An Eco-Technological Approach to Handcraft Production. Two Cases in the Colombian Caribbean Region*

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Abstract

The present article is a result of the research entitled "*An eco-technological model for handicraft production in wood carving and weaving with Iraca fibres*" with the rural communities of Galapa and Usiacurí, located in the Colombian Caribbean region. We centered our analysis on the productive reality of the artisan communities, for which we sought the relations between the variables associated to the local technology. We worked using participatory methodologies. The eco-technological model we obtained reveals the complexity of the key relations existing among the artisan groups in order to achieve an appropriate productivity level. We concluded that the global economic challenges for the rural artisans calls for a technological productivity based on the sustainable use of the natural resources that is necessary for the handcraft production.

Keywords author:

Eco-technological Model, Colombian Caribbean region, handicraft production.

Keywords plus:

Handicraft industries, artisans, handicraft, Caribbean region (Colombia).

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Una aproximación eco-tecnológica para la producción artesanal. Dos casos en el caribe colombiano

Resumen

El presente artículo es el resultado de la investigación titulada *"Un modelo eco-tecnológico para la producción de artesanías de talla en madera y tejeduría con fibras de iraca"* con las comunidades rurales de Galapa y Usiacurí, ubicadas en el Caribe colombiano. Centramos nuestro análisis en la realidad productiva de las comunidades artesanales, para lo cual se analizaron las relaciones entre las variables asociadas y la tecnología local. Trabajamos con metodologías participativas. El modelo eco-tecnológico que obtuvimos revela la complejidad de las relaciones fundamentales que existen entre los grupos de artesanos con el fin de lograr un nivel adecuado de productividad. Llegamos a la conclusión de que los desafíos económicos globales de los artesanos rurales llaman a la productividad tecnológica basada en el uso sostenible de los recursos naturales que son necesarios para la producción de artesanías.

Palabras clave:

Modelo eco-tecnológico, Caribe colombiano, Producción artesanal.

Palabras clave descriptores:

Industria artesanal, artesanos, artesanías, región Caribe (Colombia).

Approche éco-technologique à la production des artisanats. Deux cas dans le Caraïbe colombien

Résumé

Cet article est le résultat d'une recherche intitulée «Un modèle éco-technologique pour la production artisanale de bois et tissage avec des fibres d'Iraca» avec les communautés rurales de Galapa et Usiacurí, situé dans les Caraïbes colombiennes. Notre analyse est centrée sur la réalité productive des communautés d'artisans. Nous avons analysé les relations entre les variables associés et la technologie locale. Nous travaillons avec des méthodologies participatives. Le modèle éco-technologique qu'on a obtenu révèle la complexité des relations fondamentales qui existe entre les groupes d'artisans afin d'atteindre un niveau de productivité suffisant. On a conclu que les défis économiques mondiaux des artisans ruraux appellent a la productivité technologique fondée sur l'utilisation durable des ressources naturelles qui sont nécessaires pour la production d'objets artisanaux.

Mots-clés auteur:

Modèle éco-technologique, des Caraïbes colombiennes, production artisanale.

Mots-clés descripteur:

Artisanat, artisans, l'artisanat, Caraïbes (Colombie).

Introduction

Crafts are conceived as the interaction between (a) a craftsman with an empirical knowledge, expressed in technical abilities to do a traditional craftwork, who constantly has to cope with the challenges of the global dynamics; (b) an artisan trade, representing essentially a community's material culture that is being expressed through craftworks with an exchange value (craft products); and (c) a cultural meaning, interrelated with the social organization of production, the capacity to transform natural resources, and a community's cosmogony (Gomez & Pacheco, 2007). This meaning is articulated with the individual and collective artisan practices (the trades) to promote a social interchange between different actors concerned with handicraft products. Once understood this relation, we find a research problem based on the analysis of the impacts of global trade on the production of craftworks. The dynamics of global commerce require an increase in craft production. This, in turn, implies an increased use of natural resources and threatens the traditional culture of the crafts, as they move from a pre-capitalist production to one dominated by the market requirements.

In this study, we have established two units of analysis in the Caribbean region of Colombia. On the one hand, we find the artisan workshops in Galapa, a rural municipality located 13 kilometers away from the city of Barranquilla, capital of the Atlántico Department. Since 1959, the local handcrafts, carved in *Ceiba roja* wood (*Bombacopsis quinata*), have achieved a recognized position on the national market. The most representative pieces are the masques used in the Carnival of Barranquilla, a traditional Colombian celebration declared as cultural heritage of humanity by UNESCO in 2009. At present, however, the artisans have a product portfolio with different products and 120 different designs. On the other hand, we find the artisan groups of Usiacurí, a rural municipality located 38 kilometres away from Barranquilla. They come from an artisan tradition that was originated in the 19th century, the artisans have chosen the design of Colombian fashion, and their products are among the most highly valuated artisan designs elaborated in *Iraca* palm (*Carludovica palmata*) on the Colombian fashion market.

According to the national economic craft census carried out in 1998 by *Artesanías de Colombia* - an institution with public and private investment that fosters the development of the craft sector in Colombia -, the Caribbean region concentrates the highest number of the Colombian rural artisans (42.71%). The two municipalities mentioned above represent a 40.91% of the rural artisan population of the Colombian Caribbean region (Artesanías de Colombia, 1998). Currently, in Colombia more than

1'300.000 artisans depend on their natural resources and their different ecosystems (Vega, 2003). The demand for natural resources in the Colombian craft sector is based on the traditional knowledge of transforming the natural resources into products recognized for their symbolic and economic value. For this reason, we take as our conceptual basis the concept of eco-technology, understood as a development strategy based on the social and technological transformation of the values of use of nature (Leff, 2003). We conceive eco-technology as an artisan community's rationality for adapting the traditional knowledge of a trade, into technological dynamics and the creation of sustainable production processes as part of a possibility for traditional craft groups with innovative potential, in order to compete on the global market.

The methodology used for implementing an eco-technological model to guarantee the sustainability of handicraft production is based on a participatory approach which establishes the relation of three key elements for this research: the way the artisan groups operate in their traditional production processes. The viewpoints of the different local actors concerning the cultural, technological, and ecological aspects of their craft production, and the bias of the researchers in the process of understanding and constructing the complexity of these relations in a conceptual model.

From the results of our research we concluded that the historical validity of crafts is supported by their cultural value and their use value, in accordance with the expectations of a possible market. This suggests the hybridization between the traditional values of craftworks and the values that emerge from the processes of local technological innovation. This hybridization may be within a sustainability framework that relates the technological changes based on local knowledge and a sustainable use of natural resources. However, this kind of hybridization is not always achieved accurately.

1. The technological sustainability of handicraft production and the global market

The handcraft production is a cultural activity of transformation of the natural resources where the major part of the production processes are carried out with small infrastructure, in workshops (with a low social division of labor) where manual work with simple tools and machines predominates, and where useful products that represent the local identity of a population, are elaborated. Handcrafts have entered into the dynamics of a global market, as products that materialize a community's

historical value, which validate the material cultural heritage of that community. Thus, they can find a differentiated position on the global market, where the current trend is to acknowledge the craft production as a model of opportunities. According to UNESCO (2007), in the majority of the so-called Third-World countries the craft sector is very important. For example, report no. 17 on crafts and the generation of employment for women and young people, points out that in Colombia the total production of handcrafts represents an annual income of approximately 400 millions of dollars, whereas in Tunisia 11% of the population is dedicated to the production of handcrafts, generating an annual income of US $2.400 per family (five persons on average) (UNESCO, 2007). Consequently, if the crafts sector wants to enter to the global market in a competitive and innovative way, it should take into consideration three elements: first, the technology represented by the accumulated traditional knowledge about craft production. Second, the products that identify cultural memory, and third, the sustainable use of the natural resources, which guarantees the future existence of the natural capital, and which is a paramount variable in the sustainability of Colombian handcrafts.

The research problem focuses on two aspects. On the one hand, it focuses on the challenges that handcrafts have had to confront in recent years, such as the competition on a global market or the conservation of their principle of autonomy, in spite of the institutional influences. *Artesanías de Colombia*, for example, organizes an annual handcraft fair that has become a consolidated and specialized commercial opportunity. Only in 2008 and 2009, the fair, in average, sold more than USD 5.5 million (Artesanías de Colombia, 2008). Further challenges are the effects of industrialization, the general crisis of natural resources, the rural poverty, the transformation of their principles of identity in order to survive on the national market and other typical problems of the Colombian rural context. On the other hand, the doubtful trustworthiness of the national data on the state of the natural resources and the ecosystems associated with craft production in Colombia. The information is not registered in a continuous way. Therefore, it is difficult to analyze the impact of craft production on natural resources on a time scale. Additionally, much of the information is based on qualitative, but not on a quantitative criteria. For example, the information we review did not show the registers of the annual quantities of natural fibres used for craft production. Neither did we find data on the degradation of the plant cover related to craft production, nor documentary registers about organic production or sustainable use of technology.

Although in the two municipalities of this study there are no really good eco-systemic conditions in order to provide the artisans with natural resources, the communities of Galapa and Usiacurí have increased their participation on the national and international market. As a consequence, handcraft production finds an opportunity to participate on global markets, although with a low technological capacity and under the risk of negatively affect the carrying capacity of the ecosystems related to handcraft production. But even so, they enter to the market with a high symbolic and differentiating value, which allows them to establish significant exchange values.

The key problem that we want to point out is that when the natural capital, understood as the natural and cultural assets associated with the identity of a territory (Emery & Flora, 2006), begins to participate on the open market, the craft production takes the risk of sacrificing some elements of identity linked to the sustainable use of the natural capital knowledge. In other words, while the opportunity of selling more handcrafts implies increasing the average production within the workshops, this increased production would require more natural resources and more energy consumption.

In Colombia, handcraft production is confronted with a technological imbalance in relation to a sustainable participation on a global market. This problem is evidenced in the indicators of craft production as listed by the national economic craft census (Artesanías de Colombia, 1998). In Chart No 1 we can see that the craft trades based their techniques on manual work and the use of manual tools (57.1%). The use of specialized tools and machines is not common (1.22%). Thus, the technological pattern is founded on the empirical abilities of the artisans, and the innovation mechanisms depend exclusively on their traditional knowledge and manual abilities.

Chart 1. Technology. Use of Workers and Tools in Craft Production.

Description	Number of Artisans	Percentage %
1. Only Manual	5,566	24.41
2. Manual and with Manual Tools	13,019	57.1
3. With Tools and Machines	3,182	13.96
4. Especially with Machines	279	1.22
5. Other	755	3.31

Source: Censo Económico Nacional Artesanal (1998)

Chart 2 indicates the lack of specialized workers (29%) within the handcrafts workshops, specialized workers are rare to find (21%) and unstable (11%). This phenomenon is due to the fractioning of the knowledge of the techniques used in handcraft production between masters and apprentices, mainly because of socio-political and socio-economical problems, which affects the traditional technology of the handcraft trades. It can even lead to the total loss of memory of the handcraft technology.

Chart 2. Most Frequent Problems with Specialized Workers

Description	Number of Artisans	Percentage %
Rare	5,200	21
Unstable	2,800	11
Negligence	1,600	6
Unqualified Workers	2,500	10
Expensive	2,600	10
Other	7,400	29
No Answer	3,200	13

Source: Censo Económico Nacional de Sector Artesanal (1998)

According to the percentages shown in charts 1 and 2, technological innovation is supported only by the masters' memory of the craft trade. However, despite its fragmentation, it is possible to broaden the specialization of craft techniques if it is needed for a commercial growth.

As stated by *Artesanías de Colombia* (1996), a 45.35% of the Colombian artisans confirm that there is a shortage of resources for handcraft production (see chart 3). The problem of a shortage of natural resources is directly related to the processes of transforming the territory by other actors, such as the urbanization of the rural areas, the increase in cattle and agricultural production, which evidence the artisans' difficulties in obtaining the resources for their handcraft production. Taking into account that handcraft production depends directly on the stability of the resource provision, it becomes necessary to implement technological innovative strategies, associated to the sustainable management of the natural resources and cultural aspects.

Chart 3. Production problems related to raw materials

Description	Number of Artisans	Percentage %
No Answer	3,295	14.45
Scarcity	10,431	45.35
Not Enough for Production	1,477	6.48
Accumulation and Deterioration	633	2.78
No Selection Before	5,914	25.94
No Indicators for Handling	565	2.48
Transport Problems	1,402	6.15
Credit	6,152	26.98

Source: Censo Económico Nacional Artesanal (1998)

2. A technological model for handcraft production

The theoretical basis of technology is based on the discussion about its ontological and epistemological dimensions. According to Mitcham (2002), one can recognize a historical rivalry between two philosophical visions of technology: the first, given by engineers and their urge to theorize about technology as an objective fact, and the second, given by philosophers and their need to categorize technology as a subjective fact. The eco-technological model follows the second vision, as it refers to technology as a possible fact, which allows men to adapt to their eco-system, and additionally brings a dynamic to their conscience so that they could produce their own transformations. The cultural elements related to the ecosystems generate social dynamics in function of resource sustainability. Therefore, we can state that the technological processes can transform abstractions such as space, time, cosmogony, or social identity.

One should consider the following: we propose a preliminary conceptual construction based on two considerations in order to elaborate the eco-technological model: (a) technology is an instrument to solve problems of the society, as far as the local technological knowledge is oriented towards the sustainability of using common resources. (b) Technology is a practice that allows men to adapt to their environment (eco-system) and, additionally, to generate knowledge in order to carry out new transformations in this environment and in the environments interrelated

with it (González L. de G., 2006). Furthermore, technology and its processes are able to transform realities such as space, time, cosmogony, and identity of a human group, and (c) technology is the product of the complex unity of artifacts, energy flows, and actors of transformation (Quintanilla, 2001). These considerations involve organizational aspects, value systems, and cultural dynamics in order to achieve social innovation in an artisan community.

In this sense, the eco-technological model focuses on social incidence, environmental effects, the adaptation of innovations, and the transfer of practical knowledge in the artisan communities.

On the other hand, eco-technology, as an umbrella concept, goes back to two origins. According to Leff (2003), the first is the economical origin, which implies a study on the interrelation between two basic production factors – capital and labour. In the case of handcraft production, capital is determined by the technological memory of the craft trade, that is to say, by the way in which an artisan community uses the natural resources for the elaboration of products. The capital consists also in the valuation of the resources integrated into handcraft production. Capital evolves as the technological memory.

In Emery and Flora's (2006) concept of community capitals we find that there is a way to value the assets of each capital, to understand the interaction between them, and to know the impact caused by this interaction. Thus, the cultural valuation of natural resources of an artisan community becomes a factor for sustainability. In the case of handcraft production, capital consists of the technological memory of the craft; this is to say, the way in which an artisan community transforms the natural resources into products. The capital consists also of the symbolic value and the exchange value of the natural resources used in handcraft production. Thus, capital evolves as the technological memory, and the use of natural resources, if sustainable, in the production of handcrafts.

Labour is the second factor in this relation. The productive capital is based on a person's productive abilities. However, in the production of handcrafts, the labor force integrates technical, symbolical, aesthetic, or political knowledge of a group of individuals, and it is represented in different artisan products.

That is to say, a complex knowledge emerges from a traditional knowledge and manifests itself in a craft product. Therefore, a craftwork is characterized not only by the physical effort of an individual, but also by the convergence of different kinds of knowledge. In this study, the productive force is related to ethnic identities, the historical value of the land, and the knowledge about the diversity

of eco-systems, which provide the artisans with raw material and other elements to develop their abilities.

The second root is ecology (Leff, 2003). It refers to a technological pattern that transforms the values of use of the natural resources into the social values of the handcraft production. Ecology is considered as the resources transformed by an artisan community into functional elements of its culture. In this social process the transformation of the natural resources is grounded on patterns of equilibrium based on the optimization of the productivity of a given eco-system (Leff, 2003). The transformation factor in handcraft production should be directed towards the rational use of natural resources and the equilibrium of the ecological functions of the ecosystem.

3. Methodology

The methodological framework consists of four stages: the first stage is the documentary analysis, in which we systematized the documentation for the construction of the theoretical and conceptual framework, the state of the art of the handcraft production, the environmental problems, and some socio-economic aspects of the region. The second stage is the interpretation of our cases based on the fieldwork. We used instruments for the observation of contexts, participatory diagnosis, and semi-structured dialogues. The third stage is the design of the eco-technological model where we describe three categories of analysis, nine variables, and 27 dimensions that describe the complexity of the relations existing in the reality of the artisan groups of Galapa and Usiacurí. The fourth stage is the validation of the conceptual model using a participatory approach.

In order to respond to the first objective of identifying the empirical knowledge of the craft trades in the communities under study, the technological production structures, and the dynamics of natural resources management associated with production (Gómez & Pacheco, 2007), we described the contexts in order to identify the fundamental variables of the conceptual model.

Then we carried out participatory workshops where the artisans developed the relations of the cultural, technological, and ecological variables through the application of instruments such as productive profiles, Venn diagrams, problem priorization and problem trees (Geilfus, 1997). Finally, during our fieldwork we made semi-structured interviews with the different actors of the municipalities. They contributed with ideas that helped to dimension the social value of the

handcraft trades, their socio-economic reality, and the initiatives of sustainable natural resources management.

In order to respond to the second objective of analyzing the evident complexity in the interrelation of the cultural structure of the handcraft trades, the technological structure, and ecological support, we made a conceptual model that shows the relations of categories, variables, and dimensions defined in the participatory workshops by artisan groups.

4. The eco-technological model, an approach to a technological model for handcraft production

The eco-technology proposes two levels of analysis of a productive process based on making usage of the ecological conditions in a region: the first is the level of ecological productivity (Leff, 2003). This refers to the way in which the production practices of a social organization affect the cycles of material and energy of the eco-systems. These practices are related to the cultural valuation of the resources, the socio-economic conditions of a community, and its technological capacity. The second is the level of technological productivity (Leff, 2003). It embraces technical efficiency, means of production, and production processes. This technological structure is also guided by the cultural valuation of the resources of an eco-system and the socio-economic conditions of the organization of the production process.

These levels of analysis are coherent with the model proposed by Ray (1998) and are related to the typologies of a cultural economy where the identity of the territory and the cultural markers generate a product identity, as well as the construction of identity in a territory.

The concept of eco-technology proposes an environmental rationality which articulates three independent processes, according to Leff (2003): a level of cultural productivity which involves the local knowledge of natural resources, a level of ecological productivity which integrates the functional structures of eco-systems with the way of using the resources, and a level of technological productivity which establishes the processes and the knowledge of a social organization in order to transform nature in a productive way.

Following the research objective of evident complexity within the interrelation of the cultural structure of the handcraft trades, the technological structure, and

the ecological support (Gómez & Pacheco, 2007), we made an eco-technological model which interrelated three main categories: cultural productivity, technological productivity, and ecological productivity (Gómez & Pacheco, 2007). In this article we will focus on the second category.

The category of technological productivity in our model is based on the technological pattern suggested by Quintanilla (2001). He argues that the technique and the technology can be supported under three specific orientations: the "cognitive approach" (Quintanilla, 2001) which, according to the author, embraces three constitutive distinctions: the first refers to the empirical techniques, that is, the knowledge grounded exclusively on practical experiences, of pre-technological character, and without systematical application of scientific knowledge. The second one considers technology as an applied science for solving practical problems. The third distinction refers to the technical change, that is, the advance in knowledge and its different applications, when the main sources are being invented, a development, and the application of a scientific knowledge.

The second approach is the "instrumental approach" (Quintanilla, 2001). It refers to the artifacts, objects, or products that come up as the results of a technical activity. The third approach, the "systemic approach" (Quintanilla, 2001), refers to the technical systems composed of, on the one hand, artifacts, materials, and energy; and, on the other hand, the agents who carry out transformative actions. We pay special attention to this last approach, as it expresses and synthesizes 'technology' as a system of intentional actions oriented towards the transformation of specific phenomena in order to achieve efficiently a result. But it also conceives technology as the result of knowledge represented in artifacts, processes, descriptions, solutions for the practical solution of a problem, "*we may talk about empirical techniques, in the case of artisan artifacts, or about technologies that use science, in the case of industrial artifacts*" (Quintanilla, 2001) (author's translation).

Therefore, if the technological knowledge is oriented towards a specific practice for the resolution of complex problems and decision-making about issues that affect a society, the technological dimension of knowledge focuses on the social transformation, on the adaptation of cultural innovations, and on the transfer of practical knowledge for cultural evolution. A technological action, or: a dimensioned action from a technological perspective implies a reflection on the cultural practice of a community concerning its environment.

We have to add that the technological productivity is linked to cultural and ecological aspects through the categorical approaches mentioned before for the

development of a society. We understand that technology is: *"a collection of knowledge of scientific basis that allow to describe, explain, design and apply technical solutions to practical problems in a systematic and rational way"* (Quintanilla, 1998).

These two conceptions show a setting where the technological aspect is evidenced in several possible cultural constructions of an environment. This allows us to recognize four relevant areas: first, technology centered in the inclusion of new knowledge, the creation of new ways of 'knowing to do', 'knowing to learn', and 'understand what is done' the objects, systems, and products by the society. The second area is linked to the socio-technology as a cultural derivate. This refers to the meaning that a social group can share about an artifact, a process, or a system, which in turn has an impact on the sustainability of human groups in their territory and can lead to better socio-environmental processes. The third area refers to the abilities that a person has to create new technological structures, which allows him/her to permanently construct his/hers reality according to his/hers cultural environment. The fourth and last area defines technology as a constitutive factor for the processes of knowledge related to the cultural innovation of a group of people.

In the handcrafts, culturally speaking, nature is transformed. We talk about a technological system interrelated with an ecological system. Its aim is to make a productive use of natural resources, turn them into raw materials and, in a handcraft (a product), giving shape to the symbolic materiality of its artisan identity. Thus, it is in technology where the cultural and ecological categories of handcrafts converge, but not exclusively in production.

5. The productive technological category

The eco-technological model proposes three main categories: cultural productivity, technological productivity, and ecological productivity (Gómez & Pacheco, 2007). Interrelating these categories, 27 different variables emerge that show how the handcraft production acts in relation to the use of natural resources without harming its cultural values and how it establishes technological appropriations to become efficient when responding to the market requirements. In this article, we want to highlight the aspects related to the technological level of handcraft trades, the elements of identity expressed in the products made in each workshop, and the characteristics of the natural resources used in the handcraft production. In Galapa we analyzed the technological structure of three craft workshops: "El Toro

Miura" run by Manuel Pertuz, "El Congo Real" run by Luis Alberto Pertuz, and the workshop of Francisco Padilla, an artisan leader who has been working in woodcarving for more than 65 years in this municipality. Then, we analyzed the technological structures of the "*Asociación de artesanos*" (the artisans' association), the "*Cooperativa de artesanos de Usiacurí*" (the artisans' cooperative of Usiacurí), and of some independent artisans in Usiacurí. With regard to the category of technological productivity in the eco-technological model, we identified the following:

- The use of natural, human, and capital resources used for handcraft production is not always sustainable. This impedes a better access to local, regional and international market.
- A low capacity for the adoption of sustainable technologies due to the fact that some technical solutions are difficult to be articulated with the socio-cultural dynamics of the artisan communities.
- The access to conventional technologies is not easy for some of the craftsmen because of their excessive costs. The thorny access to new markets makes it more difficult for them to get to know, and to acquire other kinds of technology.
- The local and regional policies on technological development and innovation of handcraft production reflect the institutional negligence with regards to specific actions that could change the conditions for the rural artisan communities in Colombia.
- The eco-technological model offers an opportunity of progress for the artisan communities based on the sustainability of the natural resources used in the craft production.

The model of technological productivity is understood as the capacity of an artisan group to direct their technological knowledge and their innovation strategies towards a sustainable use of the environmental resources of their municipality. This technological bias allows us to establish a productive model which

- Defines the eco-technological characteristics of the artisan groups.
- Measures the productive capacity of the handcraft trades in relation with the sustainable management of the resources linked to handcrafts.
- Identifies the synergy of two elements: the knowledge included in the handcraft techniques for the use of resources (natural and artificial), the technical capacity of the organization of the production process for a sustainable management of natural resources.

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