XXII SEMEAD
Seminários em Administração

novembro de 2019
ISSN 2177-3866

BICYCLE SHARING SYSTEM AS SOCIAL INNOVATION IN URBAN MOBILITY

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Agradecimento à orgão de fomento:
FUNCAP - Fundação Cearense de Apoio ao Desenvolvimento Científico e Tecnológico

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1 INTRODUCTION

Social innovation related to a context of analysis emerges with the idea of exploring the conjuncture of necessity and seeking to improve the quality of life and care of the basic priorities of individuals. This type of innovation can be seen as new alternatives that meet collective needs, generating new relationships capable of influencing society to act on the challenges facing (Bureau of European Policy Advisers, 2011), offering solutions to economic, social and environmental problems through innovative activities or services, with a focus on social change (André & Abreu, 2006; Lévesque & Lajeunesse-Crevier, 2005; Mulgan, 2006). According to Bignetti (2011), social innovation arises precisely as a result of the investigation of alternatives, which can be applied in order to provide future benefits to society.

Bicycle sharing system as a social innovation allows it to be an analysis environment due to its evolution and diffusion promote changes in social practices (Jaeger-Erben, Rückert-John & Schafer, 2015). To ascertain this environment from the perspective of this innovation would allow investigating the alteration of an urban and social context, since for Moulaert et al. (2013) urban studies are prolific fields for cases of social innovation, and according to Lázaro et al. (2018) the public bicycle system allows to be analyzed as an object that demonstrates the dynamics of this innovation.

As a structure that can substantiate and contribute to the advancement of the understanding of this innovation, the use of analysis dimensions – proposed by researchers as way to evaluate contexts of a locality – brings together central elements that enable verification and analysis in different parts of their process: context-environment. For the study of this context will be analyzed all those involved with public bicycles, located in the Fortaleza City, Ceará, which involves management (public power and operating company), sponsoring companies and users of bike-share.

Thus, the following research problem is proposed: what elements characterize bike-share as a process of social innovation in the context of urban mobility? Having as objective: to analyze the elements that characterize these bicycles as a process of social innovation in this context. To this end, the definition of the specific objectives was aligned with the definition of dimensions for the recognition of social innovation. These dimensions, adapted from the studies of Cloutier (2003), Tardif and Harrisson (2005) and André and Abreu (2006), which will be addressed in the theoretical foundation. For each dimension, a specific objective was proposed – five dimensions of analysis in five specific objectives: (a) analyze the bike-share under the dimension Form; (b) analyze the bike-share under the dimension Processes; (c) analyze the bike-share under the dimension Nature/ Stimuli; (d) analyze the bike-share under the dimension Actors Involved; and (e) analyze the bike-share under the dimension Goals of Change.

2 SOCIAL INNOVATION

Social innovation refers to social changes aimed at satisfying human needs (Cloutier, 2003). In this perspective, this innovation can be innovative activities or services disseminated among organizations, with a purpose motivated by the social need (Mulgan, 2006), being a new response that seeks to generate changes to society (André & Abreu, 2006).

Social innovation directed towards the generation of change is applied to meet the social needs not met by the state or the market, being considered, according to Fleury (2001), as a process that produces the reconstruction of the systems of relationships, in which changes that occur alter the already pre-established power structures. For Phills Jr., Deiglmeier and Miller (2008), social innovation is conceptualized as a new solution that will be useful for a social problem, responding to it efficiently, effectively and sustainably, favoring the creation of value for society, rather than an individual value creation.

Social innovation alters the dynamics of the social relations of programs and institutions allowing individuals or groups from different spheres of society to be included in the innovation process (Hillier, Moulaert & Nussbaumer, 2004). Understanding the environment and social conditions are fundamental for understanding the initiatives of this innovation, in which factors such as social, political and economic can use different lenses of analysis for a given context (Phills Jr., Deiglmeier & Miller, 2008).

For Jaeger-Erben, Rückert-John and Schafer (2015), social innovations are alternative practices or new variations of them, not needing to be complete novelties, but they must be a rebirth that in a certain locality are contrary to traditional practices, implying in structural changes. For Lázaro et al. (2018), the social practices and arrangements of individuals and institutions are social innovations.

The literature about this matter is in continuous process of formation and according Moulaert et al. (2010) the variety of definitions results in a set of concepts that favors a vast and interdisciplinary field about this innovation. Therefore, social innovation acquires a characteristic, by nature, multidisciplinary, covering different sectors and fields of action.

2.1 Dimensions of social innovation – analytical studies

The elaboration of new forms of research on certain contexts, as well as the use of theoretical tools that enable practical application can offer differentiated analyzes in relation to the subject. According to Cajaiba-Santana (2014), despite the possibility of basing by previous researches about technical innovation, the innovation expanding its research process for social actions requires the incorporation of new paradigms that perceive its particularities.

The measurement of social innovation can occur at various levels that are interrelated. Therefore, it is possible to verify the interventions that are occurring, analyze the conditions of society, regions or communities that have the potential to be considered socially innovative, and verify how the interventions and the entrepreneurial activities have had a social impact (The Theoretical, Empirical and Policy Foundations for Building Social Innovation in Europe, 2014).

Addressing social innovation using dimensions of analysis is susceptible to scientific studies that enable the expansion of the theme to society. Among some researches, Agostini et al. (2017) analyze the field of social innovation comprising its antecedents and tendencies and Patias et al. (2017) present the main models of analysis of this innovation. In addition, other researches study some sector using dimensions of analysis, such as Souza, Lessa and Silva Filho (2019) investigate the promotion of local economic development; Schutz et al. (2017) investigate socio-educational actions as practices of social innovation; Franzoni and Silva (2016) and Costa et al. (2014) investigate the family farmers chain; Maguirre, Ruelas and La Torre (2016) explore indigenous social enterprises as social innovation; Freitas et al. (2016) identify relationships in family producer groups and Quirino et al. (2015) investigate a federal program in the perspectives of social innovation.

In the case of analytical studies that address dimensions of social innovation, it can be verified researches such as Cloutier (2003), Tardif and Harrisson (2005) and André and Abreu (2006), of which the first two works are from researchers who are members of the *Centre de Recherche sur les Innovations Sociales* (CRISES) and the third work of researchers from the Center for Geographic Studies of the University of Lisbon (CEG). Such works complement each other. Cloutier (2003) proposed a classification of social innovation centered on the individual, oriented on the environment (territory) and generated in the companies. Tardif and Harrisson (2005) observed the basic concepts of social innovation with a focus on social transformation. André and Abreu (2006) observed the presence of social innovation in the transformations of the territory, in initiatives of the third sector aimed at combating social exclusion.

2.1.1 Analysis framework developed for research

With the exposition of three different frameworks containing dimensions of analysis of social innovation, elaborated by researchers and created with the purpose of verifying contexts in which social innovation could be present, a connection is made between the dimensions of analysis of the studies of Cloutier (2003), Tardif and Harrisson (2005) and André and Abreu (2006). By grouping the dimensions of social innovation, of each researcher, according to the similarities of characteristics of each variable was assembled the Figure 1, exposing in a synthetic way the variables of each dimension by author and linking them in new definitions.

	Dimensions of social innovation				
Cloutier (2003)	**Form**	**Process**	-	**Actors involved**	**Goals of change**
	• Tangibility • Novelty/Innovative character • Global objective	• Diversity of actors • Degree of user participation	-	• Individual • Territory • Company	• Wellbeing of individuals and communities • Results produced
Tardif and Harrisson (2005)	**Innovative character**	**Processes**	**Transformations**	**Actors**	**Innovation**
	• Model • Economy • Social action	• Mode of coordination • Means • Restrictions	• Macro/Micro context • Economic • Social	• Social • Organizations • Institutions • Intermediaries	• Scala • Types • Finality (purpose)
André and Abreu (2006)	-	**Resources and dynamics**	**Nature**	**Stimuli**	**Agency interface**	-
	-	• Resources • Dynamic	• Essence • Barriers • Scopes • Domains	• Adversities • Risks • Challenges • Opportunities	• Type • Function • Power interface	-
Proposed adaptation	**FORM (*Object itself*)**	**PROCESSES (*Process of change*)**	**NATURE-STIMULI (*Process of change)***		**ACTORS INVOLVED (*Destination of change)***	**OBJECTIVES OF CHANGE (*Results*)**

Figure 1. By grouping of dimensions of social innovation (Own elaboration, adapted in the readings in Cloutier (2003), Tardif and Harrisson (2005) and André and Abreu (2006)).

With a proposal adapted for the analysis of the theme in this research, five dimensions were defined referring to the specifications of Cloutier (2003): the object itself, the process of change, the destination of change, and the results obtained. These proposed dimensions were: (a) Form, with six variables (tangibility, novelty/innovative character, global objective, model, economy and social action); (b) Processes, with seven variables (diversity of actors, degree of user participation, modes of coordination, means, restrictions, resources and dynamics); (c) Nature-stimuli, with eleven variables (macro/micro context, economic, social, essence, barriers, scopes, domains, adversities, risks, challenges, and opportunities); (d) Actors involved, with ten variables (individual, territory, company, social, organizational, institutions, intermediaries, type, function, and power interface); and (e) Objectives of change, with five

variables (wellbeing of individuals and communities, results produced, scale, types, finality (purpose)).

As for the variables of the Form: the tangibility is related to the form that innovation is occurring, whether it is procedural, organizational, institutional, product or technology; the novelty/innovative character is related to the character of innovation, whether it is a new solution, disproportionate, and to the importance of the changes – extension and depth; the overall objective is related to the general purpose of innovation; the model is related, in a macro view, to the representativeness of the context: whether it is a model of work, of development, of governance, of development Quebec (social and solidarity economy); the economy is related to the articulation between the economic sphere and the social sphere that could originate in a new economy, with characteristics of economy of knowledge, mixed or social; and social action is related to the emergence of new attempts at solution, experiments in the initial phase of implementation, new public policies, new programs, institutional arrangements, new social regulations.

Regarding the variables of the Processes: the diversity of actors allows obtaining a more complete representation of the problem, its causes and possibilities of solutions, through the plurality of points of views; the degree of user participation is related to the awareness of the problem, creation, implementation, and evaluation of innovation; the modes of coordination of innovation are related to how they occur, as to their mobilization and mediation; the means, refer to the formation of social innovation, whether through: partnership, consultation, integration, negotiation, empowerment and dissemination; the constraints, refer to the complexity, uncertainty, resistance and tension of the applied innovation; the resources are related to the conditions that favor innovation, such as knowledge and relational capital; and the dynamics refer to how social innovation is produced: absorption by institutions, exhaustion, braking (repression), abandonment, origin of another wave of innovation.

Regarding the variables of Nature-Stimuli: the macro/micro context involves the environment where transformations occur, if they derive from crisis, rupture, discontinuity; the economic refers to transformations in local, regional and/or national economic structures; the social refers to the transformations that occur in the social sphere, with changes in relations; the essence is related to the focus of change; the barriers are related to what will be threatened with social innovation; the scopes are related to policies, processes and products through which social innovation is manifested; the domains are related to the economic, technological, political, social, cultural and ethical spheres, where social innovation emerges and develops; adversities are related to what social innovation aims to overcome; the risks are related to what social innovation aims to mitigate; the challenges related to what social innovation intends to respond to; and the opportunities related to what social innovation seeks to take advantage of.

Regarding the variables of the Actors Involved: the levels of analysis are related to how the actors relate: the individual; the territory; the company; the social; the organizational; the institutions; the intermediaries; the type; the function; and the power interface.

Regarding the variables of the Objectives of Change: the wellbeing of individuals and communities relates to how much innovation is able to solve problems and prevent future difficulties; the results produced are related to the quality of responses after the application of innovation; the scale relates to the creation and implementation of localized solutions; the types, related to innovation: technical (technological), technical, social, organizational and/or institutional; and the finality (purpose) involves the reconciliation of individual interest and collective interest, in a process of cooperation of the different actors.

3 METHODOLOGICAL PROCEDURES

To meet the problem of this study, qualitative research becomes relevant for the analysis of the proposed social context. Thus, as to the approach of the problem, this research

is configured as a qualitative research. As for the research objectives, these are configured as exploratory and descriptive.

It complements the conduction of the research with the detailing of two components essential for the development of scientific work, as proposed by Creswell (2010): the research strategy and the specific methods. The research strategy adopted is the case study, which according to Coraiola et al. (2013) offers the option to explore and analyze complex social units, investigating, according to Yin (2010), a current phenomenon in a reality in which phenomenon and context do not are clearly defined. Regarding the specific methods for data collection, four techniques were used: participant observation, direct observation, semi-structured interview and documentary research.

The use of various techniques allows more explanations for the problem of the research, allowing the triangulation of data. Data triangulation corroborates the researcher's greater confidence in the data and results validation (Souza & Zioni, 2003) and enriches the understanding of the phenomenon, not only with the analysis under multiple perspectives, but also providing the emergence of new or more dimensions (Clark & Creswell, 2008).

3.1 Unit of analysis and subjects of the research

The case study contributing to the comprehension of individual, organizational, social and political phenomena can be characterized in single or multiple (Yin, 2010). With the study aimed at analyzing the bicycles sharing system in the city of Fortaleza/CE, two projects are in operation: the Bicicletar and the Bicicleta Integrada. Thus, the analysis units comprised these two projects and the research comprised the observation of all the subjects involved. Observing the groups involved in the Bicicletar and Bicicleta Integrada projects, we noticed the set of three distinct groups that comprised them. In this work called (1) management and operation (public management and operator company); (2) sponsoring companies; and (3) users of the bike-share.

3.2 Data collection techniques

Regarding the specific methods for data collection, four techniques were used: participant observation, direct observation, semi-structured and documentary interviews, reinforcing the idea of Yin (2010) that the case study should involve multiple sources of evidence.

3.2.1 Participant observation

Participant observation allowed the researchers themselves, being part of the context under analysis as users, to observe the research context from which they were working, understanding the reality of those involved and gathering information from the environment. This method was fundamental and indispensable for the experiences, the questions of the script were formulated and directed to the subjects of the research in a manner consistent with the study scenario. Flick (2009) complements that this type of observation should be understood in two aspects: first, the researcher should become a participant with access to the research field and to the participants, and secondly, the observation must go through a process that allows focus on the essential aspects of the research question, and the use of tokens, observation schemes and field notes can be made.

In this way, a field diary was used to make the records. The annotations were made after the end of each event, with 21 pages written by hand. There were observed in four days, contemplating seven stations of the Bicicletar, details about: the removal of the bicycle (as if proceeded, difficulties), the location of the station and the context (space in which it was situated) and various facts that occurred that were recorded as useful information for the analysis (problems with the bicycle, intention of the withdrawal at the time and how was the

route, for example). The stations were selected according to: (1) proximity to which the researcher was, (2) availability of bicycles at the station to which it would be withdrawn, and (3) station near the place of destination with vacancy available for return of the bicycle. The data described in the field diary were considered as interpretative data, which according to Stake (2011) are data that immediately isolated already seem relevant, and when mixed with other data make them into aggregative data.

3.2.2 Direct observation

Direct observation allowed us to visualize how individuals acted in the context: type of withdrawal they performed, user profile, location of the station and general movements that were directly or indirectly related to the research and that were important to be registered. Patton (2002) mentions that direct observation is the best investigation to understand and capture the context within which people interact. Thus, a field notebook was used to perform the records of the moments in which the researcher was in the stations (we chose to use the name notebook to differentiate the notes from the participant observation). Annotations were made during the period in which they were in the season, in drafts, being revisited and complemented with more details after each event. They were observed in six days, five stations of the Bicicletar and two stations of the Bicicleta Integrada, with permanence of 4 hours races in each season, being registered 51 pages written to fist.

For the selection of the stations to be observed, in the case of the Bicicletar: (1) the analysis of the application during one week, registering the withdrawals and verifying which stations with the greatest use, (2) station in different directions and neighborhoods (distribution geographic), (3) station with at least one bike on the day, before the beginning of the observation, (4) information passed, by e-mail, by the management of the stations with more use and less use, and (5) station different from the participant observation. In the case of the Bicicleta Integrada, the selection of the stations to be observed considered: (1) the analysis of the application during one week, registering the withdrawals and verifying which stations with greater use, (2), information dictated by management, in informal conversation, of the stations with the most use, and (3) time of the station's existence in the locality.

The analysis of the applications of the Bicicletar and Bicicleta Integrada for one week was performed after consultation and registration in electronic spreadsheet of the quantity of withdrawals of public bicycles that occurred in all available stations. Consultation performed every hour, verifying the number of bikes available for the withdrawal and the number of vacancies available for replacement of bicycles, making the registration on electronic spreadsheet for one week. This procedure was carried out to confront the information that was to be passed through the project management.

According to Konstantatos, Siatitsa and Vaiou (2013), in the study of socially innovative initiatives, the in loco analysis and the effort of the researcher directed to understand the meanings and priorities of the actors and their practices, places and phenomena contributes to the understanding of the context studied. The researcher familiarizes himself with the environment (Shah, 2006) and observes the realism of the situation to be analyzed by providing an indicator of the level of inquiries that structure later interviews (Günther, 2006).

3.2.3 Semi-structured interview

The interviews with the users were initiated only after the realization of participant observation and direct observation made in the stations of the Bicicletar, due to the observations allow the review of the interview script, being made the appropriate adjustments so that appropriate with users. Moreover, direct observation allowed the direct access to users of the bicycles sharing to be able to deliver research cards containing various forms of contact for scheduling the interview.

For the interviews, it was used as instrument of data collection semi-structured scripts for gathering of in-depth data: a specific roadmap for interviews with the municipal government (responsible in project management), a roadmap for Interview with the operating company, a roadmap for interviews with the supporting companies and an interview script for the users of the bike-share. All scripts consist of questions according to the dimensions defined for this research. Some of the questions were used both for the operating company and for the sponsoring companies as they suited both.

As the systems are conceived by the City Hall of Fortaleza, under the responsibility of the Municipal Secretariat of Conservation and Public Services (SCSP), operationalized by the company Serttel, and supported by sponsoring companies, the participants interviewees were composed of: (1) management and operation: two representatives of the team responsible for the immediate Action Plan for Transport and Transit of Fortaleza (municipal government) and a representative of the operator Serttel; (2) sponsoring companies: one company of each project; and (3) users of the bike-share: thirteen users. The interviews were conducted in the period from February to July 2018 with different individuals who were enrolled in one of the three distinct groups that comprised the Bicicletar and Bicicleta Integrada projects. All interviews were recorded for filing with authorization of the parties, with an average duration of 44 minutes in each interview.

3.2.4 Documentary research

The documentary research allowed the collection of recent or old information referring to the cases under analysis, which makes it possible to bring greater details about the studied environment. This research was based on the exposed of Cellard (2014), in which he mentions that the written documents are an extremely precious source, since the memory capacities are limited, and its analysis makes it possible to perform some types of reconstructions, but for both It is necessary to look for the researcher to find pertinent texts.

Some historical data and records were provided by the city of Fortaleza, passed by e-mail, for consultation on their actions, among them, a greater number of records on the Bicicletar, more detailed for being in operation longer, but also have documentation on the Bicicleta Integrada. Such internal documents were indispensable for the construction of the analysis of the results, since they supported excerpts that were not mentioned in the interviews. In all, six internal documents were analyzed, consisting of: bookcases and unpublished articles. As a complement to the internal documents, we used the consultation of three references that reinforced the data analysis, with more emphatic explanations. These are available for public access consisting of manual and legislation.

3.3 Data analysis

The data analysis method used was content analysis. Among the categories and subcategories of analysis, we considered the five dimensions and their variables exposed in the analysis framework of this research. Such categories: (a) Form, with six subcategories; (b) Processes, with seven subcategories; (c) Nature-Stimuli, with eleven subcategories; (d) Actors Involved, with ten subcategories; and (e) Objectives of Change, with five subcategories.

Following the analysis phases proposed by Bardin (2011), this research was organized in three chronological clusters of content analysis: (1) pre-analysis, (2) exploration of the material and (3) treatment of results, inference and interpretation. The first phase systematized the initial ideas, organizing them and making them operational in an analysis development scheme, for this purpose, the use of the NVivo 10 program was used. The second phase consisted of coding and decomposition operations, being a lengthy and lengthy process with analysis of the various data. Finally, the third phase in which the interpretations of the results were made.

4 DISCUSSION OF RESULTS

In this section, we analyze the results for each dimension of the proposed analysis model, based on the studies of Cloutier (2003), Tardif and Harrisson (2005) and André and Abreu (2006). Therefore, initially, presents in more detail the units of analysis (Bicicletar Project and Bicicleta Integrada) and how these public bicycle systems alter the public space of the city of Fortaleza, Ceará. It addresses how the projects started, how they work, what the current impact on the public served, and other relevant information about the field of study.

4.1 Bicicletar Project

Aiming at reducing greenhouse gas emissions released by transport, in 20% by 2030, the Fortaleza City Hall verified the need to implement low-cost measures, such as the creation of bicycle lanes (199 km of bicycle lane) and creation of a bicycle sharing program (Onubr, 2017). With the intention of offering a sustainable transport option in the city, on December 15, 2014, the Public Bicycle System of Fortaleza known as Bicicletar started its services (Bicicletar, 2017a, Povo, 2015).

The project of public bicycles was designed by the City Hall, operated by Serttel, and supported by the Cooperativa Médica Unimed Fortaleza. The Municipality of Fortaleza, idealizing the System of Public Bicycles Bicycling as a safe means of transport, not polluting the environment and being a sustainable mobility option that offers fast displacement, has 80 stations and 800 bicycles in operation, being executed by the Municipal Secretary of Conservation and Public Services (SCSP), by means of the Fortaleza Final Action Plan for Transit and Transit (PAITT) (Prefeitura de Fortaleza, 2017). The Unimed Fortaleza, located in the state of Ceará, is a large medical cooperative in the North-Northeast region of Brazil, which has the potential to promote quality of life, an exclusive sponsoring company that makes the project viable (Unimed Fortaleza, [2017]). The Serttel Group, formed by the Serttel, Samba and Mobilicidade companies, located in the city of Recife, state of Pernambuco, and with a center present in the state of Ceará, offers innovative technological solutions aimed at traffic management, convenience, safety and urban mobility, and acts in the Bicicletar project through the software developed by Mobilicidade and with the technical maintenance of the equipment. (Prefeitura de Fortaleza, 2017; Serttel, [2017]).

According to Unimed Fortaleza [2017], the system of public bicycles, besides including innovation and social and environmental responsibility, has promoted the sustainability, the community and the incentive to the best quality of life. Composed of stations distributed in strategic points of the city of Fortaleza, the points are powered by solar energy and operated via wireless by the central operations, in which registered customers can withdraw the bicycle (Prefeitura de Fortaleza, 2017). It has a panel with instructions for use and map with the location of the stations, electromechanical devices for locking and releasing bicycles, signaling lamps and the release can be made via mobile phone application (Bicicletar, 2017b).

With a year and a half of operation, more than 962.707 trips with public bicycles were carried out, being more used on weekdays, reducing the emission of carbon dioxide into the atmosphere in 346 tons, 120 thousand registered users, of which 83% used Single Ticket (Prefeitura de Fortaleza, 2017). By October 2017, 1,789,604 trips had been made with Bicicletar, 5,008 trips with Mini Bicicletar (bicycles suitable for children, with operations starting in 2017, currently counting with four stations), and reduction of gas emissions carbon dioxide in the atmosphere by 646.03 tons (Bicicletar, 2017a). In October 2018, 2,239,184 trips were made with Bicicletar, 12,761 trips with Mini Bicicletar, and reduction of carbon dioxide emission in the atmosphere at 810.66 tons / CO2 credit. (Bicicletar, 2018).

To remove the bicycles from the stations, it is necessary to use passes. To acquire them, there are four ways: (1) through monthly pass (valid for 30 days), in the amount of R$

10.00; (2) annual pass (valid for 1 year), in the amount of R$ 60.00; (3) daily pass (valid for 24 hours), in the amount of R$ 5.00; or (4) annual pass (with Single Ticket), free for users residing in the city of Fortaleza and registered in the system. All must make a previous registration by the site for the use, and the payment is credited in the credit card informed by the user. After the registration is made, the bicycle can be picked up at the station in three ways: (1) through the smartphone application, (2) cell phone call or (3) through the Single Ticket (Bicicletar, 2017c). The use of bicycles follows defined rules in which the user is aware at the moment of registration, such as time spent on the road (ranging from 60 to 90 minutes) and extra charging for the excess time. The return of the bicycle can be made at any available station.

This project, with its rules of operation and ways of using it, is unique in the state of Ceará. According to the City Hall of Fortaleza (2018a), Bicicletar remains in the ranking as the most used system in Brazil with an average of 6.1 trips performed daily, and in December 2017, some modernizations began to be made (in the application, in the bicycles and in the stations) as a process of adaptation to the factors of use of the population.

4.2 Bicicleta Integrada Project

Having a context and differentiated characteristics, and working recently, when compared to Bicicletar, the Bicicleta Integrada Project is another bicycle sharing project proposed and developed by the City Hall of Fortaleza in partnership with Serttel (winner of the public selection for equipment maintenance) and the sponsoring companies: Marquise, Extra and recently, in 2018, Rio Mar Kennedy (this last one, replacing the sponsors of the University of Fortaleza and Indaiá).

Developed by the Municipal Secretary for Conservation and Public Services (SCSP), through of the Plan of Accomplished Actions of Transportation and Transit of Fortaleza (PAITT), the project is the first in Brazil to be implemented in order to integrate the bicycle sharing with transportation public. According to the City Hall of Fortaleza (2018b), this Bicicleta Integrada loan system offers the population of Fortaleza a new transportation alternative in the city.

The model of the stations and the bicycles are similar to the Bicicletar, modifying only the colors of identification (that varies according to the sponsor), and the greater number of bicycles and vacancies available in each station.

Despite having similarities with the Bicicletar Project, the Bicicleta Integrada has different registration and usage rules, with stations located in areas far from the center of the city and near bus terminals, and with implantation after the Bicicletar, with the first station was made available in June 2016. The Bicicleta Integrada has seven stations in operation, the last being inaugurated in April 2018 (Serttel, 2018).

To remove the bicycles from the stations, it is necessary for the user to have the Fortaleza Single Ticket (card addressed to the residents of the city of Fortaleza for use with municipal public transportation). With this card it is possible to make the individual registration in specific stations in the bus terminals. After registration, the bicycle can be picked up at the station in three ways: (1) through the smartphone application, (2) cell phone call or (3) through the Single Ticket (Bicicleta Integrada, 2018). The use of bicycles follows defined rules that the user is aware of at the moment of registration, such as time spent on the road (varying in 14 hours) and blocking the registration for overtime. The return of the bicycle can be made in any available station, of the same system.

The Bicicleta Integrada is restricted to the residents of the city of Fortaleza and it is necessary to register face-to-face with the future user in a specific term of use of the bicycles, the use of the bicycle is free (without fees) and the penalty after extrapolated the term it is not monetary. In the Bicicletar registration is virtual without a signature, of the citizen, in the term

of use, anyone who does not live in the city can use it, and the penalty after extrapolated the term is monetary.

Knowing the projects to be analyzed in this research, the results of the application of the analytical framework will be detailed in the next section.

4.3 Dimensions of social innovation in the cases studied

After analysis of each variable (subdimension, subcategory) in the context of the research, the following result solidified in the following variables exposed in Figure 2.

Proposed adaptation	FORM (*Object itself*)	PROCESSES (*Process of change*)	NATURE-STIMULI (*Process of change*)	ACTORS INVOLVED (*Destination of change*)	OBJECTIVES OF CHANGE (*Results*)
Resulting variables	• Tangibility • Novelty(innovative character) • Global objective/ Social action • Model • Economy	• Diversity of actors/ Means • Degree of user participation/ Mode of coordination • Resources • Dynamics/ Restrictions	• Essence • Barriers/ Macro-micro context • Scopes • Domains/ Economic/ Social • Adversities • Risks • Challenges • Opportunities	• Where it occurs (Individual/territory/company) • Relationship type (Territory/social/ organizations/institutions/intermediaries) • Function • Power interface	• Results produced/ Scala/ Types • Finality (purpose)/ Wellbeing of individuals and communities

Figure 2: Resulting variables (Own elaboration).

By understanding the dimension Form, it is noted that the concept of bicycle sharing has existed for a long time, but what makes it specific to each locale is how it is implemented and the involvement of the actors. Each region can have a form of self-adoption, as well as characteristics of individual acceptance and use of each user. Despite the concept of the Bicicleta Integrada being innovative, in relation to other systems of bike-share, the predisposition of the stations in places where they did not exist, made the characteristics of use by the users of Fortaleza very close. From the moment when citizens are allowed access to the sharing of bicycles, the purpose of their use, regardless of the concept of the system, will be similar: while a user of the Bicicletar makes the integration with the bus, the Bicicleta Integrada uses it for tours or work without integration with the collective transport.

Regarding the dimension Process, both the Bicicletar System as the Bicicleta Integrada demonstrate articulations involving various organizations that encompass the public and private authorities working in the management, operation and sponsorship, with no single institutionalization, but a diversity of actors, each playing their role. For the bike-share to work in the city of Fortaleza, the performance of each actor is essential in each existing role: management, operation, maintenance and financial support. The partnerships, under the legal terms, contribute to the continuous existence and updating of the Bicicletar and Bicicleta Integrada, keeping the population with access. Users also gain a fundamental role in the participation of the project, because without the use of bicycles and the individual feedback the project would not continue existing and being enlarged.

In the nature-stimuli dimension, it is noted that social innovation as an idea of social change occurs from the need of the city to adapt the changes imposed in the new Brazilian legislation on mobility, so that this readjustment provides greater Directing the actions of the public authorities. With the new rules, municipal management remade its structure to meet the growing demands of society and the sponsors see as a stimulus the possibility of disseminating

its brand. Such adjustments focus on a new environment in the city with improvement in the quality of life of citizens.

Regarding the dimension Involved Actors, the bicycle sharing stimulates the individual to rethink the use of the bicycle as a means of transport. However, it is observed that at the same time, the individual's internal will and the presence of external factors interfere so that the user uses it and sees its benefits. The Bicicletar and Bicicleta Integrada System allow individuals to rethink, but those who demonstrate having perceived returns beyond mere displacement, use the bike longer. This effect could then come to the extent to which the use of the bicycle in the city is increasingly encouraged through incentives programs of the government itself, as well as intermediators as a group of cyclists, of companies developing mobility actions, organizations and actions of the society itself. Thus, the relationship between the municipal public management, the operating company and the private companies supports Bicicletar and Bicicleta Integrada project, and other actors that indirectly engage in the cyclist causes interfere so that there is the development and continuity of projects, as well as their expansion.

Finally, analyze the bike-share under the dimension Goals of Change demonstrates that the results produced are directed towards a social innovation, resulting from a change that occurs from the user to the participating institution. The institutional remodeling of the City Hall of Fortaleza with the creation of the Immediate Transport and Traffic Action Plan (PAITT), of the Cycling Management and other departments promoted a greater focus on actions related to non-motorized means of transport. This restructuring strengthens the actions in urban mobility, such as the insertion of bicycles sharing for the citizens of the city itself. When the bicycle sharing system starts to provide for the population of Fortaleza, free of charge, a "new" means of transportation for displacement, such projects induce users to the misuse of individual automobiles. It also induces a possible purchase of own bicycle (consumption) or the exclusive use of the bicycle sharing. In conclusion, for different reasons users continue using the bike to meet some need, even when they can use some other means of transportation.

5 FINAL CONSIDERATIONS

Bicycle sharing as well as being useful as a means of transportation, contributing to the health of the individual and reducing pollution in the atmosphere - already existing characteristics - embodies the vision of being a common good that enables the promotion of changes in existing social relationships. Finding it from the perspective of social innovation makes it possible to visualize how bicycle sharing systems alter the urban and social context, specifically in the locality under analysis. In addition to the fact that this study grants the concepts of social innovation and provides a new analytical environment, it allows to broaden the debate about the subject and to bring theoretical-empirical contributions to the field of research.

In sum, the elements of social innovation are present in the analysis environment and bike-share act as providers of social change in a city. The operation of the bicycle sharing system in the locality implies that the procedural, political, institutional and organizational relations are modified so that the promotion of the Bicicletar and Bicicleta Integrada systems take place, and that citizens have access to the free means of transportation. Each actor involved (municipal public authority, operating company, private company, user) plays an important role in promoting these projects in Fortaleza, in addition to other factors occurring in the city favor for users to use the bicycle. Bike-share develop the most varied opportunities that include benefits for the individual as well as for the locality in which they are inserted, through challenges and adaptations that result in transformations of the scenario.

In this way, it is understood that the elements that constitute the dimensions of social innovation are associated with the achievement of results with relevant empirical studies

that contribute to the development of the field. Thus, this research contributes theoretically, instigating the use of dimensions formulated for urban studies. Such research also contributes to the public's knowledge of the process that formed and made feasible the bicycle sharing systems in Fortaleza, and what impacts may exist for the permanence of this service.

As limitations of the research are the difficulties in achieving the rapid return of the people to be interviewed; the impossibility of conducting the interviews with the other sponsoring companies of the Bicicleta Integrada and of expanding the interviews with the users of the bicycle sharing, specifically the Bicicleta Integrada. The companies initially demonstrated willingness to collaborate, but during the process of scheduling a personal interview, and after being allowed the interview answered by email or telephone, no return was obtained, even with insistence. The vision of another sponsor who collaborates more time with the project and of sponsors that already collaborated could provide a complementary look to the field of research, due to the greater time of involvement. As for the users of bike-share, the interview at the station's location would be impracticable due to the dynamics in which the individual needs to remove the bike to move, being a limiting point in the collection of the interviews.

For future research, we suggest the continuity of this investigation by analyzing in more detail the specifications of each bicycle sharing system. It is understood as pertinent under the watch of social innovation and for the construction of this field that a sharp analysis of the details of each project verifies factors that can approach them or distant them, since they are projects implemented in different times and with characteristics individuals. In addition, it is recommended to analyze the Corporate Bicycles System in order to understand the institution-employee relationship and Mini Bicicletar in order to understand the family relationship that can bring new factors of analysis and aggregate data to the field of social innovation. Both projects are being developed in Fortaleza, Ceará. It is also suggested to carry out comparative studies with other bicycle sharing systems, be they national or international, since the specificities of implementation in each locality can bring new characteristics that contribute to the discussions on the theme.

Finally, it is exposed that the present study does not exclude that in other Brazilian cities the deployment and operation of public bicycles are similarly reported and does not exclude that the bike-share systems under study have been inspired by international mobility models. The proposal of this research was not to place the city of Fortaleza as the only municipality in the state of Ceará to have this system of sharing of bicycles, but to analyze which elements characterize bicycle sharing as a process of social innovation in the context of urban mobility , and for that, it was taken as a space of study those that are in development in this city. Such work is available so that there can be replication in other cities and verification of their processes in contribution to the development of local urban mobility, allowing even contribution to development in the field of social innovation.

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