Design and Innovation in Brazil. Reflections on a local experience within the furniture industry sector

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Abstract: Designers combine scientific knowledge and insights, thus innovating to generate new creative solutions. From a company’s perspective, competitive advantages demand innovations that also contribute to engaging people and supporting local development. Despite this favourable scenario, managing the dynamics of innovation is challenging. Thus, it is essential to amplify the sense of participation and partnership among business organizations, academic and research institutions and society towards change. This paper discusses an experience in Brazil that involved the furniture sector, a federal university, support institutions, and the local government. The pilot project was developed within an 18 month-period and was aimed at creating an inter-organizational collaborative network to support social innovation and to foster sustainable practices. Notwithstanding the collaboration of some partners, the outcomes highlighted a hard path towards more successful results. In comparison with other countries that have tried similar endeavours, the actor’s willingness to endorse the projects is also related to cultural aspects.

Keywords: Collaborative networks, Social innovation, Boundary objects, Furniture design in Brazil, Design pilot projects

1. Introduction

1.1 Collaboration and Innovation within Networks

Isolated interventions have been little effective when dealing with global challenges. Hence, strategies that are implemented from a network perspective are more likely to succeed in the long term (Tomael, Alcara, & Di Chiara, 2005). The integration of these networks represents an opportunity to face problems as a group, especially for Micro and Small Enterprises (MSEs), due to their internal weaknesses and to their difficulty in understanding external threats or opportunities (Van de Ven, 1986; Swan, Newell, Scarbrough, & Hislop, 1999; Lopes & Baldi, 2009).

Company networks typically include organizations such as suppliers, buyers, competitors, regulatory agencies and other economic institutions (Marchica, 2004; Tomael, et al., 2005; Tsai, 2009). For Di Pace (2013), such a network is a contract that allows companies to share activities and resources in
order to improve their operations and strengthen entrepreneurial competitiveness. From an economic perspective, the network of enterprises signifies an overall reduction of operating costs in comparison with each company's individual overhead expenses. Moreover, the reduction of fixed costs impacts positively on the operational risks and on the value of the companies that comprise the network (Ricciardi, 2013).

In Italy, for instance, about 95% of companies are considered MSEs, with fewer than 10 employees. Over time, because of their productive and commercial skills, even in challenging systems, such MSEs have demonstrated their ability to adapt to dissimilar contexts. Many Italian MSEs have been led to act according to the traditional management mechanisms of regulation as, for example, cooperation relationships based on the network structures. This stems from an awareness of their lack of production capacity and the need to overcome the barriers established by property ties (Ricciardi, 2010).

Rosenfeld (1996) exemplifies that, in 1989, the Danish Technological Institute created a program based on:

- Training programs to facilitate co-operative ventures;
- Stimulating the co-operation of firms in the design, development and implementation of activities by supporting them with funds; and
- Publicity campaigns.

Such efforts were based on the belief that co-operative behavior could help small and medium sized-companies (SMEs) to survive in the market, because collective work would allow companies to innovate through collaboration and to develop R&D projects, as well as to share knowledge. The author also suggests that the Danish case, along with the Italian one, stimulated other European countries to adopt similar programs for SME networking, as can be observed in Spain, in the United Kingdom and in Portugal (Rosenfeld, 1996).

For Ricciardi (2010), the efficiency of a network of enterprises depends on its solidity. The factors that favor its survival over time are mainly related to: 1) the level of reliance established among the partners; 2) the exchange of information and knowledge; 3) the presence of a planning system. Todeva and Knoke (2005) and Tsai (2009) argue that the engagement in partnerships within inter-organizational collaboration networks depends on the actual purposes of such partnerships, on the features of each organization and on multiple environmental factors. Each within its own range, these factors represent specific means to address change and performance improvement (Todeva & Knoke, 2005; Tsai, 2009).

Based on a research carried out by Unioncamere – Chambers of Commerce of Italy, Ricciardi (2010) argues that companies that operate in networks are 17% more competitive than those that operate alone. Furthermore, in the districts in which these networks of enterprises operate, it is possible to verify that their profits are also higher compared to those from the same sector that do not cooperate. This demonstrates that, when structured in a network, SMEs enjoy the advantages of large companies without the need of combination or incorporation operations, thus increasing their facilities in a virtual manner.

In this competitive context, Design can take on a central role, not only by inputting qualified knowledge, but also by motivating the building of scenarios that allow for the search of better solutions in projects, processes, services and even strategies (Zurlo, 1999; Mozota, 2003; Best, 2006; Rossi Filho, Meroni, Monti, & Galisai, 2009). The design field can also aid in the implementation of
such solutions, by managing design processes in order to reach successful outcomes (Mozota, 2003; Best, 2006) in the dimensions involved in the collaborative process.

1.2 The Role of Pilot Projects in Innovation

Innovations are generally analyzed according to three dimensions:

- The process of development, adoption and diffusion;
- The structure in which innovation occurs - industry, organization or department; and
- The innovation type - products or processes, radical or incremental, technological or non-technological, projects or social innovations (Gopalakrishnan & Damanpour, 1997).

As for collaborative networks, the favorable results for each type of innovation depend on both the context and the group involved in its development. Although innovation can provide many benefits for companies, institutions, individuals and society as a whole, some difficulties in managing its dynamics are noticed.

From the design perspective, the integration of scientific knowledge and insights produces innovations that generate new products, services or processes (Owen, 2007; Brown, 2008; 2009). The ability of designers to address needs and potential opportunities, combined with (their) business, reinforces the contributions for the entire chain of innovation activities.

Regarding the pilot projects, in literature, they are recognized as a means to:

- Develop evidence of policy innovations (Vreugdenhil & Ker Rault, 2010);
- Improve knowledge; and
- Benefit the economy and the environment (Goedkoop, Van Halen, Te Riele, & Rommes, 1999; Manzini, Vezzoli, & Clark, 2001; Mont, 2002).

Moreover, they are described as collective trials to test innovations (Latour, 1999) that enable the creation of learning platforms by exploring insights and scaling up processes (Pound, Snapp, McDougall, & Braun 2003; Van den Bosch & Rotmans, 2008). As pilot projects generally adopt new approaches in narrow fields, they contribute to adjusting management practices and policies that may improve these contexts (Vreugdenhil, Slinger, & Ker Rault, 2010). Notwithstanding the constraints, they have been used as applied instruments in different domains, because they constitute a space in which innovations are introduced and tested with smaller risks either on small geographical scales or in short time periods (Vreugdenhil & Ker Rault, 2010).

2. The Brazilian Design System

A map designed by Raulik-Murphy, Cawood, Larsen, and Lewis (2008) and Raulik-Murphy (2010) shows the structure of the Design System in Brazil (figure 1). Formed by a large and diversified number of initiatives, mainly short-span ones, the system is not enough to make companies aware of the value of design and to prove its applied benefits. In addition to this, funding for design initiatives does not come from government sources, but usually from large private or non-profit organizations and industry federations (Raulik-Murphy, et al., 2008; Raulik-Murphy, 2010). In the case of MSEs, the lack of design knowledge, procedures for requesting funding and many other internal management issues severely restrict access to investments or funding.
Among others aspects, this highly fragmented design system in Brazil strongly affects the country’s industrial competitiveness. The Global Competitiveness Index (GCI) of the World Economic Forum 2012-2013 (which includes 144 countries around the world), ranked Brazil in the 48th position, at the Transition Level, between Stage 2 (efficiency-driven economy) and Stage 3 (innovation-driven economy) of competitiveness (Schwab & Sala-i-Martin, 2012). However, Stage 2 (i.e., previous level, 66th position in 2006) supposed that policies should aim at developing more efficient production processes and at increasing product quality, which did not occurred.

Despite some evolution having been noticed in specific areas, Brazil still underperforms when it comes to innovating, partly due to scarce R&D investment and partly due to short-lived initiatives of joint projects that do not have an effective impact on the industry’s performance.

### 2.1 The Bespoke Furniture Sector: local context

This pilot experience took place in the city of Uberlândia, situated in the state of Minas Gerais, in the Southeast of Brazil, whose relevance to the micro-region represents 70% of the regional demands for goods and services. However, the local scenario of the wooden furniture sector is marked by design system that is fragmented in different institutions, which reproduces the general situation in Brazil on a smaller scale of.

The approximately 800 MSEs (Oliveira, et al., 2012) are oriented to bespoke orders that are to be manufactured in a craft production process (Chinnaiah & Kamarthi, 2000). Nearly 85% of MSEs are not officially registered and most of them operate in unsafe facilities with poorly adapted and obsolete machinery. The awareness of practices that reduce environmental impact, supply innovation and bridge technological gaps, where they exist, is not enough to change the scenario. Moreover, out of the 15% of companies that are officially registered MSEs (about 120), only 50% are members of the Furniture Union (SINDMOB). With the exception of the few MSEs which work with interior designers and architects in personalized projects, the sector is strongly characterized by a lack of movement toward organizational, technological or knowledge advances, which reflects its
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deficiency of leadership (SENAI, FIEMG, SEBRAE, & SINDMOB, 2006). The local MSEs are at different stages of development and only a few of them have a real potential to adopt more sustainable practices due to limited design, managerial and operational skills.

2.2 The Design Pilot Project Approach

A strategic Design Pilot Project (DPP) was deemed to provide stimulus for collaboration among stakeholders and, thus, as a trigger to change from a fragmented local system to a more interdependent and sustainable dynamic scenario. The pilot project promoted the development of a network-based experience involving different actors and focused on the System-Ability as a promoter of sustainable change. Named MODU.Lares Pilot Project, the project started in February 2011, lasted 18 months and was divided into two main phases:

The initial phase (six months), carried out by the researchers and SINDMOB, was aimed at establishing the different partnerships and at checking the willingness of the MSEs’ to take part in the experience, which included several visits to different entities, such as business support institutions – SEBRAE and SENAI, NGOs and the local government, to present the proposals.

The second phase (12 months) regarded the DPP implementation, based on the actions needed to carry out the pilot. In order to explore new furniture production solutions by simultaneously practicing and producing, analyzing, evaluating results and future perspectives as a group, this phase included the design of the artifacts to be prototyped by MSE partners, which would work as instruments for common understanding. The furniture was targeted at low-income customers.

- Prototyping Phase

The artifacts were produced in a two-stage process: first as a mock-up and then as a prototype. Before starting the production phase, there were meetings with the MSEs, the SINDMOB and the University to discuss the design solutions. The prototyping phase was planned based on the artifacts’ features and on the infrastructural conditions of the MSE, i.e., based on the means available.

The researchers and two collaborators supervised the entire process. The mock-up production aimed at evaluating the technical and aesthetic solutions of the objects and enabled the producers and researchers to re-design them for the next step. After the mock-up and prototyping rounds, there were meetings with all the parties involved to evaluate the results of production, which led to some decisions and to preliminary conclusions.

3 MODU.Lares Project as a Boundary Object

In innovation processes that include the development of new artifacts or the adoption of new practices, boundary objects have two important capacities.

- One is a practical capacity, which arises from: a) the need for a common language that can be shared by a group when performing specific activities; and b) the feasibility of working as a means to represent differences and dependencies at a given boundary.

- The other capacity is political, since they bring about conditions to transform existing knowledge mutually, thus contributing to creating a new one that can solve the negative results identified by these new experiences.

These capacities lead participants towards a more shared knowledge and, in consequence, help to reduce misunderstandings and differences (Carlile, 2002; 2004).
Within this research, the notion of boundary objects was associated with four different dimensions: Prototypes, Meetings, Exhibitions and the Pilot Project as a whole process. These dimensions were intended to work with a two-fold approach: a) to serve as an element of common language in order to aid in the communication, and b) to encourage commitment and synergy among the different groups involved in the inter-organization collaborative network.

The Meetings (figure 2) and the Prototyping Phase (figure 3) were key steps to stimulate collective learning among the MSEs involved in the Pilot. By using tangible objects to share knowledge, those steps contributed to mutually exploring new visions and understanding through practicing and producing.

Figure 2. Meetings in different times of the DPP development

It is worth noting that during the prototyping period the entrepreneurs behaved in different ways when together. Some of them were quite engaged with the Pilot development and participated effectively in the exchange and in increasing knowledge among the group. On the other hand, some were less involved, possibly because they were overburdened with daily tasks or because they did not comprehend the significance of new skills, or even because they were not interested, despite their inclusion in the project.

Figure 3. Discussions around the Prototypes

The aim of approaching the Exhibitions (figure 4 and 5) as strategic boundary objects was to enable a common language to interact with the broader public by using tangible objects. Such exhibitions represented an opportunity to increase society’s awareness of sustainability and social innovations, as well as to demonstrate to MSEs that increasing competitiveness through the established collaborative network was feasible, and to stimulate its continuation.
As a strategy for Design Promotion, the exhibitions also aimed at communicating the competitive advantages that design could provide to the region’s economic and social development to other MSEs, the government and society.

In order to fully explore the possibility of interacting with the broader public, three exhibitions were held within the scope of this research. The first, named Prototypes Exhibition, was held in January 2012, whereas the second, an Intermediate Exhibition, was held at the beginning of June 2012. The third one, named MODU.Lares Furniture Exhibition, was held at the end of June 2012 and included some ‘rooms’ in which it was possible to combine the solutions offered by the modular nature of the artifacts.

4. MODU.Lares Pilot Project analysis

4.1 Reflections on the local experience

The engagement of individuals and organizations in partnerships, which have collaboration as their main objective depends on several conditions and intents. The more effective the involvement, the more promising the results associated with an experience, since the actors work in collaboration with each other (Todeva & Knoke, 2005; Tsai, 2009). Some conditions also can, nonetheless, negatively affect the whole collaborative network building process.

In such situations, as it is the case with the MODU.Lares Pilot Project, continuous efforts and mostly new strategies are needed in order to achieve the most favorable results. In this respect, it is worth noting that the phases where potential partners were contacted and effective partnerships were
established constituted the most demanding steps of the project, not only due to the several organizations desired as partners, but also to the MSEs themselves.

There are, in fact, many conditions that jeopardize engagement and collaboration among organizations. Even though some of them are very often pointed out as part of the relations among organizations of the same type, they can be equally valid for different types as well. Among the aspects that prevent collaboration, some are related to the following:

- A lack of interest in making a well-coordinated effort to solve a problem together (Roschelle & Teasley, 1995; Brna, 1998);
- Difficulty in communicating (Burton, et al., 1997; Brna & Burton, 1997; Brna, 1998);
- Little social or professional relations among parties, which is a basis for trust, transparency and belief in mutual efforts to achieve group goals (McCormack, 2001; Kloth & Applegate, 2004; Hocevar, Jansen, & Thomas, 2011);
- Commitment to the individual (and implicit) responsibilities each participant must take on in relation to the whole task (Brna, 1998);
- Difficulty of assuming both a continuum of practices and changing internal policies to create alignment and co-responsibility with others over whom there is no direct influence (Kloth & Applegate, 2004) - even indirect influence is quite relevant;
- Limitation in defining common goals, values and procedures (Pareek, 1981; Kloth & Applegate, 2004);
- Poor ability to visualize the interconnected system with interdependent actions (Elkington, 1994; Sachs, 2002; Redclift, 2003; Manzini, 2006) that generate positive or negative cause/effect reactions;

All these arguments were identified during the MODU.Lares Project development. Notwithstanding the efforts dedicated to establishing the collaborative network, the evident lack of engagement of relevant partners - i.e. local government, other associations and NGO - limited, to a certain extent, the achievement of a higher level of sustainability and innovation in the local context. Based on the

![Figure 6. The ICoN activated by the MODU.Lares Project (Nunes, 2013; Zurlo, Nunes, 2015)](image)
4.2 Effectiveness as a Collaborative Pilot Project

By approaching the concept of boundary objects as a shared touch point among organizations, the MODU.Lares Project provided a space, a basis for their interaction around a common focus (Jarzabkowski & Wilson, 2006) through the use of a common language (Carlile, 2002, 2004). In such a space, current and new knowledge were mutually explored and, although this was done in different intensities among partners, it contributed to producing more shared knowledge (Carlile, 2002), thus trying to cross the organizations’ boundaries. Such a basis included all the elements involved in the research: meetings, prototypes, exhibitions, and the pilot project itself. Each one was recognized with a different intensity by the partnering individuals and organizations, which reflected in its effectiveness, as described below:

- **Meetings:**

  The common language established in the Meetings encouraged communication among participants based on the focal points, i.e. the actions and activities proposed during the project. At the same time, not only did it provide a means to make communication easier, it also highlighted differences. At times, divergent points of view or unfriendly ways of expressing ideas among participants when facing the same issues prevented participants from crossing boundaries. This, in turn, affected the actual opportunity for some of them to continue the collaborative path they had started.

  Even though some partners were committed to the goal of collaborating and improving themselves, therefore seeking the best path to achieve it, trust and mutual respect are still a hard challenge.

- **Prototypes:**

  Differences of perception among MSE participants were noticed. Despite this, the Prototypes were recognized as the most efficient boundary object of this experience. Because they are characteristically tangible objects, they worked as an interface, establishing a common language between entrepreneurs and researchers, and among entrepreneurs themselves. This being so, they effectively contributed to stimulating discussion and sharing knowledge, thus supporting the collective improvement of solutions through a learning process.

  Starting from their tacit but also pragmatic knowledge, entrepreneurs were able to explore ideas, built from all the participants’ intervention in a very active attitude that aimed at collective benefit. As it occurs with other elements (i.e. meetings and exhibitions), collaboration was performed with different levels of engagement, which also helped identify the potential of participation and leadership of some partnering entrepreneurs.

- **Exhibitions:**

  The Exhibitions were a means to communicate with the broader public also by using tangible objects as the common language. They functioned as an efficient channel of interaction, stimulating knowledge and information exchange among visitors, students and researchers. The three exhibitions allowed to for approaching sustainability issues, technical solutions and innovation in conversations with the general public, also because there was great media support for all of them.

  Furthermore, they were meaningful occasions for gauging, *in loco*, target audience’s interest, in the solutions proposed with such artifacts. Indeed, thanks to the use of tangible objects, visitors had the opportunity to learn more about the concepts behind such objects, such as the possibilities for
customization and flexibility. The interaction of the public with the prototypes also allowed them to express their opinion about those solutions.

On the other hand, the engagement of entrepreneurs in the exhibitions was less intense than expected. Actually, it remained more as observation instead of active participation in conversations with the public and even with the support institutions and local government. This issue illustrates the argument of Van de Ven (1986) about the difficulty experienced by participants involved in a new project or job in paying attention to opportunities or even managing ideas into actual practices.

- Pilot Project Process:

The use of the MODU.Lares Project as a broad strategic tool to interact with the political context is still an unfinished element. However, the project can be recognized as an important link in the chain: it was the first time in that region that a group of organizations (businesses or otherwise) was involved in a common proposal with a common objective. In this way, the pilot worked as an instrument to foster inter-organizational collaboration among enterprises and business support institutions guided by the university.

From another perspective, the Pilot also revealed the distrust among MSEs, in particular regarding the effective contribution that business support institutions (i.e. SEBRAE and SENAI) could provide. As noticed, their engagement only occurred through specific short actions, without any interest expressed in building a long-term collaborative project with either the furniture sector or with the university. This situation highlights the difference between this approach and the ones in the Italian and Danish cases previously presented.

As for the local government, its engagement is a still a huge challenge to overcome. Communication with the several sectorial departments of the City Hall and with Associations and NGOs, which is considered crucial to potentiate the outcomes of a collaborative network, was not established on a sufficient level of commitment to allow their effective participation.

4.2 Final considerations

Regarding the reflections presented in this paper, some final considerations are due. In order to achieve more comprehensive positive impacts, partners within an inter-organizational collaborative network must understand the crucial interdependence of operations that make the system function - including individual responsibilities and response time. Equally relevant is the integration of the best possible diversity in the types of partners, which can provide specific and effective skills and attributions that may support its functioning in a synergic way.

In the case of Uberlândia, a historically fragmented system with a poor record of sustainability concerns and innovation initiatives, the integration of actors was a little limited. Even though the number of partners of the same type was significant (eight MSEs) if we consider the local conditions, only a few of the other types of actors (businesses, support institutions, NGOs and local government) were engaged. With this, it is possible to claim that the MODU.Lares Project worked far better as a boundary object between MSEs and the University. Regarding the business support institutions, the process was much less expressive and, in the case of the local government, interchange and collaboration were practically negligible.

The Design Pilot Project worked mainly as a motivation for MSEs to kick start a long process towards more evolved and innovative scenarios. It is also true that the information generated by and the outcomes from the MODU.Lares Project provided a basis for further proposals that include the furniture sector, likewise purporting to broaden the range of partnering organizations. In the future,
this may foster the creation of Design policies in the region. However, this will be possible only with the effective engagement of new and relevant partners that are committed to the intention of the complex inter-organizational collaborative network.

The results also showed that, although some partners are willing and prepared to collaborate, there is a difficult path to be navigated towards the consolidation of the engagement of society as a whole and the achievement of more successful results. In comparison with other countries that have carried out similar endeavors, most of times, Brazil’s cultural environment is the harder aspect to deal with in collaborative projects, especially those that include social and environmental issues. Nevertheless, although it is hard, the best way to develop the next society - one that is supported by more balanced values - in developing countries like Brazil is to empower communities so that they take part in it.

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Acknowledgements: I would like to acknowledge all the organizations and individuals that made this experience possible and also the Federal University of Uberlândia/MG - UFU/Brazil for supporting my participation in this Conference.