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# JUSTICE 4.0 CENTERS AND EFFECTIVENESS OF JUDICIAL SERVICE DELIVERY: ACCESS TO JUSTICE AND PROCEDURAL EFFICIENCY IN BRAZIL

CENTROS JUSTICIA 4.0 Y EFICACIA DE LA PRESTACIÓN DE SERVICIOS JUDICIALES: ACCESO A LA JUSTICIA Y EFICIENCIA PROCEDIMENTAL EN BRASIL

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**Abstract:** Digital technologies have triggered significant transformations in the contemporary world and, in Brazil, have also impacted the judicial sector, which faces challenges such as case overload and judicial delay. In response, the Conselho Nacional de Justiça (CNJ) launched the Justice 4.0 Program and the Justice 4.0 Centers, aiming to modernize the judicial system through the digitalization and decentralization of judicial services, in alignment with the notion of the Democratic Rule of Law, in which access to justice is regarded as

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a fundamental right to be realized. This article aims to examine the Justice 4.0 Centers and their influence on judicial service delivery, particularly regarding access to justice and procedural speed. That way, it explores how innovations based on information and communication technologies (ICTs) contribute to the modernization of the judiciary and the creation of new conflict resolution mechanisms, also examining the structure and functioning of the Justice 4.0 Centers. The applied methodology is qualitative, based on a bibliographic review of doctrinal sources, legislation, and official CNJ documents published between 2020 and 2024, employing document analysis and literature review. The study concludes by discussing the challenges and limitations of the Justice 4.0 Centers, including issues related to territorial jurisdiction and the need for continuous training of judges and court staff, in addition to technical and cultural obstacles that must be overcome in order to achieve the program's objectives, ensuring that the justice system is inclusive and efficient and reflecting a commitment to the effectiveness of human rights through participatory and adaptive processes.

**Keywords:** Judiciary, Judicial service delivery, Procedural management, Enforcement of rights, Justice 4.0 Centers.

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***Resumen:*** *Las tecnologías digitales han provocado transformaciones significativas en el mundo contemporáneo y, en Brasil, también han impactado el sector judicial, el cual enfrenta desafíos como la sobrecarga de procesos y la lentitud en la tramitación judicial. En respuesta, el Conselho Nacional de Justiça (CNJ) lanzó el Programa Justicia 4.0 y los Núcleos de Justicia 4.0, con el objetivo de modernizar el sistema judicial mediante la digitalización y la descentralización de los servicios jurisdiccionales, en consonancia con la noción de Estado democrático de derecho, en la cual el acceso a la justicia se considera un derecho fundamental que debe efectivarse. Este artículo tiene como objetivo analizar los Núcleos de Justicia 4.0 y su influencia en la prestación jurisdiccional, especialmente en lo que respecta al acceso a la justicia y la celeridad procesal. Así, se explora cómo las innovaciones fundamentadas en las tecnologías de la información y la comunicación (TIC) contribuyen a la modernización del poder judicial y la creación de nuevos mecanismos de resolución de conflictos, al examinar también la estructura y el funcionamiento de los Núcleos de Justicia 4.0. La metodología aplicada es*

*cualitativa, basada en una revisión bibliográfica de fuentes doctrinarias, legislaciones y documentos oficiales del CNJ publicados entre 2020 y 2024, para lo cual se utilizan el análisis documental y la revisión de literatura. El estudio concluye con una discusión sobre los desafíos y limitaciones de los Núcleos de Justicia 4.0, donde se incluyen cuestiones de competencia territorial y la necesidad de capacitación continua de magistrados y funcionarios, además de obstáculos técnicos y culturales que deben superarse para alcanzar los objetivos del programa, a fin de garantizar que el sistema de justicia sea inclusivo y eficiente, y refleje un compromiso con la efectividad de los derechos humanos mediante procesos participativos y adaptativos.*

***Palabras clave:*** *Poder judicial, Servicios jurisdiccionales, Gestión procesal, Efectividad de los derechos, Centros de Justicia 4.0.*



## I. INTRODUCTION

Digital technologies have driven structural transformations in the contemporary world, reshaping the social, economic, cultural, and institutional dimensions of society. These changes are mainly reflected in behavioral shifts that characterize an increasingly connected, participatory, and collaboration-oriented society. Unlike traditional consumption patterns based on the ownership of material goods, a new social logic emerges, centered on the sharing of experiences and interaction mediated by ICTs.

This phenomenon of digital transformation represents the third major technological revolution of humankind, comparable in scale to the invention of the printing press and the Industrial Revolution. Contemporary digitalization, which began in the late twentieth century, extends beyond technical innovation to become a transformative force that reshapes economic, political, and communicational structures, as well as potentially all spheres of human experience. Business models consolidated over decades are rapidly disappearing, while new forms of social and economic organization emerge at an accelerated pace.

In Brazil, this digital revolution is most evident in the modernization of the judiciary. Traditionally marked by case overload, procedural delays, and bureaucratic complexity in judicial services, the Brazilian judicial system has faced growing pressure to meet contemporary demands for efficiency and accessibility. In response to these structural challenges, the CNJ created the Justice 4.0 Program, a strategic initiative that integrates advanced digital technologies and procedural innovations to promote the comprehensive modernization of the judicial system.

The Justice 4.0 Program is implemented through several innovative measures, with the creation of the Justice 4.0 Centers standing out as its most emblematic expression. These centers embody a new paradigm in the delivery of judicial services, operating in a decentralized and fully digitalized manner to more efficiently meet society's demands for justice. By simultaneously promoting democratization of access to justice and enhancing procedural efficiency, the Justice 4.0 Centers represent a significant step forward in

realizing fundamental rights in Brazil, reflecting an institutional commitment to modernization and judicial efficiency.

The main objective of this article is to analyze the Justice 4.0 Centers and their impact on judicial service, particularly in terms of access to justice and procedural efficiency. To this end, the study first examines the innovations introduced by the Justice 4.0 Program, emphasizing the role of ICTs in modernizing the judiciary and creating new mechanisms for conflict resolution. Subsequently, the paper examines the structure and functioning of these centers; and, regarding procedural efficiency, the study analyzes how the use of digital platforms and the specialization of judges and staff within these centers contribute to reducing processing times and promoting consistency in judicial decisions.

Finally, the article addresses the challenges and limitations faced by the Justice 4.0 Centers, emphasizing issues related to territorial jurisdiction, the need for continuous training of judges and staff, and the technical and cultural barriers that must be overcome to fully achieve the objectives of the Justice 4.0 Program.

The scientific methodology adopted in this study is predominantly qualitative, with an exploratory and descriptive nature, based on a systematic bibliographic review and documentary analysis. This choice is justified by the need to understand an emerging phenomenon within the Brazilian judicial system, the Justice 4.0 Centers, which requires a detailed investigation of their characteristics, functioning, and effects on judicial service delivery.

Qualitative research is appropriate for the object of study because it enables an interpretative analysis of normative documents, institutional reports, and academic literature on the digital transformation of the judiciary. As De Souza (1995) observed, the investigation of complex social phenomena –such as changes in access to justice– requires methodologies that incorporate multiple analytical dimensions and provide a contextualized understanding of the processes under study.

Official documents from the CNJ published between 2020 and 2024 were examined. This period covers the initial accelerated digitalization measures adopted during the COVID-19 pandemic and the subsequent consolidation of the Justice 4.0 Program. The main documents analyzed include CNJ Resolutions No. 335/2020, 337/2020, 345/2020, 354/2020, 372/2021, 385/2021, and 465/2022, along with reports and informational materials on the Justice 4.0 Program made available by the CNJ.

Likewise, the research presents certain limitations that must be considered when interpreting the results. The relative novelty of the Justice 4.0 Centers results in a lack of empirical data on their long-term effects, restricting the analysis to preliminary results and projections based on initial operational information.

In that sense, this study seeks to contribute to the debate on the modernization of the Brazilian judiciary by providing a critical and well-founded analysis of the innovations introduced by the Justice 4.0 Program and their implications for the future of access to justice in Brazil. The following

section specifically addresses the modernization of the judicial system in the context of the global technological revolution.

## II. INNOVATION AND MODERNIZATION OF THE JUDICIAL SYSTEM

The digital transformation of judicial systems is a global phenomenon that brings profound changes to the way justice is administered and accessed in various parts of the world. With the advent of the Fourth Industrial Revolution, characterized by the convergence of technologies that blurs the boundaries between the physical, digital, and biological realities, judicial systems face the urgent need to adapt to a new technological and operational paradigm (Schwab, 2016).

The digitalization of justice, driven by advances in artificial intelligence (AI), big data, blockchain, and other emerging technologies, offers important opportunities to improve procedural efficiency, transparency, and access to justice. These innovations support the development of more agile and interconnected systems capable of processing large volumes of data and delivering judicial services that are more accessible and inclusive (Rabinovich-Einy & Katsh, 2017).

At the same time, this digital transformation brings significant challenges, including concerns about privacy, data security, and the need to ensure that technological innovations do not undermine fundamental principles of justice, such as impartiality and equity. There is also growing concern about "automated justice" and the effects that algorithmic decisions may have on

individual freedoms and rights, particularly in contexts where the data may be biased or insufficient (O'Neil, 2016).

Also, among the scholars who have made relevant contributions to this debate, Susskind (2019) stands out, as his works examine the impact of emerging technologies on law and legal practice. He argues that online courts represent one of the most significant developments for the future of justice, providing new ways to resolve disputes more efficiently, accessibly, and at lower cost.

Moreover, Susskind (2019) defines online courts as digital platforms that allow disputes to be resolved and legal services to be provided without requiring physical presence. In his view, the implementation of online courts could serve as a strong response to the limitations of traditional judicial systems, often marked by delays, high costs, and procedural complexity.

In that sense, Susskind's vision of online courts is closely connected to the principle of access to justice. He maintains that, by eliminating geographical barriers and reducing costs, online courts can democratize access to the judiciary, allowing more people to resolve their disputes quickly and effectively (Susskind, 2019).

Within this framework, the concept of Justice 4.0 arises as a response to contemporary demands for efficiency, accessibility, and transparency in the judicial system. Justice 4.0 goes beyond the digitalization of processes, incorporating innovative tools and solutions, such as AI, process automation, and virtual hearings, which collectively aim to improve judicial service delivery.

According to Porto (2023), Justice 4.0 represents a substantial step in the modernization of the judicial system, enabling faster procedures and reducing operational costs. One of its primary objectives is to accelerate case processing, a chronic challenge for the Brazilian judiciary.

In addition, Justice 4.0 seeks to democratize access to the judiciary by making it more accessible and inclusive. But another central element is the reinforcement of transparency and public trust in the judicial system. As Porto (2023) emphasizes, the digitalization of processes and the use of information technologies increase the transparency of judicial decisions and allow greater societal oversight of the actions of judges and court staff. The availability of data on public platforms and easier access to judicial information contribute to a more transparent and, therefore, more reliable justice system for society.

For Susskind, online courts not only facilitate dispute resolution but also foster a culture of innovation within the judicial system by promoting the adoption of new practices and technologies capable of profoundly transforming the administration of justice. He stresses that the success of online courts depends on the willingness of courts and legal professionals to adapt to new ways of conceptualizing justice and dispute resolution (Susskind, 2019).

This concept is particularly relevant in the Brazilian context, where the Justice 4.0 Program and the Justice 4.0 Centers aim to implement similar technological solutions to address the challenges of an overburdened and inefficient judicial system (Porto, 2023; CNJ, 2022).

Starting with CNJ Resolution No. 335 (CNJ, 2020a), a series of measures were adopted to maintain judicial services during a highly complex

period, thereby preventing a complete suspension of activities. Subsequently, Law No. 14.129/2021 established the basic framework for "digital government", setting out principles and regulations to harness innovation and digital transformation in order to improve public efficiency.

The Justice 4.0 Program, launched by the CNJ in 2021, was created to promote the digital transformation of the Brazilian judiciary and expand access to justice through new technologies and innovative practices. Its central purpose is to modernize the judicial system, making it more accessible, efficient, and transparent, particularly in a context of growing demand for judicial services and the need to adapt to new social and technological realities (Porto, 2023; CNJ, 2022).

Such program originated from the CNJ's efforts to confront the challenges imposed by the COVID-19 pandemic, which severely restricted the functioning of physical courts and accelerated the demand for digital solutions. Therefore, the CNJ recognized the need for a new justice paradigm that would not depend exclusively on in-person attendance and could provide rapid and effective responses even in times of crisis (Porto, 2023; CNJ, 2022).

A key component of the Justice 4.0 Program is the establishment of the Justice 4.0 Centers, created under CNJ Resolution No. 385 (CNJ, 2021). These centers are judicial units that function on digital platforms without fixed territorial jurisdiction, enabling judges and court staff to work remotely and in a decentralized manner. They were designed to address specific challenges, including case overload in certain courts and the demand for greater procedural efficiency, especially in repetitive cases (Porto, 2023).

On the other hand, with the advancement of ICTs, it has become clear that the justice system must evolve to meet these changes and provide solutions better aligned with citizens' needs. According to Rampim & Igreja (2022), the Justice 4.0 Centers represent a significant step toward the decentralization of judicial power, allowing more efficient case management and better use of human and technological resources.

Thus, the Justice 4.0 Centers in Brazil can be regarded as a concrete expression of the ideas advanced by Susskind, adapted to the specific needs and challenges of the Brazilian judicial system. By adopting practices and technologies that improve access to justice and procedural efficiency, they represent an important step toward a more modern and accessible judiciary. The following section examines the main elements of these centers.

## III. EFFECTIVENESS OF ACCESS TO JUSTICE AND THE JUSTICE 4.0 CENTERS

The concept of access to justice is fundamental to understand the role of judiciary in a democratic society. According to Cappelletti & Garth (1978), access to justice can be understood as a mechanism that ensures all individuals, regardless of their economic or social condition, can seek the protection of their rights through the judicial system. This concept unfolds into various dimensions, including physical and economic accessibility to the judiciary, simplification of legal procedures, and legal aid for those who cannot afford the costs of litigation.

In Brazil, the effort to expand access to justice has been a constant challenge. Cappelletti & Garth (1978) identified three "waves" of reform aimed at guaranteeing this access: the first focused on free legal aid; the second on the representation of diffuse and collective interests; and the third on the modernization and simplification of judicial procedures. These reforms significantly contributed to democratizing access to the judicial system, although persistent obstacles remain, such as procedural delays and bureaucratic complexity.

In this line, De Souza (1995) offered a broader and critical perspective on access to justice, emphasizing that the judicial system should not only be accessible but also capable of delivering fair and equitable outcomes. For him, justice must be understood as a fundamental right that goes beyond the mere possibility of litigation; it must ensure that judicial processes are able to respond effectively and fairly to social demands. He argued that, in contexts of inequality, the judiciary should act proactively to promote social justice, adapting its practices to meet the needs of the most vulnerable populations.

In the Brazilian context, the discussion on access to justice has also been advanced by authors such as Sadek (2004), who highlighted the importance of public policies that guarantee not only formal access to the judiciary but also effective access, reflected in timely and fair judicial service delivery. Sadek stressed that the effectiveness of access to justice depends on the judiciary's ability to adapt to social demands and respond adequately and promptly to the needs of the population, especially marginalized groups.

Therefore, when analyzing the role of the Justice 4.0 Centers in access to justice, it is necessary to consider these different dimensions and theoretical approaches. These centers represent an attempt to modernize and democratize access to the judiciary by eliminating traditional barriers such as physical distance and high costs, while promoting greater speed and efficiency in conflict resolution.

Through the Virtual Counter, citizens can access case information and participate in hearings by videoconference, in accordance with CNJ Resolution No. 372/2021. Additionally, CNJ Resolutions No. 337/2020 and No. 354/2020 authorize participation in hearings and the performance of procedural acts via videoconference, eliminating the need for precatory letters (Araújo et al., 2022).

Likewise, the "100 % Digital Court" (CNJ Resolution No. 345/2020) allows all procedural acts to be conducted electronically. Already implemented in more than 11 000 judicial units, this initiative encompasses nearly 50 % of the Brazilian judiciary. Furthermore, CNJ Resolution No. 385/2021 established the Justice 4.0 Centers, where all proceedings are fully digital and not tied to physical premises, thereby improving both access to and the effectiveness of justice (CNJ, 2020b; Araújo et al., 2022).

In that sense, in just over a year, at least 48 such centers have been created in Brazil, with specializations in areas such as public health. At TJRJ, for example, seven centers cover various fields, including industrial property and public health (Araújo et al., 2022).

In other words, judicial service delivery is adapting to the new digital environment, where justice is no longer limited to a physical space. However,

liturgy and procedural rules remain essential. CNJ Resolution No. 465/2022 establishes guidelines for videoconferences, including proper identification of participants and the use of appropriate attire and backgrounds. Failure to comply with these requirements may lead to suspension of the hearing and corrective measures (Araújo et al., 2022).

Finally, it is necessary to mention that the adoption of innovative technologies and procedures, such as virtual hearings and automated case triage systems, can significantly contribute to building a more accessible and equitable justice system, as highlighted by Cappelletti & Garth (1978) and De Souza (1995).

## IV. STRUCTURE AND OPERATION OF THE CENTERS IN JUDICIAL SERVICE DELIVERY

The Justice 4.0 Centers were implemented by the CNJ as part of the Justice 4.0 Program, which aims to modernize and streamline the operation of the Brazilian judicial system through the integration of new technologies. These centers are designed to operate in a decentralized and digital manner, providing greater efficiency and accessibility in judicial service delivery, especially in regions where the physical infrastructure of the judiciary is limited or non-existent (CNJ, 2021).

Each center is structured to operate entirely virtually, eliminating the need for a fixed physical space. This virtualization allows judges, court staff, and other legal professionals to work remotely, using digital platforms to conduct hearings, issue rulings, and perform other procedural acts. In this way,

the centers are reshaping the judicial system and redefining the concepts of "judicial district" and "judicial section". According to the CNJ (2021), this virtual model not only reduces operational costs but also provides greater flexibility and speed in case management.

The centers are equipped with advanced technological tools, including AI systems for case triage, automation of repetitive tasks, and videoconferencing platforms for virtual hearings. Rampim & Igreja (2022) noted that these technologies have the potential to transform the dynamics of judicial proceedings by automating bureaucratic functions and enabling judges to focus on more complex cases, which results in significant savings of time and resources.

The structure of the centers also incorporates integrated case management systems that allow real-time monitoring of proceedings and enhance collaboration among participants in the justice system. According to Porto (2023), these systems contribute to reducing bureaucracy and expediting case processing by centralizing information and standardizing procedures, thereby optimizing workflow.

Another key element of the centers' operation is digital accessibility. Through online platforms, parties and lawyers can participate in procedural acts from any location with internet access. This accessibility is particularly important to guarantee that citizens in remote or difficult-to-reach areas can fully exercise their rights. As highlighted by Lopes & Dos Santos (2020), this inclusive approach is essential for democratizing access to justice and ensuring

that all individuals, regardless of geographical location, can access judicial services.

### IV.1. Digital case management and procedural expediency

Procedural expediency is one of the major objectives of the Brazilian judicial system, essential for ensuring efficiency and effectiveness in judicial service delivery. The Justice 4.0 Centers, as an integral part of the CNJ's strategy for judicial modernization, play a crucial role in reducing case processing times by utilizing technological tools that automate and accelerate various judicial procedures.

As noted by Marinoni (2021), procedural expediency benefits significantly from the full digitalization of cases in these centers. The elimination of paper and the adoption of electronic case management systems considerably reduce the time between the performance of procedural acts and their registration in the case records, enabling cases to progress more quickly and efficiently. In that sense, digitalization also ensures immediate access to case files for all parties involved, including judges, lawyers, and prosecutors, thereby contributing to faster decision-making (Marinoni, 2021).

Another important factor is the use of AI and advanced algorithms for case triage and predictive decision analysis. Calderon-Valencia et al. (2021) observed that these technologies allow large volumes of repetitive cases to be processed automatically, freeing judges to focus on more complex matters that require in-depth legal analysis. AI can also forecast case outcomes based on prior jurisprudence, supporting faster and more informed decisions.

The adoption of virtual hearings further strengthens procedural expediency. Lopes & Dos Santos (2020) emphasized that holding hearings remotely by videoconference eliminates the time and costs associated with the physical travel of parties, witnesses and lawyers, while providing judges with greater scheduling flexibility. This enables a larger number of hearings to be conducted in less time, accelerating case resolution overall.

In addition, the integration of systems and the use of digital case management platforms improve the monitoring of deadlines and procedural progress. Porto (2023) highlighted that the standardization of procedures and the centralization of information in digital systems facilitate case tracking and allow for the early identification of potential delays, making it possible to implement corrective measures more quickly. As a result, the Justice 4.0 Centers have succeeded in substantially reducing case processing times, consistent with the objectives of a faster and more efficient judicial system.

## IV.2. Inclusion and accessibility in Justice 4.0 Centers

The Justice 4.0 Centers were created to expand access to justice, particularly for individuals who face geographical, economic, or social obstacles in reaching the judicial system. Their digital and decentralized structure allows people from different regions, including remote areas and vulnerable communities, to access judicial services more easily and efficiently (CNJ, 2021; Rampin & Igreja, 2022).

One of their main advantages is the removal of physical barriers that traditionally limited access to the judiciary. Araújo et al. (2022) noted that, by operating fully online, these centers enable citizens to participate in proceedings

and attend hearings from any location with internet access. This is especially important for rural populations and those distant from large urban centers, that often face serious difficulties in attending court due to limited transportation infrastructure or financial constraints.

Traditionally, judicial jurisdiction has been determined by territorial criteria, which define a judge's or court's authority over a case. With the Justice 4.0 Centers, this model is redefined. These centers are characterized by territorial flexibility, allowing judges and staff to work remotely and handle cases from different locations, marking a significant departure from the conventional understanding of territorial jurisdiction (Moreira de Oliveira & Cezar, 2024).

In this new model, jurisdiction is no longer strictly tied to a specific territory. Moreira de Oliveira & Cezar (2024) explained that this flexibility makes it possible for cases to be processed by judges not bound to the place of origin, which improves procedural efficiency and optimizes the distribution of workload within the judiciary. This proves particularly useful in situations of regional overload, as cases can be redistributed to judges in areas with lighter caseloads.

Additionally, the digitalization of services and the use of online platforms improve access to case information and communication with the judiciary. Rampin & Igreja (2022) observed that the centers provide digital tools that allow real-time case monitoring, electronic filing of documents, and virtual hearings. This accessibility reduces time and costs while ensuring that all parties

involved have equal opportunities to participate and be heard, fostering a more inclusive and transparent justice system.

Another important aspect is the use of assistive technologies and digital accessibility tools, such as automatic subtitles in videoconferences and websites compatible with screen readers, which are essential for people with disabilities. Araújo et al. (2022) observed that incorporating these tools into the centers demonstrates a commitment to building a more accessible and equitable justice system, consistent with constitutional principles of equality and non-discrimination.

Therefore, the adoption of virtual hearings and digital platforms by the Justice 4.0 Centers has been crucial for expanding access to justice, particularly for citizens with mobility difficulties or financial limitations. Rampim & Igreja (2022) pointed out that these resources allow individuals living in remote regions or with physical restrictions to participate in procedural acts without having to travel to court buildings, thereby reducing geographical and economic barriers that have historically limited access to the judiciary.

The possibility of remote participation in hearings and other procedural acts also generates significant savings of time and resources, allowing citizens to handle legal matters without interrupting their daily activities or bearing transportation and lodging expenses (Araújo et al., 2022).

Nevertheless, despite the progress achieved by these centers, challenges remain in guaranteeing effective and equitable access to justice through digital platforms. Digital exclusion, which mainly affects low-income populations and

rural areas with insufficient internet infrastructure, is a major concern, though not the only one, as will be examined in the following section.

## V. CHALLENGES AND LIMITATIONS

The implementation of the Justice 4.0 Centers in Brazil has brought significant advances in modernizing the judicial system, but it has also revealed a series of limitations that affect both the implementation process and ongoing operation. These limitations include technological, structural, cultural, and training-related issues, all of which challenge the full effectiveness of the centers and the achievement of their proposed objectives.

### V.1. Technological and structural barriers

One of the main obstacles encountered in implementing these centers is the inequality in technological infrastructure. The variation in the availability of technological resources and the quality of internet connectivity across different regions of Brazil compromises the uniformity and efficiency of the judicial services provided by the centers. This technological disparity leads to significant operational difficulties, especially for courts located in remote and less developed areas, where inadequate equipment and limited internet access hinder the full utilization of digital tools (Porto, 2023).

Inadequate training for legal professionals is another significant limitation. Many judges, lawyers, and court staff still face challenges adapting to new digital systems, resulting in operational errors and resistance to adopt the implemented technologies. Porto (2023) emphasizes that the lack of

continuous training and the scarcity of resources dedicated to capacity building impede the efficiency of the centers, ultimately affecting both the quality of services provided and procedural expediency.

Cultural resistance to change within the judicial system also constitutes a major limitation. Tradition and conservatism in legal practice often lead to hesitation in adopting new digital methods. Therefore, overcoming these barriers requires promoting a cultural shift that values innovation and acknowledges the benefits of new technologies.

### V.2. Digital exclusion and access barriers

Alongside technological infrastructure, digital exclusion remains a persistent challenge that limits equitable access to the services offered by the Justice 4.0 Centers. The lack of digital skills and adequate equipment among segments of the population, especially in low-income areas and among the elderly, continues to hinder full inclusion in digital judicial processes. This issue underscores the need for specific policies to promote digital inclusion and ensure that everyone has access to the necessary tools to participate in the judicial system (Moreira de Oliveira & Cezar, 2024).

Therefore, it is essential that users of electronic justice are properly informed –in clear and accessible language– about how to access the digital platform, the main available tools, the procedures to follow, and the norms of conduct in virtual environments, among other guidelines. Such information can be provided in booklets and manuals prepared by the judiciary, which may also include educational videos and utilize techniques such as Visual Law (Moreira de & Cezar, 2024).

Likewise, a fundamental measure is the provision of an alternative for in-person or hybrid participation, rather than mandating that hearings be conducted entirely via videoconference, which may present an insurmountable barrier for digitally excluded individuals. A viable solution would be the implementation of hybrid hearings, allowing for the in-person participation of litigants who lack the technical or material means to participate virtually (Moreira de Oliveira & Cezar, 2024).

### V.3. Algorithmic risks and AI concerns

Another crucial point that deserves attention is the use of AI. While the incorporation of AI systems into the Justice 4.0 Centers is promising, it poses significant risks to the transparency and integrity of the judicial process. One of the main challenges is the so-called "algorithmic opacity" or "black box" phenomenon, which prevents a clear understanding of the criteria employed by automated tools for case triage and predictive analysis. This lack of transparency undermines the principle of reasoning in judicial decisions and may render procedural review and adversarial participation, cornerstones of due process-unfeasible (Calderon-Valencia et al., 2021).

Additionally, the algorithms used in Justice 4.0 may reproduce or even exacerbate preexisting structural inequalities. As O'Neil (2016) points out, systems trained on historical data tend to replicate the discriminatory patterns embedded in past rulings. In a country such as Brazil, marked by deep socioeconomic and regional disparities, improperly calibrated algorithms can result in unequal treatment of similar cases, directly compromising the principle

of procedural equality. The unmonitored application of AI may therefore perpetuate exclusion and injustice, rather than correct them.

In light of these risks, it is imperative to adopt algorithmic governance measures that include mechanisms for explainability, proportionality, and continuous human oversight. In that sense, algorithmic auditability must be both a technical and legal requirement within the Justice 4.0 Centers to ensure that the use of AI complies with fundamental rights and safeguards the legitimacy of judicial proceedings.

### V.4. Ethical limits in contexts of vulnerability

The digitalization of the judicial system, while representing a significant advance toward modernization and efficiency, raises complex ethical questions that merit critical reflection, especially when considering its impact on vulnerable populations. The implementation of Justice 4.0 Centers, although seeking to democratize access to justice, may inadvertently create new forms of exclusion and deepen preexisting inequalities.

In contexts of socioeconomic vulnerability, judicial digitalization can become an additional obstacle to the exercise of fundamental rights. Sen (2000) emphasized that development should be assessed not only by technological progress but also by its ability to expand real human freedoms. From this perspective, digital justice must be analyzed through the lens of capabilities, considering whether it effectively broadens or restricts access to justice for different social groups.

In Brazil, digital exclusion has reached alarming levels, undermining the effectiveness of digitalized justice for vulnerable populations. According to the National Household Sample Survey - ICT (PNAD Contínua TIC) of 2022, about 21.1 million Brazilians (11.1 % of the population aged 10 or older) lack internet access. This exclusion is disproportionately concentrated in vulnerable groups: 23.4 % of the rural population has no internet access, compared to 8.6 % in urban areas (Instituto Brasileiro de Geografia e Estatística [IBGE], 2022).

Inequalities are even more pronounced when analyzed by age and income. Among people over 60, 38.9 % do not use the internet; and, in the lowest income group (up to one minimum wage), 29.7 % remain offline. In contrast, only 2.1 % of families with income above five minimum wages lack internet access (IBGE, 2023). These figures show that the groups most in need of access to public services, including justice, are the ones facing the greatest digital barriers.

The situation is even more concerning when considering the quality of access. The TIC Domicílios 2024 survey (Centro Regional de Estudos para o Desenvolvimento da Sociedade da Informação [CETIC.br], 2025) revealed that 60 % of Brazilian users access the internet exclusively via mobile phones, a percentage that rises to 86 % among lower-income groups. This technological limitation seriously hinders participation in complex judicial procedures, which require navigation through advanced systems and the handling of digital documents.

Regional disparities further aggravate the problem. In the North, 18.7 % of the population lacks internet access, compared to only 7.4 % in the Southeast

(IBGE, 2023). Since many states in the North and Northeast are home to indigenous and quilombola communities, these groups face double vulnerability: digital exclusion combined with historical marginalization from the formal justice system.

According to the Internet Society Foundation (2025), data on vulnerable populations reveal additional challenges: 39 % of residents in northern Brazil lacked fixed or mobile internet access, underscoring the precarious connectivity in indigenous territories.

For the homeless population, stable internet access is virtually nonexistent. As documented by Natalino (2023), the extreme conditions of social vulnerability experienced by this group create multiple barriers to accessing basic services and public policies, effectively excluding them from digitalized justice services.

Likewise, people with disabilities encounter specific barriers. The IBGE (2022) reported that 23.9 % of individuals with some form of disability do not use the internet, a proportion considerably higher than that of the general population. In addition, many judicial digital platforms still fail to fully comply with web accessibility standards, generating further obstacles for this group.

The ethical implications of personal data use in digital justice must also be considered. The collection, processing, and storage of sensitive information on digital platforms raise serious concerns about privacy and data protection, particularly for vulnerable groups who may lack full awareness of the risks involved or the capacity to provide genuinely informed consent (O'Neil, 2016; Winner, 1980).

In this context, adopting an ethical approach that prioritizes inclusion and equity becomes imperative. Digital justice policies must include specific safeguards to protect vulnerable populations. Ethics in digital justice also requires transparency in automated decision-making processes and social participation in the design and implementation of new technologies. As Winner (1980) noted, technologies are not neutral, but they embody particular values and political visions. Therefore, it is essential for civil society, especially representatives of vulnerable groups, to play an active role in shaping the direction of judicial digitalization.

Finally, procedural efficiency cannot be the sole criterion for evaluating the success of digital justice. Dworkin (1986) emphasized that justice demands not only efficiency but also equity and integrity. Digitalization must therefore be grounded in strong ethical principles to ensure that technological modernization does not undermine the fundamental values of the justice system or deepen existing inequalities. The digital transformation of justice must go beyond the simple digitization of analog practices and involve an institutional redesign committed to inclusion, equity, and transparency.

## VI. CONCLUDING REMARKS

The analysis of the Justice 4.0 Centers and their influence on judicial service delivery in Brazil reveals a complex landscape of significant advancements accompanied by structural challenges that require ongoing attention. This investigation has shown that the implementation of these digital judicial units represents an important milestone in the modernization of the

Brazilian judicial system, materializing the objectives of expanding access to justice and enhancing procedural efficiency as advocated by the Justice 4.0 Program.

The implementation of the centers has produced positive results and significant impacts on the Brazilian judicial system, particularly in expanding access to justice and improving procedural efficiency. Since their creation, these centers have shown considerable potential to transform court operations by using digital technologies to overcome structural limitations and promote a more accessible and efficient justice system (CNJ, 2021).

Procedural efficiency has been strengthened by the possibility of conducting hearings and procedural acts virtually, which has considerably reduced the costs and time related to the travel of parties, lawyers, and witnesses to court. Virtual hearings have also facilitated compliance with the schedules of judges and lawyers, allowing for more effective time management and, as a result, greater productivity in case resolution.

Regarding access to justice, the Justice 4.0 Centers have broadened the inclusion of historically marginalized groups and individuals living in geographically isolated regions. Through digital platforms, people from remote areas, who otherwise would have limited access to courts and forums, can now participate in judicial proceedings, contributing to a greater democratization of justice. Furthermore, the incorporation of assistive technologies and accessibility tools in the systems used by these centers has ensured more equitable access to judicial services for people with disabilities.

Despite these achievements, challenges and limitations persist. One of the main obstacles is digital exclusion, which continues to affect a significant part of the Brazilian population. Although the centers have the potential to expand access to justice, the lack of adequate technological infrastructure and low levels of digital literacy in certain regions remain barriers that must be addressed for Justice 4.0 to achieve its full potential.

An ethical analysis of judicial digitalization in contexts of vulnerability shows that, while modernization is promising, it may unintentionally generate new forms of exclusion that disproportionately affect the most vulnerable groups. Statistical data confirm that digital exclusion in Brazil is not simply a technical issue but reflects deep structural inequalities that risk being perpetuated or even intensified by judicial digitalization. The fact that 21.1 million Brazilians remain without internet access, with this exclusion concentrated among rural populations, the elderly, low-income groups, indigenous communities, and people with disabilities, raises serious concerns about the equity and inclusiveness of digital justice.

Additionally, some legal professionals initially resisted adapting to new digital methods. Although this resistance has gradually been reduced through training programs and the demonstration of the practical benefits of these tools, it highlights the need for continuous cultural change within the judiciary.

Another concern is the use of AI in these centers, which, despite its potential to improve efficiency, also poses risks to due process and fundamental rights. The opacity of algorithmic systems –commonly referred to as the "black box" effect– may compromise the ability to understand and challenge

automated decisions applied in case triage and predictive analysis. Without proper regulation, such systems risk reproducing historical biases and aggravating existing inequalities, particularly in regions with significant socioeconomic disparities. For this reason, the integration of AI into judicial processes must be accompanied by robust governance mechanisms, including transparency, human oversight, and technical auditability, to safeguard fairness and institutional legitimacy.

The ethical implications of personal data use in digital judicial contexts also require careful consideration, especially regarding vulnerable populations who may lack full awareness of the risks involved or the capacity to provide genuinely informed consent. The depersonalization inherent in technology-mediated interactions creates additional risks to human dignity and the quality of procedural dialogue, particularly for individuals with limited technological skills.

These findings emphasize the need for digital justice policies to include safeguards for vulnerable groups, such as guaranteed in-person alternatives, targeted digital literacy initiatives, free technical assistance mechanisms, and special protocols for cases involving people in situations of vulnerability. Equally important is investing in connectivity infrastructure in remote regions and traditional communities to ensure that technological modernization does not deepen existing social inequalities.

Overall, the Justice 4.0 Centers have had a significant impact on the modernization and efficiency of the Brazilian judicial system, expanding access to justice and improving procedural efficiency. The pursuit of faster case

resolution has driven the judiciary to adopt new technologies. The implementation of electronic processes not only increases transparency within the judiciary but also helps ensure compliance with the principle of reasonable duration of proceedings.

In that sense, the adoption of technology has become essential for the judiciary's survival, as it must adapt to modern developments. Furthermore, delays in resolving cases have contributed to growing public distrust in the judicial system.

This study shows, however, that technological modernization alone is not sufficient to guarantee an inclusive and equitable justice system. The success of Justice 4.0 must be evaluated not only in terms of efficiency but also by its ability to foster genuine democratization of access to justice while upholding fundamental principles such as human dignity, equity, and procedural integrity. The digital transformation of justice must therefore be guided by strong ethical principles that ensure no citizen is left behind in the pursuit of a more modern and efficient judicial system.

The electronic process, as a successful example of integrating technology and law, reinforces this connection. In conclusion, despite the challenges, the Justice 4.0 Centers represent a major step forward in building a more accessible and efficient justice system aligned with the demands of contemporary society. Nonetheless, their full success will depend on addressing the ethical limits of digitalization and establishing robust safeguards to ensure that technological innovation expands, rather than restricts, access to justice for

all sectors of Brazilian society, particularly the most vulnerable populations that have historically faced barriers in exercising their fundamental rights.

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