

Chapter 2

Research Design

Abstract This Chapter presents the research approach adopted as research strategy to carry out this investigation. It describes the research problem, the assumptions and questions as well as the methodology used to develop the work. The chapter describes the research process and explains the action-research method adopted to implement the Design Pilot Project experience in Brazil. Finally, the main theoretical references used and the assessment model developed within the scope of this research are synthetically presented, to be further discussed.

Keywords Brazilian Strategic Design Pilot Project • Wooden furniture sector in Brazil • Boundary objects

2.1 Problem

Understanding the highly fragmented design system in the context of this work requires some background information. Uberlândia is a medium-sized city in the Minas Gerais State, Southeastern Brazil. Geographically placed in a strategic position, it is considered the main logistics center of Latin America, and its tertiary sector (e.g. commerce and services) is the most relevant for the local economy (about 70 %) (SEPLAN 2009).

Firstly, it is worth clarifying that the definition of the strategic orientation and management of any business or enterprise depends on its characteristics. However, there are no universal criteria to define it. Many indications have been used to classify enterprises as micro, small, medium and/or large-sized categories, but these classifications are not completely adapted to all situations, thus varying according to the contexts.

Definitions can either be relevant for tax reasons or to establish criteria to identify eligible enterprises in order to receive government benefits (Lima 2001), as shown in Table 2.1. Since a company's size is related to the market it operates in, there will often be companies that fall outside a particular classification, which may well be suitable for inclusion (Storey 1994). Thus, in order to define the

Table 2.1 Definitions of micro, small and medium-sized enterprises

Agency enterprise\ category	Bolton Report 1971 ¹	European Commission 2005 ²	Statute of MSE ^b Brazilian Law 77/2011 ³	SEBRAE (Brazilian Service of Support for MSEs) ³
Micro-sized	Owner managed	<10 employees ≤ € 2 million ^a (previously not defined)	≤€ 149 thousand ^a (until 2010 € 93 thousand)	<19 employees (industry/building sector) <9 employees (commerce/service sector)
Small-sized	Financially independent	<50 employees ≤€ 10 million ^a (in 1996 €7 million)	≤€ 1.4 million ^a (until 2010 € 930 thousand)	20–99 employees (industry/building sector) 10–49 employees (commerce/service sector)
Medium-sized	Small market share	<250 employees ≤€ 50 million (in 1996 € 40 million)	(non-defined)	100–499 employees (industry/building sector) 50–99 employees (commerce/service sector)

Sources ¹Bruce et al. (1999); ²European Commission (2005) and Muller et al. (2014); ³SEBRAE (2012)

^aannual turnover

^bMSE—Micro and Small Enterprise

group of micro and small companies that are part of this research, the references of SEBRAE (2012) were adopted.

In general, the existing MSEs in Uberlândia have different development levels. Due to their limited skills in many aspects, only a few of them have a feasible potential for adopting more efficient and sustainable practices as well as innovation paths. Most of these aspects are related to design skills, managerial issues and operations mainly verified in their complex company facilities, as well as relations with different actors (SENAI et al. 2006).

To make carrying out DPP development easier, partners were selected according to similar levels of facilities, managing practices and target markets of the MSEs involved. Even though still lacking, these companies presented better conditions compared to other competitors with regard to renovating design practices, production by co-productive practices and management issues. Such a perspective included the potential for improving environmental, economic and technological performances, comprising new social and cultural values in their relationships with stakeholders.

The history of the furniture sector in Uberlândia reveals a slow progress in the enhancement of product and service performance. Indeed, the only existing diagnosis to analyze the sector was carried out by SENAI in 2006. From that analysis, a series of recommendations concerning the technical, technological and managerial issues was proposed for the sector. However, none of them was implemented

until the beginning of this field study in 2012. Among the recommendations proposed by SENAI et al. (2006), the most relevant were:

- Improvement of managerial practices: an action plan for improving MSEs in the furniture sector, starting from the basic concepts of management and their implementation;
- Collaboration as strategy to improve knowledge: to explore personal skills and foster participation. The report advised the adoption of a plan based on practical knowledge concepts to support: (a) production processes through standardization; (b) technical issues and Design; (c) relations and networking and (d) co-development of abilities;
- Understanding market demands: to provide enterprises with support for identifying clients and for understanding marketing methods and investments;
- The execution of a Pilot Project as a strategy to encourage collaboration: a cooperative action trial to obtain benefits in scale, in distribution or in brand communication. The report emphasized the need for a coordinated investment, to sustain compromise within the group, as well as the crucial engagement of the company leaders.

Despite being proposed in 2006, those recommendations were still aligned with the furniture sector scenario in 2012. Since MSEs have always operated in individual and isolated ways, collaboration was quite absent among them. Such behavior resulted in the reduced impact of their decisions at strategic, tactical or even at operating levels, as well as limiting their capacity to obtain financial subsidies or economic incentives to invest either in R&D or in focused consultancies.

In relation to the manufacturing systems, the MSEs' tailored-to-consumer orders often generate problems of different nature concerning the companies' technical and managerial inefficiencies, including the capacity to handle market research and environmental problems. In short, the status of their performance is described by: (a) loss of time and high costs; (b) inappropriate material selection and lack of optimization; (c) products with difficult assembly/disassembly systems; and (d) lack of a flow of orders.

2.2 Assumption and Questions

The research assumed that a strategic Design Pilot Project, developed in a collaborative way, could trigger the beginning of an evolution towards the sustainability of a fragmented local system with a poor record in sustainability issues, as well as in managerial and technological aspects. Such a project regarded a network-based experience, which engaged actors with different organizational types. Even though the questions were focused on a Brazilian context, they can be associated with other contexts, either in developed or in developing countries, with similar conditions related to micro and small businesses and fragmented design systems.

The main research question was: *'How can a Design Pilot Project (and the objects generated through its implementation) be used as a Boundary Object*

element? References of Boundary Objects (Star and Griesemer 1989; Carlile 2002; Fong et al. 2007) and ‘common language’ were adopted to help propose a collaborative model to interact and produce. This started from the creation of a common understanding, to stimulate synergy and encourage commitment.

Other three complementary issues were considered:

- *Can a Design Pilot Project be used to improve technical and environmental solutions, as well as socio-organizational and economic issues, for MSEs in the furniture sector?* To answer this, a Design Pilot Project with the furniture sector was proposed. The focus was to trigger collaboration and behavioral changes within MSEs partners, and also to demonstrate to the local government the relevance of creating design policies.
- *What are the actual benefits of sustainability efforts in building up a collaborative network towards innovation and competitiveness within MSEs?* Analyzing the importance of collaborative networks to motivate both individuals and organizations, as well as to contribute to innovation performance, to change and to growth development, building up a network was extremely relevant to increase benefits.
- *What is the impact of the intervention obtained with a Collaborative Design Pilot Project developed in a fragmented local context with a poor record in innovation and sustainability concerns?* Pilot Projects are known for their value to improve knowledge, produce economic benefits, reduce environmental problems and to learn about the innovation context interaction. Thus, a Pilot Project represented a chance to assess the actual outcomes achieved by its execution, in order to verify the effectiveness in triggering the beginning of an evolution toward sustainability through collaborative practices (Fig. 2.1).

In its whole, the Pilot Project was considered as a Boundary Object element, i.e. an instrument of common language (Carlile 2002), which addresses both direct



Fig. 2.1 Diagram of Pilot Project as a Boundary Object (elaborated by Nunes 2013)

stakeholders—enterprises and government—as well as indirect stakeholders—users, education sector, environment, market. The improvement of system skills and of the abilities to follow a sustainable path and more competitive directions was the major expectation of the Pilot Project trial.

2.3 Methodology

2.3.1 Research Process

The research process followed three main phases (Fig. 2.2): (a) a First theoretical phase, with literature review, theoretical framework, case studies; (b) a Second *action research* phase, related to the MODU.Lares Project action planning and execution, divided into five steps; and (c) a Third theoretical phase, with the Assessment of outcomes, Discussion and Recommendations.

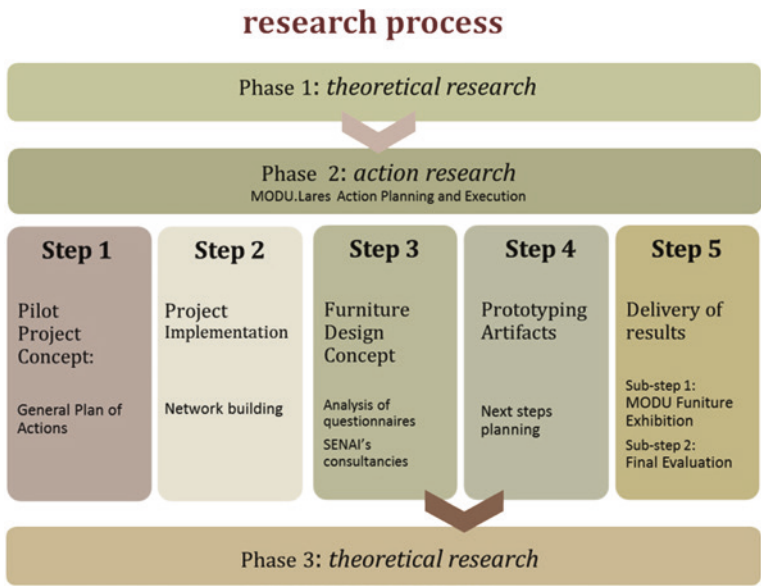


Fig. 2.2 Scheme of the research process (based on NUNES 2013)

2.3.2 Action-Research Phase

The DPP developed in an 18-month period aimed at making the wooden furniture sector evolve in relation to various issues, such as collaborative actions, design thinking, technical, manufacturing and innovation solutions, market strategies, socio-cultural attention and sustainability concerns. Beyond triggering collaboration and behavioral changes within partners, the Pilot Project aimed to demonstrate to the local government the relevance of creating sustainable design policies for the region.

Such a proposal was supported by the understanding that good action strategies could enable viable solutions to respond to problems or even explore opportunities. Therefore, contextualized strategies could support the development of new concepts for MSE operations in such a fragmented local system, in coordination with tactical and operational decisions.

Since Pilot Projects are considered collective experiments and strategic tools to test technical, socio-political and economic configurations of an innovation (Latour 1999) and can be adopted for scaling up processes (Pound et al. 2003; Snapp and Heong 2003), they represented a feasible instrument for action. Pilot Projects can, therefore, be designed to serve multiple functions also in transition management, thus making them an attractive instrument for diverse social problems and contexts (Loorbach 2007).

Based on these issues, the Design Pilot Project was defined as a strategy to implement a collaborative environment and to try the proposed actions.

2.3.3 Literature Review and Conceptual Framework

The The main references adopted were:

- Collaboration, as a valuable approach to embolden learning (Brna 1998; Lopes and Baldi 2009), to pursue collective outcomes (Jansen et al. 2008; Hocevar et al. 2011), and to empower shared resources (Kloth and Applegate 2004);
- Innovation, from Schumpeter (1934) to several other authors (Swan et al. 1999; Ahuja 2000; Akrich et al. 2002; OECD 2005; MacCraw 2006; Tsai 2009; Croitoru 2012; Gopalakrishnan and Damanpour 1997; Bucolo and Matthews 2010, 2011);
- The role of Design in seeking better solutions (i.e. in products, processes, services and even strategies) (Zurlo 1999; Mozota 2003; Best 2006; Rossi Filho et al. 2009) and their implementation. This includes the Design Management perspective (Mozota 2003; Best 2006) as a response of individuals to their businesses (even the micro and small sized) (Cooper and Press 1995; Bruce et al. 1999), its effective use by companies (Gorb 1990), either at the corporate or at the project level (Topalian 2003);

- Sustainability, to favorably orient the attainment of environmental stewardship, economic growth and social progress (Elkington 1994; Manzini and Vezzoli 2002; Ljungberg 2005; Morelli 2007; Tischner 2010), and also to face other problems (of an organizational, managerial and marketing nature, as well as related to social cohesion).

The conceptual framework adopts the Boundary Objects (Star and Griesemer 1989; Carlile 2002, 2004) as facilitators of communication at the boundaries (Carlile 2002). As defined by Star and Griesemer (1989), Boundary Objects are elements that are sufficiently flexible to adapt to local needs but still specific enough to maintain a common identity across different interpretations. This means that “their structure is common enough to more than one world to make them recognizable” (Star and Griesemer 1989, p. 393).

2.3.4 Assessment Tool

Approaches to achieve the transition level towards more sustainable operating conditions were found in many authors (Elkington 1994; Winograd 1995; Sachs 2002; Manzini and Vezzoli 2002; Redclift 2003). Based on these approaches, it is possible to argue that the use and preservation of natural resources, as well as the maintenance and propagation of diverse social, technological and responsible productive practices, are feasible solutions toward sustainability.

In order to identify any emerging change in the MSEs’ performance and the participants’ behavior, thus perceiving how to solve problems or guide future experiences and strategies (Kloth and Applegate 2004; Hocevar et al. 2011), it was important to evaluate the intervention.

The indicators that integrate the MP Assessment Tool were defined on the dimensions of sustainability approached by the ICoN established with the MODU.Lares Project. They are then converted into specific issues, to be further analyzed by using mainly quantitative data. The MP tool was intended to be simple, in order to provide a broad vision of the MSE before and after the intervention.

The MP tool makes it possible to visualize the current and future scenario of MSEs, thus helping to guide actions and decision making processes. Despite some limitations, for the scope of this research the MP tool was a useful instrument which helped to visualize the current situation of MSEs. It also helped identify emerging changes generated from the pilot project’s development. The assessment tool is presented in the next chapter.

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