals of the design challenge
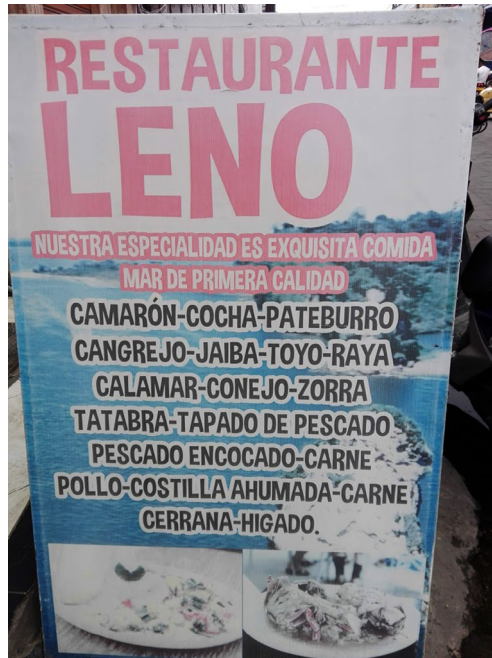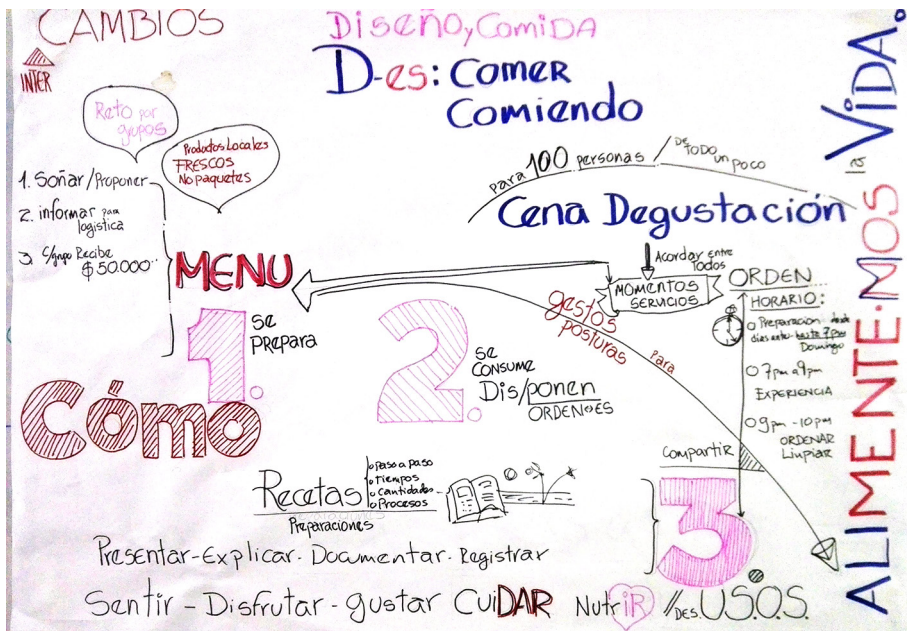

Source: Andrés Sicard.

Methodology

The Tadic workshop was attended by 65 participants, outlining that half were women, 30 persons from the Tumaco communities, and an organizing team of 22 volunteers. There were fishermen, farmers, artists and musicians, community leaders, students from different areas of knowledge, designers, physicists, and professors, forming a universe of knowledge and experiences that was very diverse as well. This diverse group worked to find solutions to problems and opportunities identified within the different communities. At the workshop, ten work teams were confirmed, each in charge of different problems from the communities of Tumaco. The methodology of Tadic is based on design thinking, for which the participants transit through the design cycle to solve a context problem (Yayici, 2016). The workshop is based on learning by doing, considering that everyone is creative and able to use tools or create things with their own hands, can generate proposals for solutions to the problems or necessities of the context, and, more importantly, implement them. During the first days of the workshop, the participants built a diversity of low-cost technologies under the philosophy of do-it-yourself. Those activities aim to strengthen their confidence in creativity and convince them that we can use tools and construct useful objects (Kelley & Kelley, 2019). In the second stage of the workshop, we focus on understanding the context of the problematics; and in the final stage, on building prototypes to solve those problems. With this in mind, we proposed a design challenge surrounding food as one of the activities. We recognize that the experience of the food culture is present in every single aspect of the common life of the Tumaco people and that its action through the hand is present everywhere.

In Figure 6.2. we can observe the diagram that was presented during the food challenge to each of the teams at the workshop. We propose three moments for each group. First, we assigned a maximum of 20 dollars to go and find everything they needed to cook and bring to make a non-traditional product in the territory. They had to create not a traditional food but a dynamic of innovation. We were starting from the dialogue between the value of tradition, its preparations, and the territory's resources, introducing design actions. The challenge was not a competition between different groups but an exercise of knowledge-interchange. They had to use fresh local products, not packaged food, as part of the design requirements. The teams could prepare the food in the kitchen where the workshop was taking place or in the house of one of the participants from the community. The money from the budget was delivered on Saturday night. They had Sunday, as it was

a free day, to buy all the resources they needed. They had from 4:00 to 7:00 p.m. to prepare the food, as at 7:00 p.m., we scheduled the dinner for tasting and for sharing the food created by everyone as a result of this exercise of collaborative construction. As a second moment of the challenge, the teams had to dispose of how to present the food. In other words, the challenge was not only to design a dish but also to serve it to one hundred people. This meant that every participant had to share a small bite of everything. The third moment was to share, present, explain, and display the uses of the local resources and potentiate the eating experience.

Figure 6.2. Diagram presented for the design challenge to the work's teams.

Source: Andrés Sicard

Design must propose and build based on agreements and promote freedom regarding decision-making as the principal action of the designer. In that sense, this exercise couldn't be a series of instructions. The three moments proposed in this design and food challenge gave the participants plenty of freedom to choose the foods and make decisions. Because of the above, the challenge had a great variety of results to satisfy the dining table, as shown below.

Results

The food culture of the territory of the Pacific is very rich in variety. Nine of the teams had as the only place to work the kitchen of the workshop. It is hard to imagine the poetic orchestration and courage of having just one kitchen with four stoves. So, nine teams were battling and conciliating for turns to enter the kitchen and prepare their dishes and achieve results like the ones we are going to present, starting with transforming the workshop tables into kitchen counters, managing food, putting on the table, bringing, taking out, disposing of it, fixing it, chopping it, etc. In a place where everyone with no distinction, no discrimination, and no fears with their abilities brought into the game all the knowledge, wisdom, taste, and pleasure for preparing and presenting their food creations for dinner.

Consequently, this culture had to work as a source of inspiration for creating the different groups' proposals. In some places of Tumaco that sell food, it is possible to find small sharks that are smoked but that are not cooked previously. They are placed next to and or on top of the wooden stove, and that preparation assures the taste and preservation of the food at the territory, which is characterized by its high temperatures and humidity. Table 6.1 shows the ten dishes that resulted from the food design challenge, mentioning each one's name, a brief description, and the type of food. Note that some words of the dishes are not translated into English because they are part of the creative proposal of the design challenge, as is the case of *Ubunto,* which means "I am because we are." Next, we will describe some of them, highlighting several aspects of their preparation, attributes, or specificities.

The group working on food security and sovereignty, named Sabrosura, based its proposal on preparing an uncooked smoked skate ceviche. Usually, they do ceviche of stingray in the territory, but the ray is bought, smoked, and then cooked. For dinner, the stingray was served for eating raw, as it is the traditional way of serving ceviche. In Figure 6.3, we can observe the final presentation of this proposal, where all the ingredients are from the region and acquired at the food market with only the $20 designated. In this proposal, we evidenced a wonderful experience that added to the tastes of other territories. One of the participants was a *Huitoto* indigenous who incorporated into the food the *Caguana*. The *Caguana* is a drink based on pineapple that is mixed boiling into preparation with sweet potato flour and served cold. At the base of the *ceviche*, we found mashed sweet potatoes from the culture of the other two participants from the department of Nariño. The proposal of this team was a hybridization of the gastronomic culture and culinary expe-

rience that was placed in service of the design challenge. In Figure 6.3, are placed all the ingredients. They exhibit some of the inputs used for the preparation, such as pineapple, the disposition of the table, and the use of elements from nature. This placing, disposition, and order are recognized as design actions where the principles of repetition, cultural aesthetic patterns, forms of consumption, and accessibility to some foods are evidenced.

The other proposals also have a mixture of knowledge from different places. Emerging products and presentations such as the one shown in Figure 6.4 named *Santo Cacao*: Slices of fried plantain, mounted with tuna; but not tuna from a can but tuna captured at sea, delicious. This proposal was presented by the team that was building a project with cacao at the Tadic. They prepared a chocolate sauce with the consistency of a paste that enables it is spreading as dressing for the dish to serve and eat it. Outline the nature of the territory, using the plantain's fresh leaves for doing and exalting its food proposal.

Figure 6.3. La Sabrosura, raw smoked stingray ceviche with variations of gapingacho, coconut, fried casabe, and caguana

Source: Andrés Sicard

Design of Food as a Space of Creativity and Cultural Interchange

Another team made a wonderful product combining fruits such as *Carambolos* and grapes. This team wanted to recognize that forms and aesthetics are also present in nature, so there was no need to create beauty but only to exalt it. They Incorporated the *Charuco*, the divine *Viche*, a traditional appetizer with alcohol, to spice up and add flavor to the food product. During the preparation, something that attracted our attention was the details and the finest of putting, with a straw, the appetizer on top of each one of the grapes. *Chontadic* is the name that was given to this product. It seems that the semantic capacity within our cultural abilities has evidenced that the things acquire a dimension by being named and when are taken towards unknown statements and potentiated through those things we can put our heart on.

Figure 6.4. Santo Cacao, bites of green fried plantain with tuna and cacao sauce

Source: Andrés Sicard

Another splendid and delicious dish, with the territory's elements, was a great preparation of a lobster biscuit with cream cheese served as an entrance, with fried *patacones* (plantain crackers) and onion-seasoned shrimps.

Finally, the activity presented the green plantain cakes filled with cheese, made in slow cooking at the wooden stove. They were ready after working all day in the grinding, shredding, mixing, wrapping, and so on. After the cakes were offered aesthetically, we all enjoyed them with the other food creations in our special dinner, served next to a spiritual appetizer, *conspi-arrechón*. A love potion, which is a cocktail based on exotic fruits with an elixir of traditional appetizers, is enjoyed with the sounds of the rhythm of the marimba.

Table 6.1. Dishes from the design challenge activity with food in the workshop

#	Name of the dish	Description	Kind
1	**Chontadic**	A fruit cocktail (Carambolo and skinned grapes without seeds) bathed in *Charuco* drops (distilled artisanal *viche*). Presented on top of fresh plantain leaves.	Charuco cocktail
2	**Cochan**	A duo of tastes between salt and sweet: Shells filled with seafood and as counterweight *cocadas* of the heart (bites of coconut and brown sugar)	Entry and dessert
3	**Santo Cacao**	Bites of green fried plantain filled with fresh tuna, bathed in a cacao sauce	Side dish
4	**La sabrosura**	Combination of territories: a smoked stingray ceviche (without cooking), with a variation of *Lapingacho* (mashed potatoes from Nariño). Decorated with casaba with *Caguana* (pineapple with casaba starch which is a traditional beverage from the Amazonian region)	Ceviche
5	**Conspi-Arrechón**	Love potion: a cocktail based on Borojó juice with an elixir of *Charuco*	Elixir: juice with alcohol
6	**Envueltos**	Wrap of green plantain filled with cheese simmered at a wooden stove.	Wrap
7	**Coctelangostinos**	Shrimps cocktail in green fried plantain *patacón*.	Cocktail
8	**Arroz**	White rice on a bed of strained seafood with brown sugar powder and gum, covered with *patacones* decorated with parsley leaves.	Main dish
9	**bisque**	A *bisque* of lobster and cream cheese, used as entrance for green fried plantain crackers (*patacón*) with squid in onion shrimps.	Cream and side dish
10	UBUNTU	*Charuco* ice-cream	Ice-cream

Source: own work

Discussion

What caught our attention from the first sight of the results was that all the food proposals differed following the same orientations for the challenge. Many variables were not controlled regarding the construction, the orientation, or even the design restrictions for the food design challenge. This shows that the exercise can be proposed with some design requirements, and these requirements will not generate the same solutions, as it opens an infinite number of possibilities.

The different proposals are creations that emerge from the culture, from the representation and the regard of the people from the territory they inhabit. Moreover, they were free to use various natural resources from the Pacific region of Colombia to benefit the creative process. When going out in the search of those resources to elaborate their proposals, the different groups found that the capacity of expression of the people in the territory is enormous and that this potentiates the elements from the nature that are present. As a result, the participants witnessed that these resources were strong enough to construct proposals for the food design challenge they had to solve. From the different suggestions, they designed foods related to products from the region, such as coconut, cacao, shark, shrimp, plantain, traditional beverages, leaves from the area, and so on. These products have a common presence in the culture and identity of the Tumaco region, expressed in the rhythms of its gastronomic richness. In addition, we can observe the great experience and wisdom accumulated from traditions amongst the participants surrounding the preparation of food that was shared to solve the design challenge. The food is transmitted from generation to generation, and the woman has played a fundamental role, from the traditional perspective of the family, in the preparation of food and care of the home. At the design challenge, we saw all the participants work integrally; some participants perhaps broke cultural barriers surrounding the woman as the only actor in food preparation.

In any community, food preparation plays a critical role in the day-by-day, and there is a great compilation of cultural identity surrounding this action. We believe that exercises like our proposed one enable space for cultural interchange without selfishness. Due to accumulated experience and wisdom, it promotes the creativity and the dialogue implicit in the design of the food. This exercise allows the addition of knowledge and traditional wisdom, and experiences from the different participants that conform the teams, showing

that the cultural identity of food is not something fixed or unique but that can be transformed to get better or to give new tastes, flavors, smells, combinations and so on. It is a valuable result of an exercise that used design to produce new ways of approaching and understanding other cultures. Designing new food is not to give up on our culture or identity, but it enriches it and incorporates the good from other forms of action in our everyday life. The global is incorporated through the experiences lived by participants within the different teams. This allows the construction or modifications of culinary identities by enriching their values and lessons learned from other cultures and traditions. Undoubtedly, the culture is inherent to the territory, but this design challenge allowed this local knowledge to reunite with the regional and even the global. The participants harmoniously combine everything to produce new creations by preparing and presenting food.

At the serving, we evidence the discard of ceramic dishes or non-recyclable materials to replace them with leaves. Due to the facility for its manipulation, these leaves can be easily cut and allow a great variety of designs, shapes, and forms of wrapping. This environmental proposal should be maintained and promoted to avoid the contamination of non-recyclable materials and plastic at the beaches. This is a consequence of the cultural design that was not thought of or considered initially at the challenge. In other words, the participants explored new food serving forms, using the variety of leaves available in the region and aggregating color, taste, and visual variety to the foods.

Another important reflection is that the armed conflict has strongly affected the Colombian Pacific. Moreover, it is one of the territories in Colombia with the highest social and economic inequality. Nonetheless, the food continues to be part of their everyday life and emerges as a conjunction of gratifying gestures of celebration, hope, sharing and commemorating special dates. It is a part of the community life that appears in any action, even inside the conflict. Surrounding the food emerges, from time to time, a catalyzing factor that helps to forget, remember, create, dream, and so on.

As a projection towards the future, we could ask ourselves: Can becoming the preparation of food a place where different actors of the conflict can reunite to create through design methodologies new dishes, enabling the ulterior dialog about the things that separate them?

Can the action of preparing food be an alternative for the managing of agreements?

Conclusions

The food design challenge can be seen as a direct dialogue between the act of creation and imagination, mediated by cooking and preparation, to elaborate a proposal that renews the tradition, the cultural knowledge, and the identity of the food. It is a social action that reunites people's knowledge and experiences from local territories, regional and global, surrounding a common interest, feeding us from the sharing action.

The role of design in the exercise is to challenge creativity and imagination, push the ingenious, push towards change, and enable. In other words, the design offers a mediator for the union between the diversity and the great richness of knowledge and experiences in cultural traditions surrounding the practice and the joy of food preparation.

Food design is an activity that potentiates the mixture of traditions, knowledge sharing, and experiences interchange. It promotes traditional cooking and preservation; it produces its enrichment and incorporates new and old preparation processes. Moreover, it encourages the value of diverse ways and gestures to prepare and serve food. Challenges such as this are places for learning-teaching outside the traditional concept of the classroom because everyone participates and gets involved, everyone proposes, and there are no teachers or head instructors. This challenge recovers the value of those who are on the other side, having a clear conscience that they have a universe of know-how, with a cultural capital filled with abilities, technologies, and knowledge that is not always put into the game now of developing a design, or an exercise of creation for the solution of problems.

Finally, we believe that food design workshops within communities facilitate the insertion of politics surrounding the fostering and strengthening of the protection and recognition of the traditional foods and practices that are part of the cultural heritage of the regions. As a complement to this kind of design activities, it can be proposed exercises of taste memories to recover knowledge and flavors that are present only through experience and tradition within the communities, and that are accompanied as well with other cultural manifestations such as the music, preparation, and consumption protocols. Moreover, it could help enhance cultural and biodiversity management capacity with nutritional goals within the communities.

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Adaptation as a Stage in the Production and the Product Design in Colombia.
A Reflection Based on the Experiences of Bogota's First Factory of Pottery, The Salman Industry, and the Metal Industries of Palmira

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This paper deals with aspects of manufacturing products in Colombia that have been linked to the adaptation of foreign forms and designs for local production. In this study, historical analysis is used as a tool, taking as an example the experiences of three large factories located in our territory at three different times: at the beginning of the 19th century, during the mid-20th century, and in the late 20th century, with the arrival of the first pottery factory in Bogotá, as well as the Salman industry and the metal industries of Palmira. Various secondary and primary sources, such as objects, images, written documents, and advertisements, have been used to study these cases. The paper culminates in a question: Given the preparatory processes for the local production of industrial products, generating small and creative conceptualization processes, and with the experiences gained with adaptation, could these be more feasible in future output in Colombia?

Adaptation as a Stage in the Production and the Product Design of Products in Colombia

Historical studies of industrial product design emphasize the notion of the project as a characteristic and determining component of this process, which became linked to it (or even more present) after the Industrial Revolution (De Fusco, 2005). In a production that sought efficiency, seriality, increased productivity, and mass consumption, projecting was a fundamental step in achieving each of these. In that sense, handled interventions during the process of manufacturing some goods were more feasible in the artisanal and decorative arts tradition and minimized or absent during the industrial process, hence, the relevance of the projection and this step as a critical moment in the industrial production experience and industrial product design.

Although examples are abundant, three cases illustrate how appropriation and product development practices have been more prevalent in

industrial product design than conceptualization and projection in developing new goods. In our territory, however, arriving at the conceptualization and projection of products has been a more far-reaching process that could lead us to recent times compared to the international experience. We present the three case studies, which highlight the predominance of product adoption and development practices, as well as the small agencies that we consider favored local bets and, with it, the first modest projective explorations of product design in our territory.

The Pottery Factory of Bogotá, 1832

Considered the first pottery factory in Bogotá (although other production existed before this factory), The Pottery Factory of Bogotá is the most famous, not only due to the studies written by María Carolina Lamo (2000), Monika Therrien (2007) and María Astrid Rios (2002), in which they told of its creation, location, production, etc., but also because of preserved pieces of pottery, such as a fruit bowl and tray in the Museum of Colonial Art of Bogotá; four plates in the Museum July 20; a jug and a tray in the Museum in the 19th Century; the base of a bowl, two basins, and a jug in the National Museum of Colombia; the same jug in the Banco de la República; and a plate and a tray in the Museo del Chicó.

The establishment of the factory was a consequence of the government of the First Republic eager to promote and support the creation of new industries directly after independence from Spain to reduce goods imports (Ospina, 1955). However, the factory's infrastructure (machinery and molds) was brought from England, as were the first master potters, who taught the techniques and processes to produce fine earthenware. That is why, initially, pieces fit English models and decorations, such as landscapes and men dressed in English style. But later, locally inspired decorative motifs were applied, such as the view of the factory in Bogotá and contemporary personalities, such as Tomás Cipriano of Mosquera and some people dressed in "ruanas," as visible in some replicas preserved in the museums (see Figures 7.1 and 7.2).

Figure 7.1. Drawing of a tray from the Bogotá Earthenware Factory with a possibly English decorative motif. The original plate is preserved in the Museum of Colonial Art in Bogotá.

Source: Angie Vélez, 2023.

Figure 7.2. Drawing of the detail of the center of the plate from the Bogotá Earthenware Factory with a sabanero decorative motif. The original plate is preserved in the National Museum of Colombia.

Source: Angie Vélez, 2023.

Salman: Bogota's First Home Appliance Industry

In the mid-20th century, a new phenomenon arrived in Bogotá and other Colombian cities: the first household appliances. This cultural change was initially linked to imported products from American factories, such as Westinghouse and General Electric. However, as time went by, conditions became more optimal for the acquisition and use of these goods in the homes of residents of the capital due to, for example, the introduction of electricity and the ease of payment and in front of the impossibility of acquiring some pieces to repair this articles in Bogotá city according with some import restrictions that prohibited the entry of spare parts for the imported appliances were established some local companies, such as Salman, to meet the demand of this parts.

To our surprise, just as in the pottery case mentioned above, the technology and type of goods initially produced by Salman corresponded to those of foreign companies, such as the aforementioned American company, Westinghouse, and local production was in the hands of someone who knew about the processes and management of the parent company because he having worked directly in the Factory like was the case of its founder and owner Jorge Enrique Salazar Gutiérrez who has worked in the Westinghouse Refrigeration Department (he also was a graduate of the University of Chicago in Electronics, Refrigeration and Air Conditioning, and a member of the Society of Engineers of Chicago and New York), and Salman industry also produced appliances such as refrigerators, stoves, kitchens, and kitchenettes. These appliances need to be adapted to the new city architectural projects of the city, such as those in Centro Nariño, where Salman, in 1957, installed kitchens and electric stoves, according to a contract signed with the Constructions Department of Banco Popular (Salman, 1958; Ríos, 2018). This industry was located in Bogotá on 13th Avenue and 50th Street in 1952.

It is also worth mentioning how, as time passed, Salman diversified in services offered and established, in January 1957, the San Diego Electro-Mechanical Center, located in Bogotá on 28[th]street with 13th avenue, in which provided public service through departments with technical radio and television experts, motor winding, paint and brass, refrigeration and air conditioning, washing machines, and spare parts manufacturing.

Palmira Metal Industries (IMP)

Finally, we want to cite the most recognized of the three companies chosen: Palmira Metal Industries. The origins of this company lead us to the first half

of the 20th century when the Cuban Don Vicente Vallejo "took advantage of the 25-year tax exemption that the Palmira City Council gave industries that settled in the city and relocated the company Vallejo Steel Works".

Known as IMP, it was initially dedicated to manufacturing plows, rakes, and spare parts for the agricultural machinery of the sugar and "panela" industries. However, in 1940, it also began producing metal furniture (Arquimuebles, 2019).

However, we brought up the case of IMP because, in the 1980s, this company was one of the most recognized in the country in terms of furniture production. Additionally, IMP had a modern furniture line inspired by iconic chairs designed at the beginning of the 20th century, such as the Wassily chair. However, during recent research about the 100 years commemoration of the Bauhaus, we determined that producing this chair was solely due to production and market purposes. The IMP experience did not provide some space for the conceptualization or projection of this chair like when Breuer designed the Wassily chair.

Palmira Metal Industries took foreign models of chairs, some of them as internationally recognized as in the case of Wassily, and adopted its production technology to manufacture them. However, we also observe that, although not projecting the original design, IMP managed to project the entire distribution and consumption plan, following the modern (foreign) dynamics established for this purpose. Together with this furniture, the company developed a simpler design inspired by these larger models, as was the case of the set k'room (Ríos *et al.*, 2019), see figures 7.3 and 7.4.

For these reasons, we can see that this company reaffirms later those characteristics highlighted in the other cases cited and related to the recurrence of the first moments in the design of industrial products to the adoption and development of goods and how these stages subsequently give rise to some first attempts to project and develop new goods and services.

Conclusion and Final Considerations

In conclusion, we would like to highlight a particularity of our experience in the industrial design of products related to the adoption and development of products and how, through it, modestly gives way to local projection. In that sense, we also wanted to demonstrate the validity of using time and history to learn about these aspects. We have used three examples from three historically different moments to evidence this.

Figure 7.3. The interior of a room with a Wassily chair. Advertisement from Palmira Metal Industries (IMP). Ca. 1980.

Source: Phanor Mondragon's archive.

Figure 7.4. Set K'room (mid-range furniture). Advertisement from IMP. Ca. 1980.

Source: Phanor Mondragon's archive

However, in this small analysis, we are not looking to stigmatize this fact or judge it but to characterize it and even think of a possible validation of these practices as stages before the projection of new products, as we have found timidity in the cases studied. Specifically, when small local responses were not made following the implanted models, as was the case of decorative themes in what was considered to be the first pottery factory in Bogotá, and when appliances produced had to adapt for installation in local constructions, like was the experience in the Salman industry in the case of Centro Nariño; and when was possible development new products formally inspired by some products adopted and developed as happened in IMP with the mid-range K'room furniture and the Wassily chair.

In citing these cases, we also think about the adoption and development of products as stages or experiences that can strengthen the projection stage. Additionally, knowing these historical experiences could help strengthen present and future projections. This proposal would require more profound studies because these dynamics clearly correspond to our country's political, economic, and cultural realities and do not fall solely on the shoulders of industrial designers. However, we consider that calling attention to the fact perhaps helps us to become more aware of it and to consider it feasible that, in the future, our design practices can be emphasized concerning the project, especially if we believe that there is also the opportunity to think about new, more situated design from our realities and escape a little to the notion of the transnational market and the colonialism established from design and material culture.

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Design and Territory: Culture and Environment. Observations about Interdisciplinarity and Interculturality in the Industrial Design

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Design requires more sensitive approaches and closer stories from the habitat, territory, environment, art, and culture, which implies a commitment to interdisciplinary and intercultural. From this perspective, there are some questions that we will try to answer in this chapter: What is the relationship between consumption habits and territory, and what place do nature and human habitat occupy today.

Prelude

A couple of years ago, an article circulated on social networks about the lawsuit filed by a French citizen against Apple and Epson on planned obsolescence, with Apple for slowing down its mobile devices just at the time of launching a new model on the market, and with Epson for making ink cartridges unusable before they were empty. Facts like these confront us with the logic of the market and capitalism, forcing us to think about the impact of design and innovation on everyday life, raising questions such as: Why does the public continue to buy Apple and Epson products and how can we explain the acceptance of a mobile phone that lasts less than one manufactured five years ago? The simple answer lies in consumption and the need to produce more to consume more.

It is unclear that the goal is to insert habits of people's daily lives through consumption, such as answering calls or maintaining battery charges in a mobile phone. Programmed obsolescence is designed according to (specific) goals that philosophers call teleology, such as progress, well-being, status, and sustainability, *i.e.*, it determines the life of objects and people. That design defines the form that a city, a neighborhood, a house, or an apartment will have. In the same way, in a certain way, it presupposes the objects we should have in the intimacy of our rooms, which means that, in effect, design has installed itself in public and private spaces.

However, the omnipresence of design and its exhibitionist and hyper-realistic overexposure require more specialized or fragmented designers,

less sensitive and closer to any culture or history. But now, design demands instead a synoptic or circumspect (perhaps holistic) vision that makes any place a habitat, a landscape, a frontier, and establishes a trusting dialogue with other knowledge and experience, however strange, anonymous, and marginal.

Anthropology and Design

To say that home comes from a bonfire is not a mere hermetic subtlety. It has its anthropological confirmation; it is enough to imagine a primitive man the outside or inside a cave; the fire has the function of heating the body and preparing food (which are also bodies); this place is the center (the vortex) of the sociability that occurs among relatives, friends, neighbors, but also, in symbolic terms, is the foundation and premise of the territory. The center is the vortex through which a village or a city is created and designed; it is the stone on which the temple is built, the divine fire that incessantly renews nature (ideas-images these very previous to the Christian cosmogony).

The center is the matrix of everything. It tells a story of how it happened and how it began; anthropologists call them foundational myths, which not only occurred in the founding of the great empires (for example, in Rome and the reason why Romulus killed Remus, after warning him that he would kill anyone who crossed the circle he had drawn on Mount Palatine), but it appears in any town or city (however remote and unknown it may be), for example, in the Kogi cosmogony in Colombia, their malocas are the center of the universe, similar to the "great" cosmogonies of ancient cities: Beijing, London, etc., which were conceived to be the center of the universe. "The temple is the cosmos and its relationship is materialized in each of its parts. The center of the temple is called eisuáma and the center of the Universe is designated as muán" (Duque-Cañas, 2004, p. 37).

From a Paleolithic cavern, around which the bones of humans and animals are deposited, to a Christian church in whose crypt the remains of illustrious personages and ecclesiastical authorities were deposited (the Romans called it a columbarium, and this practice was maintained until the Neo-Gothic), or a relic in the high altar, or an oratory, etc. What is observed in each case is that the organization (or design) of the habitat (or inhabited space) does not respond only to a technical facility but to the need to provide and ensure a framework (and codes) for the social system. "Every habitat is an instrument, and by that fact, it is subject to the rules of the evolution of the relationship between function and form" (Leroi-Gourhan, 1971, p. 311).

It is necessary to arrange or design the surrounding space to inhabit (Heidegger proposes that inhabiting cannot be separated from construction) to resist chaos or the onslaught of "wild" nature. Carving the hard rock, building a hut, or painting a cave, are actions that are done rather than to overcome nature (survive or dominate it), to cohabit with it (coexist with it); a canoe is made to stay on the surface of the waters, or an umbrella to resist rain for a longer time. These objects are also places to live and meet with nature and others. However, that canoe or that umbrella are different. For example, between the cultures of Northern Europe and the Eastern cultures of the Pacific, the climate and the disposition of their natural heritage make them different, and therefore their identities (and most of their things) are different, although functionally similar, formally and materially they vary among themselves; as Leroi-Gourhan (1971) proposed that each one has an ethnic style since they have a peculiar way of assuming and marking forms, values and rhythms."

What is the relationship between consumption habits and territory? A rapid answer suggests thinking of culture as a system of arbitrary (homogeneous and hegemonic) signs and objects exercised through global, massive, and anonymous identity within the local and the popular. Forms, values, and rhythms are concepts that should be included in design thinking since it converges not only aesthetics and the market but also social imagination, ideologies, and policies that determine the design of objects without losing sight of the territory (landscape, natural cycles) since these define cultural identity.

Digression on History and a Brief Context of Design

Some authors (such as Ricoeur, 1995, and Danto, 1989) have questioned classical historiography based on the understanding that the reconstruction of a historical event is equivalent to the work of the positivist scientist who, having a "sufficient" amount of data or information, can write history rationally and efficiently. By questioning such a claim to legitimacy or truth, the possibility arises of configuring other histories (different from the usual ones of the exploits of great men). To make a history of eroticism, madness, or weeping was not possible less than 100 years ago.

Teleology was mentioned to refer to imaginary (social constituents as Cornelius Castoriadis called them) such as progress, welfare, and development, which are inherent to culture; for Aristotle (the Poetics), teleology par excellence is that of happiness, understood as the supreme good and

therefore all people would try to go towards it. But beyond men or women being good or bad, what forces the tragic tale or story is that something happens, that there is action, that there are vicissitudes, that the hero suffers but can get out of those pitfalls that fate or chance puts him. Aristotle says: "The end sought is an action, not a quality," not necessarily the right action, but any action (however immoral it may be).

In the historical narrative, as in the fictional narrative (including cinema), it is the action that shapes the story, the arrangement of events, and the plot, even independent of the character of the protagonist/antagonist. In the tragic narrative, the action leads to death. Although there is evidence in the historical narrative that it ends in the same way (World War I and World War II confirm this), this is not decisive because science, technology, and design are optimistic (and not tragic like the Greeks, according to Nietzsche they expected much more from life and were true ptimists, some real vitalist"). Today, the Baroque is recognized as a fascinating period in art history, but its exponents were treated disparagingly at the time. Rembrandt's Rape of Persephone was not a setback in art history. Neither was Duchamp's Fountain or Warhol's Campbell Soup; this cannot be said because the History of the West (and of capitalism) is irremediably heading towards a happy ending, maturity, or coming of age, as Kant put it.

The introduction references obsolescence programs, the life of things, and people and their habits, but this is not new. It can be seen in the history of monasteries (for several historians of art and science) that would have been precursors of capitalism. The "invention" of the clock in the Middle Ages as Mumford taught us in *Technique and Civilization* (Mumford, 1992, p. 29), from the chimes of the churches that announced the canonical hours (hours in which the monks had to make their prayers), can be considered the first great invention of modernity, even before the steam engine, if thanks to this "clock" it was possible to synchronize and regulate the actions of men. Behind the history of the steam engine is the story of crowds swept by the fever of progress towards the cities, a fairy tale that was reinforced by impressionist painting and later by cinema; there were other, darker versions, such as those of Poe, who unveiled a part of London full of dens, outcasts, and delinquents, although later the debris of industry (Duchamp's Fountain) would serve to critically re-signify art and its function in everyday life. At the same time, the design seems to have remained in the Victorian assumptions of art for art's sake and the fatuous promise of progress, thus distancing itself somewhat from art close to the world of life (Lebenswelt) and from the avant-garde's demand to bring art closer to everyday life.

Environment, Art, and Design

Returning to the subject of imagery, the railroad and the cinematograph are probably the most beloved inventions and the most impressive achievements of Western culture, which in symbolic terms represent the triumph or pree-minence of time and movement over space and nature (the body, the earth), and in aesthetic terms, the distraction to the detriment of contemplation; that a paradigmatic image of a factory or a smoking railroad as a symbol of progress today is nothing more than a symbol of decadence and an ana-chronistic situation if we have the decency to accept that this rationalist and capitalist modernity was the one that produced the current environmental and cultural crisis.

The interesting thing about the artistic avant-garde is that they are reacted to the elitist art (more or less homogeneous) of the past. They evidenced the decadence of the West, and this is a logical (perhaps ironic) consequence of that at the end of the Second World War, it was necessary -to wipe the slate clean- to re-found that old culture that had failed in which, as Adorno announced, poetry was no longer possible. If in the 19th century art sought its autonomy, in the 20th century, it showed how mechanization and technique develop (apparently as a function of itself), and losing the aura announced by Benjamin would be one of its consequences. And all the artistic avant-garde probably reacted to this mechanization and commodification to which, suppos-edly, art is destined (like any other merchandise), except perhaps with pop art, which would dissolve this critical tendency in favor of industry and the market (Warhol said of himself that he was an art-making machine).

Curiously enough, the design has had a fate like that of cinema since, in its beginnings, each one tried to justify its existence as art through theoretical resources. Still, it did not take long for it to become an industry. While each one managed (in its way) to remain partially within the limits of art, most objects or films ended up condescending to the industrial logic of reproduction, classification, and rectification. The reduction or simplifica-tion of the forms of nature and the world to geometric shapes operated by neoplasticism (as a reaction to romanticism and neoclassicism), which would later influence the entire modern movement (Gropius and Le Corbusier at the Bauhaus), was undoubtedly one of the significant events in the recent history of art and the birth of design. Still, it also inaugurated an alliance (to this day problematic) between art and industry. However, whether we con-sider a Le Corbusier house or this or that piece of furniture produced at the Bauhaus, the prevailing functionalism (not counting that of communication)

consolidated the wall box (the building) and the objects inside it as elements of a machine, a machine to inhabit.

Beyond the cult of the new (today's innovation) promoted by the avant-garde, which is an eminently modern condition, the Bauhaus and Dada (certainly contemporary) represent two art trends that can be reconciled so that designers are not only pragmatic in terms of the design of objects and their insertion in everyday life and commercial circuits, but also in terms of a transgressive and critical attitude (concerning production systems, materials and the market itself), which is the prelude to true innovation, as were the ready-made and the assemblages of the Dada movement. However, they were not precisely functional objects. Today, they have a special value because of their ideological and conceptual presuppositions. Despite their supposed extravagance, they could question the "fever of progress" and its mechanization and not impact so negatively on nature.

The Place of Nature and Human Habitation

According to Marc Augé's definition, the place is a practiced space and a non-place, a space that is not relational, that does not imply identity or historical processes (Augé, 2000), in nature as inhuman places, there are few (and fortunately) places that a geologist or a psychologist has not reached; to say that there are hidden and unknown places in nature is not a vain illusion, but it is not good that they remain so, at least in "rationality" since reason (supposedly) is the one that can reveal everything, measure and calculate. So, as Spinoza proposes, the place of Nature is a beautiful backdrop for the exploits of humanity, or it is a violent place of struggle and usurpation (never an efficient cause or an emergency) in which divinity is disseminated and of which we are part.

Throughout history, nature can in three moments. With the Romans, nature became domestic to the point of making it property, a property of all; in the Renaissance, nature became an object of study and would inaugurate the positivist behavior of science; and finally, in modernity and (the supposed) post-modernity, it would become a mere exploitable and devastating resource, distant from the nature seen by the Baroque or the Romantics, for whom it hid the unknown deep mysteries and pleasures.

Today we speak of a resurgence of interest in space, place, and landscape, categories that force us to interact with our body (perceptual experiences), with the other, and with others, as suggested by Delueze and

Guattari (2004) in a rhizomatic relationship (more hierarchical than arborescent). Western philosophy has been a philosophy of time and the self, while the new paradigm belongs to space, to the body. Shultz states that "if space is existence, then existence is spatial," Norberg-Schulz, 1975, p. 17), and the relationship of people to places or things, rather than functional (traveling them in a given time), is in terms of approximations or distances.

Heidegger called discouragement this type of proxemics. He speaks of discomfort out of the area and disorientation to refer to the condition of the human being now of technique, according to which he would be thrown and stunned on the hard earth (the native, the mythical); we no longer speak of metaphysics, teleology or projects, but presence, of a natural attitude (pure aesthetic experience without prejudice).

According to this, the experience with objects changes people. For example, if we consider a pair of farming shoes, a canned soup, or a bridge, each one contains relations between the place it occupies (the present) and the place from which it comes and to which it refers. A dwelling opens a place or a square, according to Heidegger, to "save the earth, receive heaven, await the divine and guide mortals". It is the essence of inhabiting, and therefore of construction, and could also be of design or any other creation.

Materiality, Territory, and Design

Bachelard (1993; 2005) makes a phenomenological and psychoanalytical interpretation of water, dreams, and air based on literary references, poems, stories, and novels. Probably the most plausible premise is that those literary images (place names, metaphors, symbols, etc.) that refer to one of these elements are not only referents but material imaginations but that somehow contain the qualities of these elements; that impossible apparent union between the material and the spiritual (as with Environmental Thought that has tried to connect the natural or physical sciences with the human sciences and the arts) and is located precisely in the aesthetic.

The study of aesthetics is not a task that is reduced to the learning of concepts and theories but one that confronts the place we occupy, the territory and the materiality that surrounds us, and what we have in our hands. An architect should ask himself why, when building a house, cement, and iron are used almost only, and a designer should ask himself why so much paper or so much plastic is used? If it is known that cement is excessively polluting and yet this type of construction does not stop, this is because of economic

interests. Still, also the imaginary inserted in society by the market (arbitrarily and homogeneously) and has to do with an agenda related to distinction, which temporarily replaces the need to differentiate oneself from others, to be better, to change (or consume) simply or to achieve a certain status.

This displacement of distinction makes identity somewhat unstable because it is produced because of a lack (one ceases to be a vagabond or remains a person lacking a car). Identity is reinforced if the objects or machines used are close to the territory one inhabits; the development of iron in Spain and a large part of the Mediterranean basin in the Neolithic, navigation in northern Europe, paper in China, spices in the Middle East, have powerfully shaped the identity of these territories.

Consumption habits must be in dialogue with the habitat (or territory); this split makes habits and habitats so homogeneous. In other words, innovatively, the best way to be part of the global village is to empower the local identity, research, and production in the territories, think globally, and act locally. Bauman (2007) states that "the separation and destruction of waste should be the secret of modern creation; eliminate and throw away the superfluous, the unnecessary and the useless; thus, the pleasant and the rewarding would be guessed" (p. 36).

However, design tends towards the "pleasant and gratifying" promise of progress, development, or sustainability, which is ultimately the sustainability of development and an eminently anthropocentric attitude, with a positivist approach that radically questions the place it occupies in contemporary culture and the power it must help change habits of consumption, coexistence, and respect for nature. The question is, following Arturo Escobar (Escobar, 2016, p. 51) who quotes Manizini: how can we fight for "a new civilization, hopefully wiser?".

Emergency Exit or the Beginning of the End

Heidegger (1994) wrote that "the ultimate is final judgment and death," or at least silence.

Previously it was proposed how in obsolescence, besides designing objects, "designs," people (as things), and in environmental crisis (more or less apocalyptic), design requires an honest dialogue (with itself and with other knowledge), where design—understood as putting in order or composing space—, is preceded by the center, fire, inhabiting, but besides objects. It was also exposed how design has had a history equivalent to cinema and art, and

its avant-garde mood should be recovered, besides its historical relationship with nature and its place in culture. The invitation to think about human habitation from phenomenology allows us to dimension the relationship between territory, materiality, and identity, how Bauman's contributions question the conviction of globalized production and exploitation and the role of waste and modern creation.

Finally, recalling the Dadaists of the ready-made (of assemblage and bricolage), if we recognize that garbage once had a certain dignity, it can have a useful and splendid future if the design takes charge of repairing the disaster in which it takes part. It takes more creativity than innovative technology to take care of one's surrounding garbage.

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Links between Food, Armed Conflict and Rural Development. Learnings from the Colombian Case

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Colombian society has faced more than six decades of armed conflicts. Understanding how violence and food have woven into each other in rural territories is a priority topic of this discussion. This work aims to analyze the links between food, armed conflict, and rural development and to understand how they have influenced the dynamics of Colombian society. The study employs Albert O. Hirschman's Possibilist Approach, in addition to Neil Fligstein and Doug McAdam's Theory of Strategic Action Fields (SAF), to explain the coercive food conflicts in the fields and the tactics of different actors to dispute food like a resource. Over three months, 83 semi-structured interviews and 40 informal talks were held in the municipalities of Samaniego (Nariño), Florencia (Caquetá), and Granada (Antioquia). Databases, reports, and other documents were reviewed. The results indicate that the actors fight for food as a disputed resource within the field. Armed violence has been the control mechanism implemented by dominant actors who reproduce instabilities to maintain the appropriation of material and symbolic resources. Peacebuilding and resolving armed conflicts are deeply related to agro-food issues, governance, and politics. The dominant actors constantly induce instabilities to keep structures' immutability and limit the possibilities for building a stable and lasting peace in rural territories.

Introduction

Until 2017, the armed conflict in Colombia had claimed more than 8,074,272 victims. Although the number of armed confrontations was reduced with the peace agreement signed between the state and the guerrilla Revolutionary Armed Forces of Colombia-People's Army (*Fuerzas Armadas Revolucionarias de Colombia-Ejercito Popular*, FARC-EP), the threats, murders, and human rights violations have not ceased. According to the Instituto de Estudios para el Desarrollo y la Paz (2018), there are still 3,000 narco-paramilitaries, 2,500 members of the post-disarmament Farc-EP, 2,000 of the National Liberation Army (*Ejército de Liberación Nacional*, ELN) and 250 of the Army Popular Liberation (*Ejército Popular de Liberación*, EPL) in the national territory. The places where

violence intensified after the peace agreement were Norte de Santander, Nariño, Antioquia, and Chocó.

Rural development is deeply related to armed violence, as there are direct links between armed conflict and poverty. The statistics indicate that rural areas are the most affected by the conflict in Colombia. When violence increased, poverty in rural areas rose from 68% in 1991 to 78% in 1994 and 83% at the end of the same decade (Universidad Pedagógica Nacional, 2004). In 2012, rural poverty was 65%, misery was 33%, and informal employment was 60%. Additionally, 85% of residences did not have sewerage, and 60% did not have aqueducts (*Revista Semana*, 2012). This result was attributed to armed violence and the absence of public policies focused on peasants' social and productive development. According to Cartagena (2000), the Ministry of Agriculture in the 1990s went from being an executing agency to a guiding and facilitator. The public credit programs of the *Caja Agraria* were eliminated, and technical assistance was limited. Besides, some institutions were extinct: The National Institute of Renewable Natural Resources and the Environment (*Instituto Nacional de Recursos Naturales Renovables y del Ambiente*-INDERENA); the Colombian Institute for Agrarian Reform (*Instituto Colombiano de la Reforma Agraria*-Incora); the Colombian Agricultural Institute (*Instituto Colombiano Agropecuario*-ICA); the Agricultural Marketing Institute (*Instituto de Mercadeo Agropecuario*, Idema). Since the 1990s, an economic opening has allowed for increased competition in the domestic market. However, in the face of power asymmetries in the Free Trade Agreements (FTA) negotiations, peasants have faced the problem of competing with prices unequally (Álvarez & Merchán, 2007). According to Álvarez (2002) and Álvarez *et al.* (2006), increasing dependence on external markets has become a loss of food autonomy. Another result of the FTA with the United States of America is the reduction in the food production values: 52% white maize; 54% yellow corn; 62% wheat; 65% pork; 66% sage; 68% chicken; 79% bean (Salamanca *et al.*, 2010).

The economic opening coincides chronologically with the strengthening of the mining-energy sector, the decline of agriculture, the fight exacerbation against insurgents, and the country's positioning as the largest coca producer. The development of capitalism relates to these phenomena (Cramer & Richards, 2011). Several studies link expanding public and private sector investments to exacerbating armed violence in rural areas. Some studies suggest direct alliances exist between the state, armed groups, and private capital (Gutierrez & Baron, 2006; LeGrand, 2003; Richani, 2008; Richards, 2011; Tate, 2007). This work explores these convergences when examining how the obliteration of coca crops shapes the social dynamics in the territories studied.

This work aims to analyze the links between food, armed conflict, and rural development to understand how they have influenced the dynamics of Colombian Society. Three case studies addressed these links in the municipalities of *Samaniego* (*Nariño*), Florencia (*Caquetá*), and *Granada* (*Antioquia*). The evidence in this paper was analyzed using Albert O. Hirschman's Possibilist Approach, in addition to Neil Fligstein and Doug McAdam's Theory of Strategic Action Fields.

Methodology

The methodology of the work was based on three case studies in the municipalities of *Florencia* (*Caquetá*), *Samaniego* (*Nariño*), and *Granada* (*Antioquia*). Over three months, 83 semi-structured interviews and 40 informal talks were conducted. The diversity of the groups of actors was: 27% government (managers), 26% teachers, 16% peasant farmers, 10% NGOs, 9% international organizations, 8% community mothers, 6% private firms, and 1% traders. A content analysis of primary and secondary data, under the thematic analysis modality, was used after identifying categories. The collected information was coded and categorized using the NVIVO 11 during data processing. This information tool was mainly used to locate, organize, group, categorize, encode, and relate data more effectively and efficiently (Fleury, 2015).

The study employs Albert O. Hirschman's Possibilist Approach and Neil Fligstein and Doug McAdam's Theory of Strategic Action Fields (SAF). According to Fligstein and McAdam (2011), the SAF are socially constructed arenas where actors seek access to resources and social recognition to ensure their reproduction. These theoretical frameworks explain some solvent-type/coercive conflicts about food. Coercive tactics will be adopted in fields with a high difference, while cooperative and competitive tactics will be adopted in fields with less inequality (Fligstein & McAdam, 2012). Coercive tactics emerge from tail-type or indivisible conflicts. In these conflicts, only one of the sides wins, and some of its components are non-negotiable (Hirschman, 1996b). Like a disputed resource, food is analyzed in socially constructed arenas as the SAF theory proposes. Food is linked to the private sphere because there is nothing more individual than the act of eating, which is related to the public sphere. After all, it promotes demands and shared concerns in societies (Hirschman, 1996a). Some tactics that guarantee the actor's access to resources and their social recognition and reproduction are explained in this study.

Discussion

Contextualization of the Socio-Economic Characteristics of Rural Areas and the Armed Conflict in the Municipalities Analyzed

The trajectories of the dynamics of armed violence and their influence on the agro-food networks fitting were analyzed in the rural areas of the municipalities of *Granada* (*Antioquia*), *Samaniego* (*Nariño*), and *Florencia* (*Caquetá*). Although these territories have their trajectories, some common strokes are evident. First, actors have many different interests in appropriating material and symbolic resources. Second, state actions exacerbate confrontations and increase social and economic crises. Some socio-economical and historical elements are considered in this territorial analysis.

The municipality of *Granada* is in the East of *Antioquia*, in the sub-region of water reservoirs. The armed conflict reduced its population from 19,692 in 1985 to 9,885 in 2019 (Departamento Administrativo Nacional de Estadística [Dane], 2013). The most significant violent expulsion period was from 1990 to 2003, when more than 7,000 people left the municipality. Some demographic dynamics were mainly influenced by the construction of the *Medellín-Bogotá* highway and the Calderas Hydroelectric Power Project. Both encouraged agriculture and markets, but the second limited agricultural production by flooding fertile lands (Aramburo *et al.*, 1990). According to Zuluaga (2017), recent armed violence responded to the need to weaken the civilian movements that opposed extractivist energy projects and the interest in politically and economically governing this region. Armed groups began to form in the 1980s (Farc-EP and ELN). However, the critical period of armed confrontations occurred between 1997 and 2005, by the actions of the paramilitary groups (*Bloque Cacique Nutibara*) and the military forces, the last one using the discourse of territory control through tactics against the counterinsurgency (Centro Nacional de Memoria Histórica (CNMH), 2016a). The conflict significantly altered the municipality's agro-food networks by inducing forced displacement and reducing food production. Paramilitary groups and military forces restricted the food and input supply into rural areas, limiting its agricultural and commercial potential.

The municipality of *Samaniego* is in the *Abades* sub-region of *Nariño*. The main agricultural products are bananas, coffee, and *panela*; the last two are artisanally processed. Many residents of rural areas do not complete primary education (72%). This suggests limited access to education for a lack

of educational institutions and the search for sources of income in the coca economy or the derived service sector. The increase in money flows derived from this activity strengthened the service sector. The recent expansion of coca in the municipality stems from counterinsurgency policies and glyphosate aerial sprays that lead to forced displacement. *Nariño* is the most important receiving place (*department*) in the country's south for displaced persons. Besides, *Samaniego* delimits the Pacific Region, a strategic region for coca exportation, by having coastline and international borders (Lopez & Echeverria, 2007). The emergence of guerrilla groups in the region occurred in the 1980s (*Columna Mariscal Sucre* of the Farc-EP and *Guerrilleros Comuneros del Sur*, *Compañía Guerreros del Sindagua* and *Mártires of Barbacoas* of the ELN). On the other hand, paramilitary groups (*Bloque Central Bolivar* and the *Libertadores del Sur* of the *Autodefensas Unidas de Colombia*-AUC) emerged at the start of this century. According to Llamamiento de Ginebra (n.d.), the emergence of paramilitary groups responds to their interest in having control of the coca chain and the military interest of encircling guerrillas in the south of the country.

The municipality of *Florencia* is the capital of the department of *Caquetá*. Its geography covers part of the *Cordillera Oriental*, the *Llanos del Yari,* and the Amazon rainforest. The main agricultural activities are livestock, banana, *panela*, cassava, coffee, maize, and pineapple (Almario, 1987). Human flows are marked by bonanzas and crises of coca prices, territorial control, military interventions, aerial spraying with glyphosate, cocaine domestic and international demand, and blows to drug trafficking, among others (Instituto Amazónico de Investigaciones Científicas, 2000). Since 2014, the most substantial deforestation rates have been present in this department due to illicit crops, small-scale agriculture, livestock ranches, and timber extraction (Hoffmann, 2016). The recent countryside burnings correspond to changes in the arrangements of territorial governance due to the departure of the Farc-EP after the signing of the last peace agreement, which induces the phenomenon of *praderizacion* (when the landscape becomes pasture fields). Coca has been part of the life and landscape of its potential to guarantee economic resources and social recognition for peasants. However, the policies against the insurgency and the coca crops have been part of the historical drama in the department (Rodriguez, 2016). Coca production and land grabbing (under a facade of the extensive livestock) have competed concomitantly with food production. Finally, armed groups emerged in the region in 1981 with greater representativeness of the *Frente Sur* of the guerrilla *Movimiento 19 de Abril* (M-19) and lesser of the ELN and the EPL. The paramilitary emergency began at the end of the last century, with the formation of the *Autodefensas Campesinas*

de Córdoba y Urabá, and later the *Bloque Central Bolívar* recognized as *Héroes de Los Andaquíes*. Even after the paramilitary's demobilization in 2005, their violent actions persist. The state identifies them as criminal gangs (*Bandas Criminales* Bacrim) (Rodriguez, 2013).

Problematizing the Trajectory of Public Policies in Areas of Armed Conflict

This research analyses how some state actions have exacerbated territorial conflicts in the three municipalities. First, the state started the economic opening in 1990 and decided to close some institutions, such as Idema. This state institution was responsible for buying grain production directly from farmers, supplying institutional markets, and allowing food access to vulnerable populations (Fao & Sida, 1976; Rubio, 1990; ICBF, 1980). The loss of this institutional market induced many families to start producing coca and poppy crops. The reduction of the state led to the adoption of standardized logic and practices through the discourses of increased fiscal efficiency. However, this change reinforced the mass production and the specialized and globalized models inside the local territories.

Third, in Colombia, transnational corporations invest in the agricultural and extractive sectors while linking with violent practices exacerbating armed conflict. The last is linked to achieving its interests (Gutierrez & Baron, 2006; LeGrand, 2003; Richani, 2008; Richards, 2011; Tate, 2007). Fourth, the state is involved in these dynamics to strengthen the extractive sector for exportation. However, the absence of differentiated public policies pushes peasants into the wild market game and the disadvantaged price competition (Fajardo, 2014). For example, in *Samaniego*, the losses related to the pest that attacked the *caturra* coffee crop produced losses of 60% of crops. They forced many peasants to take refuge in coca crops to overcome the crisis.

Fifth, some state actions have intensified the phenomena of territorial violence. For example, the persecution of coca producers and forced eradication are unaware of the social complexity weaved around this economy and their links with some social, political, economic, and cultural elements in Florencia and Samaniego. The success of coca lies in a set of factors in both cases of study. It is first cultivated on the peripheries, with abundant peasant labor, limited market access, precarious infrastructure conditions, and limited economic investment capacities (Dion & Russler, 2008). Empirical evidence shows that the coca crop is resistant and produces several crops yearly. It also indicates that coca can grow almost anywhere below 2,000

meters above sea level and is transported without deterioration or difficulty on the horseshoe paths.

Furthermore, the evidence reveals that coca employs intensive labor, has some secured markets all year, and is low likely to suffer the effects of price competition. The characteristics of coca are almost unbeatable when compared to other agro-food products. In contrast, state actions to combat coca crops are attempts to impose standardized models, contributing to some rural villagers finding reasons to join guerrillas (Uribe & Ferro, 2002). Forced eradication by glyphosate spraying has dangerous effects on human health and high environmental impacts (Peterson, 2002). These glyphosate sprayings are not a tool to reduce their production (Diaz & Sanchez, 2004). In addition, these did not reduce the number of coca crops since, between 1996 and 2000, the area increased from 8,280 to 13,200 hectares (Tokatlian, 2003). In contrast, forced eradication is linked to increasing crimes and forced displacements (Bogliacino & Naranjo, 2012; Dion & Russler, 2008). These tactics of combating coca crops favor accumulation by disposition, by dominant political and economic groups, and eroding the foundations of peasant organizations (Bocarejo & Ojeda, 2015).

Food as a Disputed Resource among Armed Groups

Food occupies a fundamental place in society because it allows life reproduction and social relation maintenance in territories. In the context of the Colombian armed conflict, food struggled as a resource, which has led to the rise of solvent-type territorial conflicts. During the conflicts, armed groups were particularly interested in controlling human lives through food. Some actions restrict the flow of supplies and foods in agro-food networks.

Some differences exist between the armed groups that have tried to dispute food as a resource. First, the guerrilla groups ensure the basis for the reproduction of life through food and care about maintaining good relations and social recognition of rural communities. In the face of the state's indolence, the guerrilla groups position themselves as the only agent who resolves social conflicts and conducts informal rules. According to Richani (2008), some of the tax collection of transnational corporations is intended to encourage communitarian actions, even with the political and ideological position that opposes the expansion of these investments in the territories, which is different from the paramilitary groups. Besides, in territories with coca crops, guerrillas set informal rules to reduce food supply problems by defining the quantities each family must produce and limiting hunting and

fishing in critical periods under the penalty of paying taxes. They also prohibit the entrance of foreign investors interested in land speculation, which reduces deforestation rates. Finally, guerrilla groups cash taxes on drug traffickers or intermediaries while marketing coca paste, and paramilitary groups are closely linked to drug trafficking and the state to secure their reproduction (Tate, 2007).

Paramilitaries are private security groups created by drug traffickers and endorsed by military forces (Guizado & Restrepo, 2000). The private sector, state, and paramilitaries alliances converge on exterminating the left political sectors or civilian groups that oppose their interests (Aviles, 2001). According to Gray (2008), paramilitaries join economic elites and military forces to ensure their mutual reproduction. The paramilitaries have no social recognition of rural communities, and the State loses legitimacy by taking violent actions alongside them (Rodriguez, 2016). The interlocutors in the three municipalities commented that the paramilitaries come from outside. Their arrival intensified the armed conflict, and their role was to protect the businesses of the regional elites. In Colombia, war privatization perpetuates the armed conflict, and security is considered a commodity in the search for profit (Richani, 2008). Thus, armed violence is used by the elites to maintain an unequal development model (Thomson, 2011). Food is a resource disputed by paramilitary groups and military forces as a suffocation strategy. Control of the food supply flows (inputs and products) is incorporated as a counterinsurgency tactic. The insolent state quietly assumes that the social and political basis of the enemy, the civilian population, needs to be eradicated (Ribera, 2007). It responds to the logic that "to catch the fish [guerrilla enemies], you have to remove the water" (CNMH, 2016a, pp. 99-100, p. 229; CNMH, 2017, pp. 98-102). The endless cycles of human rights violations and the extermination of social leaders, more than 500 murders since the signing of the last peace agreement, are tactics for the maintenance and perpetuation of structures that ensure the dominant groups' survival in fields. In the three cases of study, armed violence intentionally induces permanent imbalances that limit the chances for changes, for example, weakening the foundations of an organized civil society through violence.

The armed conflicts have intentionally reduced the rural productive capacity and induced forced displacements. The territorial control by paramilitary groups and military forces restricts the agro-food flows in the three municipalities. Additionally, the productive reduction led to the construction of new supply networks because many foods began to be brought from outside, which currently competes with the possibilities of activating

peasant economies of returned families and building new food networks or nested markets.

Conclusions

In the Strategic Action Fields (SAF), the dominant actors can employ tactics to dispute resources and ensure their recognition and social reproduction. The cases of the study show that the control of agro-food networks has led to some solvent-type territorial conflicts through coercive practices that limit the foods and supply flows, which has led to changes in the rural communities and the productive dynamics in these territories in the three cases of the study analyzed.

The state has been unable to counterbalance the power of actors and their relationships in the conflicting territories. In contrast, some state policies and practices have intensified tensions and disputes, especially about counter-insurgency tactics, the fighting against coca crops, and some alliances with paramilitary groups. The perpetuation of armed conflict by the dominant groups corresponds to a control mechanism that limits the possibilities for territorial changes. Violence has incentivized the imbalances of power in the fields and kept the immutability of dominant structures.

This study suggests developing future comparative analyses of past peace treatments in Colombia and abroad. It can help to understand the links between peace construction, the development of capitalism, and territorial changes at local and worldly levels.

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Part III. Collaboration

Discovering the Frugal Attitude of Social Innovation. Bricolage as Activism

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There is an increasing awareness of the impact of design in understanding and framing problems and finding solutions in collaboration with communities, impacting societies and the wider environment (Armstrong *et al.*, 2014). In the last decade, we have also observed the rise of a "social design" moment characterized by a social-oriented objective with a wide acknowledgment of the design's role in facing societal challenges and helping social innovation to flourish. Nevertheless, many research results show that if, from one side, SI needs to find a balance between its social and economic objectives (Terstrip *et al.*, 2014), on the other hand, frugal solution and improvisation—far away from linear process—often represent a common practice in these institutions. This paper discusses these general results as they have been elaborated in the context of the Simpact European project (2015) and, considering the recent literature and research on the emerging area of frugal innovation focuses, will discuss the actual role of this informal approach in the ideation and development of SI in opposition to the formal job description.

Introduction

According to a recent report from the Arts and Humanities Research Council, we can talk about Social Design intended as a design-based practice towards collective and social ends rather than predominantly commercial or consumer-oriented objectives that operate across many fields of application, including local and central government, as well as policy areas such as healthcare and international development (Armstrong *et al.*, 2014).

Social Innovation results from highly constrained creative processes occurring under resource scarcity. Even though Social Innovators do not apply New Product Development (NPD) strategies (use of prototypes, feedback, etc.) nor any other form of the structured process—as they don't have resources to support an idea generation or a prototyping phase—, SI solution emerges from a creative process. In a situation characterized by resource scarcity, where new resources cannot be easily acquired, bricolage seems to be the only way social innovators may react.

Considering the recent literature and research on the emerging area of frugal innovation and considering bricolage as a rationale for goal attainment, this essay will discuss the actual role of this informal approach in the ideation and development of SI in opposition to the formal job description.

The social system entails more innovative and more agile responses to identify and frame problems and to the ideation and development of solutions. There is growing awareness of the impact of Social Innovation (SI) in understanding societal challenges and solving problems in collaboration with communities, impacting societies and the wider environment.

SI is a collaborative innovation process between the actors and stakeholders that populate its environment, including beneficiaries and customers. We soon recognize some similarities with open innovation (Chesbrough, 2003) in its model.

Both SI and Open innovation call for participation and are somehow bottom-up processes, but

> whereas in business the firm is the key agent of innovation, in the social field the drive is more likely to come from a wider network, perhaps linking some commissioners in the public sector, providers in social enterprises, advocates in social movements, and entrepreneurs in business." (Murray *et al.*, 2010, p. 7)

When operating in the social field, the innovators require both the ability to engage several actors with different resources, skills, knowledge, backgrounds and the capability to manage the complexity of these relationships.

The literature highlights the problems for social innovators connecting to established networks, as their issues seldom fit existing categories. In addition, social innovators may have a deficit of specific skills to manage collaboration since it also raises the problem of conflicts and alignment of different visions, objectives, and resources (Terstrep, 2015, p. 113)

What are the main capacities required to strat-up and deal with a new network and manage both the complexity and the resource scarcity inside which the social innovators operate?

Hypothesis

In the Simpact (2015) project framework, a contradiction has been observed between SI as a bottom-up process and design as a process of innovation led by applying specific design competencies (design-driven innovation). Despite the

number of studies that have tried to demonstrate how SI development can be described with user-centered design principles, Simpact field research indicates that planning of activity is scarce in SI. The desk research suggests that Design Thinking has been applied, until now, only to analyze ex-post processes of SI. In this regard, some tentative interpretations of the nature of SI have tried to use the typical process of New Product Development (NPD) (Murray *et al.*, 2010). It has been conceptualized as developing and implementing new ideas, products, services, and programs to meet social needs (Mulgan *et al.*, 2007).

According to Simpact field research, there's little correspondence between the New Product Development phases and SI process, and, most of all; it is very difficult to translate the different observed processes into a linear model: it seems that SI is somehow governed by the strength of motivation and deep knowledge of the problem addressed, but solutions are not deeply explored or compared, they are improvised. Coping with a structural lack of resources, the Social Innovators act based on a bricoleur attitude and, to achieve set objectives, they adopt frugal solutions.

Considering the recent literature and research on the emerging area of frugal innovation and the similarities between design processes and bricolage, the essay will discuss the actual role of this informal and improvised approach in the ideation and development of SI in opposition to the formal job description.

Frugal Innovation as Framework

In the actual crisis conjunction where Western companies deal with evermore cost-conscious and eco-aware customers and face a production era characterized by resource scarcity, growing attention has been paid in recent years to the eastern countries and the so-called "Bottom of the Pyramid" (BOP)—Bottom of the Pyramid—as a huge untapped market. Many companies started to develop products and services dedicated to this market and characterized as suitable, affordable, and sustainable. Emerging market innovations are usually cheaper and offer fewer features than matching products in Western markets. Still, meanwhile, addressing BOP or underserved customers yields inclusive growth through a minimalist approach: this phenomenon is recognized as *Frugal Innovation* (Radjou & Jaideep, 2015).

The phenomenon is particularly flourishing in India, where it was labeled first as *Jugaad innovation*: jugaad is a Hindi word that means 'overcoming harsh constraints by improvising an effective solution using limited resources.'

Jugaad represents a culture of creative improvisation that has been described by Radjou, Prabhu, and Ahuja (2012) in *Jugaad Innovation: Think frugal, be flexible, generate breakthrough* that fosters the idea that this mindset and the correspondent adaptability attitude are crucial not only for Indian native innovations, but also for multinationals whose innovation processes have become inflexible, inward-looking, and saturate to remain successful. *Jugaad innovation is described as* an unstructured process that embodies '*making do'* to develop an innovative fix through six principles frugal, flexible, simple, intuition, opportunity in adversity, and includes the margin.

In 2010, Prahalad and Mashelkar, in their article for the Harvard Business Review, introduced a framework to describe the emerging innovation model in India as "a new value model capable of transforming almost every element of the value chain, from supply-chain management to recruitment, and creating novel business ecosystems." They describe this phenomenon as overcoming the Indian tradition of *jugaad*—considered compromising because of quality and of a make-do connotation— using the term *Gandhian innovation* recalling this type of innovation's ability to generate both affordability and sustainability—two of the Mahatma's tenets six decades ago. Their study identifies three main features of innovation: disrupting business models, modifying organizational capabilities, and creating or sourcing new capabilities.

The actual broader and most comprehensive term of *Frugal Innovation* can be defined as a "design innovation process in which the needs and context of citizens in the developing world are put first to develop appropriate, adaptable, affordable, and accessible services and products for emerging markets" (Basu *et al.*, 2013).

Frugal innovation presents a distinctive approach to innovation both in its means and its ends (Bound & Thornton, 2012, p. 10), presenting in an overlapping with Social Innovation:

1. Means. They have methods and techniques involved in creating distinctive solutions. They answer to specific needs but with limited resources (financial, material, or institutional) and can often turn these constraints into an advantage. Both Frugal and Social Innovation result in lower–cost products and services by minimizing the use of resources or leveraging them in new ways.

2. Ends. The nature of the products, services, or processes developed is distinctive. Effective frugal innovations are efficient in terms of cost/performance and often outperform the alternative,

opening the innovation to a larger scale (BOP) and revealing an explicit social mission (Bound & Thornton, 2012, p.11).

The literature has recently added a third element to the Frugal innovation framework. In 2013, Bhatti proposed a conceptual framework that addresses the unique challenges associated with emerging markets. The model incorporates resource limitations at the upstream end of the value chain and affordability constraints at the downstream end, particularly aimed at catering to the needs of the economically disadvantaged population. Another critical aspect of this model is its consideration of the intricate institutional settings or institutional gaps prevalent in these markets. These factors collectively influence the nature of innovation in emerging markets, making it more closely aligned with socially impactful innovation due to the dynamics of large, diverse populations that frugal innovation seeks to address.

The Frugal Attitude of Social Innovation

The frugal attitude of SI embodies "doing more with less": a frugal solution is low-cost and affordable. However, affordability extends beyond simply the cost of the solution. The service is designed to operate in the resource-constrained context, providing complementary solutions, resources, and infrastructure to continue performing to its worth.

The cultural anthropologist Claude Lévi-Strauss, to define the creation of something new through a process in which actors recombine and transform existing resources, firstly introduced the idea of *bricolage* in the social field and subsequently applied it to the behavior and resource management of enterprises by Weick (1993; 2001), Ciborra (2002) and others (Baker & Nelson, 2005), has already been applied to provide an understanding of the culture, the structure and the behavior of mission-driven organizations. *Bricolage* involves creatively adapting and manipulating human capital, materials, financial resources, and social capital to solve problems or embrace new opportunities (Gundry *et al.*, 2011).

Bricolages and improvisation rather than strategic planning emerge as shared patterns of social innovation to deal with **resource scarcity**, recombining them creatively to cope with difficulties and unexpected drifts. According to Simpact's empirical findings, frugal solutions answer resource scarcity on different levels.

Insufficient Financial Assets and Knowledge

Social enterprises have a first great obstacle in accessing financial assets. Our research confirms that to bypass this lack of resources, the initiator often recurs to self-financing and lean budget approach with a bricoleur attitude.

The *bricolage* view has also been adopted to explain the limited use that social enterprises make of traditional financial instruments, which is confirmed in our empirical research: "This view implies that it is not surprising that SEs are not seeking conventional business loans or equity finance, because they have instead adapted to working in resource-poor environments by re-using redundant and social capital" (Sunley & Pinch, 2012, p. 111). The cause-effect relationship can be easily inverted: social innovators are forced to cope with resource scarcity because they do not use financial tools, but at the same time, they do not use financial tools because of their *bricoleur* attitude.

Sunley and Pinch discuss the lack of interest in traditional financial tools from the perspective of **evolutionary entrepreneurialism** (Aldrich & Martinez, 2001), which places a great interest in the relationship between the entrepreneur and the environment in which he operates. Building on this theoretical body and empirical research, Sunley and Pinch recognize that nascent social entrepreneurs tend to draw on their savings to cope with the lack of financial assets. Regarding this discussion, our empirical findings show a twofold situation.

On the one hand, social innovators are unfamiliar with financial aspects and confident in financial tools. **They tend to give shape to frugal solutions and adopt a bootstrapping approach based on a lean budget with limited start-up capital, often using their savings and assets.** In many Simpact cases, we observed that SIs were based on the self-financing of the entrepreneurs and that initiators worked at their SIs without a salary or with a meager salary, sometimes for quite a long time.

On the other hand, **traditional financial tools are often unsuitable to the governance and revenue-sharing models underpinning** SI, and, apart from some exceptions, many SIs found difficulties in being supported by traditional financial tools, even when they were taking the form of a for-profit enterprise.

Moreover, the research findings show that scarcity often became a constant also to the lack of re-investment of the surplus in the organizations (Terstriep *et al.*, 2015, p. 109). When produced, the surplus is usually fed into social goals achievement, and to allocate the greatest number of resources to social mission, overheads are kept at a minimum level, making the structure more fragile.

Lack of Transversal Managerial Knowledge, Capacities, and Experiences

The sɪ initiators are the ones who better know the problem and that is strongly motivated. Still, the research shows that they often have a naïve approach to establishing and developing a business, assuming a bricoleur attitude. **Mission-driven organizations do not adopt formalized methods to evaluate economic impact but "do things on a shoestring," making the most of scarce resources and generating hyper-efficiency.**

In the organizational literature, dynamic capabilities are defined as the firm's ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments (O'Reilly & Tushman, 2008). Organizational capabilities are rooted in existing organizational routines, structures, and processes but, most of all, embedded in people's cultures and governance. The same authors sustain that finding the proper human capital is harder for social entrepreneurs (Dorado, 2006): social businesses can rarely offer an appropriate benefits package (salary, stock options) and often rely on volunteers, which are difficult to find, especially for managerial or more expert positions. **The hyperefficency of social innovators seems to relate to a sort of** *forced ambidexterity* (O'Reilly & Tushman, 2008) since initiators are contemporarily exploiting and maximizing the scarce resources in the concise term, from one side and the other, are exploring new solutions, recombining and reconfiguring assets to survive in the medium term.

Lack of Vertical Knowledge of the Industry where the Commercial Branches of the Mission-Driven Organization Operate

To cope with the scarce economic resources, the actors often establish instrumental commercial activities to feed the social mission. Dew to the deep involvement in the social mission, often the first idea becomes the solution's core instead of triggering a real idea generation and screening phase. The lack of business or industry knowledge can heavily influence the sɪ's success or failure, especially when the company is meant to provide a surplus to pursue the social mission.

The Urge to Achieve Immediate Social Impact

In Simpact, the empirical research shows that organizations with a social mission can cope with a structural lack of resources to a great extent and

can draw the most out of scarce inputs. As a result, sis are usually built as economical solutions, and mission-driven organizations keep on existing at a small scale in a sort of constant struggle for survival.

This attitude overlaps with *Jugaad innovation* in its meaning of innovative fixes and improvised solutions born from ingenuity and cleverness (Radjou *et al.*, 2012). si often is pushed by a combination of a deep understanding of problems and needs and a high level of urgency. Differently from other types of innovation, and technological innovation in particular, SI are usually related to service and oriented to outcomes instead of outputs. Nevertheless, to sustain the social mission, often the initiator has to deal with a commercial mission to produce surplus and feed the service. si addresses specific needs not addressed by the government that are often no-marketable (Brandsen, 2010) and originate from civil society and social movements in a non-market context.

In these situations characterized by resource scarcity, where new resources cannot be easily acquired, *bricolage* seems to be the only way social innovators may react.

Bricolage: the Unstructured Way to si Sustainability

Because the Bricolage attitude has an unharness nature and involves contextual embeddedness, instrumental thinking tends to be avoided in the description of *managed organization* but erupts in the *unmanaged organization* (Gabriel, 1995). In other words, in traditional production sectors, bricolage is a practice often only admitted by employees. Conversely, the bricoleur attitude emerges spontaneously as a resourceful and sometimes imaginative trickster in the unmanaged or less-managed organization.

Mulgan (2012) stated that social innovations require various actors to work together, such as social entrepreneurs, social movements, governments, foundations, etc. Even though, according to the literature review, these various actors support each other collaboratively in processes "of collective idea generation, selection and implementation" (Dawson & Daniel, 2010, p. 16), our empirical research shows that the lack of assets also refers to human resources. As already discussed, sis use significant quantities of unpaid labor because they rely on volunteers or because initiators put in their labor without receiving any salary, sometimes working at their mission-driven business while keeping their original work in another organization. As acknowledged in Jugaad Innovation (2012), most grassroots innovations are typically done by single men, often with limited funds. When different authors (Radjou *et*

al., 2012; Basu *et al.*, 2013) described the stereotypical *jugaad* innovator, this talent stood out: the capacity for *detached engagement*. These individuals seem deeply motivated and embroiled in their projects but do not let failure or success impact their passion. Also, in Simpact, the evidence shows that this relentless resilience is often the core element of the SI's success.

Moreover—while in other forms of innovation, the richness of competencies is recognized as an asset to deal with the multiple aspects of innovation, and the answer is often connected with innovation teams that cover a wide area of competencies and attitudes—in SI teams are joined by the motivation for the final mission independently from competences. This mission-driven vocation of the SI team pushes the innovators to outsource knowledge by acquiring it on the market, when possible, but, in most cases, forces Social innovators to find a creative solution.

In particular, the concept has been used to explain their attitude—particularly in the early phases of development—to use resources and capacities at hand, refusing to be constrained by resource limitations. According to this perspective, "the lack of resources pushes the SE to use all available means to acquire unused or underused resources capable of being leveraged in a different way to create social value" (Di Domenico *et al.*, 2010, p. 699). In other words, mission-driven organizations primarily "utilize their governance and stakeholder networks to access and construct resources, and they deploy persuasive tactics to build legitimacy and financial sustainability" (Sunley & Pinch, 2012, p. 110).

Simpact project findings are confirmed by the very few investigations of the reasons for the failure of SIS that may be found in the existing literature. These studies analyze mission-driven businesses that bootstrapped with high hopes, sometimes with great fanfare, and less noticeably closed, trying to draw conclusions and lessons for aspiring social innovators and policymakers. The accounts of the failures of Cause, a "philanthropub" that closed 14 months after it opened (Cobb *et al.*, 2015), and of Aspire, a social franchising experimenting with a new approach to tackle homelessness through training and employment (Tracey & Jarvis, 2006), get to conclusions quite like those that we draw from our empirical research.

Conclusions: Bricolage as Activism

While for a long time, discussions on innovation and its relationship with territories have essentially focused on the recognized sectors of the economies, the

'informal economies'—widely present in the global South—remained largely excluded (Bhaduri, 2016). The expansion of informal economies in the global South demonstrates that they are not the exception; instead, they are closer to being the rule. indeed, today, everyday economic activities account for a big part of the Gross Domestic Product (GDP) (around 50%) and more than 70% of employment in many of these countries (Bhaduri, 2016, p. 4).

The research shows that social innovators mainly act through practices of bricolage and *Design Activism*. The capacity of mission-driven organizations to cope with a structural lack of resources thus turns into a two-fold reality: on the one hand, social innovators come out with frugal solutions and use their creativity to get the most out of what is at hand; on the other hand, they mistake gaps and structural lacks as potential motivations of errors and failure. Our cases confirm the strong will of social innovators, who are ready to bootstrap in lack of resources, sacrifice their savings and time, and use their creativity and bricoleur attitude to overcome obstacles and adapt to circumstances. During empirical research, some social innovators did not give up in front of great difficulties and have often retried after failure. Nonetheless, it is necessary to distinguish the capacity of adaptation to circumstances and scarcity of resources from the gaps in the construction of a sound organization that can be spotted, evaluated, and bridged before its establishment. Our empirical research shows that specific evaluation processes and tools should also be developed and adopted. It is more explicit in its political intentions than the two previous categories.

Nevertheless, when speaking about frugal innovation and bricolage, we can endorse them in the so-called *design activism* because they include the creation of artifacts and experiences associated with political discussion and protest but also result in designs that intervene in everyday lives while raising social consciousness concerning collective challenges (Armstrong *et al.*, 2015). It usually sits outside commercial or governmental structures and works through settings such as grassroots activities, community action, or pressure groups.

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Mapping Emotional Connections to Foster Engagement in Sustainability Projects. A Case in the Plastic Packaging Industry in Medellín (Colombia)

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In Colombia, approximately twelve million tons of waste are generated annually, and out of that, only 17% is recycled; in this context, plastic waste is becoming more relevant for the Colombian government. On the other hand, small and medium-sized organizations find it hard to trust each other and collaborate in sustainability projects due to different drivers, including the perception of corruption, uncertainty, and inequality in needs satisfaction. This latter situation is preventing stakeholders in the plastic packaging industrial system in Medellín (Colombia) from working on joint projects to comply with Resolution 1407/2018 and new market requirements regarding the extended producer responsibility. The Centre for Design Innovation's Waste to Opportunity (w2o) project, a joint initiative between Colombian-based company Plastines S.A.S. and the Swinburne University of Technology in Australia, looks to help organizations to engage and collaborate in joint sustainability projects by applying design thinking conceptual framework and the adaptive leadership approach with the stakeholders, along all the participatory activities of this project. The literature shows that shared values help to build an environment of trust, a prerequisite for an engagement process to be successful; in this sense, in the context of this project, the design helped the participants, among other things, to be more empathetic with each other and to change their behaviors to be more open to collaboration.

This paper will report on the activities the w2o team has developed since 2017, showing the importance of identifying and sharing values to improve engagement.

Introduction

Colombia faces different sustainability challenges, including climate change and improving waste management systems (Organization for Economic Cooperation and Development [OECD], 2012). To be able to increase the efficiency across the waste management value chains, all the stakeholders need to be engaged (Departamento Nacional de Planeación & Instituto Global de Crecimiento Verde, 2016) when developing new solutions; in this process,

design helps stakeholders to solve problems looking for a better quality of life, through articulating different disciplines in participatory activities (World Design Organization [WDO], 2015). Twelve million tons of waste are generated in Colombia each year, only 17% is recycled, and around 74% of the packaging ends up in landfills (Greenpeace, 2018); in this framework, the Decree 596/2016 (Ministerio de Vivienda, Ciudad y Territorio de Colombia [MVCT], 2016) and the Resolution 1407/2018 (Ministerio de Ambiente y Desarrollo Sostenible [MADS], 2018) are requiring stakeholders to collaborate in sustainability-related projects. However, before people are willing to work together, they must first be keen to know each other; people also need to feel there are opportunities to believe in (Desmet & Pohlmeyer, 2013), and design has helped stakeholders in this project to discover and pursue those opportunities. In this territory, where Colombians find it hard to trust beyond their families and closest friends (Revista Arcadia *et al*., 2019) (though there are examples that show that it is possible to rely on specific scenarios, such as the public bicycle system in Medellín, *EnCicla* (Instituto de Empresa de Madrid [IEM]), 2016) and the program "*Ciudadanos como vos*" (Alcaldía de Medellín, 2018), the w2o team has faced multiple unexpected situations: *e.g.*, dealing with people who met for the first time requiring the team to serve as negotiators; managing safety issues needing the team to re-design the workflow; giving more time to discussions, and reducing the time for individual activities.

In this scenario, the Waste to Opportunity (w2o) project (Parnell *et al.*, 2019), a joint initiative between Plastines S.A.S., a company based in Colombia that sells supplies for the plastic packaging industry, and Swinburne University of Technology based in Melbourne (Australia), looks for helping organizations in Medellín (Colombia) related to plastic packaging, to work on solutions that will help them comply with the regulations and the new market requirements. Looking to motivate people to participate, the w2o team has focused on understanding their emotions to increase their empathy (Krettek, 2018, 2019); for that, the w2o team defined the Design Thinking framework (Brown, 2009) to foster empathizing to understand their needs, to prototype and test initiatives. On the other hand, the w2o team considered the Adaptive Leadership approach (Heifetz *et al.*, 2014), knowing that the stakeholders are the experts in their fields and will make the decisions regarding the solutions (Geilfus, 2009). In this context of uncertainty, the w2o team designed the second and the third workshops only after analyzing the results of the first and the second workshops correspondingly.

Through three workshops and visits to organizations, the team has brought together different stakeholders, and the participants have been

discovering the need to design new systems and change their behaviors (Niederer, 2017). Considering that design is "inherently persuasive" (Redström, 2006), designers in the team have helped the participants to 1) understand their needs, 2) raise awareness of their role, 3) foster creativity and 4) understand why and how to ideate prototype and test ideas. Stakeholder engagement (Bouskela *et al.*, 2016; OECD & City Council of Las Palmas, 2009; Parnell *et al.*, 2019; World Bank. Group, 2015) is the critical challenge in this project; the lack of communication and awareness are reducing the probabilities of success for the small and medium organizations, regarding being more sustainable in the plastic packaging industry; it is also preventing some organizations from collaborating (*Parnell et al., 2019*). In this regard, the designers have also been supporting the participants to work on intangible ideas of new systems and ways of interaction (Pierre, 2015); in other words, designers have been working from the strategic design perspective. For an engaging process to be successful, stakeholders need to have an environment of trust (Teicher *et al.*, 2006; United Nations, 2018; Glenorchy City Council, 2017) because they need to deal with the unknowns and risks (Botsman, 2017). There are many ways to build trust (Glackin & Dionisio, 2016), including sharing values (Wu *et al.*, 2015), loyalties, fears, and needs to establish better emotional connections (Panyathanakun *et al.*, 2013); from the design perspective, people need to be inspired (IDEO, 2015), and designers in the w2o have fostered conversations, told stories, and invited participants to draw what they talk, to achieve this. Though sharing emotions with others can be challenging (Bai, 2012), this helps nurture relationships (Kollmuss & Agyeman, 2010).

The w2o team (conformed of designers and engineers) has also been working on mapping the stakeholders (Project Management Institute [PMI], 2017) and gathering data about their attributes while facilitating the workshops to understand better the potential new connections that could arise based on common characteristics among the stakeholders.

Methodology

The w2o team has been playing the role of facilitator in this project. After the first visits to stakeholders in 2017, the team held the first workshop in June 2018, the second in April 2019, and the third in November 2019. Creating scenarios helps the participants to come up with new ideas (Eason, 2014), learn from each other (Innes and Booher, 2004; Mathur *et al.*, 2008; Parnell, 2012), and reach a consensus (Marroondah City Council, 2016). Through workshops,

the w2o team has also been able to help people feel empowered and build trust (Glackin & Dionisio, 2016). To achieve this, the w2o team held activities to help them know each other and train them about ideation, prototyping, and testing; the w2o team had to run additional training sessions until the participants felt comfortable working with tangible and non-tangible ideas. For these strategies to work, education is also an asset to help them be empowered (Kaatz *et al.*, 2005), and authors like Bloom identified affection as one of the three critical aspects of education (Bloom, 1956).

On the one hand, the design thinking framework helped to 1) empathize (knowing and understanding each other), 2) define (the network of challenges), 3) ideate (proposing solutions), 4) prototyping, and 5) testing (*e.g.*, via discussions). On the other hand, the adaptive leadership approach helped to 1) manage the uncertainty; 2) foster experimentation through prototyping and testing ideas; 3) promote diversity in the ideas and participants; 4) be observers to have a real feeling of the complexity of the project and 5) help the participants take their decisions. It is clear to the w2o team that this project is about "wicked problems" (Australian Public Service Commission (APSC), 2007; Rittel & Webber, 1973), with technical and social challenges (Appelbaum, 1997). The w2o team recruited the participants by calling, emailing, or visiting them; Ruta N in Medellín and Austrade in Bogotá also helped to bring people together. In parallel, the w2o team designed every workshop to respond to the emergent needs of the stakeholders:

1. First workshop: Stakeholders met for the first time. Focus on sustainability challenges and their values, loyalties, and losses.
2. Second workshop: Stakeholders deepened their values, loyalties, and losses. Focus: solutions for the challenges in legislation.
3. Third workshop: Stakeholders deepened the solutions for the challenges in legislation.

Every workshop consisted of the same activities (with variations of themes and levels of detail): 1) Group shaping; 2) Background activities (about key themes); 3) Individual activities; 4) Group activities (to reach consensus); 5) Discussions (sharing ideas) and 6) Conclusions. During this process, the w2o asked the stakeholders to share their values, loyalties, and losses (individually and by consensus, regarding their lives, sustainability, and the new legislation) to analyze it with the software *Kumu* later; later, the w2o team recorded these answers in a spreadsheet. Although the w2o team was able to collect this data, some challenges made this process more complicated:

some participants were confused about what value and loyalty are, which led to redundant responses; others focused on their personal lives only, and some individual responses did not appear when teams reached consensus.

The w2o team used the data from the second workshop (focused on Resolution 1407/2018) as input for the analysis. The author created the maps following these steps: 1) Creating the nodes (every node represented an organization), 2) adding stakeholder's attributes (the expressed values/loyalties/losses—individually and by consensus—), and 3) using the software to show the links based on shared attributes (*e.g.*, values). What the w2o team looked for was identifying new possibilities for understanding the actual and potential relationships between the stakeholders based on common attributes. Given the complexity of the discussions the stakeholders held, the team established some criteria to graph the data (Parnell *et al.*, 2019):

- Every stakeholder has a unique role.
- Some words are standardized, *e.g.*, "ecological" and "environmental."
- Connections are between organizations, not individuals.
- Some ideas are condensed: *e.g.*, the articulation of stakeholders is related to teamwork.

Finally, as part of the methodology, the w2o has been sharing reports about the activities and lessons learned: 1) Executive summaries, 2) Full reports, and 3) Some monthly reports. Also, the w2o team has kept communication with all the stakeholders open by email/phone.

Results and Discussion

The project has brought together an average of approximately forty people per workshop. The w2o team has shared three executive summaries, two full reports, and five monthly reports to the stakeholders; also, the w2o team participated in an international forum in 2019 organized by GTM, a chemical supplier for the plastic industry. The stakeholders have engaged in different ways, even after some unexpected issues (*e.g.*, the third workshop was planned for the same day on which a national strike occurred): 1) Participants from different organizations have come to all the workshops; 2) some participants have expressed that they have met with other organizations to look for new opportunities; 3) the w2o team held a meeting in Cali (Colombia) to explore

new opportunities; 4) some participants expressed that after three workshops they are now aware of the importance collaborating and 5) some participants have helped the w2o to fund costs (*e.g.*, food for the participants). Besides, the w2o team committed to creating an online platform during the first semester of 2020 to help the stakeholders communicate better.

The w2o team (including the designers) has been able to build trust to foster engagement through different ways: 1) giving more relevance to the emotional connections; 2) allowing plenty of time for people to know each other; 3) inspiring the stakeholders to dream about new opportunities; 4) embracing the uncertainty; 5) complying with the commitments; 6) keeping the communication flowing; 7) expressing how valuable is every input; 8) expressing all the effort and the risks that W2O has managed; 9) being transparent about the w2o project intentions and 10) showing how everything that happens is an opportunity. In this sense, the w2o team has gathered feedback from the participants through many ways to validate the work: 1) at the end of every workshop, the w2o team asked for feedback about how the project could do better; 2) the monthly reports invited the stakeholders to send their feedback and their ideas; 3) the representatives of Plastines S.A.S. have gathered vital feedback to use it as input for the following activities.

Regarding the data analysis in Kumu, on the left side of Figure 11.1, each node represents a participant organization in the second w2o workshop; the links between the nodes represent the potential connections based on each participant's role (*e.g.*, plastic packaging manufacturers could be suppliers to the food brands; in turn, food brands could be clients of the plastic packaging manufacturers). On the right side of Figure 11.1, each node represents a participant organization from which some of their representatives expressed that, for example, "Ethic" is a critical value for them; in this case, the connections represent the same as the graphic on the left side of the figure. The right side of the figure makes evident the potential connections that could take place between different organizations from different categories (*e.g.*, people in some environmental consultants—in green—and recyclers cooperatives—in blue—believe that "Ethic" is a critical value: they expressed that shared value) The author notes that some other participants expressed similar values such as transparency and integrity.

Figure 11.1. The left side is the complete network of participant organizations in the Second w2o Visions Workshop: Route 2020, with the full set of potential connections based on their roles. Right side: Participant organizations of the Second w2o Visions Workshop: Route 2020, from which some participants expressed that "Ethics" is a critical value for them
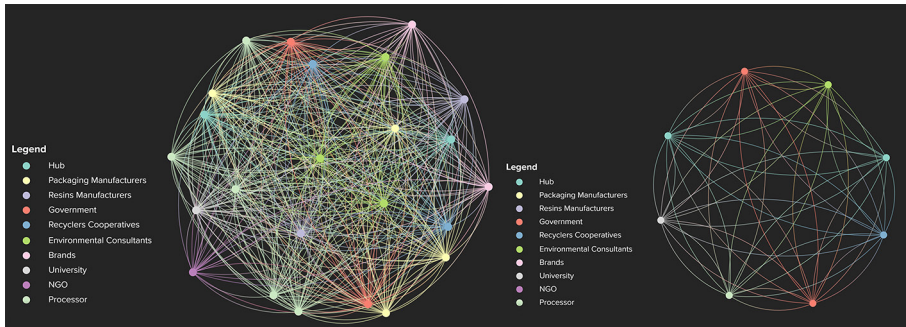
Source: own work

After the third w2o workshop, and looking to keep the engagement process ongoing, there are critical challenges that the organizations need to address to thrive in the system:

- Identifying the differences between all the stakeholders regarding their needs, priorities, and cultural backgrounds and recognizing the importance of building trust with those differences (Fukuyama, 1995). In this scenario, designers help to raise awareness of this phenomenon and help to foster the dialogue so that the stakeholders can work out the best way to prioritize and satisfy everyone's requirements.

- Every stakeholder has language, jargon, and different communication channels and strategies. In this context, designers help to translate from one stakeholder to another, looking for common grounds that could help them discuss and negotiate (*e.g.*, connecting the requirements of one stakeholder to the capabilities of another)

- Internal and external drivers explain how every organization behaves, and those drivers are different among the stakeholders. On the one hand, every participant comes with different emotions and feelings; on the other hand, every participant is part of other networks (*e.g.,* family and friends). In this situa-

tion, designers can also help to foster the dialogue to help un-
cover and share those drivers.

Also, the w2o team has identified the following critical aspects of
the context that are affecting the willingness to collaborate and engage in
joint projects (Parnell *et al.*, 2019):

- Resolution 1407/2018 establishes collaboration as a compul-
  sory requirement; nevertheless, evidence shows that this is
  counterproductive in terms of motivating the stakeholders to
  collaborate (Appelbaum, 1997; Seemann & Marinova, 2010), as
  some of the participants have mentioned (Parnell *et al.*, 2019).
- One reason that explains the previous idea is the perception
  of corruption in Colombia (Pring *et al.*, 2019), which negatively
  affects the opportunity to trust the government and big com-
  panies.
- Colombia still has high levels of inequalities (Departamento Ad-
  ministrativo Nacional de Estadística (Dane), 2018; Programa de
  las Naciones Unidas para el Desarrollo (PNUD), 2018), and this
  situation affects the assumptions and prejudices of the partici-
  pants, as the data from the workshops show.
- People in Colombia feel uncertainty when it comes to satisfying
  their basic needs (*Revista Arcadia et al.*, 2019), and this situation
  could make some organizations feel vulnerable (Dini & Stumpo,
  2018) and focus on surviving and satisfying short-term needs,
  reducing the chances to be willing to work in long-term pro-
  jects.
- It is hard for Colombians to trust beyond their families and clo-
  sest friends (Edelman, 2018; Pring *et al.*, 2019; *Revista Arcadia
  et al.,* 2019). This situation makes it more difficult for some
  organizations to take the initiative to propose and lead joint
  projects, as the activities in the w2o workshops have shown as
  well.

Conclusion

Dialogues between stakeholders in projects around sustainability challenges can
be considered an emergent property of the systems (Parnell, 2012), following
a process where the organizations can know each other and identify shared

attributes among them. In this case, the designers, being part of interdisciplinary projects, help to empathize and understand every stakeholder's position.

Despite the differences in the stakeholder's needs and requirements and their cultural backgrounds, there are shared attributes that could help foster engagement and collaboration once they are identified and communicated. Talking about emotions, values, and other information considered part of the personal domain of each person is challenging; however, designers could help to build trust through different methods of participative design and research. For example, in this project, workshops have been useful in bringing people together to know each other; within the workshops, techniques such as sketching, mind maps, and storytelling have also been beneficial to motivate participants to collaborate.

Designers play different roles in the territories during projects, depending on 1) The needs of the project and the stakeholders and 2) the emergences during the project, looking to adopt the role according to the changing conditions. These roles could be diverse, and designers should be open to adapt; in the w2o activities, designers have helped as 1) conversation-starters during the workshops; 2) mediators/negotiators when discussing problems and potential solutions; 3) translators when looking for consensus between different requirements from different stakeholders.

In summary, in complex projects such as w2o, the dialogues between design and the society, through the development of a project can spark by considering these principles: 1) Designers can help a project and its stakeholders the possibility to bridge the technical and the social aspects of the project challenges, and that includes bringing emotions and feelings to the project activities as a prerequisite for the people to better interact; 2) Designers have the capabilities to keep the broad perspective of a project, with all its complexity, but also focus on small and very well defined aspects of a solution, which makes designers valuable for helping different stakeholders to navigate through discussions and conversations; 3) design, through the framework of the design thinking way of doing things, for example, help the stakeholders to be more confident about experimenting, testing, and running iterations of an idea without the fear of "being wrong", as a natural stage of any creative process, and, finally, 4) being a human-centered process, design can help humans to have better experiences in projects, to help them take care of each other while doing the project activities.

Acknowledgments

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Design Solutions to Confront Excessive Tourism Development. The case of Colombia's Caribbean Sea Flower Reserve and the Benefits of a Collaborative Team-Based Approach

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Chapter 12

Within the post-conflict framework in Colombia, it is crucial to think about the development processes of rural regions while at the same time building awareness about the sustainable use of local resources with a view to global projections. In this peace context, the participation of youth in the construction of responsible and sustainable tourism practices is highly desirable—under a creative approach—that contributes to territorial development, the transformation of social structures, and the production of reconciliatory urban/rural value chains that improve the quality of life of all communities. Hence, when correctly implemented, tourism is one of the strategies integrated into the economic and sustainable global agenda for its purported positive impact. At the local level, the Colombian government has included in its National Development Plan a focus on economic growth and social inclusion via developing and enforcing the Creative Industries. Within this strategy, the development of eco-tourism projects is included as one of the top priorities.

Since 2016 the partner institutions have been working on a research project called Design of Hyper-local Tourist Experiences, in which the Parks, Recreation, and Tourism Program and the Anthropology Program from the North Carolina State University (NC State) and the Industrial Design Program from Jorge Tadeo Lozano University (utadeo) are part of. This partnership has been implemented in three phases. The first phase was implemented between 2016 and 2018, including one Summer School in the San Andres Archipelago. The second phase is under implementation, including a Summer School in Santa Marta. These two Summer Schools have been the vehicle through which utadeo has identified and worked with local communities. This text supports the third phase of this engaged scholarly project, including a third Summer School in Cartagena.

This continuous process in different cities from the north of Colombia will allow making an impact evaluation process of the work with relation to:

1. The importance of International Collaboration to Sustainable local development through culture and creativity.
2. Design resistors: design is shock absorbers against universalist design tendencies

3. How to think about global problems using design
4. Using local socio-cultural meanings, the design uses diversity to create dynamic artifacts, images, spaces, and relationships to forge "a global heritage."

Introduction

Undoubtedly, being in a Forum of Design favors international cooperation and encourages exchanging experiences and resources to promote local development through culture and creativity.

If so, I would like to start with a simple reflection on the triadic relationship among culture, internationalization, and design: at present, culture as a structuring element of social relations, is defined by the then-called Culture of Masses to Mike Featherson in his book Culture of Consumption and Postmodernism (1991, pp. 38-39), is a culture that is based on the capitalist production of goods. Let us say that the design and its multiple expressions have occupied a predominant place in this way of the vast accumulation of the material culture in the form of consumer goods that—through the game of the technical, technological, productive, and esthetic seduction—, put in the global scenario that which is particular. A little or extreme, global design ends what might be called an ideological design. This is the tendency of the international economy or global society to homogenize and regulate collective life from the market. Faced with this outlook of homogenization, the emergence of countertendencies and variant design projects of the totalitarian model is indisputable, resisting everything that is supposed to be global: defense for identity, autonomy, and freedom is now the principles of which I have called in other writings Resistance Design, resistance against the also called Universal Design.

Leaders of many creative disciplines and international organizations are thinking of global problems through design, so for me, it becomes necessary to present elements that characterize democracy today and build design models where private men coexist, hybrid cultures, and universal institutions. Can we live together? If, in the case of the designers and, in general, the creative ones, we project the world towards a multipolar universe, where multiple realities coexist, where the devices of design are the product of a cultural DIY (do it yourself) and where the difference is a condition to live together.

Working with a lot of semantics makes diversity an active heritage so that cultural codes increase the possibilities of artifacts, images, spaces, and

relationships. It proposes how the average designs between the individual and humanity, the instrumental world, the symbolic world, technique, and values—a plan committed to the new global realities harmoniously with local conditions.

I am from Colombia, from the Jorge Tadeo Lozano University in Bogotá. I am an Industrial Designer and magister in Habitat, and currently, I manage the Industrial Design programs of the Faculty of Arts and Design. At utadeo, we have committed ourselves to moving in this direction. Still, more than anything else, we have committed ourselves to open the discussion about the practices, the values, the emotions, and the meanings that give meaning to the productions of design. From there, we move forward with projects that establish the differences between one social group and another, between practices and territories.

I want to talk about an international collaborative project we have developed in the Colombian Caribbean—in the San Andrés archipelago, Providencia, and Santa Catalina—around the rampant and devastating Tourism plagues the Island. We do this project in collaboration between Colombia and the United States, where we approach the region's design, heritage, and ecological issues.

Seaflower Biosphere Reserve and Tourism Development

The struggle against the environmental and social crisis caused by global climate change and dependence on neoliberal solutions, such as free trade policies and tourism development, is fought in the most remote corners of the planet (Serenari *et al.*, 2017). There is no doubt that tourism today represents one of the greatest global economic, cultural, and environmental challenges facing countries, as their results are often the deterioration of the physical and social environment, as well as significant disparities in the distribution of wealth. The losses of ecological and economic sustainability are typical problems of places where tourism overflows its capacities. This reality is problematic for many tropical communities of islands and coasts whose primary source of economic sustenance is the profits of the internationally controlled local tourism industry.

A particularly vulnerable place for tourism development policies is the Caribbean archipelago known as the Seaflower Biosphere Reserve. This Archipelago, which includes the islands of San Andrés, Providencia, and Santa

Catalina, is politically part of Colombia despite being 470 miles northwest of its continental territory and only 140 miles east of Nicaragua. It is home to one of the most extensive coral reefs in the Atlantic Ocean (Coralina, 2016). Still, much of the native flora and fauna has been lost with the destructive forces of tourism development, particularly in San Andrés.

It was a thriving island in the first half of the 20th century when it exported coconut to the US, but changes in import policies to this country destroyed that market. In 1955, the Colombian government created a tax-free port, causing dramatic changes in agriculture and the demographic situation (Solano Suárez, 2008). The native islanders, known as Raizales, have a strong heritage connection with their Caribbean Anglo-Saxon neighbors. Still, Colombia, determined to ensure its cultural and political dependence, made the archipelago a significant tourist destination, regardless of socio-cultural cost (Crawford, 2009).

The effects of uncontrolled tourism development are immediately visible in San Andrés: an island that is only 12 km long and 26 km², with a population of over 90,000 people, making it the most densely populated island in the Caribbean. Some 700 to 800,000 tourists annually exacerbate the social and ecological crisis in which the island is located (UNDP-Colombia 2015). In addition, 77% of tourists go to tourist plans with everything included and very few dollars spent outside the international chain hotels. In addition, climate changes and mass tourism are endangering the barrier of coral reefs that protect the ecology and water supply of the islands and threaten the marine life on which Raizales depend. The island of Providencia, 31 miles northeast of San Andrés, is accessible only by two flights per day, is less developed than San Andrés, and depends on the few tourists who receive to supplement the income derived from fishing. In 2016, more than 1,000,000 tourists visited the two main islands of San Andrés and Providencia, whose total area is only 35 km² with a population of almost 95,000 inhabitants (90,000 in San Andrés and 5,000 in Providencia and Santa Catalina). The invasion of lionfish, coral extinction, and excessive tourism are unprecedented threats that devastate island life and ecology.

Another problem facing residents of the Seaflower Reserve is the recent International Court ruling that has alienated a significant region of the Archipelago used by residents for fishing, their main local production activity. The Hague ruled in 2012 that Nicaragua has the right to control a Caribbean area that has long been in the traditional fishing rights zone of the Raizales fishermen. A more recent decision (2017) suggests that Nicaragua

may have even more fishing territory, whose interests in the area include exploration for oil and gas, which could drastically affect local ecology. The loss of their fishing rights and heritage is a blow from which the roots of the British Moskito Kingdom, Jamaica, and Africa, with a strong influence of the English-speaking expatriates of England and the United States, can never be recovered.

Collaborative Approach

With these pressing issues in San Andrés, the Industrial Design Program of the Jorge Tadeo Lozano University in Bogotá, Colombia, and professors from the Departments of Anthropology, Sustainable Tourism, and Industrial Design at North Carolina University, we partnered to develop a long-term project with a collaborative research and development approach, addressing the problems posed by unrestrained tourism and the destruction of heritage claims by residents.

The general objectives of the project are to bring together professors, students, and collaborators from various disciplines, including urban planning, public interest design, anthropology, and park recreation and tourism management, to (1) use this diversity of perspectives to assist local communities and stakeholders in developing appropriate strategies to combat these external threats, including environmental education programs, environmentally sustainable micro-entrepreneurship practices and a re-design of local tourism strategies, and (2) training young designers, anthropologists, and tourism students in data collection and project design in the context of community collaboration.

It is a long-term collaboration, not only because of mutual interest but also because of the complexity of the subject we work with. Hence the North Carolina State University (NCSU) interdisciplinary team works closely with Jorge Tadeo Lozano University (UJTL) colleagues and community stakeholders to create a change model that uses theoretical and applied concepts of public interest design, participative tourism development, and environmental conservation. Once the Seaflower Biosphere Research pilot project is completed, the two Universities can take the collaborative research model to other islands and coastal Caribbean communities where unsustainable tourism practices are physically, socially, and economically harmful. This project also exposes students to applied research methods and practices in community development efforts. Due to the project's interdisciplinary nature, students

and professors of NCSU (Anthropology, Parks and Tourism, Design) develop close connections with the students and professors of the UJTL (Industrial Design, Graphic Design). The purpose is to open promising opportunities for students and faculty at both Universities, including short—and long—term exchanges and study opportunities abroad. In addition, this project not only facilitates connections with the UJTL but also fosters opportunities for long-term collaboration with other institutions involved in the project, including BioComercio Fund, a non-profit entity center focused on the conservation of the environment and Coralina, an environmental corporation focused on the sustainable development of the Seaflower Biosphere Reserve.

Intervention Model

Our project has several phases. The first year, 2016, was used to develop modeling and diagnostic techniques through interdisciplinary collaboration between anthropology and design. The project began in Bogota when the two groups from each University participated in the construction of teams that clarified the meaning of the work, the roles, and the ways of collecting the necessary data to design alternatives that mitigate the impact of tourism in the Islands. All this is a preamble to the first trip that was done collaboratively and interdisciplinary to the place. As a preparation, NCSU representatives organized workshops that provided the UJTL students and professors with additional training in collecting and analyzing qualitative data and participatory action research. UJTL educators and students helped NCSU students and teachers better understand public interest design and intervention possibilities from artifacts, devices, experiences, and services, all of which enable a community to be involved in collaborative design projects. With the holding of these workshops, the exchange of knowledge between representatives of both Universities produced innovative advances in curriculum development for all disciplines represented. Following this, trips to the Islands have been made for a week or two, involving students, professors and potential collaborators who help to understand the nuanced culture that residents face.

Results

In these trips, it has been possible to measure the local reactions of the residents and local officials to proposals of projects aimed at solving the problems derived from tourism. They are proposals defined from six tourist scenarios

(gastronomy, ecology, seas, culture, crafts, agricultural production), involving social, cultural, ecological, and economic development processes based on the residents' particularities and the tourists' interests (Figure 12.1). Each trip has refined these proposals thanks to the direct work with the community and the local and national institutions, who participate in the design and project management processes. The most relevant way has been the contribution of multiple disciplinary perspectives in both universities and numerous cultural attitudes of the local and foreign communities. This is how this work scenario —tourism— is one of the most representative places of what can be the local design with global projection.

Figure 12.1. Tourist Categories and Scenarios in the Colombian Caribbean
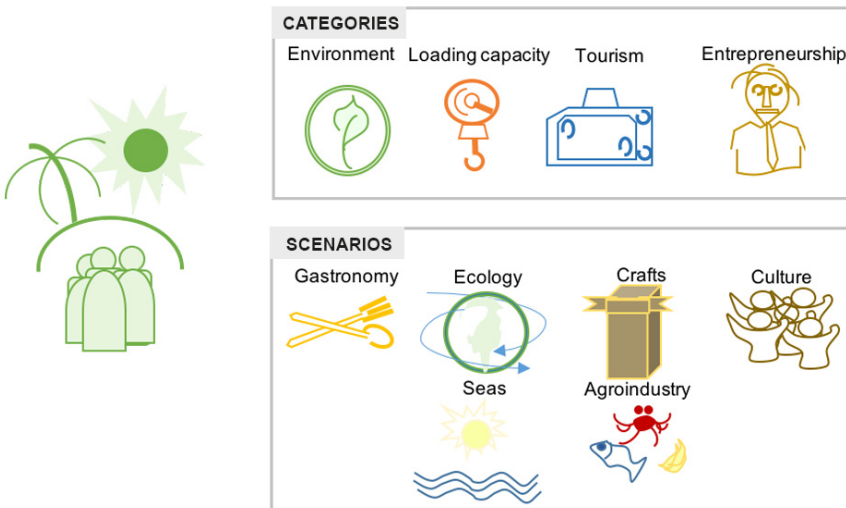
Source: research team project Design of Tourist Experiences

Results Obtained: Years 2016-2017

Pedagogical–Social Innovation–Social Management–Academics:

- 6 industrial design degree projects in the year 2016
- 21 students of Industrial Design at Tadeo University working on the project
- 8 students of Social Science at NC State University working on the project

- 1 Visiting Professor of NC State University in Tadeo University
- 1 academic event with the Raizal community in Bogotá
- Presentation of the main cultural activity in San Andrés: Green Moon Festival
- Community actors working on the project
- Governmental actors working on the project
- Local Entrepreneurs working on craft projects
- Product Design in the craft sector

Results Obtained: Years 2017–2018

Pedagogical–Social Innovation–Social Management–Academics:

- Refinement of concepts and products
- Details for product implementation
- Refining social management models with Entities and Communities

Conclusion

The professional exercise of industrial designers has to do with the symbolic, aesthetic, and functional production of everyday life of men: design of experiences, artifacts, interactions, aesthetic, intellectual, and practical simulations that, among other things, allow us to think about issues such as overpopulation, information, manipulation of energy resources, waste; excess of social exclusion, inequality, promises, oblivion, intolerance, images. Excesses and more relocated industrial design practices in what could be vital—life issues—modify man's capabilities to deal with social crises.

We are facing a disciplinary opening that shows how the industrial imaginary of the XX and XXI centuries is organized beyond material production and work: today, we talk about intangibles and concepts, information society, and knowledge society. A world of opportunities for the design of products, services, images, and, in general, for the building of the cultural landscape, where design ceases to be a medium to produce concrete pieces and becomes a means for the creation of languages, experiences, and cartographies that make the messages of the multiple social realities intelligible.

Through this project, the partner institutions will consolidate an exchange program that promotes the collaborative design of equitable and

sustainable tourism experiences with select destination communities to guarantee, in the medium term, the creation of a graduate program focused on an innovative academic field where arts, design, anthropology, and tourism will come together.

For that purpose, it is important to think about these topics:

Glocal Conditions

- Clash of cultures
- Excessive population and tourism density
- Erosion of fragile ecological resource

Multidisciplinary Perspectives

- Designers understand transformational opportunities.
- Anthropology contributes to a historic-cultural perspective.
- Tourism provides insight into the local effects of the tourism industry.

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Business Strengthening Model Acunar. A Proposal from Design

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In the contemporary dynamics of the market, design plays a fundamental role in strengthening processes in organizations, either productive initiatives, ventures, or companies. Acunar is a design knowledge transfer program that develops a strengthening model in the three dimensions of the organization: strategic, tactical, and operational; it emphasizes design management (the tactical) as an articulating dimension of the strategic and the operational within the company, consolidating the Strategic Organizational System from the SEO-D Design, which allows interaction with the different organizational units to enhance their response to market dynamics and make them more competitive within the framework of innovation.

Introduction

The reflection on design and territory originates in 2005 from the discussions carried out on the insertion of design in the artisanal theme and its impact on communities, which led to a review of international experiences such as those of the Leader program (local rural economic development of the European Economic Community), to be reviewed by authors such as Fernando Martín Juez (2000), Orlando Fals Borda and Fabricio Balcazar (2003) from the social sciences and, on the other hand, views on territory and development in the case de Beatriz Galán (2004), Francisco Albuquerque (2004), Manuel Lecuona (2006 and 2010) And others who influenced the initial theoretical position of the program and the design management approaches developed from the proposed model.

Within the agreement developed between 2006 and 2013 between the Universidad Nacional de Colombia and the District Secretary for Economic Development (SDDE) of the Bogota City Hall, operated by the program, business strengthening processes were developed based on the design of the Entrepreneurs Network Innovators (REI) and the Rural Economy Branch, which allowed not only to build the model but also to reflect, scale and test each of its phases under construction.

Looking back on the program, in 2010, the intervention model that had been built based on all these experiences emerged, allowing its validation to begin between 2011 and 2013 in the different projects developed with the Mayor's Office of Bogotá and the Agro-Industrial Technology Corridor, inside the Universidad Nacional de Colombia.

In a later phase, the model was implemented to develop product dynamics that could be installed in the agricultural sector and the consolidation of value chains, as is the case of the project carried out with royalty resources within the framework of the Agroindustrial Technological Corridor (CTA in Spanish) formulated in 2016: Technologies and design or redesign of products that support the logistics and distribution operating system and also, development of a model in Bogotá and Cundinamarca, which ended in 2018.

The Acunar Program

The importance that the MSMEs sector has gained as a pole for developing the country's local economies and more equitable distribution of wealth has motivated the Colombian state to generate policies and programs that promote its growth.

In this scenario, the Universidad Nacional de Colombia, as a Public University, is related to constructing knowledge through training, research, and extension as missionary axes in constructing the Nation Project.

The Acunar program was created to transfer design knowledge to emerging productive communities committed to achieving social equity, economic competitiveness, and cultural identity.

Therefore, the position of Acunar aims to improve the competitiveness of productive sectors belonging to micro, small, and medium enterprises in the manufacturing, service, agro-industrial, or artisanal fields. It proposes a change in ethics that advocates a collective benefit in preference to the individual, who seeks the good use and preservation of the environment, who is responsible for the complete life cycle of the product and the construction of fair value chains within the organizations and directed to the market, to guarantee the goods and services to the people, who require them and who respond to the dynamics of the market.

Therefore, Acunar focuses on communities whose value addition does not have an optimal insertion in the market and needs to be projected to external markets. It generally requires support at some level relevant to the design action.

Acunar's focus is the territory where the actors, knowledge, resources, and know-how are valued as relevant capital when design operates, recognizing in them the elements of the identity of each community in the interaction with market economies.

Acunar approaches the dynamics of the market and the interaction with organizations from three axes:

The Characterization: The Emergency

Acunar focuses on emerging communities, a situation in the contrast and division between production and market dynamics. Then, an emergency is understood as a situation that arises from the union of new realities in a system with social, cultural, productive, economic, and market changes.

Consequently, understanding the emergency as *what arises* implies understanding it as *urgent*. In productive communities, there is an essential need for coordination between effective units, government entities, organizations that support development at different scales, and the communities installed in the territory (Figures 13.1 and 13.2).

Figure 13.1. The emergency territory as a meeting of the market and production territories
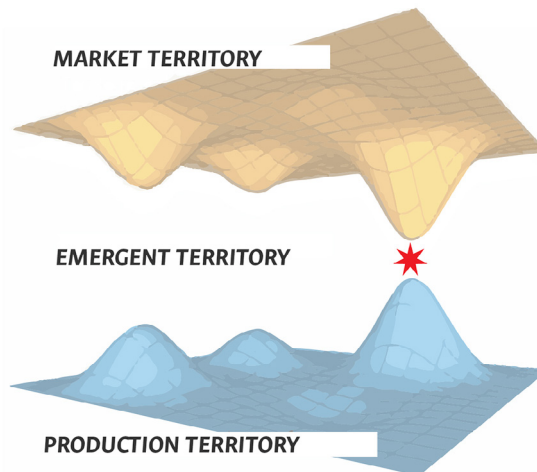
Source: Design transfer in emerging productive communities, Acunar Program.
Design and territory, National University of Colombia, 2007.

The Strategy: Participation

Figure 13.2. Participation is understood as a reflective practice that links polar patterns: action and research

THE DIFUSSED

EXPLORATORY PRACTICE — ACTION — EMPIRICAL

REFLECTIVE PRACTICE — PARTICIPATION

RFLECTIVE CORE — RESEARCH — THEORICAL

THE CONCRETE
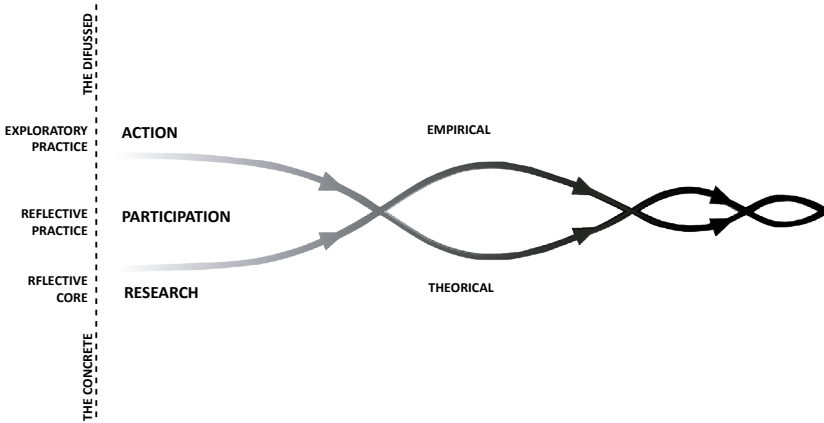
Source: Presentation of the Acunar image 16 program, design and territory meeting, 2006

As a strategy, participation introduces interaction, dialogue, and negotiation processes with the sectors involved, where projects are formulated based on the community's needs and articulated with the vision of the different sectors where the uniqueness of the projects developed for each neighborhood is configured.

Participatory Action Research (PAR) proposes a break in the way reality is approached in processes oriented to developing and improving production and organization conditions in communities.

Furthermore, the recognition of the other as a valid interlocutor with knowledge of their reality, capable of identifying and undertaking processes aimed at improving their standard of living, implies the appropriation of initiatives by the community, which promotes self-management processes and the sustainability of projects, as well as the construction of a more democratic society where plurality begins to be fundamental in the construction of development models.

The Field of Action: the Territory

The notion of territory overflows physical space and includes the relationships that push men to recognize and appropriate their environment to create

communities based on their interests. On the other hand, the actors, the resources, and the valuation of knowledge make the local identities sensitive to be reconfigured in material culture, which as a differential factor is capital to interact in the market dynamics.

The dimension of the territory must allow the productive communities to be strengthened as poles of local development to interact in the global markets. In this process, the objective is to construct an organizational, material, and project culture within the communities (Figure 13.3).

Figure 13.3. The territory as a field of action connects the areas of participation and emergency in the discourse of sustainable local development
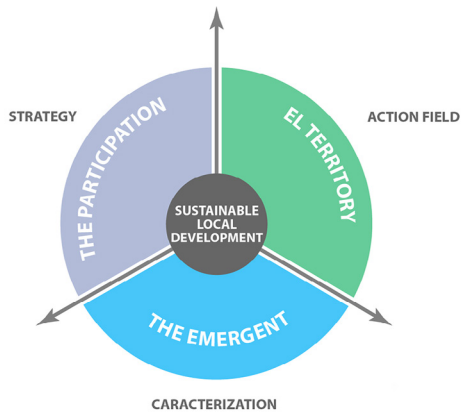
Source: Presentation of the Acunar image 12 program, design and territory meeting April 2006, National University April 2006 headquarters Bogotá

Design as an Activator of Sustainable Local Development Processes

The design understands the relations between the object, the context, and the culture; from this perspective, its capacity to manage the social imaginary is precisely what constitutes a differential factor and a competitive advantage concerning other disciplines, with which it collaborates to act as an articulating instrument of the material, organizational and project culture. Acunar aims to strengthen the social fabric by formulating and implementing development projects in which knowledge transfer generates self-management processes.

Thus, under these principles, we find two phases in the development of the model proposed by Acunar:

Phase 1. Consolidation of the Operational Dimension

The program seeks, from its platform, to generate an inclusive impact within the markets in which the productive communities achieve the development of management models through their accompaniment and intervention in participatory processes, which allow them to strengthen themselves as effective organizations and, in turn, implement the organizational culture, project, and product.

Based on the experiences of the Universidad Nacional de Colombia and those developed in the Acunar program, the structuring of a model of integral strengthening begins, where work is done from three dimensions that allow the construction of the product value chain:

- Packaging, product, and image (EPI for its initials in Spanish)
- Production, from a design vision focused on workers and process intervention, to increase productivity (M&M for its initials in Spanish–better work area, better productivity)
- Distribution and commercialization of the value chain, viewed from the design of services (Viladàs, 2010) as the commercial and service improvement of (MCS for its initials in Spanish).

It is necessary to clarify that these dimensions were constituted from the approach to companies and products and service organizations that, based on the weaknesses evidenced with the characterization tool (a tool developed at the Universidad Politécnica de Valencia and adapted by the program to the Colombian reality) allowed to observe how companies build value chains, their actions, their operation and how this affects their competitiveness in the market.

Phase 2. Improvement Model

As indicated above, the 2010 event allowed us to reflect on the strengthening model that had been built and to make explicit the tactical dimension of the program that was manifested in what was called the *Strategic Organizational System from the design* (SEO-D for its initials in Spanish). This complex structure allowed progress toward a strategy for companies.

Figure 13.4. Strategic Organizational System
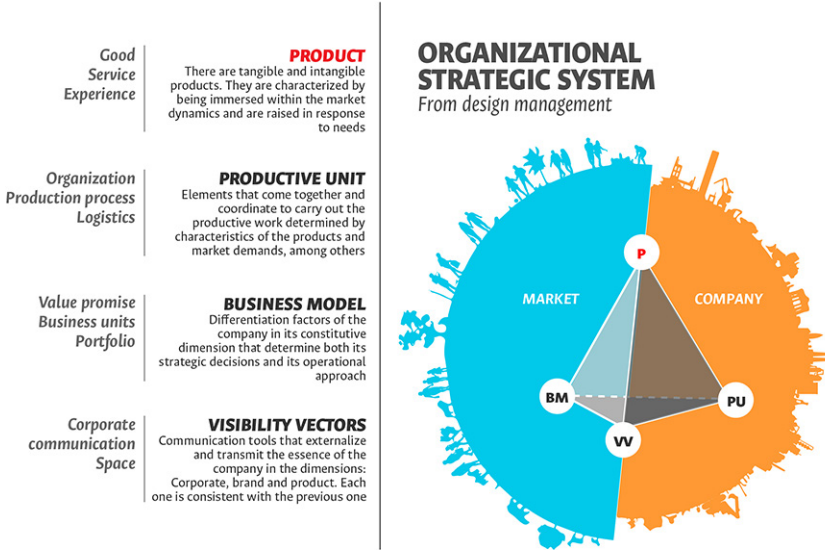
Source: Naranjo, Ortega y Alfonso (2013).

From the point of view of design management, which takes place within the tactical dimension, it is the basis for building strategies for companies. SEO-D takes place within the framework of the Intervention through the Design Model. SEO-D in Figure 13.4).

> The design responds to the strategic aspects of the company, from the development of products oriented to the markets in which it participates, going from a design concept as a configurator of shapes and generator of utilitarian objects towards the construction of value chains in the company. (Naranjo, 2019)

Next, the model is presented with the fundamental elements, its stages, and the subsequent development associated with the tools in the value chain to carry out the intervention in the companies.

In the first instance, the knowledge transfer platform is presented in terms of processes and competencies, which follow the theoretical framework, objectives, and scope that the program sets out from the university's vision, which must be developed with productive organizations.

Processes

They are determined as those stages of the interaction process with the companies to determine the actions to be implemented and developed in a timeline that allows the organization to achieve its strategic objectives for its development in a defined space-time relationship.

- Identify: it is determined by the mapping and characterization of the company, its market within a specific context, and the determination of the consumption profiles it directs to.
- Interpret: It establishes in the diagnosis phase the proactive dimension of the company in front of the future scenario it expects according to the expectations and aspirations, which will guide the adjustments or changes of the business model and the establishment of the short, medium and long term action plan in each of the areas of the organization and the variables of the Strategic Organizational System from Design (SEO-D), decisions that will direct the development plan of the organization.
- Implement: based on the action plan, the activities to be carried out in the four vertices of SEO-D (Business Model, Visibility Vectors, Product, and Productive Unit) are established, which allows to determine and configure the strategic model of the company from what the organization pursues, in front of the market dynamics and the strategic objectives of the organization that allows a projection towards the future from a sustainable and sustainable perspective.

It is here where, from the visualization of the model, the SEO-D appears as an integrating tool between the strategic dimension of the organization and the operational dimension (activities leading to the construction of the value chains of the products), which allows explaining the whole model of accompaniment and intervention from an organizational and management perspective from the design (Best, 2007).

Competences

Regarding the competencies that are sought to be developed through co-construction processes in companies, we find three moments in terms of the cradle-to-cradle model:

- **Recognition**: this is achieved through the transfer of knowledge developed in the first stages of the intervention: characterization and diagnosis. The objective of the program with the companies through the tools used is to be able to carry out the processes of transference of these, which allows them later to carry out self-diagnosis and to control their development, with which the follow-up of the action plan that arises as part of the end of this stage, the actions in the short and medium term can be controlled by the organization and corrected if necessary.
- **Strengthening**: it starts with the implementation stage of the first actions agreed upon with the company, which allows, from the training in action, to transfer the design tools that will enable you to replicate, process and execute the actions proposed in time to comply with the plan from self-management processes.
- **Integration**: is a later phase, which allows the company to correlate with other companies strategically, to strengthen the value chain under supply models or alliances for product development, the production or marketing process, or with other similar companies to better respond to market expectations under forward and backward integration models of the chain, which allows the consolidation of clusters, production chains, strategic alliances or production networks that would enable the construction of more complex value chains to address broader or more demanding markets, either at the level of trends or technology, allowing them to be more competitive.

The strategic design plays a fundamental value in understanding the organization from the design, which, after the reflection made in 2010, became the center of the tetrahedron, which determined the SEO-D.

Model of Intervention through Design

The analysis of the model focused on the process in the implementation stage, allowed us to understand the system of relationships of the four dimensions that had been linearly intervening in the companies, which resulted in the possibility of carrying out a pilot that allowed to make the exercise of passing from a coverage model to an impact model, achieving results that allow to demonstrate and understand the effect of these interventions in

the companies. The modeling of the strategic organizational system is the result of these reflections, which allow us to conclude that the interaction and intervention in the company cannot be linear but rather complex, attacking all the vertexes or dimensions integrally, evidencing the existence of the law of Interdependence that constituted this relationship within the organization.

Interventions to improve packaging, product, and image advocate the installation of design as a managerial and strategic process within organizations, for which different methodological tools and transference tactics have been generated that allow managers to understand the value of design from the conceptual and operational points of view. Therefore, the insertion of interventions in the market dynamics and the characterization of objective user profiles allow the establishment of common areas of dialogue with entrepreneurs, who, in their capacity as businesspeople and solution of operational emergencies, demonstrate from this that the managed and projected design constitutes a great contribution to the commercial success of their companies.

In stage 3 (implement), the action plan is developed in the areas concentrated in the Strategic Organizational System (SEO-D in Figure 13.5).

That is why the interventions have been directed mainly to work with the brands of the companies, and their spokesman in the market, so it was necessary to address the transfer processes from the conceptual creation of the brand, review the values and intangibles that the company's product has developed and marketed. As we can see, the development of packaging, product, and image involves and relates to the visibility and product vectors projected to the market that synthesize, materialize, and communicate the organization's value proposition.

An important element in the tactical dimension is the business model, not seen as in the strategic dimension. Still, it is a structural tool that helps determine the business units that materialize the strategic dimension and contribute to determining a product portfolio to be offered according to the affinity groups or specific markets the company is targeting.

Its construction from the tactical as a research tool seeks input on how the company perceives itself in its target market; how it creates, captures, and delivers value. The manager's answers are taken to the Canvas matrix to make visible the key factors of its current reality that allow determining the organization's actions to achieve the strategic objectives.

In the diagnosis stage, it is proposed to detect, evaluate, and assess the operating conditions of the productive unit. The effective unit is not

only the production process but the structure that the company assumes to add and capture value, as well as the internal and external logistics. It is characterized by including the different lines of command in the Company, the methodological accompaniment, and the consensus for the hierarchy of priorities act, which later materializes in the action plan of the dimensions.

Figure 13.5. Intervention model through design
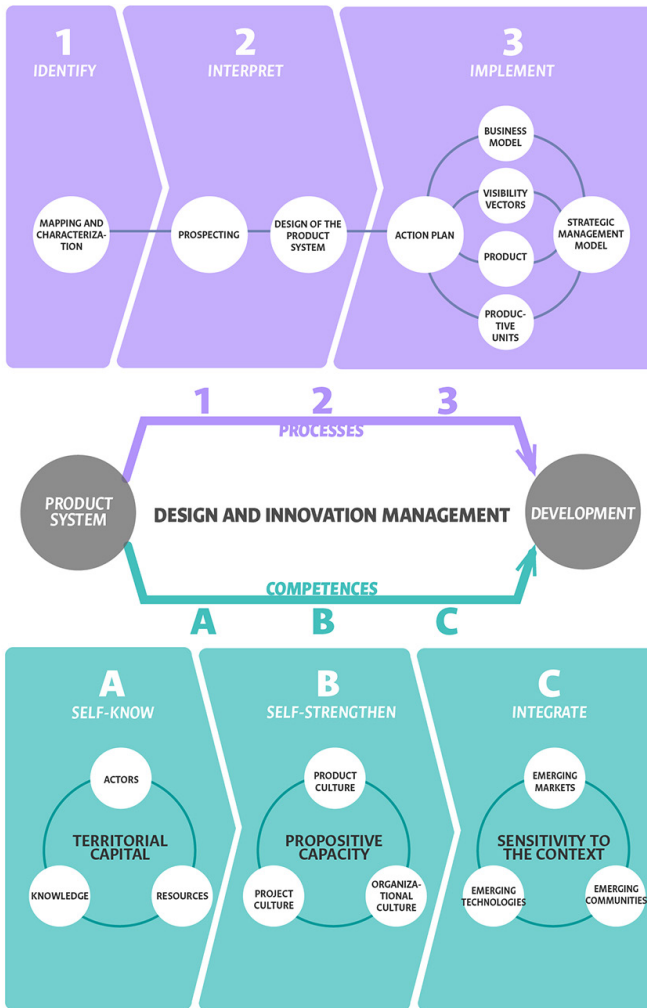
Source: own work

The product dimension seeks to recognize the characteristics of the company's products associated with the markets in which it is installed; identify the competition and its strategies; analyze the trends related to the target group to which the company is directed, and with this information already in the design process (focused on the construction and configuration of the product value chain), establish the brief or executive summary of the product determination The requirements and determinants that will define the profile according to the value proposal.

In closing, it can be concluded that the competitive awareness of entrepreneurs cannot be limited only to the growth of their operations since productivity and competitiveness tend to depend on the satisfaction of the needs of those responsible for the production chains and the final consumer. Responsible support to business organizations will improve human productivity, improve working conditions, and enable innovation processes to be implemented by the responsible actors in the organizations. Consequently, it will increase their competitiveness (Figure 13.6).

Figure 13.6. Acunar timeline, examples of products developed by the Acunar program, associated with interventions with companies and agricultural production initiatives
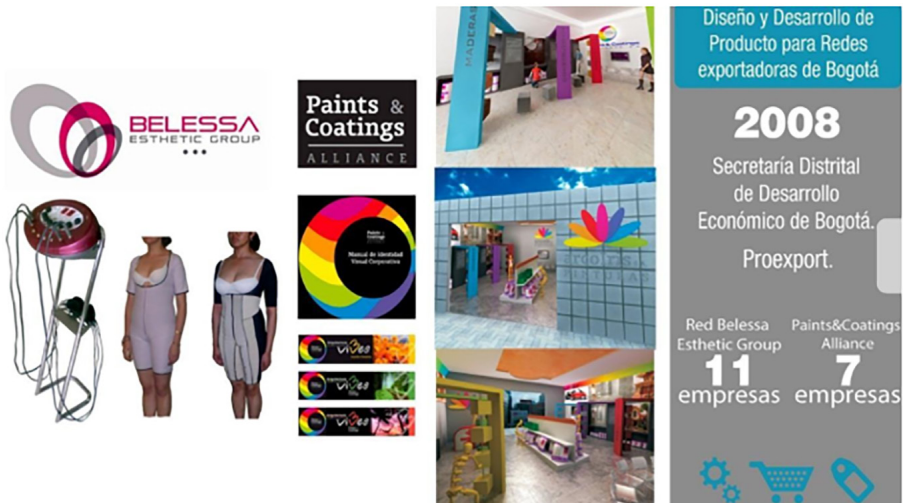
Sistema de recolección para Uchuvas

Sistema de Recolección para Cebollín y Albahaca

Herramienta de corte para Uchuva

Utensilio para recolección de Granadilla

Corredor Tecnológico Agroindustrial I
Desarrollo de empaque y herramientas para Uchuva, Granadilla, Albahaca, Romero y Cebollín

2009

Servicio Nacional de Aprendizaje SENA.
Corpoica.
U.Nacional Facultad de Agronomía y Artes.

Desarrollo de:

2 contenedores   **4** empaques
2 Sistemas de recolección   **1** Herramienta de corte

Fresemillas

Disvinilos

Villa K'nina

El Glotón

Avícola del Tequendama

Mejoramiento de Empaque, Producto y Áreas de Trabajo para las empresas pertenecientes a la Red de Empresarios Innovadores II

2009
Secretaría Distrital de Desarrollo Económico de Bogotá.

Intervención en **21** empresas
5 producto
empaque **10**
6 condiciones de trabajo

Mecanizados CNC

Advantage 6704

ADVANTECH
prendas con identidad secreta

Apiarios El Pinar

OCOA
Miel para tu piel

Fruservice

Frutatto
Deliciosa forma de cuidarte!

Mejoramiento de Empaque, Producto y Áreas de Trabajo para las empresas pertenecientes a la Red de Empresarios Innovadores III

2010 - 2011

Secretaría Distrital de Desarrollo Económico de Bogotá.

14 M&M   **47** EPI
23 Empaques   **17** Productos   **11** Imágenes

Source: Acunar

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Part IV. Learning

Appreciation of Regional Identity and Culture in The Teaching of Amazonian Wood Products Design

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Regional identity and culture are losing ground to global culture as communication systems and technology advance. Young people's lack of interest in local aspects of culture makes them very fragile in a worldwide media context. To contribute to the construction of divergent thinking about this situation, the article presents the process of conducting academic work on the subject of Special Topics in Design III (TED III) of the Design course at Universidade Federal do Amazonas (Ufam), Brazil, where wood product designs were developed using Amazonian legends as a theme. In partnership with Instituto Nacional de Pesquisas da Amazônia, through the Wood Artifact Engineering Laboratory (Leam/Inpa), the study takes a technical, conceptual, and qualitative approach, structured according to the survey and data analysis, carried out in groups, using observational, laboratory and experimental activities that resulted in the creation of a collection of educational toys for children aged 4 to 6 years old. The actions taken follow the necessary steps in the design research process, the appreciation of the regional culture, using visual aspects of the legends and natural woods from the Amazon, considering the traditional, cultural, and technological knowledge to offer to the Design students a greater contact in theoretical and practical experiments so that they can find creative solutions for designing products.

Introduction

The technological advancement that has enabled the improvement of communications at the global level has led to a growing detachment of young people from local culture and identity. The academic environment may be one of the most appropriate to create a way of thinking focused on appreciating what is developed regionally, especially in the cultural context. For Barizon (2006), when this goal is directed towards design, teachers, as well as professionals, must be aware and prepared to plan an academic and work-based

environment according to the following aspects: social, cultural, traditional, environmental, marketable, sustainable and technological, through knowledge and creativity, designers must propose learning resources that are innovative and that take better advantage of the general and intrinsic characteristics of the objects to be studied.

This article presents the results of the subject of Special Topics in Design III (TED III), offered annually at the Design Course of Universidade Federal do Amazonas (Ufam, Brazil), elaborated through the interdisciplinary perspective of relating Product Design, regional woods, and legends of the Amazon. Based on the principles of design, the use of wood from the Amazon region, and elements of local culture, the students developed a toy collection called 'ZUIMÃ' (which in the indigenous language means Child).

The work was planned and executed in stages, and its main objective was to create and disseminate a line of educational toys aimed at children aged 4 to 6 years old. Some species of Amazonian wood were used in the project as a natural resource, made available by coordinating the Laboratory of Engineering of Wood Artifacts of Instituto Nacional de Pesquisas da Amazônia (Leam/Inpa–Brazil). The project also addressed the following objectives:

- Relate the practice of Design as an aid to the actions of reuse of natural resources for product development
- Establish an exchange of knowledge, professional and scientific experience between project participants
- Make Design Students at Universidade Federal do Amazonas (Ufam) aware of the appreciation of regional identity and culture
- Develop a collection of educational toys with elements of regional culture.

Materials and Methods

The research was based on the methods and tools that Gil (2010) studied and is classified by nature as qualitative, applied, and technological research. As for the objectives: descriptive, explanatory, and exploratory research. Regarding the procedures: experimental research. All of them are based on bibliographic surveys and action research. For design practices, as an aid to identifying and reusing natural resources for product development, the guidelines of Krucken (2009) and Oliveira *et al.* (2014) address the theme of local resources and their appreciation for the benefit of communities

and territorial economies. For the choice of Amazonian wood species, the project was guided by the study by Nascimento *et al.* (2010). The definition of the design requirements and parameters related to the research products was driven by the design methodology proposed by Munari (2008), and the experimentation phase (prototyping), followed by testing and evaluation of the products, was performed according to Baxter (2011).

The research range included children aged 4 to 6 years old. The time taken to perform the work was four months. Of the procedures adopted for collecting information, tools, and methods for data quality and control, the project team used guidance forms produced by the coordinating teachers of the work. These documents were used to register field research conducted with the natural products market; weekly meetings were held with *focus groups* to explain and discuss the data collected; such sessions were recorded with a camera camcorder, and the results were recorded in digital files.

The theme of Amazonian legends was defined based on studies by Pacheco *et al.* (2018). The basic themes that children study in subjects such as mathematics, Portuguese, arts, logic, and interaction were considered for creating educational toys.

In the product creation stage, conceptual techniques of technical design, observation design, and construction of semantic panels were used. The graphic software used were *CorelDraw*, *Illustrator*, *Indesign, Photoshop,* and the 3D *software*: AutoCAD and *Blender*. The process of making the toys was carried out at the Leam/Inpa joinery. The laboratory also made available the species of Amazon wood to produce products. A catalog was created with the technical and conceptual information of the project and its products, which will be registered to obtain patents with the Dean of Technological Innovation of Ufam.

Results and Discussions

Design Practice and the Appreciation of Local Resources for the Development of Natural Products

Based on the design theory, the project considered the observations made by Krucken (2009), who states that the appreciation of local resources and products is a very rich theme since it involves physical and cognitive dimensions simultaneously, necessary to understand the qualities of the local context. The

design perspective assists in mediating production and consumption, tradition and innovation, local qualities, and social connections. For this project, the outstanding values in the development of natural products are emphasized:

- **Regional significance:** evidenced by using naturally fallen Amazon woods in the forest (with environmental certification registration).
- **Symbolic context:** emphasized through the representativeness of Amazonian legends, portrayed in the conception and structuring of educational toys.
- **Cultural identity:** blends different regional and local elements in developing a product collection with educational appeal linked to the Amazonian roots, which should be transmitted to its users more contemporarily.

The target audience consisted of children aged 4 to 6 years old. A line of educational toys was developed to present some local legends and generate a playful interaction with the local culture through them. The intention was to ratify the role assigned to toys that, according to Capra (2014), have always been tools people use about the world around them. For the author, toys result from what is understood of nature and people's interaction with it. The purpose was to relate local culture and show how products were integrated into the territory and children; the project reflects on design and its practice for developing products to attribute "interaction" as the basis for making social connections.

Through the TED III course, students understood that appreciating local natural resources in product development guides constructing a new understanding of identity. Such a concept can be strategically differentiated, worked on, and applied by design, as it can idealize scenarios and translate them into desirable visions of products and services that are characterized by their relationship with the territory and its community and thus stimulate the recognition of its originality—with this focus students concentrated on product design of the ZUIMÃ line, considering the following design requirements: relationship of design, local context, and recognition of territory aspects; esteem value of the emotional, aesthetic and symbolic factors; dissemination of cultural identity; and development of educational toys. Figure 14.1 presents one of the moments of the classroom approach to the requirements and parameters required for the project.

Figure 14.1. Theoretical approach to the project contents

Source: From the authors.

Then, Figure 14.2 presents the initial process of students' reflection on the subjects covered and the definition of the conceptual characteristics of the products to be developed.

Figure 14.2. Students and the initial process of reflection and definition of the conceptual characteristics of the project products

Source: From the authors.

Students also took notes and conducted small group discussions to establish a good connection between territory, product, and target audience.

Amazon Woods, Identification Process and Technological Transformation

At this project stage, students had the opportunity to learn about some wood species from the Amazon, their characteristics, symbolic, commercial, and social value, being divided into noble and popular species.

Many wood residues are destined for burning and sometimes used to manufacture low-value products, so the knowledge of the raw material was considered fundamental and obtained through observational, laboratory, and experimental activities carried out in the Leam/Inpa facilities. At Leam, students understood that the reuse of wood could be done with a nobler

purpose, especially waste, which contributes to reducing the pressure around exploitation, with this practice being much encouraged by research institutions, agencies, and universities. Thus, the first contact with the species, presented by the Leam technical team, was visual, where the students observed aspects related to colors, textures, sizes, shapes, densities, dimensions, etc. For each species presented, the information given on its origin (mechanical processing or naturally fallen), location, and an indication of use. Figure 14.3 illustrates the students' first contact with the Leam/Inpa team and the Amazonian species provided for the project.

Figure 14.3. Students' first contact with Leam/Inpa technical staff

Source: From the authors.

After initially selecting some species for their visual characteristics, students underwent basic training to identify species in the laboratory, guided by the Copant (1973) technical standards. They were instructed to observe physical, chemical, and mechanical characteristics beyond the anatomical and organoleptic (smell and taste). They received guidance on properly using wood, considering its color, brightness, odor, texture, density, hardness, and design. This experience provided security for students to identify and explain the species studied. Once learned about the intrinsic and, above all, anatomical characteristics of the woods, the students were invited to participate in a technological action (Figure 14.4), which transforms wood into a commercial product. After initially selecting some species for their visual characteristics, students underwent basic training to identify species in the laboratory, guided by the Copant (1973) technical standards. They were instructed to observe physical, chemical, and mechanical characteristics beyond the anatomical and organoleptic (smell and taste). They received guidance on properly using wood, considering its color, brightness, odor, texture, density, hardness, and design. This experience provided security for students to identify and explain the species studied. Once learned about the intrinsic and, above all, anatomical characteristics of the woods, the students were invited to

participate in a technological action (Figure 14.5), which transforms wood into a commercial product.

Figure 14.4. Students in the process of technological transformation of the woods
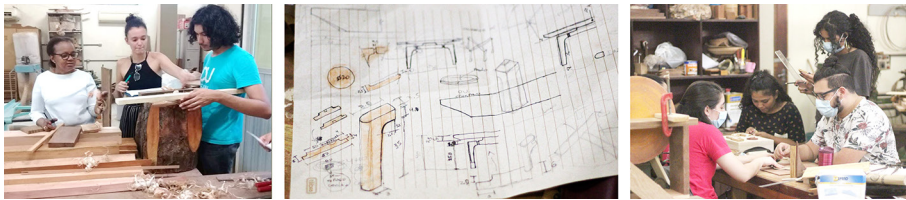
Source: From the authors.

The choice of wood, the definition of dimensions, the shape, the cuts, and the finishing of the piece summarize the technological action to transform the wood into a product. From this, the students planned a small wooden object; they chose one or two species that fit the purpose of the object and then sketched the technical drawing of the piece. With these three pieces of information defined, the students listened carefully to the considerations made by the Leam technical team and the subject teacher regarding the design attributes considered important for a project quality product, the benefits (values) that the product will offer, and the identity and territory aspects, giving meaning to the product and reiterating its importance about the propagation of the cultural context involved. From these guidelines, students considered all the knowledge acquired from the theories and practices applied in Ufam and Leam/Inpa classes extremely important. Thus, they realized that products combine various knowledge in their development process, from the value of raw materials to the most technical production. A thorough study of these is of fundamental importance to achieve the desired result, in this case, the construction of educational toys developed under the TED III discipline.

Amazonian Legends

It is understood by legend, an oral or written narrative, experienced by people visually; they are passed on orally in a subjective way, as it generally comprises heroic adventures in which reality and fantasy mix, making it almost impossible to know where the truth ends and fantasy begins, the account prevailing as a testimony of the event validating the narrative. The legend has geographic fixation and small deformation characteristics and conserves

the popular tale's four characteristics: seniority, persistence, anonymity, and orality. Legends have their basic function to record history or explain facts such as the origin of things, natural phenomena, and supernatural figures. To enhance the regional culture applied to the products and highlight the toy's visual aspects, the theme of "Amazon Legends" was chosen. After a brief survey, the students elected six legends: The Big Snake, Royal Regalia, Curupira, The River Dolphin, Muiraquitã, and Yara. The tales' aesthetic content and visual expressions were considered for the choice process.

'ZUIMÃ' Collection: Differentiated Natural Products with Local Identity

As part of the actions to produce the products proposed by this work, the following steps were defined (according to the proposal for the 'ZUIMÃ' Collection): type of toy; Amazon wood species; design requirements and parameters (design attributes, local identity, wood processing); production of technical drawings; semantic panel construction; prototype making; and user testing. All these also considered the inspiration theme for creating toys: Amazonian Legends, as shown in Figure 14.5.

Figure 14.5. Project steps and user testing

Source: From the authors.

At each stage, the students sought to interact: the acquired knowledge, using natural resources and the technical tools (used to make the pieces) to better pass on the information about the chosen legends (through the final product). The species used by the project include Queenwood (*Brosimum rubescens Taubert*), Muiracatiara (*Astronium lecointei*), Marupá (Simarouba amara), Blackheart (*Cowan Caesalpiniaceae*), and Brindle Angel (*Pithecelobium Racemosum Ducke Mlmosaceae*), all selected by students as per natural beauty, color harmony, and technological potential. The composition made with the design attributes of the products together with the color, texture, brightness, and design of each wood species, characterizing the structure of the elements (characters or shapes) presented by the content of the legends, contributed greatly to the personification, and associate the products generated to their target audience (Figure 14.6).

Figure 14.6. ZUIMÃ Collection

Source: own work.

When students saw their finished products published in a catalog of technical and conceptual information about them, they demonstrated satisfaction and recognition of all the teaching they received. They understood the importance of the exchange of knowledge between concepts of design, natural resources, technology, and, above all, the appreciation of the identity of local products. They saw that transforming local resources encompasses several factors, including the design perspective on valuing raw materials for the supply of new products and the benefit of society in general. Students, in contact with other professionals from other research and scientific institutions,

have acquired a new look to apply design and that the transformation and understanding of the world take place in a more holistic, global, and systemic way. The emphasis is overall rather than on the parts where the need for interactivity, the connection between man, territory, and society is recognized.

Conclusion

In a globalized world, the desire to preserve territoriality and identity of belonging between users and products in a cultural context becomes challenging. Thus, it was concluded from the experience of this project that thinking and acting to develop products of this nature generate needs to which universities, design courses, teachers, and students need to adapt. In addition to creating alternatives that enable future professionals in the field, they have training guided by a practice that values and disseminates local roots, allowing access to this knowledge by new generations. The partnership with Inpa was a significant strategic factor for Ufam design students and a world-renowned research institute. It invests, empowers, and encourages the development of products with regional identity through design interference. This creative and innovative activity can use local features that bring to the effect the richness of new details and compositions that give it not only beauty but also make it unique, endowed with special symbols and representations of a place. For this, designers must take on the challenge of correctly translating and interpreting these cultures and be sensitive to perceiving them as a differential and competitive factor without interfering with their real meaning.

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Impact of Teaching Materials in Learning Geometry

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This research work focused on the advancement of the development of geometric spatial thinking, referring to the recognition of three-dimensional objects and their general characteristics through the use of didactic objects, with students of the third grade of primary school of the Immaculate Conception Educational Institution of the Villagorgona district Candelaria-Valle, a rural territory inhabited by Afro-descendant families, with low academic training, who base their economy as employees of the sugar industry and agricultural work. Despite the need and importance of geometry in mathematics training, his work in the classroom has been minimized due to a greater dedication to the development of issues of numerical thinking unbalancing mathematical performances, and the scarce geometric work done within the classroom has no greater scope for the simple reproduction of geometric figures with pencil and paper. From the present work, a commitment was made to enable a teaching process mediated by active learning, developing a series of practical and sensitive activities focused on three methodological moments: an initial phase of recovery of preconceptions, an intermediate phase of appropriation of new knowledge and the final phase with the application of knowledge in context. Through a qualitative reflexive cutting methodology, participatory action research, and the Van Hiele geometric reasoning model. The results showed the students' advances in recognizing three-dimensional figures, perimeters, and areas, locating coordinates in the Cartesian plane, and understanding geometric characteristics of bi and three-dimensional figures.

Introduction

Geometry is the universal sustenance of mathematics, being the natural bridge of these with the materiality of the universe that surrounds us, from nature to our inventions; they are crossed by geometry as a tool for understanding reality and connection of the concrete and intuitive of mathematics.

Based on the directive of the Ministry of National Education (MEN) which states:

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[The study of spatial properties] involves relating the study of geometry to art and decoration; with the design and construction of craft and technological objects; with physical education, sports and dance; with the observation and reproduction of patterns (for example in plants, animals or other natural phenomena) and with other ways of reading and understanding space (elaboration and interpretation of maps, scale representations of sites or regions in drawings and models, etc.), among many other possible situations that are very enriching and motivating for the development of spatial thinking (MEN, 2006, p. 61).

The learning of geometry is fundamental from the cognitive, serving as an element of value and classification, which gives meaning to reality from the differences and similarities of form, serving as support for learning other elements of mathematics such as algebra, from the procedural it allows the connection of concepts with every day, from the visual value of the geometric concerning the functional, from the form and the movement. And from the attitudinal geometry allows the awakening of the interest of the students from curiosity and experience, facilitating by its nature the development of playful learning activities and stimulating skills. However, despite its importance and function concerning mathematics, teachers and students present many epistemological, didactic, and comprehension gaps during the teaching-learning process inside the classrooms.

From the recognition of the scarce learning, a pedagogical reflection by the teachers becomes pertinent, which allows them to rethink the importance of learning geometry in mathematics, allowing students to recognize through their real context, solve problems, build models, formulate hypotheses, and test theories, through practice and experimentation.

This study integrates a methodology through didactic exploration, the design of physical teaching material, and experimentation activities as mediating learning elements. We seek to stimulate cognitive construction processes through interaction and reasoning from reflections with peers and teachers.

The product design approach, combined with the curricular structure in its dimension of the development of didactic sequences, seeks the design and application of concrete materials as a means of support for teachers in teaching and the student in learning, focused on active learning, which stimulates training through action with activities that students can imagine, experiencing, reasoning, and performing, where the use of teaching material, allows students to use reflection and start the discussion with a solid reference to judge the validity of the statements, instead of the teachers authority

being the only basis for correcting or defining knowledge, as stated by Báez and Hernández (2002).

The development of concrete teaching materials is based on the Van Hiele model for teaching and learning geometry, from which students must identify the shortcomings or difficulties and define how learning levels can be overcome based on the identification of the necessary previous knowledge, as a basis for the structuring of the learning processes (Figure 15.1)

Figure 15.1. Van Hiele model
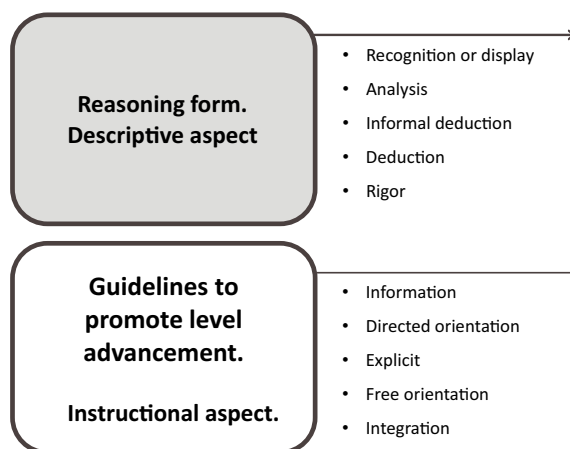
Source: adapted from Guillen (2004).

The accompaniment of the parents was fundamental in the process of construction of the different teaching materials through collaborative activities with the students, which allowed them to approach the academic processes, breaking with cultural paradigms established by the environment in which the project was developed, which is a populated rural center, inhabited by Afro-descendant population that has a very low level of schooling and dedicated to agricultural activities, which implied employing didactic strategies that would connect their worldview, their social and cultural practices, and habits, with significant elements of the territory, which allowed to identify the connection between the school and the social scenario, in their environment creating learning activities, which included elements of their rural environment in the formation of geometric spatial thinking, generating recognition of cultural identity and territorial, through ap significant performance.

Objectives

The general objective is to develop a didactic strategy based on Van Hiele's reasoning model for teaching geometry and the active learning approach as a methodological basis for developing geometric spatial thinking through the application of concrete teaching materials in students of the third grade of primary basic in the Inmaculada Concepción Educational Institution of the Villagorgona district, municipality of Candelaria (Valle del Cauca, Colombia).

The first specific objective is to establish the educational possibilities that using concrete teaching materials contributes to a didactic strategy for teaching three-dimensional objects based on Van Hiele's reasoning model for teaching geometry.

The second is to develop learning activities supported by specific teaching materials that stimulate students to develop knowledge through experience and peer interaction.

Based on the stated objectives, the following hypothesis is postulated:

Using concrete teaching material in learning three-dimensional objects based on Van Hiele's reasoning model enhances learning, improving the reasoning of geometric spatial thinking.

Conceptual framework

For Alsina (1987) "geometry as a body of knowledge is the science that aims to analyze, organize and systematize spatial knowledge. Considering it in a broad sense as the mathematics of space." (La *et al.*, 2007, p. 5); this turns it as a fundamental basis of mathematics where two important elements arise, such as natural geometric language and its significance in a reflection on the nature of the form, and its relationship with the objects associated with the environment, that offers a natural connection with the experience, that gives clear possibilities for the development of concrete didactic material, allowing to change how the students approach their knowledge, and as Montessori (1914) said, "the child has intelligence in the hands" where proposes manipulation and experimentation as direct sources of connection with learning. Piaget (1975) states that "the child learns from action on objects," today we can say that more than action is the interaction that a child can develop with concrete elements, which allows the construction and internalization of concepts since it will enable us to promote the dialogue of knowledge, from experience with the didactic material, which facilitates the discovery, the abstraction and makes meaningful learning possible.

For husbands Van Hiele to develop the geometric activity, it requires providing students with exploratory experiences based on manipulation and interaction activities with concrete materials, such as trimming, working with the geoplane, making tessellations, playing with the tangram and puzzles that favor the level advance predisposing students to learn. (Velásquez, 2014, p. 128).

Working with geometry develops spatial skills, which, according to Gardner (1983), are a type of intelligence that allows people to perceive the three-dimensional environment, transform it, manipulate it, and codify it in abstractions of forms and their intraformal relationships. as inter-forms, which allows them to form a mental model of their environment in three dimensions.

According to Gardner, students are expected to represent their context and knowledge of three-dimensional figures based on the interpretation and abstraction of the emblematic places of their locality through the use of specific teaching materials, which allow them to perform on them mental transformations through deduction and induction, and face them to solve problems of location, orientation, and distribution of spaces, strengthening their spatial thinking and understanding of geometric systems and their dynamics.

MEN recognize the need to include geometry in the mathematics curriculum from the emphasis on the development of spatial thinking, considering it as: "The set of cognitive processes through which mental representations of space objects are constructed and manipulated, the relationships between them, their transformations, and their various translations to material representations" (MEN, 1998, p. 37).

This inclusion allowed to establish the study of geometric systems as a tool for inquiry and representation of space, which is constructed through active exploration and modeling of space, which ranges from intuitive thinking to sensory-motor development, where it acts with the manipulation of shapes, situations in the environment, displacements, translations, and measurements, etc., to a conceptual or abstract space where the ability to internal represent the real space, is required, reasoning about abstract geometric properties, predicting the results of perceptual interpretation influenced by the physical, cultural, social and historical environment, helped with models and figures, with words of ordinary language, with gestures and body movements.

As an essential element of the mathematics curriculum, geometry is included in the various guiding tools of the learning processes, based on the Basic Competence Standards (BCS) created by the V in 2006 as clear criteria to judge compliance with a learning expectation of Colombian students and the

Basic Learning Rights (BLR) created in 2016 as the set of structured learning for students in all academic cycles, (Table 15.1).

Table 15.1. Defined scopes of the guidelines, BCS, and BLR taken and adapted from (MEN, 2006, p. 80) (MEN, 2016, p. 25) and (MEN, 1998, p. 57) MEN

Educational tool	Performance
GUIDELINES	Bodies, surfaces and lines Two-dimensional representation of three-dimensional space
BASIC STANDARDS	I draw and describe three-dimensional bodies and figures in different positions and sizes. I differentiate attributes and properties of three-dimensional objects.
DBA	Describe and argue possible relationships between the values of the area and the perimeter of flat figures (especially quadrilaterals). Describe and represent two-dimensional and three-dimensional shapes according to geometric properties.

These scopes arise from the development approach of the Van Hiele model for geometry teaching, which allows the development of students' communicative abilities and their relationship with the environment. This model is based on Piaget's theory of space, in which the need for understanding is prioritized over memorization, exposing how geometry teaching should be carried out: "Through it, visual perception, logical reasoning, and application to specific problems are developed" (Barrantes and Balletbo, 2012, p. 26).

Each student's individuality allows one to find different levels of reasoning in the same classroom, so it is required that from previous knowledge, it would work inductively, with learning activities and teaching material that structures the teacher to advance level once perfected the previous one. To perform this reasoning action in an organized manner, five learning phases are specified according to the Van Heile model (Table 15.3).

The method's effectiveness lies in the phased monitoring of the five levels (Table 15.2).

Table 15.2. Levels of reasoning of Van Hiele

Levels of reasoning	Description
Display	The student recognizes and reproduces the figures but does not differentiate their parts, components, or characteristics. At this level, the objects on which students reason are classes of visually recognized figures as "the same way."
Analysis	It recognizes the figures, their components, properties and characteristics but does not establish relationships or classifications of the properties of different families of figures. At this level, the objects on which students reason are the kinds of figures they think in terms of sets of properties that they associate with those figures.
Informal deduction	Recognizes figures, their properties, and characteristics, establishes relationships between families of figures; reasoning continues to be based on manipulation. It does not organize a sequence of logical reasoning that justifies his observations. At this level, the objects about which students reason are the properties of classes of shapes.
Deduction	Make logical and formal deductions and demonstrations by recognizing and justifying the proposed propositions. Understand that there are several ways to get a result.
Severity	Analyze the rigor of several deductive systems and compare them to each other. Students formally reason about mathematical systems, can study geometry without reference models, and formally reason by manipulating geometric statements such as axioms, definitions, and theorems.

Source: Adapted from Vargas and Gamboa (2013) and MEN (1998).

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Table 15.3. Phases of learning in the reasoning levels of the Van Hiele model

Phases of learning	Description
Information	It is the first contact with the concepts, previous knowledge is identified.
Directed Orientation	The concepts are explored when carrying out the activities and solving problems with the materials provided by the teacher.
Explicit	They exchange their experiences, comment on what has been observed, and explain how they resolved the activities within the group dialogue.
Free Orientation	The knowledge acquired is socialized and various situations or problems are applied.
Integration	They relate what they have learned with previous knowledge. Activities are organized about what they have learned.

Source: Adapted from Vargas and Gamboa (2013).

With these two elements under the Van Hiele model, a didactic sequence is proposed, with the necessary contents, as processes of improvement of spatial thinking (Figure 15.2), of which the first three stages were applied in the investigation:

Figure 15.2. The sequential organization of content to improve spatial thinking.
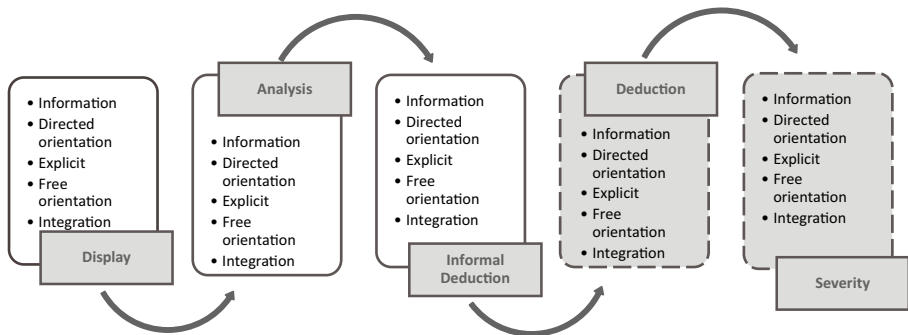
Source: own work

Structuring knowledge in sequential processes allowed determining the use of various teaching materials to reach the levels of teaching and learning of geometry.

This application is given through the didactic strategy, a teaching model with which it seeks the needs of the students to structure the joint actions that the teacher defines to achieve the training objectives in the teaching-learning process by giving priority to participatory activity and contextualization of activities, leaving aside protagonist role of teacher, motivating active participation of students in the construction of their knowledge and advance the level of reasoning according to their particularity (Table 15.4).

Given its methodological flexibility, strategy becomes essential to implementing relevant actions according to contents and context, defining paths and results, and can be adjusted if necessary.

Table 15.4. Components of a didactic strategy

Components	Description
Name	It gives personality and allows the appropriation of those who perform it
Context	Where the strategy will take place, it provides support for the choice of materials, tools and type of activity.
Duration	Time in which the strategy will be applied should be prudent to allow the student to have appropriate knowledge.
Goals	You want and need to reach these goals in the teaching-learning process. They focus on the learning that the student will obtain according to the difficulty encountered
Competition	It is the learning that the student must know when completing the strategy activities.
Theoretical support	It is the focus of learning. Any theory, approach, or model that strengthens the design of the strategy
Content	Specific knowledge (concepts) that are required to achieve the objectives. The contents are declarative, procedural, and attitudinal.
Didactic sequence	The teacher and the student carry out procedures, instructions, and deliberations within the strategy. It should have as a strategy to frame the activities at times (pre-instructional or initial, instructional or development, and post-instructional or closure) that improves the understanding of what you want to reach.
Resources and means	Any person, body, or object that provides the relevant information to facilitate student learning. They can be visual, auditory, audiovisual, printed, multi-sensory or technological.
Evaluation Strategy	The process of reflection and assessment of student achievement could be qualitative or quantitative. It allows for keeping the processes and the goal of teaching learning consistent.

Source: Adapted from Feo (2010).

The concept of "Didactic material" groups all those perceivable elements that facilitate the understanding, discovery, or appropriate concepts at different times of a didactic sequence based on their use or mediation in the development of learning activities, the use that will be given will depend on the needs identified by the teacher, in the development of the teaching sequence within the classroom, as well as the skills and reasoning that are intended to develop.

The same teaching material can have different functions according to its characteristics and the teacher's instruction (Figure 15.3).

Figure 15.3. Division of teaching material.
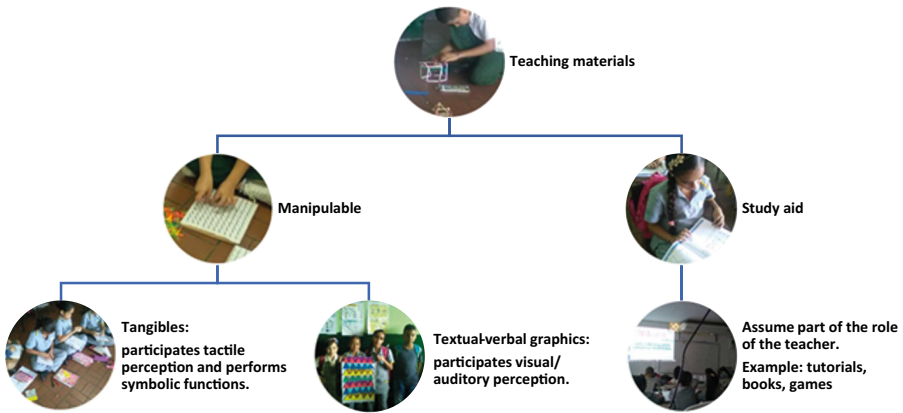
Source: Adapted from Uicab (2009).

To carry out good educational work, it is necessary to recognize the pedagogical and objective needs that teaching material must provide to achieve the curricular training objectives. Its development must be contextualized within the educational intervention that is intended to be carried out, considering the following aspects (Figure 15.4).

Working with material lays the foundation of ideal learning in mathematics, through experimentation and interaction with their peers, it can internalize abstract geometric concepts more naturally.

Figure 15.4. Aspects of selecting teaching material.
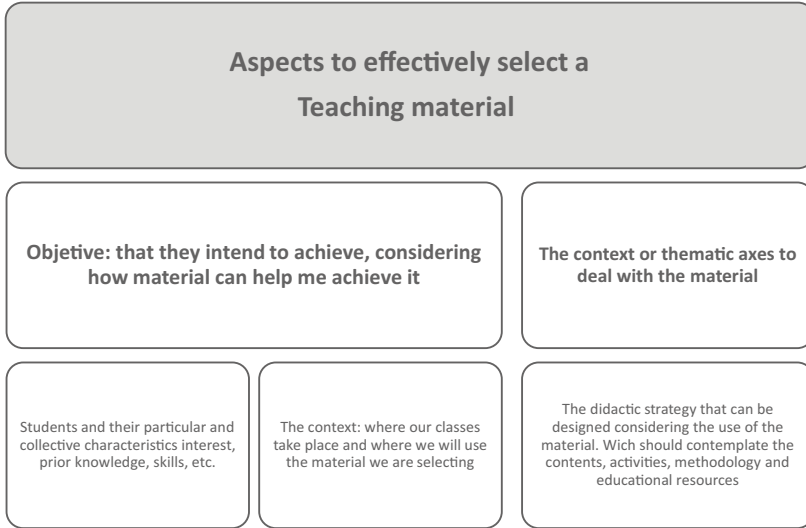
Source: Adapted from Valenzuela (2012).

Methodology

For the application of this work, a qualitative reflexive methodology was proposed based on the development and implementation of a didactic strategy focused on the various situations that may arise during the relationship between previous knowledge and the construction of new knowledge that must be acquired. In order to facilitate the study of three-dimensional objects and the development of geometric spatial thinking in 3rd grade students, a didactic material that follows a didactic sequence is proposed, that is, a series of learning activities, determined by the following cognitive variables:

- **Cognitive visualization variable:** Directed as the informative phase where the student establishes the first contact with the activity, knowledge based on that should be developed as the basis of the orientation phase.
- **Cognitive construction variable:** From the orientation and explanation phases where the students are related to the concepts and can accept or deny concepts or affirmations from the collaborative work. From the Van Hiele model, work of the level of reasoning called analysis begins. It allows them to exchange their findings and experiences with classmates and teachers.

- **Cognitive reasoning variable:** where students integrate their previous knowledge with the new knowledge acquired, achieving the abstraction of elements of the figures and solids, making conjectures about the solution of an activity, demonstrating from arguments the falsity or veracity of an affirmation, solving problems evoking the lessons learned, exposing works done from their actions and geometric implications. It is intended to improve the quality of the analysis reasoning level.

The research is deployed in 4 stages of development (Table 15.5):

Table 15.5. Stages of research development

Stages of research	Goals	Understanding
Stage 1 Failure Analysis	Identify the aspects that hinder the learning of three-dimensional objects in third-grade students	The design of a diagnostic test is performed, which is applied to third-grade students. A survey model is applied to teachers in the first cycle of schooling to recognize the work of geometry in the classroom.
Stage 2 Variable Identification	Analyze the possible variables for the work of active learning and three-dimensional objects.	The variables are described based on theoretical references and according to national educational policies (curricular guidelines, standards of competences, and basic learning rights)
Stage 3 Structure of the Didactic Strategy	Plan the didactic strategy based on the analysis of shortcomings and the variables.	The activities that make up the didactic strategy from the different moments (before, during, and after) are described, and the work is done with the students.
Stage 4 application analysis	Systematize and organize the data obtained.	The processes observed during the development of the didactic strategy are described. The results are analyzed in contrast to the established variables.

Source: own work.

As a controlling result means, in the methodological process, it is proposed to confront the results of the diagnostic process that allows identifying the shortcomings, with those obtained after the implementation of the strategy to identify its impacts, with the support of a control group.

Implementation of the didactic strategy is presented with an active learning approach, where students are encouraged to find the knowledge for themselves by developing the instructional guides of each activity and applying it to real-life situations, observing, discovering, and doing it through concrete teaching materials.

Tools

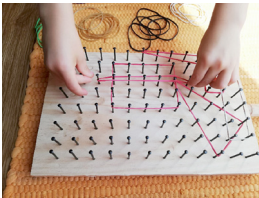Tools used for research development and analysis can be divided into two dimensions:

- Didactic tools for implementing strategy formed by learning activities and teaching materials.
- Tools of qualitative and quantitative analysis for collecting and studying data obtained through evaluative monitoring and control tests.
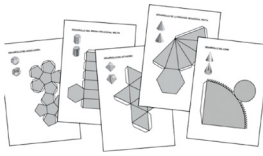
Teaching Tools

For activities development of didactic strategy, various didactic materials were developed and used, adapted by the teacher according to training and practical need of the activities, materials that had to respond to technical and pedagogical requirements to develop their function (Table 15.6), that in their application during learning activities development were accompanied by written instructional guides so that the student could carry out their activity, in addition to verbal instructions from the teacher.

Table 15.6. Teaching materials used

Teaching materials	Description
The Geoboard	The Geoboard aims to predispose the student to the understanding of the Cartesian plane, coordinate pairs, perimeter, area, and flat figures. It also allows the student to visualize the figure, identify its characteristics, perform operations by modifying an initial figure (movements of rotation, translation, and reflection, enlarge, reduce), find its area and perimeter, and achieve greater and better apprehension in geometry. The geoboard allows the student to learn through manipulation, experimentation, and verification through actions that stimulate mental processes when practicing to solve problems.

Teaching materials	Description
The Tangram	The tangram is intended to stimulate the student in geometric thinking by solving problems and creativity by forming figures from the seven geometric figures that make it up. The tangram allows the student to understand concepts of perimeter, area, flat figures and their relationship, rotation, and translation of the figures, between
Development Modules	With the help of templates, the developments of the geometric figures are defined, which are located on cardboard. Using the cutting action, the edge follows the silhouette of the development, the lines fold them, and the tabs glue them to form the solid. Each student group must perform three solids during the class to develop the other activities later. They are used for the student to perform processes of observation of three-dimensional objects and from them can recognize their characteristics, in addition to understanding the spatiality they occupy.

Source: own work

The Analysis Tools

For quantitative strategy analysis, the databases obtained from the diagnostic test application and final test are considered, respectively, where previous and subsequent learning of the didactic strategy was evidenced. For this, the following method is used (Figure 15.5).

Figure 15.5. Method for data analysis

Database analysis → Calculation of centrality and dispersion measures → Development of graphics based on information → Graph Analysis → Conclusions

Source: own work.

The information-gathering elements were raised based on a control group and an experimental group, initially developing a diagnostic test designed to measure the appropriation level of previous concepts necessary in geometry

to address the issue of three-dimensional objects in control and experimental groups.

Results

The gamification process, that is, obtaining scores during the work, was positive because it kept the students with expectations for solving the activities and obtaining a reward only until the moment before and the beginning of the phase. Still, after working with the geoboard and the development of geometric concepts, it was noted that completion and accuracy of the activities by students was already a factor of personal satisfaction of their mental process, who forgot to ask for the points: half of the development of the during, the strategy had been eliminated by students themselves.

Analysis of Results

The objective of the diagnostic test, with an application of the initial test, sought to face previous concepts necessary in geometry to address the issue of three-dimensional objects in the control group (GC) as in the experimental group (GE) (Figure 15.6).

Figure 15.6. Frequency histogram of the initial test
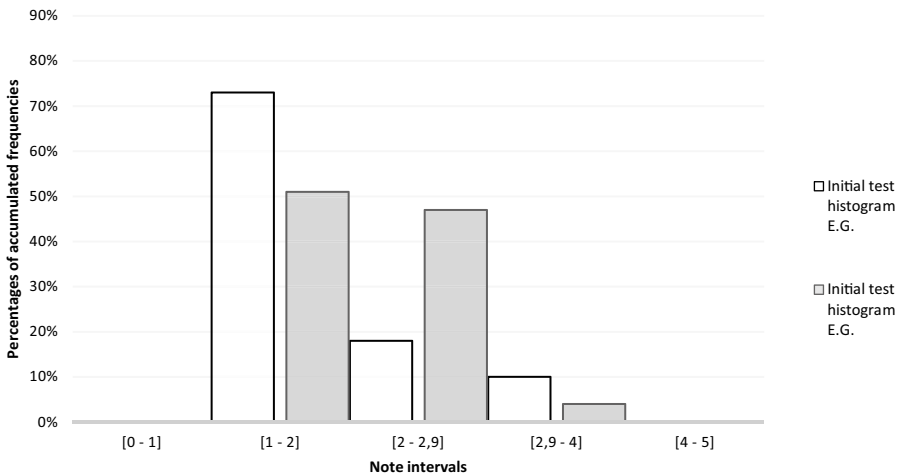
Souce: own work.

Once the process of didactic strategy application in the experimental group and the culmination of the work with the control group is finished, a second test, the final test, is intended to recognize the progress of appropriation of geometry and recognition of three-dimensional objects.

Figure 15.7. Frequency histogram of the final test
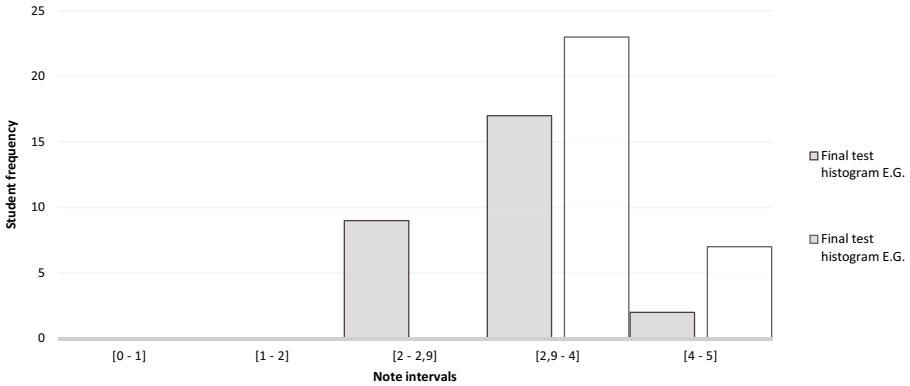
Source: own work.

In the final test (Figure 15.7), it is observed that in none of the groups, there are students with grades of less than 2.0; however, the control group has nine students with grades below 3.0, which places them in the low level of performance according to institutional system qualification. For the experimental group, there are no students with grades lower than 3.0. In the range of grades of 2.9 to 4.0, it is observed that the experimental group meets more students, the same as in a range of 4.0 to 5.0.

Conclusions

The need to use specific teaching materials and incorporate active learning methodologies is a clear fact against the data collected in this research. Still, even more so with the emotions and behavior observed in students during the development of work activities, which can hardly be reflected in this paper, but that from his experience shows us its relevance and importance as a tool to support the teaching-learning processes.

From documentary reflection, it is determined that the Van Hiele model and the active methodology are pertinent for the teaching of three-dimensional objects in geometry with third-grade students due to the approach of a sequential work, organized and with the primary participation of the student, who, through the manipulation of geometric representations, can make reasoning from a material approach to abstract concepts in a natural and fun way.

The strategy was successful because it allowed learning about three-dimensional objects, improved the previous learning of students against geometry, advanced to the level of analysis in the Van Hiele reasoning model, and improved the development of spatial thinking supported by materials concrete didactics as facilitators in the construction of knowledge, which makes it relevant for students in the third grade of primary school, from their active nature, while maintaining motivation towards learning geometry.

The elaboration of the didactic materials was done with the accompaniment of the parents, and iconic geometric references of the context were used, allowing recognition of the territory and an approach of the family environment to the educational context, generating significant training dynamics that impacted the Cognitive construction of geometric spatial thinking.

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Creative Industries as a Vehicle for the Projection of the Territory. The Case of Abacko

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Chapter 16

The creative industries represent a powerful means for boosting the terri-tory's projection and enabling regional economic growth. During the last decade, scholars and practitioners have highlighted the positive impact of the creative industries on society, diversity, and national income. However, collateral impacts such as the projection of the territories have been scarcely addressed in the academic field when referring to creative projects different from films. Furthermore, the current study emphasizes the importance of public initiatives that promote the development of creative industries that explore the image of a certain territory. To this end, we analyze the case of "Abacko", an innovative digital-learning spinoff developed by researchers at the National University of Colombia in Palmira. We conclude that creative projects have an enormous potential to produce a wide variety of applications that might generate several effects. Exploring how creative industries, design, technology, and new narratives can be combined to promote the projection of the territories might be an interesting opportunity for future research.

Introduction

The industry originated in "individual creativity, skill, and talent" (Unesco, 2001, p. 1) is regarded as the creative industry. Creativity and new narrative approaches are invaluable sources to create value and contribute to building and enhancing the image of the territories. Nowadays, creative industries have reemerged with an essential role in society, not merely because of their impact on local and national economic growth (Breznitz & Noonan, 2018), but also because of the improvement of human living conditions (United Nations [UN], 2018) has enabled societies to focus not only in the basic neces-sities (Baculakova & Harakalova, 2017), and thus, to invest resources in more sophisticated products and services such as culture, art, and entertainment.

Following Müller *et al.* (2009), creative industries contribute to society and the economy through urban and regional development, employ-ment, and new business opportunities. Creative initiatives might improve the relationships between diversity, innovation, and social integration and can

also craft a regional identity (Markowska and Lopez-Vega, 2018; Smallbone *et al.*, 2005). Going a little further, several sources point out that cultural and entertainment proposals (*e.g.*, movies, TV shows, or novels) work as agents that shape the image of a determined country or territory and may influence the spectator's choice of tourist destinations (Mestre *et al.*, 2008).

Exploring how creative industries, design, technology, and new narratives can be combined to promote the projection of the territories might be an interesting opportunity for future research. To summarize, there is strong evidence supporting the importance of creative industries due to their contribution to growth (Müller *et al.*, 2009), social integration and diversity (Smallbone *et al.*, 2005), and shaping the image of a territory (Mestre *et al.*, 2008). However, there is a lack of research bridging the potential of cultural and entertainment proposals besides films and series (for instance, video games, digital platforms, or graphic novels), the projection of the territories, and the role of public initiatives (Tung *et al.*, 2019). To partly fill these gaps, the current study examines how public initiatives might promote the projection of a territory through the creative industries. By analyzing the case of Abacko, an innovative digital-learning spinoff developed by researchers at the National University of Colombia in Palmira, we portray the linkage between the three key constructs: public initiatives, creative industries, and the projection of a territory. We conclude that creative projects have an enormous potential to produce a wide variety of applications that might generate several effects.

Creative Industries (CI)

According to the Department for Culture, Media, and Sport (DCMS) of the United Kingdom, "creative industries are industries originated in individual creativity, skills, and talent, which have a potential for wealth and job creation through the generation and exploitation of intellectual property" (Skavronska, 2017, p. 92).

In Latin America and the Caribbean (LAC), the term "orange economy" is usually used instead of CI or creative economy (Benavente & Grazzi, 2017). This concept covers the whole range of activities that can produce creative or cultural services or goods prone to be protected by intellectual property rights. In Colombia, CI has a relative weight of around 1.8% in national added value and concentrates its efforts mostly on cultural industries (42.4%, including audiovisual and video games), functional creations (34.5%, which include advertising, software, design, and digital media), and arts and heritage (23.2%,

including theater, dance, plastic arts, and craft fairs) (National Administrative Department of Statistics [Dane in Spanish], 2019).

For the CI to flourish, creative ecosystems must be developed. This involves private and public sectors, organized civil society, and consumers (Benavente and Grazzi, 2017). Research and technological organizations, public agencies, and educational institutions are crucial for providing and supporting skills and networks. Additionally, as pointed out by Skavronska (2017) and Breznitz and Noonan (2018), creativity demands appropriate conditions in the environment to preserve and leverage creative and innovative abilities and even more when the outcomes depend largely on new technology (Müller *et al.*, 2009).

Public Initiatives in CI

By public initiatives, we refer to actions promoted and coordinated by the governments and their agencies that lead to the emergence and strengthening of projects and endeavors devoted to the creative industry. Public initiatives in CI may be oriented to different purposes. For instance, to promote channel of investments, export earnings, social inclusion (Foord, 2009), to facilitate intellectual property and property rights (Pratt, 2005), venture capital support and subventions (Fagerberg, 2017; Glauco *et al.*, 2017), incubation, advisory and mentoring programs (Cunningham, 2002), access to infrastructure and restricted technologies (Foord, 2009; Potts, 2009), regeneration of public space (Rius & Sánchez-Belando, 2015), and to promote culture and national identity (Foord, 2009; Pratt, 2005).

Several authors (Breznitz & Noonan, 2018; Müller *et al.*, 2009; Yu, 2018) have highlighted the criticality of public initiatives for creative firms because they usually lack resources and bargaining power with clients, suppliers, and other key players. To take a concrete example, the Brazilian Development Bank facilitates access to audiovisual, music, and media for the game industries (Benavente & Grazzi, 2017), which might otherwise undermine the financial health of the creative firms.

Projection of the Territory

Some places, indubitably, have the power to evoke emotions and meanings. Moreover, in some cases, it is only necessary to refer to those places by naming them for experiencing the same feelings. All these aspects constitute

an idea, an image of a territory consistent enough to be projected to several persons (Adrián, 2006).

The cinema is considered one of the most powerful vehicles for the projection of the territory (Kim *et al.*, 2019; Mestre *et al.*, 2008). The projection of the territory can be reinforced through channels such as the press, propaganda, or geo-branding (Nikitin, 2018), but also through movies, series, and other types of creative products. Notwithstanding, productions such as anime or video games are becoming more important (Tung *et al.*, 2019). The evoking may become so remarkable that it can influence people in choosing tourism destinations (Kim *et al.*, 2019).

The image of a territory can be exploited and promoted in various forms, but especially in a creative way, thus serving as the vehicle for reinforcing the projection of the territory. Hollywood is a great example of how the image of territory (*i.e.*, the US) can be exploited and reinforced simultaneously; it can be said that it has created a sustainable vision of the territory.

Methods

Considering the lack of academic studies addressing alternative creative projects and the projection of the territories, it is appropriate to perform an exploratory case study (Yin, 2009). The case was conducted with a digital learning spin-off based in Palmira, Valle del Cauca (Colombia). We apply semi-structured interviews and benefit from having an observer and participant in the project on our author team. Direct observation, interviews with the key actors of the project, and access to internal documents enable us to understand in depth the particularities of the evolution of the project, the role of public initiatives, how the projection of the territory is addressed, the achievements, and the challenges as well. We conducted interviews with the director and two collaborators. In total, we conducted three formal interviews, seven informal conversations, and one of the authors participated in 25 team meetings. The interviews were conducted between July and November 2020. All the interviews were recorded and transcribed verbatim. In addition to interviews, we collected secondary archival data from the spin-off (*e.g.*, website, press release, presentations).

For data analysis, we follow the narrative strategy described by Langley (1999). This strategy aims to "achieve an understanding of organizational phenomena, not through formal propositions but by providing the vicarious experience of a real setting in all its richness and complexity" (Langley, 1999,

p. 695). Our objective is, thus, to provide a thick description of the case, as conducted by Bartunek (1984), to allow the readers to dive into the project.

Research Context

In Colombia, the public sector has developed some initiatives focused on digital production and research by funding projects in public universities. One of these initiatives was coordinated by the National Direction for Academic Innovation (known in Spanish as DNIA), an internal department of the National University of Colombia (Unal). The objective was to create digital content to solve some learning difficulties among the students at Unal; one of the approved proposals gave birth to Abacko, the case study presented in this research.

Abacko is an EdTech spin-off created in 2017 at the National University of Colombia in Palmira, which develops educational applications based on gamification, local narrative, and discovery learning. The spin-off works with its methodology that emphasizes the collaborative work among disciplines such as Physics, Pedagogy, Graphics, and Industrial Design.

Findings

In this section, we present our case analysis. The case unfolds over four phases (see Figure 16.1). For each phase, we show the strategies and actions taken by the team during the process.

Figure 16.1. Phases of Abacko
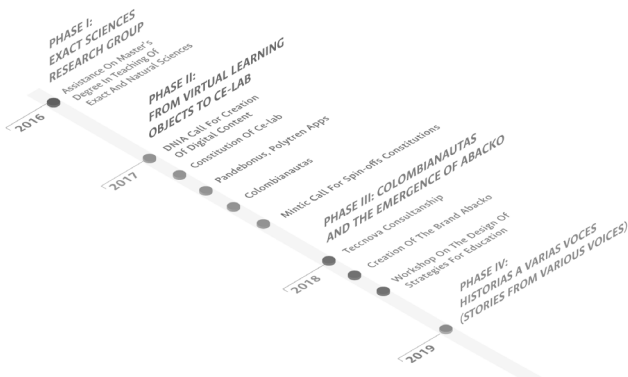
Source: own work.

Phase I: Exact Sciences Research Group

The proposal, which gave birth to Abacko, was led by the director of the master's course of Exact and Natural Sciences and was aimed at developing tools to improve the student's learning experience in mathematics. The first results were released in 2016 and consisted of digital and physical learning objects created jointly with the candidates for a Master's Degree in Teaching Exact and Natural Sciences at Unal Palmira and with the support of the Industrial Design Department. The learning objects were tested in certain remote rural areas, where teachers from schools and colleges created the first generation of digital educational resources that captured students' attention.

Phase II: From Virtual Learning Objects to Celab

After the relative success of the first generation of digital educational resources, the director of the Master, with the support of the DNIA, opened the call to consolidate an interdisciplinary team integrating illustrators, pedagogues, and engineers. To that end, the team decided to incorporate new technologies and media into the project. Thus, the Science, Education, and Innovation Research Laboratory, CeLab, was formed.

During 2017 and 2018, CeLab developed five apps (PandeBonus, Polytren, ColombiaNautas, Numeralitos Salvajes, and Numeria) that integrate playfulness and narrative in multiplatform and augmented reality apps for teaching mathematics.

The products connect the territory and the learning experience in several ways. For instance, in the app Numeria, using a combination of Virtual Reality (VR), Augmented Reality (AR), users are challenged to recognize the university campus through activities and dynamics framed in mathematics. The game *Numeralitos Salvajes* set in Arauca, on the west border of Colombia, uses institutional colors of regional schools and employs illustrations and characters representing local fauna and flora, all within one 3D interactive interface aiming to introduce students to the basic concepts of the fractional numbers. Additionally, the game Polytren gets users into a virtual tour on the Pacific Train–which in the past connected cities such as Buenaventura, Yumbo, Palmira, and Cali, while they learn about polynomials.

Phase III: Colombianautas and the Emergence of Abacko

Once again, the iterative experimental cycles lead the team to create a platform that integrates all the playful apps. In the words of one of the collaborators that were interviewed for this study:

> The idea of Colombianautas arise by chance: a professor had created a map of Co-
> lombia, and during one of the tests for product development, our team put 'Panela'
> [a game's character] inside that map and let her walk, climb mountains, cross rivers,
> and so on; and I wondered what would happen if we put all our applications and
> games in this map, (…), and we saw that this could be the connecting thread of all
> our work: a platform which allows the free exploration and interaction within the
> Colombian digital geography.

This launched Colombianautas (see Figure 16.2), a platform that presents an open-world video game enabling the 3D exploration experience through the Colombian geography, where the character discovers in valleys, rivers, and mountains, the gates containing the minigames which are created based on the local identity of the wide diversity of Colombian regions. For instance, on the route from the southern region to the country's extreme north, the player will find natural and sonorous landscapes, animals, plants, characters, and representative places.

Figure 16.2. Pacific region landscape. Platform Colombianautas

Source: Provided by Abacko

From this new platform perspective, CeLab decided to participate in the call launched in 2017, organized by the Ministry of Information and Communication Technologies (MinTIC) and Teccnova for the Creation of Spin-Off Companies. CeLab won and was favored by receiving support and

training to consolidate the business project. In this process, it was identified that the core of the products created was how the learning experience was connected to the territory. Moreover, the whole experience represented a discovery learning process because while users interact with the virtual map and apps, they learn about Colombian geography and territorial diversity. To consolidate this original and valuable insight, Teccnova suggested the conformation of a spin-off, so the trademark Abacko was created as a more commercial brand open to both public and private investors.

Phase IV: *Historias a Varias Voces* (Stories in Various Voices)

Along with the new integrated platform, the team realized that it could open the spectrum for teaching other subjects besides mathematics. According to the project director in one of the interviews: "students can learn something more than math with this platform; students might learn something special from each region."

This triggered the creation of the project *Historias a Varias Voces* (Stories from Various Voices), an application based on narrative to teach and promote cultural and oral traditions of Colombian ethnic groups considered as minorities. The underlying idea is to promote the preservation of cultural heritage, territory, stories, and languages. This project is currently being constructed and seeks to participate in national calls.

Discussion. Education, New Technologies, and the Territory

Digitalization and new technologies enable the creation of new relationships between students and learning processes (Crittenden *et al.*, 2019). Nowadays, several products and services offer revolutionary educational experiences (Elmqaddem, 2019). However, there is a concern regarding the potential loss of local identity against a standard identity that offers a homogenized world vision through the aesthetics and sounds of the apps and games (Revilla Gutiérrez, 2011).

Therefore, strengthening local identities is also part of the overall mission of Abacko. As informed by the project director in one of the interviews:

> Right now, we can find in the market a bunch of video games and platforms which teach maths and sciences, but they use a foreign language; we have always learned

> things with outside stuff, like Disney things, and so on (…). They [the books] come from different countries with stories and narratives different from ours, and we just don't fit into that, and we are not learning from things that make us feel identified.

Yet, Abacko also found out that through their products, they can contribute to the projection of the Colombian territory as well. According to Tung *et al.* (2019), video games have an enormous potential for destination marketing, unlike films and series; video games enable users to interact directly and freely with the environment. This, coupled with the permanent government's interest in promoting tourism (EFE, 2019), represents an important opportunity that could be explored.

The Role of Public Initiatives

As we presented earlier, authors such as Breznitz and Noonan (2018) argue that public initiatives are crucial in funding creative firms. Coupled with the lack of resources and bargaining power, new entities like Abacko usually have technologies and products in previous marketing stages. Therefore, commercial negotiations with profit-oriented firms are significantly difficult. Hence, following the literature, public initiatives contributed positively to the development of Abacko. However, in one of the interviews, the team considers that "the financial support is very limited (…) especially for technological and long-term projects like ours", as explained by the director.

Opportunities and Challenges

The product portfolio developed by Abacko represents an innovative proposal for educational purposes that integrates technological platforms, pedagogical techniques, and the design of visual interfaces and aesthetics that evoke country's historical, cultural, and geographical aspects. This integration has improved the learning experience by promoting the discovery and exploration of Colombian territory. The spin-off firmly believes that the merge between the design, digital platforms, and narratives enables the construction of local imaginaries and regional identities. Likewise, one important goal of the firm is to function as a bridge-builder for connecting the new generations to the rurality and the cultural heritage.

However, there are conflicting aspects that challenge the growth of the spin-off. For instance, on the one hand, working under the Unal's umbrella

has helped the firm in many ways (*e.g.,* to set up the team, financing the first stages, and sharing prestige), but on the other hand, it is an entity with a huge bureaucratic burden that slows down the dynamism that a spin-off like Abacko should have.

Another important barrier faced by institutions like Abacko is access to financing. This constraint is also reported in the literature. For example, Cunningham *et al.* (2008) suggest that the lack of financial resources is the biggest challenge for CI. To avoid over-reliance on public funding, Abacko has attempted to raise funds from private entities. But it has not been an easy task; according to Abacko's director:

> The private firms are looking for market-ready products, or close to be commercialized. Additionally, these private entities provide only limited resources, and for projects like Abacko, are insufficient. So, we are looking for entities that understand that we are still in the developing phases, and we are proposing a co-creation approach because we probably need another two or three years to get the intended results.

Therefore, the spin-off focuses on finding different public and private financing mechanisms, taking advantage of the public initiatives to develop digital projects and generating new product proposals to extend the scope of the application.

Conclusion

This research aimed to examine how public initiatives might promote the projection of territory through alternative creative industries. To that end, we present the case of Abacko, an EdTech spin-off developed by researchers at the National University of Colombia in Palmira, in which public initiatives have proven to be crucial for the firm's development.

In Colombia, the vast ecological and cultural richness is an inexhaustible source of inspiration for creating innovative projects, full of interesting features that are powerful elements to evoke territories. Exploring how creative industries, design, technology, and new narratives can be combined to promote the projection of the territories might be interesting. We find that narratives coupled with folklore can raise citizens' awareness of the importance of cultural identity.

Finally, we remark on the importance of documenting the experiences in which the role of the state in the development of creative industries was

significant and how this situation has influenced a particular territory. A territory without identity is vulnerable and exploitable; on the contrary, valuing its culture and uniqueness can contribute to leaving behind the paths of violence and war. The return of public initiatives supporting creative industries aiming to promote the territory is, in many ways, beyond the economic benefits.

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Proposal of a Methodological Tool Inspired by the *Heliconeacea* Family

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Since humans existed, nature has been taken as a reference using observation. It seeks to obtain many solutions, most simply without a greater effort (Forniés, 2014). This document references the Heliconeacea family, which is ornamental and connotes a rooted identity to the variety of native/local flora belonging to Colombian territory.

To achieve the development of this tool, initially, it was necessary to elaborate an instrument that delves into the botany discipline, whose approach is the analysis of 21 species belonging to the campus of the Universidad Nacional de Colombia-Palmira, from where it was extracted and found a large morphological variety of this family, whose characteristics can diverge and converge with each other, which enriches the formal interpretation and facilitates the inspiration in the development of elements. After elaborating on the analysis instrument, the methodological tool is structured, as previously mentioned, it seeks to facilitate the inspiration in Industrial Designers from the approach of the creative stage of Design. This proposal is validated in two parts: 1. From the students who develop each step of the proposed method and 2. Each proposal is evaluated and concluded by an expert panel, and recommendations are made to validate the tool.

Introduction

"Since the beginning of the time, the man has observed nature as an example and a source of inspiration" (Forniés, 2014, p. 12); nature is dynamic. It acts for itself and takes all its sources for its welfare. That is why humans, searching for intellectual growth and trying to get better in their quality of life, get inspired almost totally by biodiversity (behavior and morphology) for the elaboration of inert elements that supply the second-level needs to the fifth level, as Maslow's pyramid said (1943).

Trying to highlight the interest in natural inspiration and to spotlight the large variety of Colombian flora and wildlife, where a lot of them are native, and others have adopted the characteristic of tropical weather and

grounds that exist in Colombian territory, cataloging as 2nd most megadiverse country of the continent, which generates an internationally recognizable identify and is the source of national pride. Thus, the investigation is made analytically with 21 Heliconia species from the Universidad Nacional de Colombia, Palmira, to stand out the characteristics and generalities of the species belonging to Heliconeacea's family and convert them into a reference for the product's development.

Regarding the previously mentioned, Industrial Design can be distinguished as a highly productive relationship; as well, the discipline "demands from the designer an abundant dose of abstraction and creativity" (Chaur Bernal, 2005, p. 22); this evolves the requirements accordingly, and this process is complemented and significantly enriched from the study of Nature. In Industrial Design, generally exist, for the development of products/services, methodologies organize the Design process, generating a step by step that structures and regulates the scope of a project; it is taken from inspiration analysis instrument for the elaboration of a methodology tool which to intervene the conceptual design phase. Finally, that tool is validated by searching to evaluate its efficiency and effectiveness from an activity with students of Design and an expert's panel.

Frame of Reference

Industrial Design, in its need to regulate the discipline, begins its work from the planning and development of methodologies which is defined as: "the description, validation, study, analysis, and use of various methods, that is, it conducts a study of the most appropriate methods for its use in each particular case" (Forniés, 2014, p. 65) since the use of the methodologies and what has been planned has specialized, has developed in itself the management of Methods, Techniques, and Models, to strengthen its management.

As the Methodology is a sequence of steps, in the case of this research, it is especially about the "Creative phase," where Benami and Jin (2002) claim that it is a highly creative process; following this idea, it is also considered "unpredictable" (Guerrero *et al.*, 2014), from which the ideation of the proposals and the design motif diverge. In this phase, some items make the Design process efficient and, as a result, an input that responds to the needs of living beings. "Conceptual design is often considered a process that transforms a customer's need or a desired function into a conceptual solution" (Yong *et al.*, 2015, p. 12).

By understanding the relationship between Design and everything that surrounds us (the natural), it is reduced, according to Singh *et al.* (2012), the disparity and the gap between synthetic and natural arts, allowing morphological attributes to be rescued for the formal conception development of the solution (Briede & Robolledo, 2013). For 2 million years of evolution, on earth, the survival of every living organism is carried out by natural selection, where some individuals managed to adapt satisfactorily to the living conditions of the moment (Darwin, 1859).

Taking into account the arguments previously raised, it is necessary to highlight the great relevance of Nature in Industrial Design, research, and the universe; The lives that occur in the universe are of great formal wealth and colors, of patterns and structures; it is straightforward to find discernible patterns, geometric shapes which are not there randomly because yes, these usually have a foundation; although not necessarily linked to the perfect geometric bodies that usually occur since the construction of the human (Sánchez & Miramontes, 2009).

According to what was commented, nature inspires many disciplines to develop their proposals; therefore, in this investigation, a Family of the Vegetable kingdom is taken as a source of inspiration and analysis, characterized by being native to tropical America. These are chosen because of their peculiar shape and how striking the Family is. "Colombia is one of the richest countries in the world in Heliconia species. It has an excellent heritage represented by around 100 species, equivalent to 40% of Heliconia species that exist on the planet, according to the latest studies" (Martinez & Galeano, 1994, p. 13; citing Berry & Kress, 1991); for this reason, there is an interest, apart from the abovementioned, to work with this species since there is a great variety of the Heliconeacea family on the University campus of the National University of Colombia, Palmira headquarters.

Methodology

This investigation belongs to the Design and territory modality and delves into the native flora of the Colombian territory; a methodological tool is developed whose premise is the botanical analysis of 21 species of Heliconias belonging to the campus of the Universidad Nacional de Colombia, Palmira, which two are native of the Reserva Nacional Forestal Bosque de Yotoco, Valle del Cauca (Colombia) and remaining 19 although they reproduce in South America, they are more common in Colombia as a result of his tropical weather (Figure 17.1).

Figure 17.1. Common elements in the family
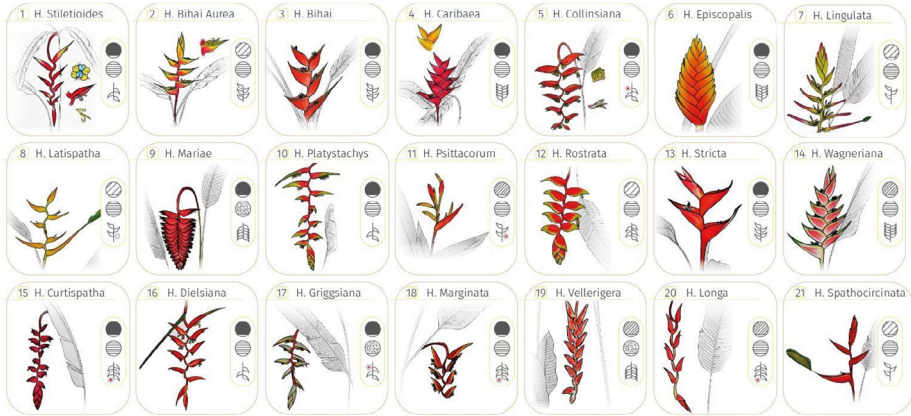
Source: Own elaboration inspired by Ábalo and Morales (1982), Berry and Kress (1991), Chanes, (1979), Dondis (1976), Jerez (2007), Martínez and Galeano (1994), Maza and Builes, (2000), Tumago and Flores (sf) and more).

Starting from the observation of the variety of species that can be born in a certain space, each one with characteristics but also generalities, can be obtained great morphological wealth where can be observed size, scales, shape, colors, compositions, contrast, patterns, texture and others variables described by Ching (2007), Rincón (2010) and Wong (1997), which correspond to the bases of industrial design (Figure 17.2), This trend analysis serves as an inspiration for product development in the case of the discipline (Industrial Design).

As a reference to the analysis instrument of the Heliconeacea family, the methodological tool is developed, which is related to a Design methodology whose author (Hans Gugelot) developed for the ULM school in 1963 (see Figure 17.3). This methodology builds the foundations of good form (Gute Form) (Rodríguez, 2014) (Figura 17.2).

Figure 17.2. Structural axes and different elements of the Heliconeacea family
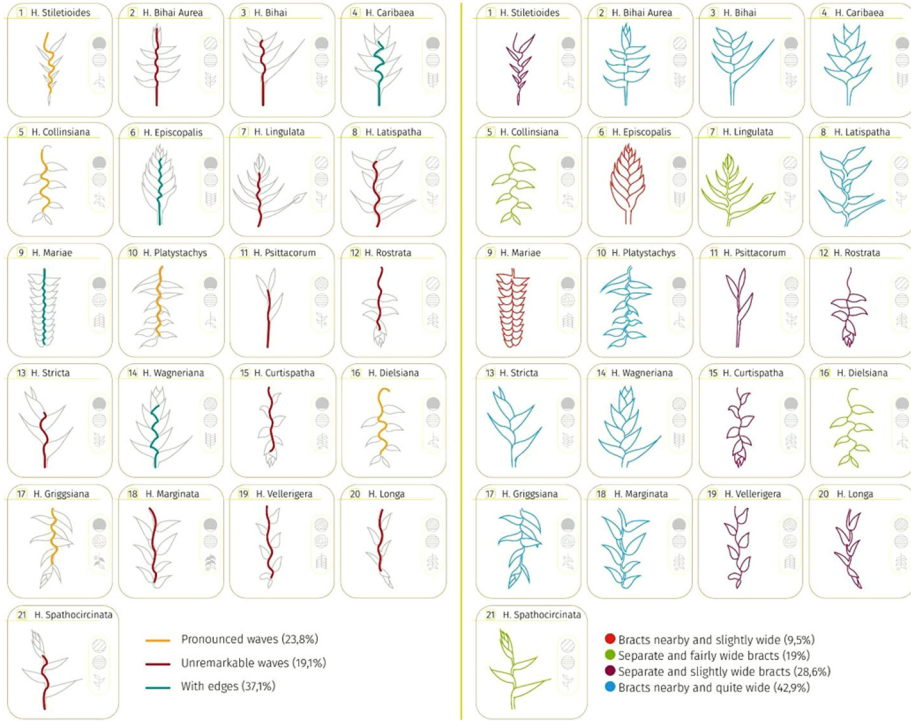
Source: Own elaboration inspired by Ábalo and Morales (1982), Berry and Kress (1991), Chanes (1979), Dondis (1976), Jerez (2007), Martínez and Galeano (1994), Maza and Builes (2000), Tumago and Flores (sf) and more.

Figure 17.3. Methodological proposal related to the Hans Gugelot methodology
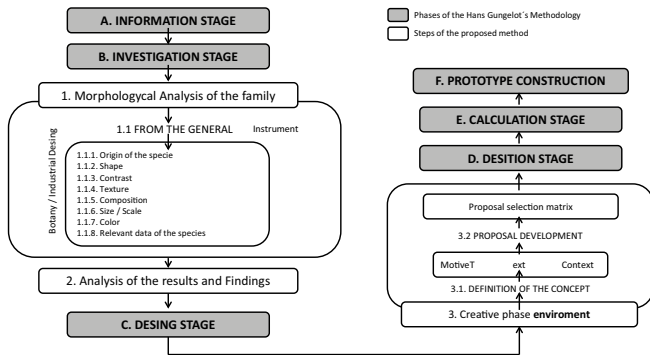
Source: Own elaboration inspired by Rodríguez Morales (2014)

Results and Recommendations

The validation of this tool has the participation of 6 students who carried out an activity. It was made between 1 and 4 proposals that follow a base methodology and the methodological tool proposed. The students had available informative material on the 21 Heliconia species; this took as a reference of inspiration one of these species to the development of their proposals.

In one of the case studies, the student has available all the material for the development of a project (Methodological tool and methodology to work, Concept, and record with references of nature); the student follows a sequence given by the methodology and methodological tool for the development of a project/product, but this exercise only emphasizes the creative phase which is based on biodiversity (in this particular case in a species of the family Heliconeacea), to design a product with characteristics inspired by such species. It is important to emphasize that the development of these proposals does not reach an object level or validation.

Later, 2 experts who had experience in research issues related to nature and Industrial Design evaluated the proposals developed by the students and wrote necessary recommendations and conclusions to do feedback. The results are exposed in Figures 17.4 to 17.10.

Figure 17.4. The student responds to all steps of the creative phases (Phase No.3) of the Proposed Metho
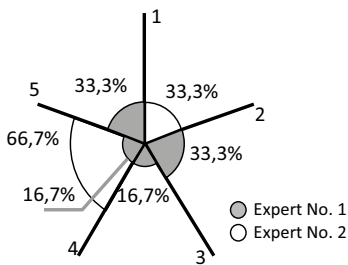
According to each expert, one considers that 4 of 6 participants (66.7%) respond to this phase. Conversely, the other expert considers that only 2 responses total (33.3%) and 1 qualifying in 4 (16.7%), the remaining percentage does not provide positive results (33,3%)

(1) expert 1) and (33,3% (2) expert 2).

Source: own work

Figure 17.5. The student properly understands and applies the steps
of the Method in their work
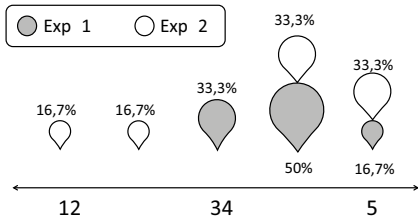
Expert No. 1 considers that 66.7% understand and apply the methodological steps, and 33.3% obtain a neutral qualification. Expert No. 2 evidence that only 66.7% responded to the question, and 33.3% did not get a positive rating.
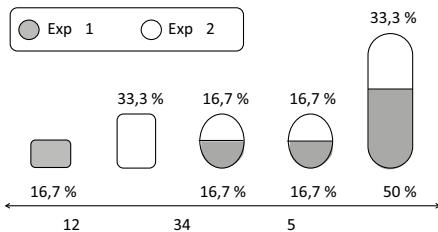
Source: own work

Figure 17.6. Coherence between the concept and the proposals
that the student develops
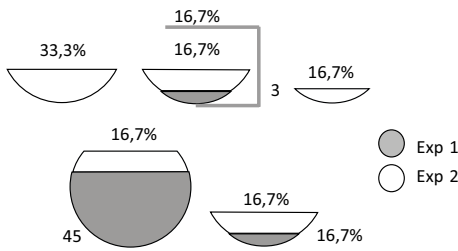
According to each Expert, expert No. 1 considers that 83.3% of the sample is consistent with the issue, and the other 16.7% obtains a negative rating. Expert No. 2 considers that only 33.3% answer the question, 50% do not answer, and 16.7% are neutral.

Source: own work

Figure 17.7. Relationship between the concept and the proposals

Expert No. 1 says that 66.7% responded to the referent, 16.7% did not, and the other 16.7% remained neutral. Expert No. 2 states that 50% respond, 33.3% do not, and 16.7% remain neutral.

Source: own work

Figure 17.8. Formal coherence of the proposals with the referent of nature
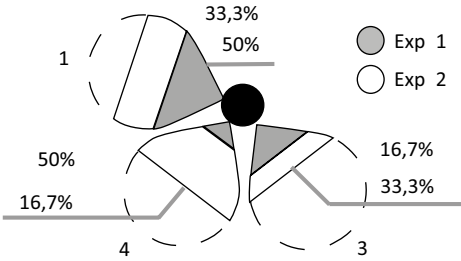
Expert No. 1 considers that 66.7% of the proposals are consistent with the referent, and 33.3% is average. Expert No. 2 considers that 83,3 answer the question, and the remaining 16.7% are neutral.

Source: own work

Figure 17.9. Need and design opportunity raised in the proposal development
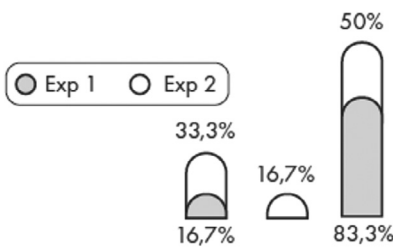
Expert 1 says 83.3% answer this question, and 16.7% rate it neutral. Expert No. 2 considers that 66.7% respond and 33.3% are neutral.

Source: own work

Figure 17.10. Features of the proposals
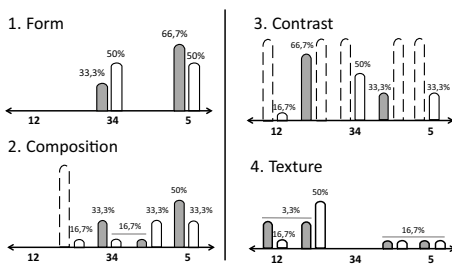
Expert 1 expresses, according to the grade obtained by students, that the variables with positive responses are form and composition, giving a rating of 5 to 66.7% and 5 and 4 to 66.7%; contrast and texture are not positively rated. Expert 2 thinks the same, but with different percentages: 50% qualifying in 5 to the form and 66.7% qualifying in 5 and 4 (33.3% in each).

Source: own work

Experts consider that there are factors that prevent a clear understanding when applying a concept because the teaching and application of the concepts vary in each class, and this reflects the process of each student, which evidences a different approach to executing a project. Therefore, students do not perceive that phase in the same way. Experts recommend being as specific as possible to avoid confusion about who creates this tool.

Conclusions

It is important to delve further into themes related to nature because it has a big morphological wealth, structural of colors, and more characteristics that can be used in abundance to inspire the development of Industrial Design projects. The students who participated in the workshop proved greatly satisfied with the result of the activity; they had nearly all the creativity and proper tools to develop proposals since the inspiration of the selected heliconia.

Finally, the methodological tool obtains positive ratings from the students and experts, effectively provides elements for inspiration, and facilitates the creative phases of Industrial Design. However, it works according to planted objectives. It is necessary to evaluate and modify some variables.

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Onomastic Index

Design & Territory: Emergencies and Conflicts

Design and Territory compiles different approaches related to the appropriation of design by communities, their identity, and their affectivity with the environment. Design is subject and action; it works from several disciplines in configuring spaces, objects, systems, communication, and strategies. The territory promotes dynamics that constitute the interaction systems of people and communities.

The interrelations between design and territory allow its study from multiple perspectives. The interaction between people and objects, images and spaces, shape multiple realities in the territory, where the local, the regional, and the global overlap and interrelate, giving rise to different forms of perception and valuation of experiences. The text compiles 17 approaches/ interpretations of this relationship, channeled from inter-institutional collaboration and academic networks; these approaches focus on diverse contexts, moments, and geographies, with visions from the periphery and the center, presenting courageous and sensitive interpretations of the territories explored; and are organized in four parts.

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