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State capacities for infrastructure policies in contemporary Brazil

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This article aims to discuss the capacities of the Brazilian State, particularly the Federal Executive Branch, to produce efficient infrastructure policies that deliver the expected benefits and also obtain support (or consent) from impacted social groups. We argue that the professionalization and technical knowledge of the federal government's public bureaucracy are constrained by low levels of autonomy and intragovernmental cohesion. Likewise, the relationship between the federal bureaucracy and local civil society, subnational governments and accountability agencies are precarious. This situation represents a barrier to the efficiency and legitimacy of state action in the sector.
Keywords: state capacity; bureaucracy; infrastructure; public policy.

Capacidades estatais para políticas de infraestrutura no Brasil contemporâneo

O texto tem como objetivo discutir as capacidades do Estado brasileiro, notadamente do Poder Executivo Federal, para produzir políticas de infraestrutura eficientes que entreguem os benefícios esperados e obtenham o apoio (ou o consentimento) dos grupos sociais impactados. Argumenta-se que a profissionalização e a qualificação técnica existentes na burocracia pública do governo federal são constrangidas pela baixa autonomia e coesão intragovernamental. Igualmente, as relações da burocracia com a sociedade local, os representantes dos entes federativos e as agências de controle são precárias. Tal situação constitui-se em barreira para a eficiência e legitimidade da ação estatal no setor.
Palavras-chave: capacidades estatais; burocracia; infraestrutura; políticas públicas.

Capacidades estatales para políticas de infraestructura en Brasil contemporáneo

El objetivo del artículo es discutir las capacidades del Estado brasileño, en particular el Poder Ejecutivo Federal, para producir políticas de infraestructura eficientes que suministren los beneficios esperados y obtengan soporte (o consentimiento) de grupos sociales impactados. Se argumenta que el profesionalismo y la cualificación técnica en la burocracia pública del gobierno federal están limitados por la baja autonomía y la cohesión gubernamental. De la misma forma, las relaciones de la burocracia y la sociedad local, los representantes de las entidades federativas y las agencias de control son precarias. Esta situación constituye una barrera a la eficiencia y legitimidad de la acción estatal en el sector.
Palabras clave: capacidades del Estado; burocracia; infraestructura; políticas públicas.

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1. INTRODUCTION

During the past decade various governmental plans and programs have appeared in Brazil with the objective of stimulating investment in the infrastructure sector as a way to leverage economic growth and meet society's needs for quality public goods and services. On the federal level, the Pilot Investment Plan (PPI) of 2005, the Accelerated Growth Program (PAC) of 2007, and the Logistics Investment Program (PIL) of 2012, are examples of these projects. According to Abreu and Câmara (2015), the focus on infrastructure projects in the political agenda during this period culminated in specific alterations in the way in which budgets are organized and produced in order to improve their chances of success. However, as the implementation of these programs progressed, it became clear that the investment problem in this sector was not only related to its fiscal resources, but also the capacity of the government to execute these projects (Raiser et al., 2017). Delays in finishing these projects and over-budget projects were the main results of this lack of capacity.

The fact that infrastructure policy is critical to a country's development makes the analysis of the state's attributes and abilities in this area an important field of research. Currently, the state is required to perform its actions with minimal waste in terms of time and resources. Thus, democracy demands transparency and control in terms of the actions of its politicians and bureaucrats and that it include more actors in the decision making processes. This has led the capacity of the state to carry out public policy being associated with not only the technical quality of the bureaucracy in providing public services, but also the existence and effective functioning of channels that connect the state's political-administrative apparatus with civil society, thus conferring legitimacy to these state actions (Painter and Pierre, 2005; Evans, 2011).

This study is situated within this context. It seeks to discuss the capacities of the Brazilian state, notably the executive branch, to formulate and implement infrastructure policy in contemporary Brazil, within a complex political-institutional environment, marked by the democratic institutions of the Federal Constitution of 1988 (Gomide and Pires, 2014).

The analysis that follows is based on the data from a survey applied to, and answered by, over two thousand federal civil servants in the infrastructure area (Freire et al., 2016) as well as information from six case studies (Ocon, 2015; Santiago, 2016; Santana, 2017; Panariello, 2015; Machado, 2016; Alves, 2016). The *survey*, applied through an online questionnaire in October and November 2015, was designed to identify the profile of federal bureaucrats who are directly or indirectly responsible for the planning, execution and regulation of these infrastructure projects in ground, air, water, and rail transport and energy.[1] The perceptions of these bureaucrats have also been investigated in terms of the main issues that affect their work routines. The case studies in turn were produced under the aegis of the Institute of Applied Economic Research (Ipea) during 2015 and 2016 (Gomide et al., 2016).

The studies investigated were selected among PAC projects based on the characteristics of the federal government's investment[2] (Gomide et al., 2016:8-10). Thus, the choice of these cases is the

[1] Respondents in regulatory bodies were excluded from the analysis for this article. The details concerning the sample in terms of the energy and transport sectors can be found in appendix.

[2] Which are the types of execution (public and private; direct and indirect) and the investment axes of the program (logístics, energy and social-urban).

product of their availability as studies related to the projects selected in this study. The selected cases are: the Candiota 3 thermoelectric complex, which is made up of a group of thermoelectric plants located within the municipality of Candiota, located 400 km from Porto Alegre, RS with the capacity to generate 350 MW of electricity; the BRT Sul of the Federal District, which consists of an exclusive bus lane 35 km long which integrates the administrative regions of Gama, Santa Maria and Entorno do Sul with the Pilot Plan; the Teles Pires hydroelectric plant, located on the river of the same name in the municipalities of Paranaíta, MT and Jacareacanga, PA with installed power of 1,820 MW and a 137 km² reservoir; the Paving of Highway BR-163/PA, a project that covers 972 km in the state of Pará and 52 km in the state of Mato Grosso, connecting the cities of Guarantã do Norte, MT and Santarém, PA and totaling a distance of 1,024 km; Line 1 of the Salvador and Lauro de Freitas Subway System which is 11.9 km long, including eight stations between Lapa and Pirajá; and the New Transnortheastern Railroad, a project that links Eliseu Martins, PI to Salgueiro, PE and São Gonçalo do Amarante, CE, totaling 1,753 km.[3]

This article is divided into four sections in addition to the introduction. The following section will offer a brief review of the literature on state capacities, offering a *framework* which has been adopted for empirical analysis. Based on the case study information, the third section will discuss critical processes identified by the literature as well as government managers in the execution of contemporary investment projects in Brazil. Based on the data collected by the *survey*, the fourth section will evaluate bureaucratic capacities and the relationship between the federal bureaucracy and the energy and transport sectors. The final section will return to the issues that have prompted this analysis and its contributions to the field.

2. THE EFFICIENCY AND LEGITIMACY OF GOVERNMENTAL ACTION AS A PRODUCT OF STATE CAPACITIES

The concept of state capacities has been highlighted in research on public policy, given that the administrative capacities of the state appear to be a source of strength for governmental actions, shaping their implementation and final impact (Wu, Ramesh and Howlett, 2015; Cingolani, Thomson and Crombrugghe, 2015). Thus, great capacities are associated with superior results, while lesser capacities are associated with suboptimal performance (Grin, 2014). Applied to the public sector, the concept of capacity is defined as the ability of the government to direct and control its human, financial, informational and physical resources with the objective of fulfilling organizational missions (Christensen and Gazley, 2008).

The first debates about state capacities are based on the literature on the formation of modern states, in terms of the capacity associated with the coercive power of the state to prevent external conflicts (Tilly, 1985). Studies about capacities grew more common during the 1980s, driven by the "statist" movement, following Weberian theory, which interpreted the state as a relatively autonomous actor capable of establishing its own objectives (Skocpol, 1985). This "statism" resurrected postwar development theory which positioned the state as a central actor in the promotion of structural change (Evans, 1993).

[3] Table 2 below presents the main implementation characteristics of the infrastructure projects under study.

Since then, the literature on this subject has been going through a process of expansion, in which the concept has been applied to themes that go beyond the initial emphasis that linked state capacities to the existence of Weberian type bureaucracies capable of implementing industrial development policy. Thus, to Wu, Ramesh and Howlett (2015), the concept of state capacity is tied to the governance functions of the state and the existence of analytical, operational and political resources and skills among the individuals and organizations of the public sector. In the same way, to Painter and Pierre (2005) this concept is associated with the ability of the state to unite the resources necessary to make collective choices and establish strategic guidelines for the allocation of scarce resources for public ends.

To Gestel, Voets and Verhoest (2012), the capacity of the state in producing public policy is a function of internal factors — such as organizational infrastructure, human and financial resources, and management systems — and external factors, including social support, and the quality of the relationship between the state and society and access to information. Gomide and Pires (2014) work from a dual perspective to explain the creation and maintenance of state capacities: endogenously, based on a technical-administrative perspective of the development of management systems capable of formulating and implementing policy with the presence of specialized professionals and financial and organizational resources; and exogenously, based on a political-relational perspective and above all the nature of the links and associations between the state and society.

The technical-administrative dimension highlights the internal structures of the state, emphasizing attributes such as the professionalization, autonomy and cohesion of the bureaucracy in performing the state's actions (Evans, 1993). The importance of the professionalization of the public bureaucracy recalls the classic works of Weber. To Skocpol (1985), professionalization, influenced by meritocratic recruitment and a group of career incentives (such as promotions and competitive salaries), makes it possible for bureaucrats to evaluate problems and propose solutions that are technically appropriate.[4] Autonomy in turn can be understood as bureaucrats not subordinating themselves to the immediate interests of social groups or classes. Autonomy is necessary for bureaucrats to elaborate consistent policies, evading the "Balkanization" of the state (Rueschemeyer and Evans, 1985). Autonomy also refers to the manner in which politicians or principals attribute mandates to bureaucrats, who act as their agents. According to Fukuyama (2013), there are a number of ways in which mandates can be issued. Ideally, the principal should establish a general mandate for an agent (for example, implementing a project). But the principal can also issue an order in such a manner that the bureaucrat will fulfill this mandate (for example, hiring a given contractor for a job). Autonomy therefore is inversely related to the nature of the mandates issued by the principal: the more general the mandates are, the greater the autonomy that is granted to the bureaucracy. Finally, cohesion may be understood as formal or informal ties among bureaucrats (Evans, 1993) and the alignment of various state organizations with the same orientation, avoiding redundancies and contradictions in achieving definite ends, or in other words, it refers to the capacity of the state bureaucracy to act in a coordinated fashion (Rueschmeyer and Evans, 1985).

The relational approach arose as a critique and a complement to the internal perspective, which, according to Weiss (1998), is based on a zero-sum view of power relationships, neglecting the effects

[4] Souza (2017), in studying the modernization of the Brazilian state, associates professionalization with specialization and the realization of tasks based on technical knowledge and meritocratic recruitment.

of conflicts and negotiations as well as the possibilities for constructing state capacities based on collaboration with actors outside of the state. This perspective is aligned with the "external" dimension of capacity elaborated by Gestel, Voets and Verhoest (2012), which emphasizes social support, the quality of relationships and the processes of articulation. According to Evans (2011), the state should look for synergies with civil society to produce public policy in a more effective manner. The relationship with civil society is fundamental not only in the attaining of accurate information regarding the problems that are faced, but also in engaging the population which benefits from the implementation of these programs.

This relational perspective of state capacities can be broadened to consider works that focus on the relationships between the bureaucracy and multiple actors in addition to civil society. Along these lines, much attention has been given to analyses of the processes related to the interactions between the executing bureaucracies, the executive branch, representatives of subnational governments, and bureaucrats of externally controlled bodies (Gomide and Pires, 2014).

One of the obstacles faced by those who study state capacities has to do with the circularity and endogeneity of the application of this concept, in which capacity is confused with its effects (Cingolani, 2013). To Kocher (2010), what leads to this problem is the generic manner in which this concept is treated, without more elaboration of which attributes are necessary to produce specific effects. To address this, he proposes breaking down this concept into its constituent parts, or in other words, spelling out the elements that influence given events or the factors that cause the phenomena under investigation.

In this sense, for the purposes of this work, the concept has been disaggregated into two main dimensions that in turn, have been operationalized with variables that can be verified empirically. The first is the bureaucratic dimension, which is associated with the criteria of efficiency and consistency of governmental actions, and is operationalized by the following variables: professionalization, autonomy and coordination. The second is the relational dimension and is associated with the criteria of legitimacy and transparency, and is operationalized by the following variables: the bureaucratic relationship of state bureaucracies with local social groups, articulation with representatives of subnational entities, and dialogue with externally controlled bodies.

Based on the causal antecedents listed by the literature, the working hypothesis adopted by this study is that bureaucratic capacity is an essential attribute to the quality of infrastructure projects that contributes to success in the decision making (or project selection) process. This has a direct impact on the quantity of time and resources used in the execution of projects (allocational and technical efficiency).[5] In this same way, relational capacity — which alludes to the qualified interaction process between multiple interested actors (stakeholders) — would be positively associated with political support for projects and social learning, resulting in quality public services with the following expected benefits[6] (box 1 below).

[5] As Flyvbjerg (2007, 2014) has shown, the quality of the selected projects has a direct impact on the meeting of planned deadlines and budgets. Raiser and collaborators (2017) make the same argument.

[6] "Quality public services with the expected benefits" refer to policies that produce regional and local development, the management of environmental issues and vulnerable populations, and the homogeneous distribution of the risks and advantages of the project (Flyvbjerg et al., 2003).

BOX 1 STATE CAPACITIES: ANALYSIS DIMENSIONS AND VARIABLES

Dimension	Criteria	Variables	Intermediate results	Final results
Bureaucratic	Efficiency Consistency	Professionalization Autonomy Coordination	Quality projects Correct decisions	Projects delivered on time and on budget
Relational	Legitimacy Transparency	Relationships with social groups Articulation with subnational entities Dialogue with controlling bodies	Political support Social learning	Quality public services with the expected benefits

Source: Elaborated by the authors.

3. THE EXECUTION OF INFRASTRUCTURE INVESTMENT PROJECTS: THE CASE STUDY INFORMATION

The execution of infrastructure projects[7] refers to conducting administrative processes to implement them involving a group of public and private bodies responsible for the planning and elaboration of engineering projects, contract management and procedures related to environmental licenses, land appropriations and external controls (Piresty, 2015).

The case studies suggest that the federal government demonstrates little capacity in the execution of infrastructure investment projects confirming the findings of Raiser and partners (2017). This low level of capacity produces different impacts in each sector: in the transport sector, projects are delivered behind schedule and over budget; in the energy sector, delays in the delivery of energy production and transmission projects produces delays in fulfilling their full energy potential. Box 2 presents the main characteristics and results of the execution of the infrastructure projects examined.

[7] According to Law No. 8,666/1993, governmental work is performed "in-house" or "outsourced." For direct in-house work, federal governmental bodies are responsible for the construction of the project. In the case of indirect in-house work, federal bodies need to hire companies to perform this work. In the case of outsourcing, the performing of this work is the responsibility of various municipal and state governmental bodies, with the federal government taking care of the stimulation, financing, and monitoring of the actions of the subnational governments.

BOX 2 CHARACTERISTICS OF THE EXECUTION OF THE STUDIED INFRASTRUCTURE PROJECTS*

Project	Estimated Duration	Actual or Revised Duration	Initial Budget	Actual or Revised Budget	Delivery Characteristics
Candiota Thermoelectric Complex – Phase 3	— Four year duration — Delivery scheduled for January 2010	— Five year duration — Delivery in January 2011	R$ 1.22 billion	— R$ 1.5 billion — Increase of 20%	Completion of total project in 2011 and completion of the transmission line in 2014.
BRT-SUL of the Federal District	— 18 month duration — Delivery scheduled for June 2013	— 30 month duration — Delivery in June 2014 (87% of the project)	R$ 659 million (R$ 561 million of CEF financing; R$ 98 million in GDF matching funds)	— R$ 581.2 million (R$ 381.5 million of CEF financing; R$ 199.7 million of GDF matching funds) - Postponement of 21.58%	Delivery of 87% of the project, with the inexistence of an integrated system and overloaded subsidiary lines.
Teles Pires Hydroelectric Plant	— 5 years —Delivery scheduled for 2015	— 5 years — Delivery in November 2015	R$ 3.74 billion	— R$ 4 billion — Increase of 7%	Entire project delivered, but the energy transmission lines entered operation only in 2016.[8]
BR-163/PA	— When the project resumed in 2007 as part of the PAC, it was scheduled to take 4 years — 75% of the project was scheduled to be delivered in 2010	— 9 years — Project is still under way with delivery scheduled for 2017[9]	R$ 752.8 million (2007) and R$ 1,756 billion (2008)	— R$ 2.2 billion (2014) — Increase of 192% in relation to initial forecast of total cost in 2007, or 25.3% in relation to the 2008 forecast	In December 2014, only 76% of the project had been completed.
Salvador Subway System (Line 1)	— 40 months — Delivery scheduled for 2003	— 14 years — Delivery in 2014	Just Phase 1 received enough resources to be completed with a value of R$ 178,488,710	In 2013, the total cost of Phase 1 reached R$ 294 million	Partial delivery of project (just Phase 1)
New Transnortheastern Railroad	— 4 years — Delivery scheduled for 2010	— 11 years — Probable Delivery in 2017[10]	R$5.42 billion	— R$ 11.23 billion — Increase of 107% in relation to the initial forecast of the total cost	At the time that this study was written, just 45% of the project had been completed.

Source: Elaborated by the authors.
* Note: this information was collected in 2015 and updated in December 2017.

[8] The operating license (OL) for the Matrinchã transmission line was emitted by the Secretariat of the Environment of the the State of Mato Grosso on July 29, 2016 (OL No. 313,167/2016); and the emission of the OL of the Guaraciaba line was granted by Ibama on August 30, 2016 (OL No. 1,349/2016).
[9] The new forecast for completing the Paving of Highway BR-163/PA is 2018, according to information from the federal government: <www.brasil.gov.br/infraestrutura/2017/08/br-163-sera-pavimentada-ate-miritituba-no-para>.
[10] However, as of December 2017, only 50 % of the physical execution of the project had been completed.

In the transport sector, the low efficiency in terms of delivering these projects on time has been diagnosed as the result of inadequate planning and preparation (Gomide et al., 2016). In the case of the Transnortheastern Railroad in 2006, when the project was launched, it was deficient because only the departure and arrival locations and the main intersections were specified. In addition, the engineering studies were elaborated only after the beginning of the implementation of the railroad between 2007and 2009 (Machado, 2016). In the same manner, the Paving of Highway BR-163/PA project was out of date and incomplete at the time work was resumed in 2008 — and it did not take into account the climatic and logistical characteristics of the region (Panariello, 2015).

In the energy area, the project selection was better managed, which explains its relatively better results (*i.e.*, compared to the transport area). This may be attributed to the existence of long-term planning in this sector, in which previous inventory and feasibility studies inform the basic elaboration of the project. However, given that regulation of the energy area is planning deverticalization of the sector— transforming its generation, transmission, distribution and commercialization into independent steps (Chagas, 2008) —, the generation and transmission auctions are conducted separately. This institutional characteristic requires strong coordination capacities on the part of the EPE and Aneel, which have to conduct planning that is parallel and convergent to these auctions and the implementation schedules.

Given the fact that the projects studied have all been part of the PAC, they have been subject to intense coordination and monitoring. These activities have been conducted mainly by the Special Secretariat of the PAC (Sepac), which is responsible for subsidizing the definition of targets relative to the program's projects, monitoring and evaluating their results, and producing managerial information (Pires, 2015). According to Pires (2015), the actions of the PAC operators have been marked by lateral and vertical interaction. The first of these are characterized by established networks through constant varied contact between Sepac bureaucrats and other bureaucrats in sector ministries. Situation rooms represent the program's main organizing instrument, being composed of bureaucrats from Sepac and the sector ministries responsible for the specific areas as well as other federal government bodies that are involved in its execution. The situation rooms function as spaces where information is shared about project execution, the identification of pending items, and the forwarding of solutions. In turn, these vertical interactions are characterized by contact between Sepac bureaucrats and authorities within the Ministry of Planning and other management structures within the PAC — such as the PAC's Executive Group and Managing Committee. These interactions make it possible for unsolved obstacles in the situation rooms to reach the central decision making nucleus of the program and the office of the nation's President.

The performance of Sepac in the studied cases illustrates the advances that have taken place in the governmental coordination processes of large infrastructure investment projects. In the case of the Transnortheastern Railroad, Sepac promoted articulation with the Secretariat of the National Treasury to monitor the various sources of financing and diminish the time taken in budgetary processing. In the case of the Teles Pires hydroelectric plant, the articulation realized by Sepac made coordination between the various ministries viable in the implementation of complementary actions related to this construction (Lotta and Favareto, 2016). Even in cases in which the execution was conducted in an indirect manner, or in other words, it was executed by states or municipalities with federal funding, we can observe the coordinating role between these different governmental actors by the bank Caixa Econômica Federal (CEF).

However, the fact that these projects were selected as part of the PAC due to their being already under way or being planned, limited the capacity for their coordination under the program, which made the coordination area concentrate only on the execution phase of the project, and always in a reactive manner (Lotta and Favareto, 2016). Fragilities in terms of governmental coordination or integration during the planning phases produced situations in which projects were completed, but the services were not delivered to the population. This was the case with the BRT Sul in the Federal District, in which the low level of coordination between DER/DF and DFTrans led to part of the project being delivered without the existence of an efficient intermodal integration system (Santiago, 2016). The same thing happened with the Teles Pires hydroelectric project in which the project was completed before the transmission lines were installed (Ocon, 2015). In the case of the Transnortheastern Railroad, the low level of coordination between the executing agencies and other governmental bodies — such as Funai and Incra — impeded the anticipated management of conflicts, which culminated in problems with land appropriations and this project's having negative impacts on traditional populations (Machado, 2016).

However, the cases analyzed were characterized by low levels of conflict with civil society, which reinforces the findings of Hochstetler and Tranjan (2016) that the majority of infrastructure projects are not the subject of these local disputes. On the contrary, there was support from the local community in some cases, as indicated by the "I support coal" movement within the context of the implementation of the Candiota thermoelectric complex (Alves, 2017), and also Line 1 of the Salvador Subway system in which the protests that occurred were due to the delay in concluding this project. However, conflicts have occurred in relation to the Transnortheastern Railroad, especially due to the elevated number of land appropriations (Machado, 2016), and in the construction of the Teles Pires hydroelectric plant, in which NGOs and Native American groups feared the environmental damage that it would cause (with the disappearance of the area known as the Seven Falls after the formation of the plant's lake).

The processing of these conflicts has proven to be a challenge for project managers, because the instruments of interaction between state bureaucracies and social actors in the infrastructure project environment are precarious. Thus, the main mechanism of participation for local social actors in decision making processes are public hearings which occur during the environmental licensing process. Studies of this subject point to the limitations of this participative instrument due to its brief and informative nature and its late occurrence (*i.e.*, after the finalization of the EIA-Rima Reports) — or in other words, after the government's decisions have been made (Abers, 2016).

In terms of the role of controlling bodies, a relevant finding which seems based on common sense is that at least for the cases studied, the actions of controlling bodies have not had a negative effect on project durations and costs (Gomide et al., 2016). The majority of these projects were subject to this control, especially by the accounting tribunals (within the nation's states). In the case of the Candiota III thermoelectric complex and the Paving of Highway BR-163/PA, the collaboration between the executing bureaucracies and the controlling bureaucracies resulted in improvements in management. In the former, the creation of a project management unit was able to efficiently manage its documentation, which made it possible to provide answers to demands for investigations about irregularities in an agile manner, which thus avoided delays (Alves, 2017). In the latter, based on the decision of the government to resume this project by inserting it in the PAC in 2007, the controls were implemented in a preventive manner, which offered more security to the technical specialists and companies involved (Panariello, 2015).

In relation to environmental licenses, this is a moment that can result in conflicts for infrastructure projects, because they involve various actors and economic, social and environmental interests. This is why the process has received much criticism related to the delay in issuing licenses. In the six case studies, the environmental license was not a critical factor in the delays and the increases in costs that have been observed. However, for the Transnortheastern Railroad project, the environmental licensing was fragmented by lots, which led to the environmental studies being concluding at a time after (and not before) the beginning of the project's execution (the project was also characterized by a lack of environmental management and delays in fulfilling environmental conditions). The licensing process for the Teles Pires hydroelectric plant was segmented, which led to the issue of Native American lands being evaluated during the execution of the São Manoel project, another hydroelectric complex on the Tapajós and Teles Pires rivers (Ocon, 2015). In the Salvador Subway system project, basic rites of the environmental licensing process were not followed properly. According to Pêgo and partners (2016), there were projects underway with expired Temporary Licenses (LPs) or Installation Licenses (LIs). In the case of the Paving of Highway BR-163/PA, the environmental licensing process took place without taking into account the unique characteristics of the Amazonian region (Panariello, 2015). The case of the Candiota 3 thermoelectric complex in which the intervention of the Justice Department in the environmental licensing phase culminated in a broad emission monitoring system during the project's three phases. In addition, an agreement was reached between Ibama and the entrepreneur to stop operating Phase 1 by 2017 due to it being a technologically outmoded plant (Alves, 2017).

In terms of the role of subnational governments, the analyzed cases indicate that municipalities act in a peripheral and one-off manner, realizing, for example, just the land appropriations necessary for these projects (Lotta and Favareto, 2016). Even when the project was originally proposed by the state government — as in the case of the Candiota 3 thermoelectric complex — the federal government assumed a central role in the execution and financing of the project. Lotta and Favoreto's analysis (2016) reveals that the articulation of the federal government with these subnational entities occurs most of the time when problems arise that must be resolved *a posteriori*, for example the readjustment of the route of the Transnortheastern Railroad due to the construction of the Serro Azul Dam, or the delay in integrating the metro operational plan — elaborated by the state and federal governments — with the collective bus transport plan for the city of Salvador (Lotta and Favareto, 2016; Sousa and Pompermeyer, 2016). The articulation of the subnational governments has also been marked by actions that have taken place in parallel with a project that sought to overcome a state deficit with the local population, as happened in the case of the Tele Pires hydroelectric dam with the implementation of Native American health equipment in the region. But even in these cases, cities appear to be just receivers of the actions implemented by the federal government.

The analysis used in this section is based on processes that are deemed critical to the execution of contemporary Brazilian investment projects by the literature and public managers (Gomide et al., 2016). These case studies indicate deficiencies in the administrative and relational capacities of the federal government's bureaucracy. In terms of the former, the planning and selection of projects appear to be the main determinants of success in the execution of the analyzed investment projects. In the same manner, there is also evidence of deficiencies in the relationship with civil society (or the local population) — especially during the environmental licensing processes — as well as in the articulation with subnational entities to the extent that appropriate dialogue with the controlling governmental bodies points to improvements in management. In the following section, we will analyze the survey data to verify what they reveal about the dimensions of state capacities.

4. BUREAUCRATIC AND RELATIONAL CAPACITIES IN THE ENERGY AND TRANSPORT SECTORS: THE SURVEY DATA

As discussed, technical-administrative capacity is a capital attribute for the quality of the planning and selection of the projects to be executed, with direct impacts on project schedules and budgets. Equally, relational capacities are positively associated with political support and project improvements during their execution, increasing the quality and performance of the goods and services offered (table 1). Therefore, we will analyze the questionnaire data applied to federal civil servants involved in the planning and execution of infrastructure projects in this manner, contrasting the energy and transport subsectors in order to reveal these two dimensions of state capacities.

4.1 BUREAUCRATIC CAPACITIES

Bureaucratic or administrative capacities have been operationalized by three variables: professionalization, autonomy and coordination.

In terms of professionalization, we examined the data regarding: education, professional experience in the sector, and compatibility between the individual's professional experience and studies in public administration. The two first pieces of information enable us to know the level of a bureaucrat's qualifications and technical knowledge. The third (compatibility) in turn aggregates data about convergence between academic education and previous professional experience with the nature of the work realized.

Table 1 reveals the high level of qualification found in the bureaucracy of both subsectors under investigation. Thus, 70.5 % of the respondents in the transport area have graduate degrees, and 78.3% of the energy sector respondents have completed graduate degrees (table 1).

TABLE 1 EDUCATION LEVEL OF INFRASTRUCTURE BUREAUCRATS

			Highest Level of Education Completed			
			Elementary and High School	College	Graduate	Total
Sector	Transport and Logistics	Total	0	243	560	794
		% in relation to the sector	0	29.5%	70.5 %	100.0%
	Energy	Total	0	25	90	115
		% in relation to the sector	0	21.7%	78.3%	100.0%

Source: Ipea/Enap Survey.
Chi squared test was performed and no relationship was discovered between sector and level of education, X^2 (1, N = 909) = 2.94, p = .086.

On the other hand, the other face of technical competence, professional experience, presents modest results, since most of the respondents in both subsectors have little professional experience in the infrastructure area — up to five years (table 2). One possible explanation for this is that the infrastructure sector has gone through a relatively recent process of strengthening their bureaucracies

by creating their own careers — such as infrastructure analysts and transport infrastructure analysts created in 2007 and 2005 respectively. However, Souza (2017) reveals that, contrary to other areas of federal public administration, the structuring of these careers is characterized by relatively low initial salaries. Thus, public service may encounter difficulties in competing with the private market for more experienced professionals in the infrastructure sector.

TABLE 2 EXPERIENCE IN INFRASTRUCTURE AREA

			Experience in Infrastructure in the Federal Government			
			Low	Medium	High	Total
Sector	Transport and Logistics	Total	434	247	112	793
		% in relation to the sector	54.7%	31.1%	14.1%	100.0%
	Energy	Total	60	42	12	114
		% in relation to the sector	52.6%	36.8%	10.5%	100.0%

Source: Ipea/Enap Survey.
Chi squared test was performed and no relationship was found between sectors and infrastructure experience in the federal government, X^2 (2, N = 907) = 2.03, p = .361.

Finally, the compatibility between the individual's studies in public administration and previous career experience reveals high values for public servants, according to the sample in table 3.

TABLE 3 ACADEMIC AND CAREER EXPERIENCE COMPATIBILITY

			Academic Compatibility			Career Experience Compatibility			
			High	Medium	Low	High	Medium	Low	Total
Sector	Transport/ Logistics	Total	681	71	41	545	157	91	793
		% in relation to the sector	85.9%	9.0%	5.2%	68.7%	19.8%	11.5%	100.0%
	Energy	Total	91	16	8	63	34	18	115
		% in relation to the sector	79.1%	13.9%	7.0%	54.8%	29.6%	15.7%	100.0%

Source: Ipea/Enap Survey.
The chi squared test was performed and no relationship was found between sector and academic compatibility, X^2 (2, N = 908) = 3.7, p = .156.
The chi squared test was performed and no relationship was found between sector and career compatibility, X^2 (2,N = 908) = 8.93, p = .012.

In relation to autonomy, the survey data provides information about the connection with public administration (whether as an effective public servant or not) and the perception of bureaucrats

regarding political interference[11] in their work routines. While the connection represents a variable which explains stability, and thus represents an important indicator of autonomy (by allowing the bureaucrat to make decisions without running the risk of being threatened with firing), the high frequency of political interference in work routines can demonstrate a subordination of bureaucrats to political interests, to the detriment of technical rationality in decision making processes.

In this sense, a little more than half of the respondents from the transport sector had an effective connection to public administration, having passed exams and having stable careers. In the energy sector, just 36.5% had an effective connection, with government jobs predominating, according to data from table 4.

TABLE 4 CONNECTION OF RESPONDENT TO FEDERAL PUBLIC ADMINISTRATION

			Connection with Federal Public Administration		
			Effective	Public Employee	Total
Sector	Transport and Logistics	Total	424	369	793*
		% in relation to the sector	53.5%	46.5%	100.0%
	Energy	Total	42	73	115*
		% in relation to the sector	36.5%	63.5%	100.0%

Source: Ipea/ENap Survey.
Chi squared test was performed and a relationship was found between the sector and the connection with the federal public administration, X^2 (1, N = 908) = 11.5, p = .001.

When asked about their work routines, "political interference" frequently appears — especially in the transport sector, with 62.6% of the responses (table 5).

TABLE 5 PERCEPTION OF BUREAUCRATS ON THE LEVEL OF POLITICAL INTERFERENCE IN DECISION MAKING PROCESSES

			Level of Political Interference				
			Low	Medium	High	Does not Apply	Total
Sector	Transport and Logistics	Total	83	159	496	54	792
		% in relation to the sector	**10.5%**	20.1%	62.6%	6.8%	100.0%
	Energy	Total	1	28	55	21	115
		% in relation to the sector	9.6%	24.3%	47.8%	18.3%	100.0%

Source: Ipea/Enap Survey.
Chi squared test was performed and a relationship was found between the sector and the level of political interference, X^2 (3, N = 907) = 20,4, p = .000.

[11] The survey question related to political interference was the following: "In terms of the execution and regulation of infrastructure projects, indicate the frequency of the following problems that affect your work routine." The option "political interference" represented one among 13 response options. Thus, the nature of political interference was not defined by the questionnaire. However, in the Final Considerations section of this article, we discuss this issue based on the literature.

In terms of coordination, the survey data provides information in terms of the frequency of intraorganizational interaction (*i.e.*, with superiors, subordinates and colleagues of other similar units in the same organization) as well as interorganizational interaction (*i.e.*, with other government bodies). The analysis of these two sectors makes it possible to infer the relative internal cohesion of the energy sector as compared to the transport sector, with values of 32.2% and 50.1%, respectively (table 6). However, in terms of the relationship to interbureaucratic interactions, there is a low frequency of interactions by the two sectors with other governmental bodies (table 7). From this we can infer low levels of intragovernmental coordination.

TABLE 6 FREQUENCY OF INTRABUREAUCRATIC INTERACTION

			Frequency of Intrabureaucratic Interaction			
			Low	Medium	High	Total
Sector	Transport and Logistics	Total	88	308	397	793*
		% in relation to the sector	11.1%	38.8%	50.1%	100.0%
	Energy	Total	20	58	37	115*
		% in relation to the sector	17.4%	50.4%	32.2%	100.0%

Source: Ipea/Enap Survey.
Chi squared test was performed and a relationship was found between the sector and frequency of intrabureaucratic interaction, X^2 (2, N = 908) = 13,4, p = .001.

TABLE 7 FREQUENCY OF INTERBUREAUCRATIC INTERACTION

			Frequency of Interbureaucratic Interaction			
			Low	Medium	High	Total
Sector	Transport and Logistics	Total	405	227	160	792*
		% in relation to the sector	51.1%	28.7%	20.2%	100.0%
	Energy	Total	49	34	30	113*
		% in relation to the sector	43.4%	30.1%	26.5%	100.0%

Source: Ipea/Enap Survey.
Chi squared test was performed and a relationship was found between the sector and the frequency of interbureaucratic interaction, X^2 (2, N = 908) = 6.84, p = .003.

4.2 RELATIONAL CAPACITIES

Relational capacity refers to the ability of bureaucrats to mobilize political and social support to realize established objectives and obtain new information and knowledge to increase the quality and effectiveness of the goods and services being offered. Thus, the dialogue between bureaucrats and local social actors and governmental control bodies can have positive effects on the fulfilling of

environmental requirements and the guaranteeing of the rights of minorities and vulnerable social groups (Pereira, 2014). Interfederal articulation in turn makes it possible to perform better territorial management, channeling the demands and interests of the actors of the territories under intervention, so that these projects leave a legacy in terms of local development (Lotta and Favareto, 2016).

As we have discussed, the interaction between state bureaucrats and social actors, within the execution environment of infrastructure projects, is limited by the predominance of public hearings. The small amount of dialogue with local social actors is contrasted by the data collected by the survey in respect to the frequency of interaction between infrastructure sector bureaucracies and private companies. A considerable portion of the respondents in the energy (36.5%) and transport (48.5%) sectors evaluated their interaction with these actors as having a high frequency (table 8). However, contrary to the relationships with civil society which occur in an institutionalized manner (public hearings), the relationships with private companies present an informal character (Pereira, 2014; Pires and Vaz, 2014). Frequent interaction with private companies is associated with low bureaucratic autonomy which can increase the risks of the capturing of the public sector by the interests of private groups.

TABLE 8 FREQUENCY OF INTERACTION OF THE INFRASTRUCTURE BUREAUCRACY WITH PRIVATE COMPANIES

			Interaction with Private Companies			
			Low	Medium	High	Total
Sector	Transport	Total	219	189	385	793
		% in relation to the sector	27.6%	23.8%	48.5%	100.0%
	Energy	Total	48	25	42	115
		% in relation to the sector	41.7%	21.7%	36.5%	100.0%

Source: Ipea/Enap Survey.
Chi squared test was performed and a relationship was found between the sector and the interaction with private companies, X^2 (2, N = 908) = 10.08, p = .006.

On the other hand, the interaction between the executive branch bureaucracy with governmental control bodies, can represent opportunities to improve investment projects (Olivieri, 2016). However, the survey data indicates that the frequency of interaction between executing bureaucracies and governmental control bodies is low: in the transport sector, 71% of the respondents evaluated this type of interaction as having a low frequency; in the energy sector, 80.2% had the same perception (table 9).

In terms of federal articulation, the data reveals a low level of interaction between the federal bureaucracy with local governmental bodies: in the transport sector, 63.1% of the respondents indicated that this interaction was low; in the energy sector 88.7% of the respondents shared the same perception (table 10). This corroborates the findings of the case studies that indicate a passive role for the cities as simply passive receivers of this investment.

TABLE 9 **FREQUENCY OF INTERACTION OF THE INFRASTRUCTURE BUREAUCRACY WITH THE GOVERNMENTAL CONTROL BODIES**

			Frequency of Interaction with the Governmental Control Bodies			
			Low	Medium	High	Total
Sector	Transport	Total	563	123	107	793
		% in relation to the sector	71.0%	15.5%	13.5%	100.0%
	Energy	Total	93	11	12	116
		% in relation to the sector	80.2%	9.5%	10.3%	100.0%

Source: Ipea/Enap Survey.
Chi squared test was performed and a relationship was not found between the sector and the frequency of interaction with governmental control bodies, X^2 (2, N = 909) = 4,44, p = .109.

TABLE 10 **FREQUENCY OF FEDERAL INTERACTION**

			Frequency of Federal Interaction (states and municipalities)			
			Low	Medium	High	Total
Sector	Transport	Total	500	159	134	793*
		% in relation to the sector	63.1%	20.1%	16.9%	100.0%
	Energy	Total	102	7	6	115*
		% in relation to the sector	88.7%	6.1%	5.2%	100.0%

Source: Ipea/Enap Survey.
Chi squared test was performed and a relationship was found between the sector and the frequency of federal interaction, X^2 (2, N = 908) = 29.5, p = .000.

5. FINAL CONSIDERATIONS

This work seeks to discuss the capacities of the Brazilian state, specifically the federal governmental bureaucracy, in producing infrastructure policies that deliver the expected results and obtain support (or consent) from the affected social groups. Based on a review of the literature on state capacities, we have developed a framework (box 1) which has oriented our analysis of the empirical data. Some inferences may be derived from this methodological strategy.

In terms of relational capacities, the case studies and the survey data indicate that the relationship of the federal bureaucracy with external actors is characterized by precarious dialogue with the social groups affected by the projects. However, there is frequent interaction with private companies. The

data analyzed also reveals the low level of interaction between the executive branch bureaucracy and subnational government bodies and external control bodies. In terms of administrative capacities, the federal bureaucracy is professionalized and has good technical-academic qualifications. However, a significant portion of the respondents do not have an effective connection with public service, and also have pointed to political interference as a frequent problem in their decision making processes, above all in the transport sector. Added to this is the low level of interaction with other governmental bodies.

In terms of the issue of political interference in decision making processes, some observations should be made. Given the socio-economic implications of infrastructure investment decisions, various actors inside and outside of the government seek to influence the decision making process and defend their interests. Large infrastructure projects are characterized by complexity (Flyvbjerg, 2007, 2014), and the more intricate, uncertain and ambiguous the conditions for decision making are, the more problematic the use of rational techniques becomes.[12] Lindblom (1959) has shown that decision making processes in public policy are fundamentally political, characterized by mutual negotiations and concessions between the various actors and interests at play. This is why, Wegrich and Hammerschmid (2017) argue that political interference in the sector's decision making is a universal and inevitable phenomenon. This is not to say that investment decisions in this sector should dispense with planning, evaluation or project selection techniques. As Loureiro and Abrucio (2012) state, the intelligence of democracy rests precisely in its capacity to incorporate technical knowledge and rational analysis into politics.

The findings of this study offer elements that can help us better understand the actions and performance of the Brazilian state in terms of infrastructure policy, and the data and information analyzed help explain the results observed by part of the recent field literature in terms of the efficiency of the state's actions. In addition, these research efforts suggest that there is a fertile field to be investigated in terms of the governance of infrastructure policy, because this country needs not only more investment, but also better results from the resources it employs.

[12] The behavior under these conditions can be easily understood by the "limited rationality" argument made by Simon (1955).

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APPENDIX

Respondent sample used for this article.

			Where the respondents currently work									Total
			National Departament of Transportati on infrastructure	Energy Research Company	Planning and Logistics Company	Brazilian Airport Infrastructure Company	Ministry of Mines and Energy	Ministry of Transport	Secretariat of Civil Aviation	Secretariat of Ports	VALEC Engineering Construction and Railroads	
Sector	Transport	Total	307	0	5	392	0	37	21	30	1	793
		% in relation to the sector	38,7%	0,0%	,6%	49,4%	0,0%	4,7%	2,6%	3,8%	,1%	100,0%
	Energy	Total	0	76	0	0	39	0	0	0	0	115*
		% in relation to the sector	0,0%	66,1%	0,0%	0,0%	33,9	0,0%	0,0%	0,0%	0,0%	100,0%

Note: To perform the data analysis for this survey, a weight was associated with each career, which was elaborated based on the population of the energy and transport sectors and sample used, in order to balance the number of respondents from the two sectors.