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Some Brazilian City halls as the more favorable locus to explore and understand the innovation capability building.

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1. Introduction

Innovation is vital to the modernization of governments in their crucial role in the economy as an employer, buyer, regulator, and service provider (European Commission, 2013). This need for public sector innovation has been pushed by increasingly demanding citizens, new technology and communication possibilities, and financial constraints, among others socio-economic and sustainability missions (Kattel & Mazzucato, 2018), leading public sector organizations around the world to look for innovative solutions.

This need is, to some extent, reflected in the research interest on the subject (European Commission, 2013; OECD, 2017a). There was an increasing interest in empirical research in this area over the last two decades (De Vries et al., 2016; Osborne et al., 2016; Osborne & Brown, 2013). However, some critical points remain less covered. First, most of the findings resulted from studies carried out in advanced economy contexts. Second, there is still a need for a better understanding of how public sector organizations manage their innovation process (Osborne et al., 2016; Walker, 2014). Specifically, few studies discuss the organizational capabilities needed to implement an innovation (Gieske et al., 2016), and how these capabilities are formed and function (Karo & Kattel, 2018). Third, and related to the latter, few studies explored the intentional learning efforts that organizations should make to build their unique capabilities to innovate (Hartley & Rashman, 2018; OECD, 2017b; Rashman et al., 2009).

This paper argues that for public sector organizations to innovate, they first need to create their innovation capabilities. The empirical literature supported that studies were mostly carried out in advanced economy contexts (Berdejo, 2019). Also, the concept of innovation capabilities is barely defined. These studies were highly influenced by the dynamic capabilities concept (Teece et al., 1997). They framed innovation capabilities as representing "the aptitude to develop new ideas, products and processes" (Favoreu et al., 2018, p. 7) which translates into accumulated knowledge shaped by organizational, physical, and human assets (O'Connor et al., 2007; Piening, 2011). Studies also supported that learning practices are an important source of such capabilities (Arundel et al., 2015; Pärna & von Tunzelmann, 2007). Moreover, a higher level of capabilities can result in more complex innovations implemented with better results (Arundel et al., 2015; Favoreu et al., 2018; Hartley & Rashman, 2018). While the debate seems to indicate that there is a strong relationship between learning practices, innovation capabilities, novelties with different levels of complexity, and organizational performance, these relationships are still blurred. The debate is centered on how to rearrange and reorganize existed capabilities and not on how to build them. The latter is due to the dominant existed methodological approach (e.g., surveys) and to the advanced economy contexts were the studies were performed, which allegedly already have organizations with dynamic capabilities.

More research is still needed to examine how organizations achieve the needed innovation capability level from scratch. The understanding of the innovation capability building process is especially important to public sector organizations in developing economies. These organizations are pressured to innovate and have a concern regarding their anemic government capacities (Schwab, 2016; United Nations, 2017), especially at the local government level in the Brazilian case (Bichir, 2016; Grin, 2014), a context that went through important transformations in recent decades. Recent research have suggested a bridge between the capacities concept (static) and the dynamic capabilities suggesting dynamic capabilities in the public sector (Kattel & Mazzucato, 2018) in order to foster innovative solutions. However,

this latter advance still demand a proper framework to better understand how those capabilities can be built in not advanced economy contexts.

Accordingly, to address this concerns this paper suggests that the analytical model that prevails in the literature of technological capabilities accumulation can be explored, adapted, and informed by public sector innovation literature. The former has advanced in the understanding, over the last 40 years, of how organizations in the private sector, mainly from developing economies, build their innovation capabilities (Bell, 2009; Bell & Figueiredo, 2012). The latter literature understands innovation capabilities as the stock of cognitive resources needed to generate and manage change in the technology (Bell & Pavitt, 1993, 1995; Figueiredo, 2001). Those capabilities are revealed (Sutton, 2012) by the innovative activities performed by the organization. The framework infers different levels of capabilities, hierarchically, from operational capabilities to innovative capabilities (Peerally et al., 2019). The levels are inferred by the degree of novelty of the innovative activities observed within the period of analysis. The organizations learning efforts are regarded as the variable that largely explains the creation and accumulation of innovation capabilities (Bell & Figueiredo, 2012).

It is argued that City halls from Sao Paulo state are a favorable focus to advance with a future research endeavor focusing on exploring the capabilities building mostly associated to the administrative capacity in managing financial, technical and human resources. Innovative initiatives from such administrative functions are one of the most frequently presented in national innovation awards programs, just after health and education (Farah & Spink, 2008; Sousa et al., 2015). However, health and education functions are more strongly tied to state and federal government level policies and are more represented in the empirical literature. Municipal structures involved in mostly involved in administrative functions play a vital role in the construction of partnerships and collaborative solutions needed to think about new approaches to the delivery of public services (Entwistle & Martin, 2005; Vignoli & Funcia, 2014). Moreover, local government areas as finance and planning are strongly linked to agencies at higher government level (e.g., Federal level, State level) that possess superior technical capacities favoring innovation initiatives (Bersch et al., 2017; Camões et al., 2017). Finally, at the federal level, the service category that has advanced the most on electronic government innovation is the economic and finance area (e.g., tax collection) (ENAP, 2018), working actively to promote such advances in other government levels.

2. Empirical studies on innovation capabilities in public sector organizations: A literature review

There is still a need for a better understanding of how public sector organizations manage their innovation process (Osborne et al., 2016; Walker, 2014). Specifically, few studies discuss the organizational capabilities needed to implement an innovation (Gieske et al., 2016), and how they are formed and function (Karo & Kattel, 2018). Moreover, few studies have explored the intentional learning efforts that organizations should make to build their unique capabilities to innovate (Hartley & Rashman, 2018; OECD, 2017a; Rashman et al., 2009).

2.1. Learning practices and organizational capabilities

In the last decade studies have advanced in exploring the connection between learning practices and organizational capabilities needed for public sector organizations to be able to innovate. Pärna and von Tunzelmann (2007), in their survey of the UK, Finland, Denmark, and Estonia, found that the improvement of organizational capabilities (technological knowledge,

project management skills, and general management skills) is needed for a successful implementation. They found that those capabilities are mostly acquired externally, and that learning is influenced by previously acquired experiences.

In a recent study based on the analysis of two cases in the early 2010s, Edler and Yeow (2016) analyzed the interaction between procurement intermediary bodies and public health organizations in the UK when deciding when to ask for, buy, and adopt innovations. The authors highlighted that the intermediary process is contingent on the existing capabilities (technological, process, economic, and linkages) of the buying organizations. Those capabilities are needed to understand the organization's needs and to be able to ask for, adopt, and use an innovation. They are also needed to coordinate the linkage of different internal knowledgeable stakeholders and external market actors. It addressed capabilities as something that the organization can build to the point where they no longer need an intermediation structure. How this process of capability building works was not discussed in the paper.

A group of studies have classified these capabilities as organization dynamic capabilities (Dameri and Ricciardi 2015) influenced by the dynamic capabilities construct (Teece et al., 1997). Piening (2011) study demonstrated that the existence of a specific set of organizational routines was a distinct feature in cases that succeeded in effective innovation implementation, and that those routines constitute a higher set of capabilities. The author observed five hospitals from a state-owned health group in Germany involved in the implementation of an innovative treatment. The author found that the hospitals that succeeded in the implementation were those that deployed a set of organizational routines involving the ability to perform certain activities. Such activities included searching, learning, knowledge diffusion, communication within teams, coordination of tasks, and integration of knowledge (e.g., interprofessional teams, exchanging information with users, continuous evaluation process).

Damanpour et al. (2009) found that one characteristic of these dynamic capabilities for public sector organizations is the ability of "co-adoption of different innovation types." The introduction and integration over time of different types of innovations throughout the organization constitutes an organization dynamic capability. The authors found that "adopting innovations of different types across the organization would ensure that the organization renews its ability to build, reconfigure, and integrate internal and external competencies to cope with environmental change and remain effective over time" (Damanpour et al., 2009, p. 658).

Recent studies have advanced the understanding of those capabilities with reference to the organization's absorptive capacity. Based on the latter concept, Gieske et al. (2018) and Mischen and Sinclair (2017) explored the concept of learning capacity as an antecedent to innovation and organization performance. Gieske et al., based on a cross-sectional structural analysis in the Netherlands, observed that optimization is highly correlated with radical innovations and has a stronger impact on organizational performance. Mischen and Sinclair used a case study to analyze the impact of learning capacity on the adoption of a process innovation (performance budgeting) in a small US county. They found evidence that the capacity to adopt innovations is derived from learning, ambidextrous, and connective capacity. They argued that it was the learning capacity at the individual and organizational levels that allows the ambidextrous capacity (i.e., to explore and exploit processes and activities), and that the connective capacity (i.e., linking content, actors and processes) enhances learning capacity. They suggested that this capacity to adopt innovations can be augmented, leading to more complex innovations (e.g., shared services attending several cities).

The study by Harvey et al. (2015) explored the contextual factors that mediate the absorptive capacity of three public hospitals in the UK. They analyzed their qualitative findings

based on Lane et al.'s (2006) definition of the absorptive capacity. The authors indicated the existence of different levels of absorptive capacity with better performance consequences for the higher levels. They also argued that the first step in building absorptive capacity should be the assessment and improvement of the organizational internal factors (e.g., willingness to learn and the establishment of systems and processes to more effectively manage information and communication within the organization).

Finally, the comprehensive multi-methods study reported in Hartley and Rashman (2018) made important contributions. They analyzed local governments' approach to innovations that had received national innovation awards during a nine-year period in England, an inter-organizational learning. They concluded that different levels of absorptive capacity can be built, and that those organizations with higher absorptive capacity (Cohen & Levinthal, 1990) were more effective in understanding, adopting and exploiting the best practices of the award winners. Moreover, they found that organizations adopt different learning strategies over time.

In sum, the studies have advanced the understanding of the relation between learning practices and the formation of organizational capabilities needed to innovate. Despite these important contributions, the studies considered organizations that were already advanced in the constitution of superior abilities to build, orchestrate, and reconfigure their assets and resources (Teece et al., 1997). The research says less about the processes through which organizations with scarce capacities can (or even whether they can) work to build such abilities, as is the case with public sector organizations in the developing economy context.

2.2. Learning practices and innovation capabilities

Very few studies have advanced the concept of innovation capabilities in public sector organizations. Innovation capability, as a higher order of capabilities, was explored in O'Connor et al.'s (2007) study analyzing organizational elements that contribute to the development of an Australian state department's ability to innovate. Innovation capability refers to the ability to combine assets that have specific objectives, and it is a concept aligned with a dynamic organizational capability (Cohen & Levinthal, 1990; Zahra & George, 2002).

The innovation capabilities were a distinguishing feature of organizations in Arundel et al.'s (2015) study exploring a survey of 3,273 public sector organizations in 27 European countries. The authors found that these better outcomes are due to better development of in-house strategies to encourage innovation capabilities (e.g., the share of employees regularly discussing innovation development; obtaining critical information from external sources; specific training for implementing novelties). However, they did not define the concept of innovation capabilities.

Finally, Favoreu et al. (2018) found that to successfully implement an innovation can lead to a more complex innovation because it contributes to augmenting an organization's innovation capability. The authors analyzed the links between the implementation of management innovations in two case studies (metropolitan and inter-municipal organizations in France). They showed that an indirect and positive link existed between the innovations, as the first management innovation encouraged, "over time, the development of greater innovation capability, defined as the aptitude to develop new ideas, products and processes" (Favoreu et al., 2018, p. 7). The positive effect of the first innovations led to more complex innovations, as the first innovation offered an opportunity for extensive communication between employees to exchange information, and to share knowledge and diagnoses that generate new knowledge. It was implied that learning practices contribute to innovation capabilities.

In conclusion, studies identified these capabilities as a higher-order set of accumulated knowledge. They are formed by human, organizational, and physical assets (O'Connor et al., 2007). Moreover, higher levels of such capabilities are translated into more complex and numerous innovations, with consequences for performance. However, less is said in the research about the specific process through which these capabilities can be built. This is mainly due to the aggregated method used in the studies (Arundel et al., 2015) and to the focus on a few successful cases (Favoreu et al., 2018; O'Connor et al., 2007). The research suggests that learning processes play an important role (Arundel et al., 2015; Favoreu et al., 2018), but the debate is much more centered on how better to coordinate and improve existing capabilities.

2.3. Contemporary contributions of studies on public sector innovation in developing economies

Brazilian studies show that there is a debate regarding the lack of government capacities, especially at the local government level, and the efforts to improve them. Government capacities are understood as the abilities and competencies needed to establish and accomplish policy objectives. Pires and Gomide (2016) analyzed eight Brazilian federal programs implemented between 2003 and 2013 within the scope of federal policies aiming at promoting economic and social development. The authors found that all the programs that resulted in innovative solutions also involved public actors with high government capacities, mostly technical and administrative capacities (e.g., a technical unit specializing in infrastructure policies).

Such capacities can change over time, differ across government functions (e.g., health, education, finance) and government levels (local, state, and federal), can be built, and include different dimensions (Bichir, 2016). The technical and administrative dimension refers to the authority and autonomy to design and implement policies, and to the existence of skilled human resources, financial resources, and regulatory instruments. Political and relational dimensions concern intergovernmental coordination between government and non-government organizations, as well as legitimacy building. These studies considered actions from higher government levels to foster capacities that open windows of opportunity. Examples are actions that enable more local government autonomy (Miharti et al., 2016), or federal funding programs focusing on the increase of local government capacity, especially on administrative and fiscal efficiency (Grin, 2014; Grin & Abrucio, 2018). The point here is the diagnostic of the lack of government capacity to perform basic functional activities related to the implementation of public policies. Accordingly, it will require additional effort by the organization to be able to implement innovative solutions with a high degree of novelty.

Few studies have explored the roles of organizational capabilities, innovation, and implications for the organization. Sousa and Guimaraes (2017) investigated the adoption of a specific e-government innovation in the federal Brazilian labor courts. The authors were able to identify several activities that organizations incorporate in their organizational routines in order to succeed in the implementation of the innovation. The routines were related to strategic planning, training, and qualification planning and implementation, management of individual skills, adoption of IT governance models, and relationship with external parties. The authors recognize this configuration of resources as capabilities in the tradition of Eisenhardt and Martin (2000), which also influenced organizational learning (Guimarães et al., 2011).

In conclusion, studies conducted in developing economy contexts indicate that public sector organizations face a lack of capacities to offer adequate services to citizens. The studies documented the central government efforts to improve this capacity, which is especially needed at the subnational level (e.g., Bichir, 2016; Grin & Abrucio, 2018; Miharti et al., 2016).

However, very few studies addressed capabilities, innovation, and learning. The few exceptions addressed the topic by using aggregated data without exploring how the capabilities were built. In the Brazilian context local government organizations (e.g., City halls) are likely to face a more critical lack of government capacities (Bichir, 2016), especially when compared to well-prepared federal government organizations (Bersch et al., 2017). It can be argued that in order for public sector organizations in developing economies to innovate, they first need to move towards building their innovation capabilities. In that sense, a specific research effort is needed that focuses on local government organizations.

To sum it up, studies in this section were mostly carried out in advanced economy contexts. While the debate seems to indicate that there are strong relationships between learning practices, innovation capabilities, novelties with different levels of complexity, and organizational performance, these relationships are still blurred. The debate is centered on how to rearrange and reorganize existing capabilities, not on how to build them. This gap is due to the existing methodological approach (e.g., surveys) and to the advanced economy contexts where the studies were performed, since advanced economies arguably have organizations with superior government capacities. More research is still needed to examine how organizations achieve the necessary innovation capability level from scratch, and to explore the role of the learning process behind such capabilities as well as their outcomes to the organization. Research is also needed to understand the importance of the innovation capability building process to public sector organizations in developing economies that have a concern about their capacities, especially at the local government level in the Brazilian case. The implementation of innovative solutions is a concern for these organizations. In that regard, it is argued that the technological capabilities literature could illuminate a research endeavor focusing on public sector innovation in developing economies.

3. Technological capabilities theoretical background

As mentioned, there is another body of literature that has gone further to expand the understanding of the innovation capabilities building process in private organizations in developing economy contexts in the last four decades. This understanding has been influenced by the organizational capabilities literature (e.g., Teece, 2007; Leonard-Barton, 1995) and is well supported by the findings of empirical studies (e.g., Ariffin, 2000; Dutrénit, 2000; P. N. Figueiredo & Piana, 2018; Figueiredo, 2001). Such studies, which are referred to as the technological capabilities accumulation literature, focus on explaining how organizations with an initial situation of having basic operational capabilities succeed in creating innovation capabilities by purposefully engaging in a learning process effort.

The technological capabilities accumulation literature understands innovation capabilities as the stock of cognitive resources needed to generate and manage change in the technology (Bell & Pavitt, 1993, 1995; Figueiredo, 2001). Such resources are accumulated in interrelated and inseparable components within the organization, but they are also distributed throughout external organizations, such as suppliers and partners (Bell & Figueiredo, 2012; Dantas & Bell, 2011). The first component concerns the techno-physical system as a tangible asset, which is known as physical capital. The second component involves the organizational capital that embraces organizational routines, norms, management practices, and related organizational assets. The third component refers to human capital, defined by accumulated experience, formal education, and other related intangible assets; and the final component concerns the products and services offered by the organization based on its tangible, intangible, and organizational assets (Bell & Pavitt, 1995; Leonard-Barton, 1995). The capability to create, adapt and manage such components, and the interaction among them, is called the innovation capability, which is intrinsic to each organization (Bell & Figueiredo, 2012).

This approach to innovation capabilities offers several points of contact with and articulates better the existing fragmented understanding of the concept presented in the last section. It provides a workable approach to advance with in-depth empirical analysis that expands on studies based on aggregated survey data (e.g., Pärna & von Tunzelmann, 2007; Arundel et al., 2015). It also helps to explore a more diverse set of innovations than do those studies focused on a single type of innovation implementation (e.g., Piening, 2011; Favoreu et al., 2018). Moreover, it contributes to a further examination of the dynamics of the learning process presented in the existing studies (e.g., Harvey et al., 2015; Hartley & Rashman, 2018) allowing the examination of non-advanced economy contexts from a capabilities building perspective.

The definition of innovation that prevails in the public sector literature is aligned with that of the technological capabilities accumulation literature. The broad definition of public sector innovation refers to the diverse implemented approaches and designs intended to transform a specific reality so that issues or deficiencies can be faced in a given context (Jacobi & Pinho, 2006). Accordingly, innovations refer to new or considerably improved implemented ideas (e.g., service, communication method, process or organizational method) for a specific context aiming to achieve beneficial results for society that include "efficiency, effectiveness, and user or employee satisfaction" (OECD, 2015, p. 14; European Commission, 2013, p. 9).

The notion of innovation applied in the technological capabilities accumulation literature, encompasses the introduction of services, processes, or organizational arrangements that are new to or considerably improved by the organization (P. N. Figueiredo, 2015). The notion involves a broad degree of novelty, which can range from minor to advanced adaptations new only to the organization, but can also include innovations that are new to the world (Bell, 2009). Innovative activities are, therefore, the result of an innovation process that involves problem solving (Rosenberg, 1982), a stock of resources of capabilities, and learning processes intrinsic to organizations (Dosi, 1988; Nelson & Winter, 1982). These innovative activities are affected by the institutional context in which they are nurtured and grown (Nelson, 2007).

3.1. Framework operationalization for local government administrative function

The accumulation of innovation capabilities is not a natural consequence of the increased experience in the use of a given set of resources; rather, it involves the organization engaging in a continuous and deliberate learning process over time (Bell & Figueiredo, 2012; Figueiredo, 2001). The basic idea is that an organization can build and accumulate such capabilities through a process that involves a continuous flow of external and internal knowledge (Bell & Figueiredo, 2012; Peerally et al., 2019). This understanding has been supported by empirical studies of private sector organizations, notably in developing and emerging economies, in the last four decades. It is possible, therefore, to identify different levels of innovation capabilities accumulation associated with different levels of innovative activities in a hierarchical order, as proposed by Bell and Pavitt (1995) and Lall (1992), and operationalized empirically in Figueiredo (2001). Also, as innovation capabilities are widely spread within organizations, different organizational functions can achieve different levels of capabilities.

The framework to assess the capability level follows the revealed capability approach (Sutton, 2012). It involves the identification of innovative activities with different and increasing levels of novelty and significance, inferring that different capability levels are at the basis and enable different innovative activities (Bell & Figueiredo, 2012). This framework is highly influenced by the typology developed by Lall (1992) and Bell and Pavitt (1995), which has been used and adapted in various qualitative and quantitative studies (Figueiredo & Cohen,

2019; Figueiredo, 2001; Peerally et al., 2019). It suggests, therefore, a hierarchy of capabilities accumulation encompassing different degrees of maturity, from operational capabilities to innovation capabilities, distributed among the main organizational functions. With this framework, it is possible to establish the rate of accumulation, meaning the length of time needed to achieve each level, and the type of innovation capability for different functions. The accumulation of the level of capabilities is identified when the organization carries out activities that were not possible to perform previously (Figueiredo, 2001).

It is argued that it is possible to identify different innovative activities with increasing levels of novelty and significance at the Brazilian local government level.

4. Why Brazilian local governments are the great focus for exploring the innovation capability building

To explore the capabilities building at the local government level is especially important to the Brazilian context. Public sector innovation studies are still in their infancy in this context. Brazilian city halls can offer substantial evidence to be explored through in-depth comparative case studies. City halls, due to their proximity to citizens, have been pointed out as an important source of diverse types of innovative solutions (Damanpour et al., 2009; Wu et al., 2013), with a high potential to disseminate ideas in the Brazilian case (Cavalcante & Camões, 2017). Moreover, and specifically in the Brazilian context, some local governments possess significant financial resources that can be deployed with considerable autonomy (Afonso, 2016). However, innovative performance at the municipalities' administration level in the Brazilian context is still little explored empirically and comparatively.

Brazil is a federation with a presidential system formed by the union of states, municipalities, and one federal district (Afonso & Araujo, 2006; Meirelles et al., 2016). In 1988, the Brazilian Constitution established the powers and autonomy of those federative elements within three respective areas: federal administration, state administration, and municipal administration. Such autonomy is threefold. It is political: the mayor and legislative representatives, elected every four years, can alter and issue local norms. The autonomy is also administrative, as the municipality administration can organize and offer public local services. Finally, municipality administrations also have financial autonomy, as they can issue and collect municipal taxes. Brazil is one of the few federative countries in the world where municipalities are considered federal entities, and it is considered one of the most decentralized countries among developing economies (Souza, 2004).

The 1988 Brazilian constitution established a clear framework for the different components of the federal system, after which the country experienced a gradual strengthening of its municipalities (Farah & Spink, 2008). This tendency involved municipalities' revenue capacity, which is concentrated in the South and Southeast regions, which contain the more prosperous states and municipalities (Afonso & Araujo, 2006). These two regions are also the most innovative. They account for the highest number (78%) of projects presented to the Public Management and Citizenship program from 1996 to 2005, a Brazilian public sector innovation award at the subnational level (Farah & Spink, 2008). In that regard Sao Paulo state, which is in the Southeast region and has 645 municipalities, presents the highest individual concentration of registered Brazilian enterprises (30.6%) and the highest individual state contribution to Brazilian GDP (31.5%). Thirty-seven municipalities from Sao Paulo are in the top 100 cities in the country for contributing to Brazilian GDP, and these include the state capital, Sao Paulo City, which accounts for 11% of Brazilian GDP, the highest contribution by an individual city.

As Afonso and Araujo (2006, p. 384) argued, the decentralization promoted by the 1988 constitution "was essentially a process of municipalization of revenue mobilization and service

delivery." Brazilian municipalities' tax collection in 2017 represented 2.5% of Brazilian GDP (almost twice that of the late 1990s) and nearly 20% of the total revenue available in the country (Afonso & Castro, 2019). However, there is still a high potential for revenue generation at the local government level, primarily to fund more and better public services that are demanded by citizens (Afonso, 2016). Accordingly, the management of revenue and expenses at the local government level has become a crucial dimension in the transformation of government bodies as providers of services to citizens.

By drawing on the last national reports from the Brazilian Institute of Geography and Statistics (IBGE), it is possible to outline the main characteristics of Brazilian municipalities according to different aspects (IBGE 2018). Those reports indicate that, on average, Brazilian City halls are managed by a male mayor with an average-to-high formal level of education. The mayors in office for the current four-year period 2017–2020 were elected within the context of a multi-party system comprising at least 10 important national parties. Mayors typically manage an organization staffed by employees with poor formal education and statutory rights of job stability. There is no formal fixed structure of secretariats among the city halls. To operate, the mayors rely on contracting external assistance, service outsourcing, interinstitutional partnerships, and on low-level use of ICT tools. The organization income depends on the collection of key taxes and fees, which also depends on ICT tools for it to be effective and efficient. Municipality administrations from the South and Southeast Brazilian regions are better positioned.

Sao Paulo state municipalities (the second highest number of municipalities in Brazil) better qualified for an in-depth research to explore public sector innovation at the local government level. There is a relatively politic stability at the state level. The last six state elections, covering a period of 28 years (since the election of 1994 for the period 1995–98), resulted in the election of politicians from the PSDB (Brazilian Social Democrat Party). This is a distinctive characteristic of the state, all the other states from the Southeast region (Minas Gerais, Rio de Janeiro, and Espirito Santo) and South region (Rio Grande do Sul, Parana, and Santa Catarina) elected at least three different parties in the same period.

5. Descriptive analysis and discussion

A survey was used to explore to what extend City halls from Sao Paulo state promote public sector innovation initiatives. Innovations were first listed and validated in exploratory interviews with practitioners, web pages from City halls and mayors associations (e.g., National Front of Mayors), and data bases from national innovation awards (i.e., e-gov award supported by the Ministry of Planning (MP), mayor entrepreneur award supported by Brazil's Micro and Small Business Support Service, and the public management and citizenship program CEAPG/FGV) in the second half of 2018. Next, innovations were presented in an online survey released from June and September 2019 resulting in 36 valid responses (30% of response rate) from 17 municipalities, a total of 20 organizations were contacted through email and telephone. Three municipalities were excluded from the responses as they presented less than five years of municipal public service of experience. The answers in Table 1 refer to 14 City halls from Sao Paulo state and include 18 respondents served as head of Secretariats and 14 dotted line directors from those areas. Considering the average years of experience at the municipal public service the former group presented 16,3 years of experience and the latter 9,4 years of experience. The secretaries' heads were composed of Secretary of Finance, 13 (72%), two (11%) from Secretary of Finance and Planning and three (17%) from Secretary of Planning. All the City halls belong to municipalities with municipality development index (people employment and income, education, and health) showing high human development results,

above 0.8, above aggregated Brazilian scenario with 0.6, moderate development (FIRJAN, 2015).

Respondents were asked if specific innovations, randomly presented, were implemented in their respective government areas. If the innovative activities were implemented, the respondent had to respond when that occurred by choosing from 11 options that include "Before 2010", "2010", "2011" and so forth until "2019". The respondents were also asked to answer whether the activity had been discontinued and, if affirmative when this occurred. Based on the answers, none of the innovative activities was discontinued. Table 1 shows a descriptive analysis of the answers, regarding those innovations that were analyzed for more than 10 City halls and were considered with a higher degree of novelty (e.g., the respondent considered that the innovation was new not only for his/her City hall but for the City halls in the near region or even in the universe of Brazilian City halls).

Respondents were also asked whether they believe to the best of their knowledge if the implemented innovation represented a novelty only to the City hall or was also new to the region where the city is located or even if they believe that the innovation compared the country city halls. Some of the respondents (Jundiai, Bauru, Itu, and Osasco) considered that innovations (2), (3), (5), (6), (7), and (8) were new to the universe of Brazilian city halls when implemented in their organizations.

When the data is analyzed by City hall and period of innovation implementation, it is possible to note that some city halls stand out regarding the number of innovations implemented Before 2010, that's the case do Jundiai (3), Sorocaba (3), Bauru (4), and Campinas (4). On the other hand, it is possible also to note that some City halls indicate a small number of innovations implemented. Americana (1), Limeira (1), Mogi das Cruzes (3), and Matão (3) indicate in their answers that they implement less than a half of the innovations presented in Table 1.

The descriptive analysis presented in the last section present interest patterns regarding the innovative solutions implemented at the local government level. First, it suggest that there are City halls in Sao Paulo state within specific areas (i.e., finance and planning) that have advanced with more innovative solutions (quantity), at fasted pace (implemented before), and with a higher degree of novelty (new to the Brazilian City halls universe). These intrinsic differences cannot be totally explained by the development heterogeneity, there is an important heterogeneity of the economic, demographic and executive capacities among Brazilian municipalities (Afonso & Araujo, 2006; Souza, 2004). As mentioned, all these organizations have a high human development level.

Table 1 - Implemented nolveties timeline

Innovation description	# City halls	N	Implementation				
			Before 2010	2010-2012	2013-2016	2017-2019	NI / DN
1.Award program to citizens who require electronic tax documents (service tax)	12	18	11%	0%	0%	28%	61%
2.Administrative reform with new governance and management norms fostering an intersectoral approach towards public policy implementation (services platform management).	12	21	5%	0%	0%	24%	71%
3.A technology that stores, analyzes, and crosses a large volume of data from different government levels (e.g., municipal, state, and federal levels) to the identification of potential tax fraudsters.	11	17	6%	6%	24%	29%	35%
4.A software solution that integrates several municipality systems into the same platform promoting management rationalization through systematized, digitized, and reliable databases (involves most of the city hall bodies).	11	17	18%	0%	6%	12%	65%
5.A more efficient process to open local businesses through internet solutions without the need to attend the City Hall. Integrated work of various secretariats and Jucesp, IRS, and State Finance bodies.	11	19	21%	5%	11%	26%	37%
6.Solution that allows electronic document management of administrative processes t (e.g., creation, editing, approval).	13	21	5%	0%	14%	33%	48%
7.Social security reform aimed at equalizing and updating issues associated with retirement (e.g., length of service, private pension plan, retirements values)	12	21	5%	0%	10%	10%	76%
8.PPA as a result of strategic discussion with focus groups involving employees and citizens defining detailed objectives with goals and indicators with projects inter secretariats. The latter includes the support of monitoring system software.	12	20	30%	0%	5%	25%	40%

Note: Include respondents from Americana, Jundiaí, Limeira, Mogi das Cruzes, Sorocaba, Itu, Bauru, Bragança, Campinas, Matão, Osasco, Santos, São Bernardo, and São Caetano city halls. Answers mostly from the head of Finance Secretariat and dotted line directors of this area. NI (Not implemented) DN (Don’t know).

The municipality population number can partially explain these differences as small municipalities (less than 100 thousand inhabitants) demand less sophisticated structure and have more limited financial resources. That could partially explain why Campinas (1.080 thou.) appear as implemented more innovations earlier and Matão (76 thou) appeared with less than a half of Table 1 innovations implemented. However, another explanation is also needed to help to explain why Mogi das Cruzes (387 thou.) also appeared in the same group as Matão having a similar size of Jundiaí (370 thou.) which is one of the earliest implementers. Another explanation is also needed to address the allegedly performance of Jundiaí, that implement solutions with high degree of novelty (new to the Brazilian municipalities universe) before than Sorocaba (586 thou.).

What the descriptive data suggest it that there is also an heterogeneity among those City halls that can be favored also by an explanation focusing on the development of innovative capabilities. The heterogeneity among municipalities regarding administrative capacities, as mentioned above is well known, but clearly there are organizations (City halls) that have advanced in their capability building.

6. Conclusion

This paper aimed to support that even though the public sector innovation literature has consistently evolved in the last two decades there is still a need for a proper theoretical framework to explore how public sector organizations in developing economies can build their innovative capabilities. Despite the important advances suggested in recent literature regarding dynamic capabilities in the public sector, it is argued that the literature of technological capability building can offer a useful framework to better understand how public sector organizations in developing economies contexts can advance in building their capabilities to innovate.

This paper also argued that Brazilian local government level organizations (i.e., City halls), especially in Sao Paulo state, constitute a favorable locus to explore how the capability building process has evolved and hopefully favoring their replication throughout Brazilian territory. The paper illustrates a descriptive already existed dynamic regarding the implementation of highly innovative novelties that can be explored in those localities. Cities and their administration are at the center of action facing the challenges of this century.

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