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Effects of investment in information and communication technologies on productivity of courts in Brazil

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ABSTRACT

The adoption of new information and communication technologies (ICT) has been one of the main strategies used by organizations of the Brazilian Judiciary in the search for solutions to the major challenges they face, such as limited access to justice services, high levels of congestion in courts and delays in the adjudication of lawsuits. However, empirical studies showing the results of this strategy are limited. The present study seeks to fill this gap. The objective is to identify and explain the effects of investment in information and communication technologies on productivity of courts in Brazil. In addition to the direct relationship between technology and judicial performance, we investigate the mediating and moderating effects of technology on other drivers of judicial performance. Official data were collected from the Justice in Numbers database of the National Justice Council. Secondary data refer to all state, federal and labor courts in the country, and cover a seven-year period, from 2009 to 2015. Panel data were analyzed using hierarchical regression and conditional analysis. The results confirm four of the five hypotheses, indicating that ICT investment has a direct and positive effect on court productivity, as well as mediating and moderating the effect of other variables on productivity. However, contrary to expectations, investment in ICT does not moderate the relationship between court caseload and productivity; although weak, the observed relationship was negative. Explanations for the findings are presented in the article.

1. Introduction

The adoption of new information and communication technologies (ICT) has been one of the main strategies in the search for improvements in the judicial administration of several countries. In Brazil, courts have invested heavily in ICT (CNJ, 2017), through the acquisition of modern equipment, in the development of software (solutions) for specific problems, in the digitization of judicial processes, in the creation of electronic portals, in the developing online queries in processes and registries, and in the sharing of databases.

The adoption of technologies is an important innovation that requires judicial managers to rethink functions and activities traditionally carried out in courts and other types of judicial units (Velicogna, 2007). The adoption of ICTs allows the management of organizational knowledge through systemic processes and organizational memory related to decision making. This is of strategic value for the courts which have to control the decision-making criteria used in judgments according to jurisprudence. According to many authors (Borkowski, 2004; Buscaglia & Dakolias, 1999; Guimaraes, Odelius, Medeiros, & Santana, 2011; Louro, Santos, & Filho, 2017; Montfort, Jong, Herweijer, &

Marseille, 2005; Reiling, 2006; Rosa, Teixeira, & Pinto, 2013), the use of information technologies in courts is a successful strategy, generating benefits for the judicial administration and for the users of justice services. In general, the results of those studies indicate that the judiciary and the courts that invest most in technologies that are associated with information and communication are those that increase efficiency and productivity most.

Despite the high investment made by the Brazilian courts in technology in recent years, empirical studies showing the results of this strategy are very limited. The present study seeks to fill this gap. The objective is to identify and explain the effects of investment in information and communication technologies (ICT) on productivity of Brazilian courts. To achieve this objective, we collected secondary official data from the Justice in Numbers database, prepared annually by the National Justice Council (*Conselho Nacional de Justiça - CNJ*). The Justice in Numbers is considered as the main source of statistical data dissemination of the Brazilian Judiciary (CNJ, 2017). The data refer to the first level of all state, federal and labor courts in the country, over a seven-year period from 2009 to 2015.

Previous studies have considered ICT investment as an explanatory

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variable of judicial performance. That is, the adoption of new technologies influences the performance of courts. The present study follows the same line investigating how ICT investment influences the performance of Brazilian courts, but it adds a new element to the analysis by considering indirect effects, in which the investment in ICT is treated as a mediator and moderator of the relationship between explanatory variables and the productivity of the courts. Thus, this article innovates in relation to previous studies testing an indirect relationship in which technology mediates and moderates the relationship between key explanatory variables and judicial performance. Also innovates when considering in the analysis both the acquisition and maintenance of ICT in the courts.

The following section presents a brief history of the adoption of technologies in the Brazilian Judiciary, highlighting the values invested in acquisition and maintenance of technologies in the courts in recent years. Then, we present the theoretical framework of the study, proposing a set of hypotheses to be tested regarding the relationship between technology investment and court productivity.

2. Technology in Brazilian courts

The introduction of new technologies sought to cope with the growing demand for justice services in Brazil after the 1988 Federal Constitution, which resulted in a huge backlog of cases awaiting trial in the courts (Diniz, Barbosa, Junqueira, & Prado, 2009). According to the CNJ (2017), at the end of 2016, more than 80 million cases were pending, considering all segments of the Brazilian Judiciary. Of this total, approximately 75% are concentrated in the State Court, mainly in the courts of first instance (CNJ, 2017). The slowness of legal proceedings is a direct reflection of the congestion of courts. Research in public opinion conducted by the Institute of Applied Economic Research (*Instituto de Pesquisa Econômica Aplicada - IPEA, 2011*) indicated that the slowness of the Judiciary was one of the most dissatisfied points.

The historical adoption of information and communication technologies in Brazilian courts, according to Andrade and Joia (2012), can be divided into three distinct phases: the first, with individual initiatives by some courts; the second, with initiatives to standardize computerization between the different systems; and the third phase, with more general standardization initiatives between systems and courts. Individual initiatives relied on the political will of decision-makers in some courts and were often implemented by members of the courts themselves. These initiatives relate to the identification and use of tools that were considered most appropriate for each court sector. Thus, the different sectors created their own taxonomies for the tasks performed and their own procedural criteria, which resulted in a high level of fragmentation among and between the courts (Andrade & Joia, 2012).

In order to overcome the intrinsic fragmentation resulting from the individual initiatives of the first phase, according to Andrade and Joia (2012), in the second phase several information systems were created to coordinate administrative and procedural work at the state level. While some courts bought information systems, others preferred to develop their own systems. The multiplicity eventually resulted in integration problems between data and documents. An extreme example is presented by those authors, a case in which the different versions of the same system, implemented in courts of the same state, were not able to communicate with each other.

The third phase, called virtualization, is characterized by the creation of a national virtual system, but implemented locally according to the rules of each court. Andrade and Joia (2012) point out that, despite the different levels of technical knowledge that exists among the courts, virtualization has become the main strategy in the Brazilian Judiciary. In spite of the increase in interest of justice organizations in adopting new technologies, many of the results of the virtualization phase were negative, since the degree of personalization led to a steep learning

curve for the global system (Andrade & Joia, 2012).

In this phase of virtualization, the main goal of the Judiciary in terms of technology has been to integrate the different systems that work in the country. One of the examples is the Electronic Judicial Process, which consists of an electronic system developed by the CNJ in partnership with various courts and other organizations, such as the Brazilian Bar Association (*Ordem dos Advogados do Brasil - OAB*). The main objective of this system is to allow users to follow the judicial cases on the internet, regardless of the branch of the Judiciary, in all levels and types of courts in the justice system. As various systems of electronic processes have developed over time in different courts in Brazil, the current challenge is to make all these systems compatible and interconnected, so that they can talk to each other (CNJ, 2009).

The strategic plan of the Brazilian Judiciary for the use of information and communication technologies was defined in 2009 by Resolution n. 99 of the CNJ. The main task of the Judiciary is to provide effective technological solutions for the courts to fulfill its institutional functions. The CNJ has been one of the greatest supporters of the adoption of information and communication technologies and administrative tools associated with these technologies. Created in 2005 to provide strategic thinking and modernize judicial organizations, the CNJ represents a turning point in the modernization of the Brazilian judiciary. As justification, the CNJ argues that the adoption of new information and communication technologies can reduce or even eliminate steps considered bureaucratic in most of the legal process. These steps can consume up to 70% of the total processing time of a lawsuit. Thus, the strategy would increase procedural speed and, consequently, reduce congestion in courts (CNJ, 2013).

Brazilian courts have begun to invest heavily in new technologies, especially since the second half of the 2000s, with the hope of increasing access to justice, speeding up court proceedings, making the work of judges and assistants more flexible, increasing reliability of judicial processes, reduce waste, among others. At first, the priority was to equip the courts in terms of computers and to digitize court cases. The higher courts, in particular the Superior Court of Justice (*Superior Tribunal de Justiça - STJ*), were the pioneers in this phase, and by 2012 all cases generated in the STJ were digital. In 2015, Brazilian courts received about 27 million new cases, and for the first time the proportion of new digital cases (55.7%) was greater than the proportion of physical cases (CNJ, 2016).

Table 1 shows the amounts spent annually in millions of dollars on acquisition and maintenance of information and communication technologies by all state, federal and labor courts in the country. As can be seen, the amounts spent increased considerably over the period, from a total of approximately US\$ 200 million in 2009 to US\$ 440 million in 2015. This increase occurred even with the decrease in the courts' investment capacity from 2013, the result of the severe economic crisis that began in the country by this period.

In the period, a total of US\$ 2.3 billion was invested in technology in the courts. The investments were made in a balanced way between acquisition and maintenance of technologies. However, it can be observed in Table 1 that there was a reversal in the investment priority in the courts in the last years of the time series. In all justice, the amounts spent on maintenance, traditionally lower than the amounts spent on acquisition in the first period of the series, were higher in the last years of the series. This inversion in investment, according to the report by Andrade and Joia (2012), was already expected, because with the initial task of equipping the courts in terms of hardware and software, in the second phase it is natural to seek the development of information systems and the training of internal court personnel to operate such systems.

The efforts observed in the second phase were predominantly individual, with some courts standing out more than others in the investment in information systems. But from Resolution n. 185, of 2013, in which the CNJ defines the Electronic Judicial Process System (*Processo Judicial Eletrônico - PJe*) as the standard information

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