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TECHNOLOGICAL INNOVATION IN THE RESOLUTION OF LOCAL SOCIO-PRODUCTIVE PROBLEMS. CASE STUDY: CONCORDIA, ENTRE RÍOS, ARGENTINA

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INNOVACIÓN TECNOLÓGICA EN LA RESOLUCIÓN DE PROBLEMÁTICAS SOCIO-PRODUCTIVAS LOCALES. CASO DE ESTUDIO: CONCORDIA, ENTRE RÍOS-ARGENTINA

VALERIA FENOGLIO
Doctora en Arquitectura, Investigadora
Universidad Nacional de Córdoba (UNC) - Centro de Investigaciones y Estudios sobre Cultura y Sociedad (CIECS) -Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Córdoba, Argentina
https://orcid.org/0000-0003-0243-1798
valefenoglio3@gmail.com

RESUMEN

El presente trabajo pone en relevancia la promoción del diseño y gestión de innovaciones tecnológicas para la resolución de problemáticas socio-productivas locales. Desde una visión de innovación, que intenta superar la óptica exclusivamente económica, se toma como caso paradigmático una experiencia de producción de hábitat desarrollada en la localidad de Concordia (Entre Ríos, Argentina). La misma, desarrolla colectivamente una tecnología asociada a sistemas constructivos en madera, con el fin de promover procesos productivos sustentables a partir de recursos y saberes locales. Asimismo, propone una innovación que intenta modificar los modos productivos actuales, superando la transferencia tecnológica unidireccional, por nuevas formas de resolución de problemas de manera cooperativa y solidaria. Mediante un estudio interpretativo, el trabajo tiene por objetivo principal analizar el caso desde la perspectiva crítica de la tecnología, relacionando el concepto de *código técnico* (normas cognitivas y sociales que configuran los procesos de producción de conocimiento) con los modos de diseñar y gestionar la producción de hábitat en la experiencia. Como resultado, se dilucidan aspectos emergentes del caso que, a modo de insumos o lineamientos, permiten contribuir a la generación de nuevos abordajes para la producción de un hábitat sustentable y más justo cognitivamente.

Palabras clave

Energía incorporada, emisiones de CO2, residuos de demolición y construcción, diseño por ordenador

ABSTRACT

This paper highlights the promotion of the design and management of technological innovations for the resolution of local socio-productive problems. Working from a point of view on innovation that attempts to overcome an exclusively economic perspective, a habitat production experience carried out in the town of Concordia (Entre Ríos, Argentina) was selected as a paradigmatic case. This experience collectively develops a technology related to wood construction systems in order to promote sustainable production processes based on local resources and knowledge. Likewise, it proposes an innovation that attempts to modify the current modes of production and surpass unidirectional technological transfer with new ways of solving problems cooperatively and charitably. By means of an interpretive study, the main objective is to analyze the case from the critical perspective of technology, relating the concept of technical codes (cognitive and social norms that configure the processes of knowledge production) with the ways of designing and managing habitat production in the experience. As a result, emerging aspects of the case are elucidated, which in the form of inputs or guidelines make it possible to contribute to the creation of new approaches for the production of a sustainable habitat that is more cognitively just.

Keywords

technology, society, construction systems

INTRODUCTION

PRESENTATION OF THE PROBLEM

The search for new approaches for the production of a sustainable and more just cognitive habitat is the main driving force in the present work. For several decades, the Social Studies of Science and Technology (ESCyT, by its initials in Spanish) try to question the role of scientific-technological knowledge in relation to society. Among the different disciplines and theoretical perspectives that make up these studies lies a common criticism: overcoming the classical and deterministic vision of Science and Technology (S&T), where the product is prioritized over any other rationality, assuming that all technological development is the solution to an existing problem without considering particularized contexts or actors. Authors such as Dagnino (2008) consider that this conception leads to a technical and not political issue, which exemplifies from a kind of virtual barrier that is formed between the scientific-technological production environment and the social, political, social and economic context of our societies. In Latin America, issues such as the democratization of knowledge and social inequality are being approached from this theoretical perspective by various institutions and research, whose emphasis is placed on generating a more appropriate management of S&T.

In Argentina, there is still a long way to go in the construction of alternative approaches that generate sustainable processes in the habitat field. But for some years a group of researchers from the National Council of Scientific and Technical Research of the Nation (CONICET, by its initials in Spanish) has been developing technological innovation processes in different places of Argentina. The ideological conviction of these processes is the strengthening of small enterprises, since they contribute to the generation of employment (70% of productive employment is in hands of these enterprises) and the distribution of income that this type of economic process promotes, promoting commercial articulations for supply and consumption within the country (Peyloubet, 2018).

By articulating the habitat problem with the productive processes, the research team has developed technological innovations with locally grown wood, considering the high socio-productive potential that it has. According to Diana Guillén, the characteristics of Argentina place this country among the regions of the world with the greatest natural advantages due to the rapid growth of its plantations and its productive potential (cited in the National Service of Food and Agriculture Health and Quality, 2014).

The city of Concordia in the province of Entre Ríos (case study) has the largest wooded area of Eucalyptus Grandis. As a local problem, it is noted that the main destination of this production is sawing (45%), predominantly small industries that use short wood and produce packaging, pallets and drawers. The remaining percentage (55%) is considered a byproduct: sawdust, beams, bark and refile for the manufacture of chipboard. In this scenario, local processes that provide added value and income distribution over that remaining 45% are not identified.

Faced with this socio-productive problem, it is worth asking: How to design and manage technological proposals that contribute to the improvement of local territories? How to proceed to other alternative operations that give rise to new codes or technological standards that are more appropriate socially and technically?

Following Albornoz (2013), innovation is today at the center of the policies that Latin American countries apply to boost development and equity. However, there was a mimetic translation of policies created in economies where there is a strong demand for new knowledge in economic contexts in which such demand is very low (Albornoz, 2013). Likewise, innovation is frequently used to influence the competitiveness of companies and very little to relate it to the improvement of social problems (OEI, 2014).

Another question that is given to technological innovation processes are the traditional ways in which knowledge is legitimated and constructed in these processes. For Santos (2009), there is an attempt to dismantle the existing dichotomy between expert or scientific knowledge and local or popular knowledge with the aim of rescuing knowledge that arises from social experiences themselves.

Within this framework, the main objective of the work is to understand and interpret the particularities that were given in a technological development process, which links the S&T sector with the territory. Methodologically, the case is analyzed from the critical perspective of technology, relating the concept of *technical code* (cognitive and social norms that configure the processes of knowledge production) with the ways of designing and managing habitat production in the experience. For this, a series of starting budgets and *ad hoc* analytical categories were developed; the latter recognized in the present work as the design premises the research team uses in its research work. Regarding results, emergent aspects of the case were elucidated, which as inputs or guidelines are intended to contribute to the generation of new approaches for the production of a sustainable and more just cognitive habitat.

THEORETICAL AND CONCEPTUAL FRAMEWORK

Throughout history, the processes of industrialization and technological development have been continuously accompanied by counter-currents of innovation, as a reaction and questioning of the dominant trajectories from the development of different movements (denominated as Appropriate Technology and Social Technology) with forms

of alternative and socially inclusive innovation (Fressoli, Smith, Thomas and Bortz, 2016).

For the present work, it is important to highlight Social Technology as a contemporary innovation movement that seeks to provide a new way to develop and implement technologies (of Product, Process and Management) oriented to the generation of dynamics of socioeconomic inclusion and sustainable development (Thomas and Becerra, 2014). This movement provides a procedural dimension, an ideological vision and a different operational element that is not found in current available technologies (Dagnino, 2008).

The integration of theoretical concepts and ideological conceptions from different disciplinary approaches (philosophy of technology; sociology of technology; economics of technological change, etc.) constitute the analytical-conceptual framework with which the study of Social Technology is approached based on a critical review of the so-called Appropriate Technology (AT), with the objective that from there another different cognitive-based technology can be built.

The criticism pointed to this technology (AT), originated in the 60s, is based on the idea that the solution to the problem is built in an unidirectional way generating a game of supply and demand, where the transfer logic subordinates all the process. This means that a series of technologies have been developed as *stock*, used many times according to demand, and that it has mainly left aside that traditional or tacit knowledge, which the academy does not legitimize. Thus, the high potential of knowledge contained in actors and social experiences is wasted, warning that knowledge is still built exclusively from top to bottom, from a unidirectional process, that is, as transfer.

Therefore, we consider that, in the search for alternatives for habitat production, Social Technology represents a path that goes in that direction. Among the theoretical models that make up these studies, Social Constructivism and Critical Theory of Technology constitute a radical response to the mono-dimensional, linear and deterministic view of technology. Regarding Social Constructivism, Valderrama (2004) describes this theory as a way to open the black box of knowledge to discover that inside there are dynamics that must be studied because they are closely linked to social processes. This theory offers the possibility of considering technology as a social construction and as a result of negotiation processes and different interpretations between relevant social groups, until technology becomes what finally is. However, we believe that it is not enough to open the black box and identify the relevant actors and their interests, but it is also necessary that, prior to the design of technologies, more democratic mechanisms operate. In that sense, Andrew Feenberg's proposal revolves around the extension of the value of democracy to the field of technology. The author suggests that the notion of rationalization, today focused on the idea of progress and efficiency, should be based on the responsibility of technical action by human and natural contexts. For this, Feenberg (2006) proposes to change the dominant values of technological rationality, incorporating a priori in the design of technology, alternative social, cultural and environmental aspects, which favor more participatory and democratic forms. It also refers to the notion of technical code as to the realization of an interest in the form of a technically coherent solution to a problem. That is, "the product of technical elections supports the way of life of one or another influential social group" (Giuliano, 2012, p. 2). In most cases, the interests of dominant groups are materialized in technical codes that, invisibly, settle into rules, procedures, instruments and artifacts for the search for power and advantages for a dominant hegemony. For Feenberg, the characteristics of this technical code are authoritarian, top-down and pose serious problems, even in the most advanced sectors of society (Tula Molina and Giuliano, 2015). This approach makes it possible to see more clearly that in technological designs there are beneficiaries and victims, so its concretization represents a series of struggles and strategies among various actors to develop one or another technological alternative. According to Feenberg (2006), technology can constrict and colonize, but it can also release repressed potentials from the world of life that would otherwise have been submerged. Therefore, for this theorist, technology is essentially ambivalent and available for various types of development. In addition, authors such as Tula Molina and Giuliano (2017) argue that other aspects such as interests, customs, values and power relations are involved in the design of technology, so it is necessary that they are under discussion by a plurality of social actors, not just experts, and organized based on democratic principles.

METHODOLOGY

The present work is positioned within the framework of the Interpretative paradigm[1], whose "foundation lies in the need to understand the meaning of social action in the context of the world of life and from the perspective of participants" (Vasilachis, 2006, p. 48). A research positioned from this paradigm considers that the case itself plays a fundamental role, which can contribute to the understanding of the problem under study. (Kazez, 2009).

[1] According to Guba and Lincoln (1994) in the interpretative paradigm there are multiple, holistic and constructed realities. This implies the renunciation of the positivist ideal of prediction and control.

Following that line, the purpose of the research presented here is to understand and elucidate deeply a particular case of habitat production (Concordia, Entre Ríos). First, it is interesting to address this case from the qualitative tradition, mainly due to two specific characteristics: a) for what this tradition studies: contexts, processes, senses, meanings and stories; and b) for the goal and its purpose: search for the new and provision of new perspectives on what is known, described, explained, elucidated, constructed and discovered (Vasilachis, 2006).

In this context, it is proposed to analyze the case from the critical perspective of technology, relating the concept of *technical code* with the ways of designing and managing habitat production in the experience. Thus, "technical code" is understood as those cognitive and social norms that configure the processes of knowledge production and whose result determines a type of technological innovation. This approach allows us to clearly appreciate that in technological designs there are benefited and affected, so that the concretization represents a series of struggles and strategies among diverse actors to develop one or another technological alternative. From this critical view about technology, a series of starting budgets that guided the current reflection are enunciated:

- Local knowledge constitutes indispensable inputs to produce transformations capable of improving people's quality of life, making them compatible with the natural and social context.
- In most technological innovations, within the field of habitat, traditionally used knowledge (local knowledge) is not incorporated and the product or technological device is privileged over technological processes or managements.
- The application of democratic management models enables the empowerment of actors and sectors often invisible in habitat production processes.

Consequently, in the search to elucidate emerging inputs for the generation of a sustainable and more just cognitive habitat, the study of the case from three analytical categories elaborated in this sense is proposed as a methodological strategy:

a) Application context (assessment of installed capacity). This analytical category refers to the production of knowledge and its relation to its social utility. This intention of producing knowledge that is useful for someone, whether the productive sector, local governments or society in general, is reflected in a relevant way from the beginning of the interventions or investigations. Therefore, this category allows us to analyze the context of application of the case, what are the capacities assessed and rescued for habitat production and to which specific sectors of society benefits.

b) Productive meetings: Co-construction of knowledge (collective knowledge production). This analytical category is a research premise the research team has been developing for several years in habitat production processes. The co-construction of knowledge ascribes to a type of collective work, where knowledge of various actors is incorporated into productive processes. It allows analyzing what kind of knowledge circulates in these spaces called "productive meetings", how these spaces are built and what meaning is given to the intellectual property of the results obtained.

c) Inter-actor/inter-sector alliances (democratic management). As a research premise, this category assumes management as an active inter-sector articulation, whose strategy is to convene in the resolution of the habitat problem to the largest number of relevant sectors for the definition of public policies that generate distributed benefits. This allows the analysis of the agreements arising from this type of management, how information is shared, how the senses and interests of each participating sector converge and how decisions are made.

Case study characterization: The experience takes place in the city of Concordia (province of Entre Ríos), located on the Argentine coast (Figure 1). As the second largest city in that province, it is characterized by the relevance of forestry activity, as it has the largest area of Eucalyptus Grandis trees. Since 2010, a group of CONICET researchers has implemented in this town (through various research projects) an Inter-Actor Network with the aim of carrying out technological developments in wood, putting in value from its beginning the local productive matrix (Peyloubet, 2017) (Figure 2). In this context of application and under a process of cognitive innovation, a timber construction technology has been specifically developed that, due to its component configuration, has a flexible design and adaptable to different uses (housing, urban equipment, recycling plants, etc.). By means of this proposal, it is tried to drive the forestry-industrial production of the region and locality in order to promote the labor potential in the sector, making efficient use of the wood resource and diversifying it to reach higher profitability levels, and thus generate on the value chain a surplus in the use of the raw material from the product design (construction system). Similarly, it is noted that the proposal involves small producers that are part of the vulnerable economy of the locality, whose insertion in the market requires a leverage of the State.

DISCUSSION AND RESULTS

A) APPLICATION CONTEXT: INSTALLED CAPACITY ASSESSMENT

The experience in Concordia is characterized by a mode of production of alternative knowledge to traditional or hegemonic mechanisms. The CONICET research team has been developing habitat production processes in other

Figure 1. Geographic location. Source: Author's elaboration.

Figure 2. Forest production. Sawn wood of Eucalytus Grandis. Source: Image extracted from PROCODAS (2011) and PAD-ANPCYT (2017).

locations where the resolution of the problem has been generated from inter-actor productive circuits and not from the conception of the device, that is, housing. This alternative way of addressing habitat production called the interest of municipal officials in Concordia and in 2010 the research team was convened by the Ministry of Production and Labor to work on projects that will boost local productive chains in the forestry sector, production of housing and work generation for small producers. In that context, Concordia had an important installed capacity: Eucalyptus forests, sawmills and a Carpenters Association.

Faced with this under-utilization of local resources and knowledge, the intervention proposal in the territory was developed under the following design premises:

a) Recognize and value the local productive matrix: sawmills and forests were visited with the objective of highlighting installed capacity (Figure 3).

b) Based on this recognition and assessment use the highest possible percentage of local wood (Eucalyptus Grandis) for the construction of components: this would allow to re-diversify and re-signify in the population the use made of wood resource in the locality[2].

c) From a local demand, it is decided to design a multipurpose room (SUM, by its initials in Spanish) as a pilot prototype, with a construction system made predominantly of 1"x4" Eucalyptus Grandis boards, recognized as the local productive matrix (Figure 4).

[2] At this point, it is key to clarify that the choice to decide to use the local productive matrix (wooden boards of very small section) to redefine the use of Eucalyptus Grandis wood, generated the development of a particular structural design able to respond primarily to the request of wind efforts. In this sense, it was necessary to subject this design to rigorous structural calculations, being formed a structure of porches (enclosure panels), columns and a roof structure. As a result of these calculations, the dimensions of the system elements, the placement of diagonals to generate rigidity to the structure, the amount and type of metal linkages, etc. were determined.

Figure 3. Tour of local forest productions. Source: Images extracted from DETEM (2012).

Figure 4. Design and technological development of a SUM with local wood. Source: Images extracted from PID 0079 (2016).

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Figure 5. Construction system of prefabricated components that adapts to different types such as housing or neighborhood equipment. Source: Images extracted from PID 0079 (2016).

d) Design a technological development of flexible product capable of adapting to different requirements and uses: housing or neighborhood equipment (Figure 5).

Likewise, the choice of a renewable natural resource such as Eucalyptus wood for construction meant that several dimensions of the problem were explored profitably: in environmental terms, a fast-growing forest wood resource was being used which, when selected as construction material had significant comparative advantages in relation to other construction materials, among which the following stand out:

- Wood production acts as a carbon store purifying the air and contributing to the reduction of the greenhouse effect;
- Wood production and transformation processes consume less energy than the production processes of other materials;
- Much of the energy consumed comes from its own waste therefore the industrialization of wood has a positive impact on reducing the demand for solid fuels;
- Wood ashes can be used as fertilizers for the field.

Decisions and elections made collectively at the beginning of the research project sought to support the interests of the local productive sector and respond to the demand of the government sector (local municipality), whose purpose was to revitalize the local economy. That is, this constitutes a proposal for habitat production that responds to local needs, and not vice versa, as when the community has to adjust to the new technology introduced (dominant process in the construction of technologies). Following Herrera (2010), it is very frequent the detection of proposals and technological developments focused on product innovation that, in general, dismiss, in a previous way, all the social and technical conditions local actors can provide to the construction of such technology. The fact that the project revalued the trade and local capacity in the city of Concordia made the actors work, from their identity;

Figure 6. Potential place of knowledge production, called as Productive Meetings. Source: Images extracted from PID 0079 (2016).

basically, from what they are and know how to do, creating a social subject that can modify and appropriate the technological product based on their experience in the trade (generation of autonomous work). In that direction, the search for added value to a sub-utilized resource and the recognition of the installed capacity in the locality constitute one of the elements that configure cognitive and social norms that govern the process of knowledge production in the experience in Concordia.

B) PRODUCTIVE MEETINGS: CO-CONSTRUCTION OF KNOWLEDGE (COLLECTIVE KNOWLEDGE PRODUCTION).

The methodological proposal of a habitat production approach that this experience poses assigns, as it has been sustained, to a type of collective work where knowledge of different actors is incorporated into the productive processes, in an integration that allows to open the black boxes of the expert knowledge of some and claim the technical and experiential knowledge of others. This methodology was called by the research team as "Co-construction of knowledge". According to Peyloubet (2018), the fundamental idea in collaborative work proposals such as this one is based on complementarity, which displaces competitiveness, in an associative action, where intellectual property is shared. In this way, the development of constructive technology, that is to say of product, is created in spaces of interaction called "productive meetings" where, in a group way and through respectful participation, ideas, knowledge and technical decisions about technology in question are expressed. For the participating actors - carpenters, researchers, municipal technicians, working cooperatives - these meetings are spaces where wisdom and knowledge circulate in solidarity and where everyone teaches and everyone learns, resulting in a collective construction of technology. In that sense, the paradigmatic and beneficial experience is that technological development did not reach the town as a closed system, as a black box and together with a user manual, but quite the opposite. The predisposition of the research technicians to exchange knowledge was present when they arrived at the Carpenters Association of Concord. The decision not to transfer technologies through a dialogic approach with the actors involved implicitly gave the technology political qualities, such as:

- The possibility of actors involved to feel part of the development of technology;
- The possibility of change, adjustments and new ideas from the exchange;
- The enrichment of all actors involved, including the academic sector itself, thanks to the exchange of different knowledge that generated new learning;
- Openness to problems and local reality, which made it possible for technology to be the most appropriate socially and technically to that context.

The strong recognition of the local, and the use of a methodology of work of Productive Meetings, promoted another transition instance in the ways of operating of the S&T sector. Once the SUM was assembled and built, and after the start of the construction of the first home as a prototype, the need to manage a Technical Aptitude Certificate of the system was collectively noted[3] (CAT, by its initials in Spanish). For the research team, the construction system that had been reached was the result of the integration of ideas, knowledge and solutions that the community had traditionally used

[3] CAT: Technical proficiency certification of non-traditional built systems such as wood required for construction with national funds.

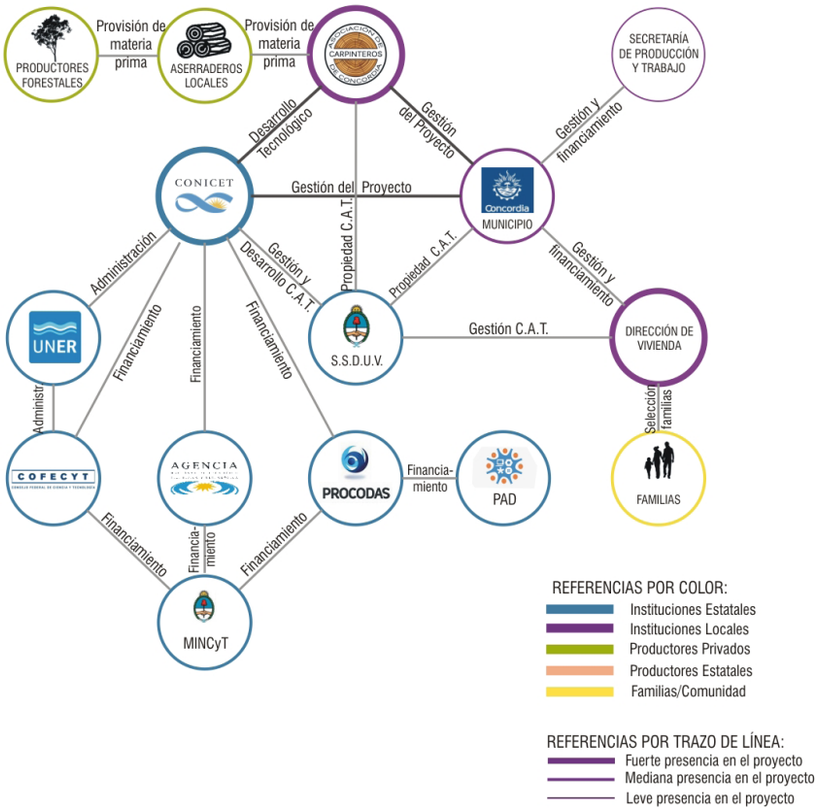

Figure 7. Inter-actor network of experience in Concordia. Source: https://coconstrucciondelconocimiento.wordpress.com

in the construction of wooden houses (product), as well as aspects of management and commercialization of local resources (process). Therefore, it was decided to leave it in the hands of the municipal actor and the Carpenters Association. A technology whose final resolution was the product of a complementarity of diverse knowledge could not be limited by patents involving lucrative rights for the alleged developers, technologists, researchers, among other participants. That is to say, there is not an actor, a *hero* behind that technology, but there are several actors that can change and, in addition, can continuously adapt the technology, without it depending on someone in particular or exclusively. In this context, the collective decision about requesting CAT of technological development meant for the experience a way to decentralize conventional housing policy and replace it by a new way of managing housing policy from a local municipality.

C)INTER-ACTOR/ INTER-SECTOR ALLIANCES (DEMOCRATIC MANAGEMENT)

Another key element of technological innovation in the experience shared here is the inter-actor and inter-sector articulation as a cognitive and social norm of knowledge production. The purpose of this strategy is to convene the resolution of the habitat problem to the largest number of relevant sectors that can contribute to the definition of public policies aimed at generating distributed benefits. In that line, for the research team the sectors that must be present are:

1. State sector: as guardians of the common good;
2. Productive sector: entrepreneurs in the value chain; and
3. Cognitive sector: mediators of diverse knowledge.

In the experience, the participation table was made up of the following sectors: representatives of the municipality (Land and Housing Institute, Sub Secretariat of Economic Development), representatives of the productive sector (Forest Producers, Sawmills, Labor Cooperatives, Carpenters Associations) and representatives of the cognitive sector (Universities, Research Centers and Agencies); who in successive deliberations were building agreements to innovate in the productive processes affecting the three sectors trying to promote the work with autonomy and the co-resolution of local problems (Figure 7).

The financing instruments that support this type of technology come from the Science and Technology sector, since the promoter and mediator group is made up of researchers (cognitive sector). It should be clarified that the proposal of the Inter-Network has had

Figure 8. Inter-sector alliances/policy articulation. Source: Images extracted from PROCODAS (2011; 2017).

the support and approval of financing projects in that sector during almost ten years of its existence, since the key aspects of this proposal are relevant because they are instruments of a scientific-technology policy established by the Innovative Argentina 2020 Plan. The initiative had five research projects funded by the National Agency for Scientific and Technological Promotion. The continuity of the financing instruments in the experience was key, since they allowed us to move forward with the objectives set and it generated in the participating actors the motivation to continue being part of the Inter-actor Network.

The methodological and ideological premise of generating a democratic management model was essential for the project. The successive meetings with each representative of sectors allowed for an exhaustive information, a deep understanding and a democratic decision of aspects and issues that have to do with the development of technology (Peyloubet, 2018).

One aspect to note was that the various meetings in the municipality with the mayor and officials always had the presence of producers of technological development (Carpenters and Cooperatives Association). In that sense, the project always sought the empowerment of sectors, often silenced when making decisions. This strategy gave way, to the interior of groups or associations, to a great availability of information and proposals to be able to take control of their work and to notice problems, solutions and new opportunities related to their ways of working. A democratic process was thus generated where everyone positioned themselves as co-participants and co-responsible for the ongoing project(s). This way of managing technology, which refers to the presence of all the actors, without establishing hierarchies, encouraged the construction of a network of external relations at national and regional level, where organizations, and particularly, the Carpenters Association, achieved establish contacts and relevant information, as well as proposals for new work. The link and alliances generated within the framework of the Network allowed a new way of participation in the resolution of socio-productive problems, where (in this case) the State (municipal government) represented the interests of smaller groups or economies, creating job opportunities and access to resources, within the framework of collective and democratic decisions (Figure 8). In this way, the Carpenters Association accessed and managed new benefits outside the project under study, among which are:

1) Capitalization in infrastructure: through the Ministry of Social Development of the Nation they obtained a machimbradora[4];
2) Sale of wooden components for the local municipality (doors and shelters for lifeguards in wood to be placed on the banks of Paraná River);
3) New Wooden Healthy Stations for the town;
4) Training in the framework of projects of the Ministry of Labor and Production;
5) Agreement with the Ministry of Social Development of the Nation for the production of structural components of roof (wood), for a waste treatment plant in the town of Concordia.

[4] Machimbradora: Machine used in carpentry to make in sawn boards moldings or inserts (machimbre).

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CONCLUSIONS

The proposal presented here has been carried out successfully since 2010, and it has been possible mainly - from what the participants themselves attribute - to the trust built between the different members that make up the socio-productive network. On one hand, the theoretical and ideological conviction of the research group is expressed year after year in the formulation and presentation of new projects in the Ministry of Science and Technology of the Nation; institution that approves and continues to support this type of technological development through its different financing lines. On the other hand, the carpenters of the Association, as the main productive actor, continue betting on generating new paths and new processes that promote benefits distributed in their locality. And a municipality, which although at the beginning of the project was very present and then not so much, never stopped leveraging and supporting the research proposal.

Faced with this scenario, three key aspects of technological innovation that the experience in Concordia carried out to address habitat-related issues can be highlighted as conclusion:

- *Local socio-productive technological developments:* The initiative is based on an approach that allows us to fully understand and take advantage of the opportunities offered by the local productive network, developing proposals that seek to strengthen and diversify new forms and production processes to generate re-distributive economic dynamics. In the case of the study experience, the research team warned of a sub-utilization of natural resources (renewable-wood), as well as local productive capacities being considered as new emerging opportunities.

- *Collaborative and Associative Technological Developments*: the methodology that implements the proposal ascribes to a type of collective work, where knowledge of the various actors are incorporated into productive processes, in an integration that manages to open the "black boxes" of the customary knowledge of some and enhance the technical and experiential knowledge of others. The co-construction proposal constitutes one of the most relevant research elements of the CONICET team, which forces us to conceive technological developments as a cognitive heritage of a group of entrepreneurs that are organized in a social economy based on the distribution of income and socio-productive inclusion, promoting a more supportive market. This co-construction is fundamentally manifested in what the research team calls *Productive Meetings* where, in a group way and in a respectful participation, ideas and technical decisions that will give birth to the technological product are agreed.

- *Inter-sector Technological Developments:* The approach to building a fairer and more sustainable habitat is based on the articulation of various actors and sectors that, from their different positions and interests, promote agreements arising from an exhaustive information and a democratic decision. For the proposal under study, the presence of State actors (guardians of the common good), productive actors (entrepreneurs in the value chain) and cognitive actors (mediators of diverse knowledge) is a relevant aspect for the promotion of new public policies in the field of habitat production.

Thus, the cognitive and social norms that govern the process of design and development of technology in the experience are based on aspects such as: a) technological developments that impact as little as possible on the environment (use of renewable resources); b) developments that leverage small and vulnerable economies; c) developments that promote associative and cooperative forms of production; d) developments that generate fair distribution of income; and, e) developments that co-design a collective property product.

Consequently, thinking of technological development processes from this approach represents an invitation to address the problem of habitat from a systemic construction, since the social, cultural, economic and environmental dimension is at the same level of hierarchy and the technological product constitutes an excuse to energize and democratize technological processes. Likewise, it allows the problem to be approached from a political perspective, assuming that power provisions are specified in technology, registered in technological developments from the premises with which they were designed. This approach also provides the opportunity to become aware of the importance of the way in which technical decisions and choices influence technological processes and the need for critical awareness about conventional ways of making technology. This leads to assume the relevance of reflexive instances, capable of being carried out by managers, technicians, professionals, academics, etc., resulting in the development of proposals in territories with a view to increasing options to proceed to other alternative operations in the habitat field.

Based on the results obtained, it can be noted that when socio-productive problems are faced in a joint, participatory manner and from its genesis, a technology of political qualities with differentiated cognitive and social norms of knowledge production would be developed. The possibility of generating a technological process where the problem is co-built, and in an inter-actor manner, allows the circulation and sharing of local knowledge and solutions that are typical of the relevant sectors of a given territory.

From that point of view, the experience in Concordia represents an opportunity to be immersed in a complex deconstruction process and then reconstruct a technology that allows solving socio-productive problems from *a socio-productive, solidarity, cooperative and inter-sector technological* approach. This work, in short, constitutes an opportunity to continue wondering where and how the development of a technology capable of configuring a fairer and more sustainable habitat should be directed.

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