The contribution of design research in solving complex problems in the field of public administration

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This theoretical study explores how design research can assist in solving complex problems in the field of Public Administration, especially when coupled with a constructivist positioning on the part of the researcher. First, the main aspects of design science are highlighted. Then, the method of design research is presented, focusing on the detail of its stages and the results generated, as well as the different research paradigms that may lead to its application. Finally, the study carries out an analysis of the contribution of design research to solve complex problems in the field of Public Administration. The conclusion presents a discussion on the relevance of design research, as a prescriptive method in the field of Public Administration, considering the context of Brazil.

Keywords: public administration; paradigms; design research.

A contribuição da design research para a resolução de problemas complexos na administração pública

Neste ensaio teórico investigamos como a *design research* pode auxiliar na resolução de problemas complexos do campo da administração pública, especialmente quando aliada a um posicionamento construtivista por parte do pesquisador. Para isso, primeiramente destacamos os principais aspectos da *design science*. Posteriormente, apresentamos o método da *design research*, tendo como foco o detalhamento de suas etapas e dos resultados gerados, bem como os diferentes paradigmas de pesquisa que podem conduzir sua aplicação. À luz dos pontos mencionados, analisamos, por fim, a contribuição da *design research* ante os problemas complexos da administração pública. Nas conclusões, discutimos a relevância da *design research*, como método prescritivo, para o campo da administração pública, dado o contexto em que o país vive, em termos de problemas públicos.

Palavras-chave: administração pública; paradigmas; *design research*.

La contribución de la design research para solucionar problemas complejos en administración pública

En este ensayo teórico tuvo como objetivo investigar cómo la *design research* puede ayudar a resolver problemas complejos de la esfera de la administración pública, especialmente cuando se combina con una posición constructivista por el investigador. Para ello, primero se destacan los principales aspectos de la *design science*. Posteriormente, se presenta el método de diseño de la investigación, centrándose en los detalles de sus etapas y resultados generados y los diferentes paradigmas de investigación que pueden conducir a su aplicación. A la luz de los puntos anteriores, se analiza, por último, la contribución de la *design research* en comparación con los complejos problemas de la administración pública. En conclusión, se discute la pertinencia de la *design research*, mientras que el método prescriptivo, al campo de la administración pública, dado el contexto en el que vive el país en términos de los problemas públicos.

Palabras clave: administración pública; paradigmas; *design research*.

1. INTRODUCTION

In general, traditional sciences influence decisively the production of scientific knowledge. In the field of Administration, research based on the paradigm of the natural and social sciences are still predominant, and are presented with a focus on the construction of theories that are based on exploration, description and explanation of how reality works (Dresch et al., 2015; Aken, 2004; Jelinek et al., 2008). Although the theories produced in the area seek to prove their validity, in practice they have shown little relevance and, because they are unknown by the professionals of the field, contribute little to the solution of real problems (De Sordi et al., 2011). Thus, knowledge in Administration has remained strongly abstract and ideological, as observed in critical field studies (Dunne and Martin, 2006; Hambrick, 1994), which are based on the practices, theories, and discourses of organizations' daily life (Davel and Alcadipani, 2003).

Jelinek and collaborators (2008) point out that the predominance of models from the natural sciences contributed to the development of knowledge in organizational studies, but these models are presented in a fragmented way and their capacity to contribute to the practice, as well as to a more global reach of its results, is low. On the other hand, Administration, as an applied social science, cannot refrain from the dimension of action, from the search for a management aimed at understanding and solving problems. In this sense, Serva (1997) observes that applied social sciences can collaborate both to diagnose the causes of a problem and to rethink new social practices.

Observing the public sector, the demands are more and more evident. Unlike other organizations or organizational structures, public administration, as highlighted by Denhardt (2012:23), "is *interested* in the *management* of *processes* of *change* that *aim* at *attaining publicly* definite societal *values*". Because of their broad scope — related not only to groups of individuals but to the whole community — public problems are inherently complex. Nevertheless, the public administration is marked by problems that involve prioritizing and managing different resources, demands and interests, which are sometimes uncertain and conflicting, and which cover a wide range of social and political actors (De Sordi et al., 2014). This specific characteristic of the sector already configures what Ackoff (1974) calls a "mess", in which the problems are poorly structured and, therefore, require greater efforts both for their diagnosis and for their mitigation and/or extinction.

In addition, the current context of public administration brings elements that add to this naturally complex scenario and pose new challenges with regard to solving problems, such as the crisis in the state's capacity for response, which is connected with the political crisis and of legitimacy and with the current financial crisis.

It is because of this scenario, and especially of the current gaps, that the potential contribution of design research is presented to — based on the constructivist paradigm and its articulating character — solve public problems, marked by a high degree of complexity.

The need for a more accessible science, which goes beyond the exploration, description and explanation of a certain problem or phenomenon, is eminent as a way of contributing to the discussion about developing solutions to public problems. The field of public administration requires answers to its problems, such as the creation and development of artifacts that may allow greater interaction between theory and practice, generating knowledge that can be used in the future in similar situations (Aken, 2004; Dresch et al., 2015).

With this in mind, emphasis here is on the need to discuss an epistemological basis and a research method capable of supporting studies of a prescriptive nature, especially the type of knowledge produced by the research method. Daft and Lewin (1990) bring attention to the use of prescriptive methods aligned to the concepts of design science, as an epistemological approach. Design science considers knowledge as a constructed project, which contributes not only to advancement in an essentially academic context, but also to the development of research aimed at solving complex and relevant problems and taking into account the context in which its results will be applied (Le Moigne, 1994).

Considering the complex scenario around public problems, which demands new forms of solutions, research in design can be of great contribution. This article explores how design research, together with a constructivist approach adopted by the researcher, can assist in the resolution of complex problems in the field of public administration. The first part of the article presents the main aspects of design science. The following sections present the design research method focusing on details of its stages, the results obtained by using the method, and the different research paradigms that may lead to its application. The final section analyzes the contributions of design research to the complex problems of public administration, with special attention to the Brazilian context.

In terms of theoretical contribution, this study discuss the relevance of design research as a prescriptive method for the field of public administration. Few studies have addressed the method in the field of public administration. Although Przeybilovicz (2014) and De Sordi and collaborators (2014) present the use of the method for the production of artifacts to solve a public problem, they do not reflect on the contributions of the method to the field of public administration, especially with regard to the complexity of problems.

2. DESIGN SCIENCE, DESIGN RESEARCH AND THE RESEARCH'S PARADIGMATIC CHOICE

Design science has its roots in engineering. It emerged because of the gap arising from the exclusive use of the traditional sciences in conducing scientific research. The concept is attributed to Herbert Simon, an American researcher and winner of the Nobel Prize in Economics. In his book *The sciences of the artificial* (Simon, 1996), Simon presents a differentiation between the natural and the artificial. For the author, natural science refers to a set of knowledge about a class of objects and/or phenomena of the world that have not undergone any kind of human intervention. The artificial, in turn, can be characterized as that which was produced by the human being or that undergoes human intervention.

Characterized as a science, design science consists of the systematic creation of knowledge about and through a project. It extends to the scientific study of the project and to the use of design processes in the creation of scientific knowledge.

Design research is the method that operates the research and aims to build an artifact. Thus, part of the understanding of the problem in order to build and evaluate artifacts that allow the transformation of a given situation to better or desirable standards, promoting, as explained by Edelson (2002), the approximation between theory and practice.

In spite of its prescriptive nature, design research presupposes methodological rigor and relevance (Hevner et al., 2004), a fundamental aspect for the achievement of the validity and reliability of the research. It also contributes to the expansion of existing knowledge base in the field of study.

As a way of assisting in conduction and evaluation of research using design research, Hevner and collaborators (2004) define seven guidelines that should be considered in this type of research. The first concerns the artifact as an object of study, whose creation is based on a set of applied theories, tested and adapted through the researcher's experience and ability to contribute to the solution of the analyzed problem (Markus et al., 2002; Walls et al., 1992). The second guideline concerns the relevance of the problem that the artifact seeks to solve. Hevner and collaborators (2004) emphasize that the problem must be motivating and its solution useful for the respective users. The third guideline is the need for rigorous evaluation of the proposed artifact. Johansson (2000) observes that artifacts can be evaluated for their functionality, consistency, performance, reliability, ease of use, their fit to the organization, among other attributes of quality. In addition, the artifacts should contribute to solve real problems (Chatterjee et al., 2009), for the development of new methodologies, as well as for the advancement of the corresponding knowledge area (Atkinson et al., 2009), which is the fourth guideline. The fifth guideline, in turn, is directly related to the use of rigorous methods, from the understanding of the problem to the moment of evaluation of the proposed artifact as solution. The sixth guideline is the efficient use of resources, satisfying the environmental laws in which the problem is embedded (De Sordi et al., 2011). The seventh and final guideline consists in communicating the results. This, according to Druckenmiller and Acar (2009) and De Sordi and collaborators (2011), should have specific focuses for each target audience, in order to facilitate their understanding.

The following authors were studied: Bunge (1980), Hideaki Takeda and collaborators (1990), Eekels and Roozenburg (1991), Nunamaker and collaborators (1991), Walls and collaborators (1992), Vaishnavi and Kuechler (2004), Cole and collaborators (2005), Manson (2006), Pefferse and collaborators (2007), Gregor and Jones (2007), Aken and Romme (2009), Baskerville and collaborators (2009), Alturki and collaborators (2011), Aken and collaborators (2012) and Dresch and collaborators, (2015). From these authors it was possible to identify the frequent stages that are common to most of the proposals. In this article they are treated as the main stages of the method.

The first concerns the *choice of the field problem*, characterized as the discrepancy between the facts presented and the set of values that are desired for these facts (Eekels and Roozenburg, 1991).

With the problem identified, it is necessary to understand it in depth. For this reason, Aken and collaborators (2012) propose to carry out *analysis and diagnosis* to obtain the maximum information available on the problem, in order to ensure a complete understanding of the causes and contexts.

From this analysis, it is possible to start the *systematic review*, which will serve as base for the development or improvement of the artifacts. This third stage of the method, allows an analysis of the already existing knowledge base in the studied field (Aken and Romme, 2009).

Synthesis of the research is the fourth stage of the method. This, together with the previous analysis, can demonstrate inconsistencies and flaws in the existing literature, as well as in solutions that were developed and tested at another time.

Then, the *artifacts propositions* are presented, that is, the possible solutions to the problem. This is the fifth stage (Dresch et al., 2015).

The next stage is aimed at the *development of the artifact*, which, among the possible solutions, is the most suitable for solving the problem. Manson (2006) observes that the researcher must

justify the choice of tools used, the components of the artifact, and the connections that showed that it is possible to fulfill the proposed objectives. At the end of this stage the artifact itself is ready, as well as the heuristic of its construction. There are many artifacts that may be developed. Dresch and collaborators (2015) highlight the constructs, the models, the methods, the instantiations, the prototypes. They also cite examples of artifacts such as the products, processes, structures, services, tools, systems, projects, programs, among others.

The *evaluation of the artifact* consists of the seventh stage of the method. It is at this moment that the artifacts are tested, aiming to analyze their ability to solve the problem.

The eighth stage is the *systematization of the lessons learned and reflections* that emerged throughout the development of the research (Cole et al., 2005).

The ninth and final stage consists of the *communication of the results* of the research. This, according to Alturki and collaborators (2011), should reach both the professionals of the field studied and the academy.

The results of research in design may vary due to the different options for data collection and analysis techniques throughout their stages. This will depend on the research paradigm adopted by the researcher.

Thus, even if the phenomenon is the same, the researcher can conduct the study both under the positivist and interpretative view. However, each will lead to a different point. In other words, the paradigm resulting from beliefs and assumptions will be responsible for conducting the research method. Thus, it should be noted that the choice of the researcher for a paradigm influences the choice of the theoretical framework, the way the methodology will be conducted and the possibility of conciliation with other theories.

From a positivist paradigm (Giddens, 1998; Triviños, 1987), the understanding of reality is constituted by isolated elements, by atomic facts (atomic logic) observed or empirically verified. That is, reality is waiting to be discovered by the researcher, because they believe in the objective knowledge of the data, unrelated to any traces of subjectivity, defending the "neutrality of science", the separation between the researcher and the analyzed object. In this way, the researcher's role is to express reality, not to judge it or intervene in it. The distinction between fact and value is also highlighted (Triviños, 1987). The facts, for positivism, are considered the goal of science. Values, in turn, are considered only cultural expressions.

Despite the predominance of the positivist paradigm also in the social sciences, several researchers, among them Orlikowski and Baroudi (1991) and Saccol (2009), have highlighted the use of a paradigm that is able to recognize the complexity of the objects of study of administration.

Presented as an alternative to positivism, the interpretative paradigm considers that the interaction between the subject and the object is fundamental. It assumes that the understanding of social phenomena requires "diving in" to the world in which they are generated, requiring openness to the perspective brought by the actors present in analyzed context.

The interpretative paradigm can be translated through subjectivity, since it does not value the existence of a totally objective reality. It also considers that there is a dialogue between the characteristics of a given object and the understanding that individuals consolidate socially. In this

way, reality is presented through social interactions, not characterizing itself as something "given", in the expectation of a discovery (Orlikowski and Baroudi, 1991). The different interpretations and realities in the social context explain the different views of the world, present in most problems of public administration, which makes them even more complex.

Thus, the constructivist interpretative approach considers that knowledge about reality is produced in a social context, subordinated to human practices and is built through the people and the world in which people are inserted (Saccol, 2009). Our knowledge of reality, including the domain of human action, is a social construction (Walsham, 1993), and therefore it is important to emphasize that research in design, conducted based on this epistemology, will be characterized by incorporating the social context of the problem into all stages of the research. Thus, both the understanding of the problem and the proposition of the artifact, its development and testing will be constructed with the main actors involved, in a process of co-design, seeking to capture the different visions.

Grounded on the notion of intentionality (Burrell and Morgan, 1979), research in design — elaborated from the interpretative point of view — aims to assimilate reality "as it is", to perceive the essential nature of the social world at the level of subjective experience, to seek answers to social or human problems. In this interpretation, the researcher conceives a holistic and complex image, investigating documents, gathering detailed visions with the research subjects and about them, as well as coordinating the study with a "natural attitude".

This constructivist approach is the background to introduce in the next section the potential of design research's contribution to solve complex problems in the field of public administration.

3. DESIGN RESEARCH AND THE COMPLEX PROBLEMS OF PUBLIC ADMINISTRATION

Problems are usually perceived as disturbances to the system or to a certain natural and desirable state, and therefore require specific interventions. However, it is important to bear in mind that problems have diverse natures and intensities, which result in different levels of complexity. Glouberman and Zimmerman (2002) present a differentiation between simple, complicated and complex problems. For the authors, a problem is complex when each situation is unique, previous success does not guarantee future success, and when specialist knowledge, while valuable, is not enough. Ackoff (1974), observes that problems considered complex, or what he calls a "mess", do not present a well-defined structure, there is little consensus on the most important aspects of the issue and even less about the goals to be achieved. There is also the tendency to present different dimensions (economic, ethical, political, etc.) that are difficult to separate from each other. Along the same lines is the concept of "wicked" problems presented by Conklin (2001) and Rittel and Webber (1973). In this case, the authors understand that each problem is new and unique. The parameters for solutions are incomplete and constantly changing.

Matus (1987), when discussing situational strategic planning, classifies the problems into well structured, quasi-structured or poorly structured. The poorly structured problems, considered as complex problems, are related to problematic situations of uncertainty in which the variables cannot be enumerated and can only be dealt with through creative interventions. The characteristics of the poorly

structured problems are: (1) they are part of problems that mobilize different actors, understandings and proposals for intervention, sometimes divergent, forming an area not necessarily consensual; (2) although they have a technical dimension, the socio-political scope is highlighted, and an objective approach is not possible, even if rigor is not abandoned; (3) they are not easily insulated, since they depend on their generation and their confrontation with other problems with which they intertwine; (4) they depend on the larger context in which they are inserted, in the scenario composed by a series of uncontrolled circumstances that interfere with it, thus possessing some degree of uncertainty; (5) assume a confrontational approach characterized by strategic, reflexive judgment; and (6) solving them depends on a multi-sectoral approach.

Particularly in the context of public organizations, the complexity of problems is a defining feature. The public administration's main objective is to meet the needs of citizens. This happens through public policies and services, which are targeted activities aimed at solving a public problem. However, the definition and implementation of a policy is a challenge for managers, since their activities are intended for collectives, for the communities as a whole, and not for specific groups or niches of individuals. In other words, they meet the needs of citizens attentive to the specificities, but seek to bring this into the scope of collective problems, for the common good (Denhardt, 2012). Throughout the process, there are uncertain and conflicting demands and a wide range of social actors (De Sordi et al., 2014). Thus, public problems (especially identifying and mitigating them), are inherently complex, being marked by the high degree of unpredictability and difficulty in identifying cause and effect.

Nevertheless, the context of public administration, especially the case of the Brazilian public administration, brings elements that add to this naturally complex scenario and impose new challenges in resolving problems.

The first of these concerns is the crisis in the state's ability to respond to public problems as an isolated actor, a crisis that has been consolidating throughout the country's history.

For a long time in Brazil, while the national state was developing and strengthening itself as a mechanism for political and economic coordination, the reforms that took place in the public administration were controlled by the oligarchic elites. These elites, in assuming control of the state, sought to impose their mode of operation to the rest of society, without any kind of articulation with actors outside the state apparatus (Bresser-Pereira, 1999). Thus, the country has been historically marked by the centrality of the state and by the belief in its ability to solve public problems by acting alone. The mindset was that citizens were to express definable and uniform needs that could be addressed using standardized "production" systems that could be divided in sectors and served in large-scale, which is typical of traditional bureaucratic organizations. However, public problems such as health and education, for example, have multiple determinations, which do not fit the perspective of sectors or of individual cases, a perspective that may work when it comes to mitigate simple and more structured problems. As a result, in the last decades, there have been periods of questioning the capacity of the state in its classical configuration to offer solutions to problems, even in the face of ever greater demands (Lechner, 1996; Abrucio, 2007).

This limitation of the state — as an actor isolated and divided in sectors — in solving complex problems is aggravated when two other elements are added: the political and legitimacy crisis faced

by the Brazilian public administration and the financial crisis that is particularly devastating the states and municipalities. Although the relative delegitimation of the state and of political institutions is not an exclusivity of the current times, it is necessary to consider that the permanent inefficiency of governments in solving economic and social problems that affect most of the Brazilian population (Lechner, 1986; Cunill Grau, 1996; Kinzo, 2001), together with the recent wave of reports of corruption practices in public bodies, involving prominent political leaders, have contributed to its aggravation. In addition, the Brazilian states and municipalities are experiencing a period of financial crisis, marked by low tax collection and reduced resources on lending, which further compromises state capacity for action. This reflects in the recent concern of different communities, who feel their needs are not fulfilled or represented by the state's actions.

The political and financial limitations that mark the current scenario of the Brazilian public administration, together with the inherent complexity of public problems, present important challenges. In particular, the challenge of developing cooperation mechanisms. Since the state alone has limitations for solving complex problems, the connection with a variety of other actors is crucial, especially with those who have valuable knowledge and deal with public problems on a daily basis.

Brugué (2004) argues that simple and isolated technical solutions may be sufficient when problems are clear. However, this is not the reality of the Brazilian public administration. Therefore, public action cannot be based on decomposing the problems into sectors. They must be taken in full, which requires a transversal and integrated approach, not only between the different sectors, but also in collaboration with external actors, who experience the problems directly. It is necessary to consider the multiple facets of reality, so that it is possible to meet diverse requirements or to consider the different vulnerability factors of social groups.

In addition to improving decision-making intelligence in public administration, democratic capacity to respond to problems must be developed so that, through interaction with different actors, public services can be designed to meet the real needs and demands of citizens (Lim, 2010).

Thus, as observed by Serra (2005), the classic organizational structures of problem solving are not able to face the various challenges that permeate the public administration. Especially regarding the emergence of social demands that are not part of the competencies of a single sector, and the need to have an integrated view of the different segments of the population that are considered priorities from the point of view of public action.

It is necessary to develop new forms of dealing with public problems, and universities can contribute in this sense, especially the administration field as an applied social science. However, in the same way that greater articulation between the different actors involved in the daily routine of public problems is necessary, the potential contribution of research to this reality is more significant when there is a greater interaction between the researcher and the object of study, mainly in the sense of understanding it in depth. This understanding of the needs of the involved actors is fundamental so that the solution proposed using the method presented here, is effective.

As a prescriptive scientific method, design research presents a significant potential contribution in the development of more effective public policies, since its cycle involves the understanding of

the problem and the development of solutions that are proved to be effective by the test carried out in the context analysis. In this case, science is not restricted to the production of knowledge, but involves the transformation of science into solutions to public problems from the interaction between human and non-human elements (Latour, 2012) and the combination of researchers, experts and citizens (Alperstedt and Andion, 2017). The potential contribution of the method includes the fact that its stages fit the development stages of a public policy (Jann and Wegrich, 2007), starting from the delimitation of the problem to the evaluation of the proposed solution, which we would call 'research artifact'.

However, the researcher looking for interaction with these various actors shows a change in the position of the researcher and the techniques used. Rather than defining the rules and controlling their application, it is necessary to foster interactions around common interests so that, in a joint and articulated way, it is possible to identify what actually constitutes the public interest or problem and to construct the public service as an effective service.

Based on these arguments, it is possible to verify that adopting the interpretative paradigm, grounded on constructivism, for design research, brings to the method a greater adherence of the characteristics of complex problems, which improves the method's contribution. It is noted, however, that the adoption of this paradigmatic approach directly influences how each of the research stages described above will be conducted, assuming a specific configuration in which the interaction between subject and object runs through the whole cycle, as highlighted in figure 1.

FIGURE 1   **DESIGN CYCLE, ACCORDING TO THE INTERPRETATIVE PARADIGM**
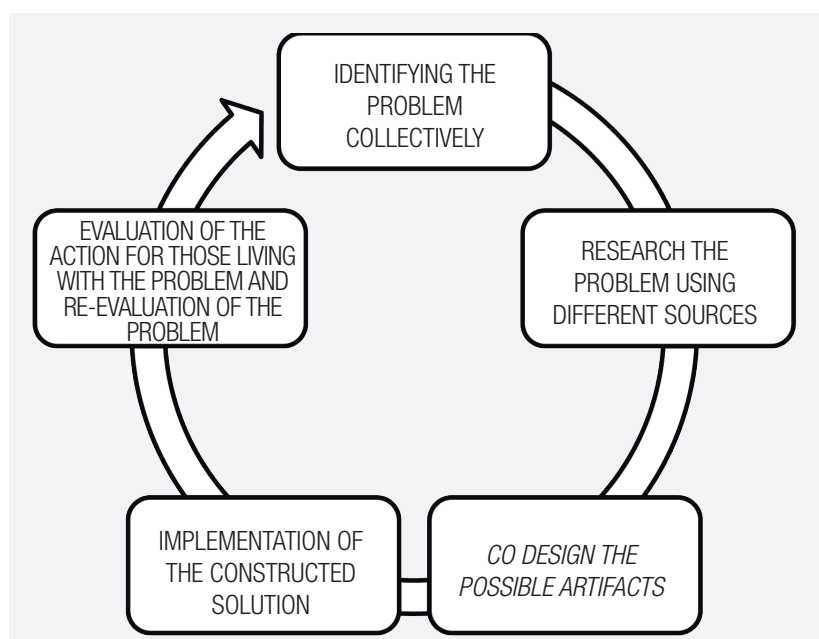
Source: Elaborated by the authors based on Van Aken (2004).

Under this bias, the choice of the field problem — and its adequate delimitation — as well as its analysis and diagnosis, becomes more meaningful and reliable when the actors who experience the problem participate actively in the process. Stakeholder engagement allows for a broader view of the problem from its ability to capture and present external and internal needs (Azevedo et al., 2008). One example is the problem of ensuring the rights of children and adolescents. A solution could highlight the need for coordination between the municipal public authority, child protective services, civil society organizations, the legislative and judicial branches, the public prosecutor's office, parents, children and other involved parties. Another example is revitalizing a public space, such as a square, in which there is the engagement of community, city hall, urban planning institute, builders, among others. The involvement of the different actors would allow understanding the phenomenon as a whole, in all its interfaces, which is fundamental in complex problems, since these different interfaces cannot be correctly understood when separated. In addition, a successful artifact development project, be it a product or a service, should take into account all stakeholders, especially in the case of complex issues where there are competing interests. Although not all mapped actors can be involved directly with the process, the way they see the analyzed problem and the effect that a solution can cause must be considered (Abras et al., 2004).

The stages of systematic review and synthesis of research, while assuming a more technical feature, can also benefit from the knowledge coming from other actors that make up the object of analysis. It is possible to add reports of good practices (which are common in areas such as health) to the scientific findings regarding the knowledge already produced about the subject, and to solutions already developed for similar problems. These reports are usually known by the technicians. It is possible to add as well as the users' opinions on the limitations of a certain service implemented in a previous moment for the problem in question. Hollins and Hollins (1991) point out that identification of services/projects that work or have already worked on the problems and their causes in the context under analysis, as well as the search for actions already carried out in other places related to the theme, can contribute to the development of the artifact.

The development of the artifact, in the same way, can follow this collaborative logic, of coproduction of knowledge in the context of research, which is brought by the interpretative paradigm. Creating a solution to a complex public problem, as observed by Jones (2011), is a task to be carried out in a decentralized way. The networks that exist need to be recognized and used in the process, from a distribution of the decision making power. Together with the researcher, those who will be directly affected by the implementation of the proposed artifact need to be involved in its development, in order to guarantee its effectiveness in solving the problem. The same is valid for the evaluation stage, in which the researcher should be based on the feedback of the various actors, future beneficiaries with the implementation of the artifact, about the performance in the test phase. These arguments will consistently substantiate the evidence for the artifact to work for the investigated reality, a key feature in design research.

The systematization of the lessons learned and reflections, should include all the relevant aspects of this interactive process, considering the validation by the actors involved, so that no information, with high potential for theoretical contribution, runs the risk of being overlooked by the researcher. The execution of all these stages, culminates in the communication of the results, which should

reach professionals and other actors in the context of the public problem, as well as the academia, completing the design research cycle.

4. CONCLUSIONS

This work started from a reflection on the production, predominant in the field of public administration, of studies that focus on the exploration, description and explanation of reality. Although relevant in the production of scientific knowledge these studies show to be abstract because of their low contribution to actually solving public problems. This scenario stems from the marked influence of the paradigms of the natural and social sciences. The evaluation of the academic production in the various areas of administration, including public administration, highlight a series of problems, among them the lack of relevance of the research carried out, especially when related to the practice (Bertero and Keinert, 1994; Souza 1998; Hocayen-da-Silva et al., 2008).

However, the demands of the public sector show the need for academia to develop research that focuses on solving complex problems, assuming a greater interaction between the researcher and the other actors involved. In the Brazilian context, this becomes even more visible if we consider the extent of the problems, especially the incapacity of the State — working in a perspective of different sectors — to respond to problems alone and, as a consequence, the incapacity to address the citizens' needs. This limitation becomes even more visible today because of the political and financial crises in Brazil.

Thus, from the detailing of the characteristics, stages and results presented by the method, we understand that design research can contribute to solve public problems promoting a closer approximation between theory and practice.

Andion and collaborators (2017) point out that "from pragmatism the field of public policies inherits, mainly, a direction for action, which is still pressing today", leading the study on public policies to a prescriptive character, with the aim of assisting in the development of solutions for governments (Boullosa, 2013). Especially when applied from the interpretative paradigm, design research promotes the interaction between the researcher and the object of analysis as a central characteristic, revealing potential to solve complex problems, not for, but with, the actors who experience the problems. The involvement of these actors becomes fundamental for the full understanding of the problems, as well as for the development and proposition of artifacts that are effective, that is, that are oriented to the satisfaction of the needs of those who are directly affected by the problem, especially in contexts of high complexity, as is the case of public administration.

Despite the contributions that design research can make, its use in the field of administration and public administration in particular is still incipient. De Sordi and collaborators (2011) note in their research that there are few publications demonstrating the use of the method in all of its guidelines. One reason for this comes from the fact that it is not a well-known method, which is a gap that this work seeks to close. Another reason that may limit the use of design research in public administration research is the time required to achieve the complete design cycle, since the method requires user feedback about the artifact created, which does not always coincide with stipulated research deadlines.

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