

The Contribution of Digital Transformation to the Development of the Judicial Procedural System

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Abstract. Many facets of political, social, and economic life are rapidly changing due to digitalization. Due to the enormous technological potential and capabilities of digital transformation technologies, which have directly affected public and private facilities and their management practices, legal systems worldwide are rushing to take advantage of them. This change has had a major impact on the legal profession in general and the judicial profession in particular. Especially in the post-COVID-19 era, the court system has benefited from various digital transformation technologies in numerous pre-trial and trial-related processes. Electronic archiving, e-courts, predictive justice, the use of artificial intelligence for legal data collection and analysis, remote hearings, judicial notifications, and many other procedural aspects have significantly reduced time and administrative complexity. These models and applications facilitate the quick preparation of cases for judgment and expedite the delivery of justice in a balanced manner, ensuring full guarantees that meet all fair trial requirements and achieve effective justice through the use of advanced technologies. The concept of digital transformation and its integration into the legal system—often referred to as digital justice—is examined in this study. It explores its primary applications, their impact on trial processes, how well legal and constitutional requirements are met, and the major obstacles to this change. The research focuses on comparative judicial system experiences worldwide, with particular emphasis on France, Egypt, and Saudi Arabia.

1. INTRODUCTION

Today's humanity is undergoing a massive scientific and technical evolution, with new advancements being made every day that cannot be disregarded or ignored. At the vanguard of these developments are digital transformation technologies, such as artificial intelligence, the Internet of Things, and others. How the law can incorporate these advancements is the constant problem.

Since jurisprudence is a human science, it is required by law to codify scientific methods and instruments and incorporate them into the legal and constitutional structure in order to keep the law current with advancements. Humanity has unquestionably profited and been tremendously assisted by the usage of numerous digital applications in economic, cultural, and scientific domains.

1.1. Study's Importance

"The judiciary really needs to use smart, cutting-edge tools to streamline its operations and get rid of the last bits of bureaucracy and routine. There are considerably more advantages to the legal system than can be discussed in the pages of this study. The most important thing to note, though, is that the application of intelligent tools in the legal field has resulted in significant changes to long-standing, traditional concepts in legal jurisprudence, giving rise to modern studies like remote litigation and electronic trials, among others.

1.2. The Problem of the Study

The issue stems from the lack of thoroughness in many research on the use of technology in the legal system, including electronic or distant litigation. As a result, it is now imperative to strike a normative balance between the existing judicial norms that protect individual rights and the employment of digital transformation technologies in trials. This balance seeks to guarantee that trials carried out by digital transformation tools are impartial and do not violate the rights of parties involved. Because judicial proceedings include many procedural and substantive standards, this study focuses on how digital transformation affects procedural regulations. A follow-up analysis will look at how digital transformation affects substantive standards.

2. STUDY METHODOLOGY

Our goal in this study is to use an analytical-comparative technique to analyze real-world experiences in this subject and get the best possible outcomes.

2.1. Plan of Study

As shown below, the study is organized into two sections, each with two subsections and a conclusion.

Section I: The Digital Transformation Concept's Legal Framework.

Subsection I: The Digital Transformation Concept and Its Legal Foundation.

Subsection II: Applications for Digital Transformation in Judicial Organizations.

Section II: The Impact of Digital Transformation on Judicial Trial Guarantees.

Subsection I: The Effect of Digital Transformation on the Procedural Controls of Judicial Justice.

Subsection II: Challenges Facing the Judicial System in the Realm of Digital Transformation.

Section I: The Digital Transformation Concept's Legal Framework

The scientific and technical developments that are occurring daily have not been separated from the field of legal science. All facets of life have been impacted by the digital revolution, and the legal field has been particularly affected. It is not hyperbole to say that the legal and judicial system desperately needs sophisticated, contemporary, and—above all—quick methods to ease burdens and make it easier to fulfill urgent obligations and responsibilities pertaining to human life. Without a doubt, digital transformation is important in this respect. This section will start with a definition of digital transformation and its legal foundation before looking at its uses in the legal system, as explained below:

Subsection I: The Digital Transformation Concept and Its Legal Foundation

First, the process of transforming data into a digital format for processing by electronic computers is known as digital transformation from a technical standpoint. The process of transforming information resources in different formats, including books, periodicals, audio recordings, and moving pictures, into a computer-readable format using the binary system ("bits")—which is regarded as the basic information unit for a computer-based information system—is another definition of digitization. Digitization is the process of converting information into a collection of binary numbers, and it is accomplished by using a variety of specialized tools and technologies. (Ahmed Farag, Information Institution Digitization, 2009).

According to Charlotte Piercy, digitization is a process that makes it possible to transfer information and data from analog to digital systems. According to Doug Hodges, digital transformation is the process of converting intellectual contents such as books, magazines, and articles—that is now available on conventional physical storage medium into a digital version. (Labeir Saleh, The Effect of Digitization Orientation and Its Efficiency on Institutional Communication, 2020).

From a different angle, digital transformation refers to the application of digital technology to improve work processes with the goal of achieving job completion speed and accuracy. Depending on the area and kind of information, digitization is essentially the act of transforming data into a digital format and processing it electronically. (Al-Baghdadi Muhammad, Virtual Courts and Digital Judiciary, 2022).

Legal jurisprudence has tried to develop a description that is comparable to the technological idea of digital transformation in the judicial sector. This definition is called "digital judiciary." Aiming to expedite case adjudication, facilitate litigant procedures, and implement judgments electronically, it is described as a new informational judicial system in which all litigation procedures are carried out through an electronic court via computer devices connected to the internet and through electronic mail. (Jaafar Hatem, Electronic Litigation's Contribution to the Advancement of Justice, 2015).

Within a legislative framework that complies with the general guidelines and principles of civil procedure law while considering the special characteristics of electronic means, it also includes the acquisition of judicial protection using electronic means that support human elements through technical procedures that guarantee the realization of litigation principles and guarantees. (The Privacy of Judiciary Through Electronic Means, Awad Youssef, 2012).

In our opinion, the most thorough definition of the digital judiciary is "the authority of a specialized group of regular judges to adjudicate cases and conduct judicial procedures using modern electronic means within an integrated judicial information system, encompassing all parties and tools, relying on the methodology of international networking technology and electronic computer file programs, to adjudicate cases, render judgments, and execute them, with the aim of achieving swift case resolution and facilitator procedures for litigants." (Electronic Litigation and Electronic Courts, Al-Shara'a Hazem, 2010).

To speed up case adjudication and streamline litigant procedures, it is also a judicial system that allows litigants to file cases electronically using digital technology. This includes the filing and adjudication of cases, the issuance of judgments, and the electronic execution of those judgments. (Alaa El-Din Rasha, Arab Experiences with the Digitalization of the Judiciary).

2.2. The Law's Justification for Including Digital Transformation in the Courts

To stay up with the swift and changing advances that are unquestionably essential to the realization of their developmental aims and economic success, contemporary legal systems in modern governments actively embrace digital transformation. Unquestionably, one of the most crucial industries where digital transformation has produced notably significant outcomes is the judicial sector. Digital transformation has been included into the judicial system on a number of different foundations, including constitutional and legislative grounds, as well as administrative and voluntary bases where the state pledges to achieve progress and move forward. Among other things, this is evident in the legislation that the lawmaker passed, which require state infrastructure to be digitally transformed. These are shown as follows:

First, the State Will

Persistent problems in public administration include bureaucracy, routine, sluggishness, and too many other problems to mention. Through digital transformation, governments have discovered a way to get rid of the traces of antiquated centralism that they had long since given up on. They are working to expand and deepen decentralization into previously unimaginable domains while leveraging the most recent developments in contemporary administration. Our study focuses on the judicial sphere, where the court faces several issues, such as delays in expert reports, frequent document loss and damage, and major delays in making choices that help judges decide cases. Additionally, the growing volume of court cases and the shortage of judges have given the public judicial administration an inherent incentive to look for answers that guarantee efficient solutions for these problems. Addressing persistent issues with concrete solutions is more important than just using technology. For these kinds of problems, digital transformation has therefore become a lifeline.

Second: The Foundation of the Constitution

Based on constitutional concepts that seek to guarantee openness, e-governance, and the defense of people's digital rights, digital transformation is a key element of legal and administrative changes in contemporary governments. This movement has been protected by comparative constitutions, and the following describes the constitutional underpinnings of digital transformation:

The foundation of France's digital revolution is the country's constitution, which upholds citizens' rights to information and public services. Since civil and administrative rights are governed by law, according to section 34 of the French Constitution, French lawmakers can pass legislation that encourages the judiciary's digital transformation, including the creation of electronic courts and digital judicial service platforms. Decisions from the French Constitutional Council have confirmed that digital data protection is a basic right that must be protected against private or state interference.

Through provisions that prioritize the right to information and the protection of personal data, Egypt's constitution offers a solid foundation for digital transformation, which has resulted in the growth of digital infrastructure inside the court.

Third: The Legal Foundation

The state's intention to transition to digital transformation was translated by the lawmaker, who also enacted several legislations in different sectors to support and strengthen this goal and carry out the effort. To minimize interruption and guarantee the efficient and reliable functioning of the judiciary, the Egyptian government has made progress in judicial digitalization, although this development has been gradual.

The addition of electronic notification methods, like email and mobile phones, in addition to traditional notification methods, to accommodate individuals without electronic access or proficiency, is one of the main features of the new draft law on criminal procedures that the Egyptian legislator finalized in March 2024. The electronic regulation of the investigation and trial processes is another aspect of this digital change. (Digital Transformation Guide in the Egyptian Judiciary, Abu Al-Abd Taher, 2021).

By passing comprehensive data protection regulations, expediting court proceedings, and advancing contemporary technology in both general and judicial-specific legislation, French lawmakers have aided in the country's digital transition. As demonstrated by the Law on Simplifying Administrative Procedures, the General Data Protection Regulation, electronic courts, the adoption of digital notarization, and other related measures, this seeks to improve access to justice, increase the effectiveness of governmental institutions, and guarantee digital data protection.

Compared to the Egyptian experience, the method has been more prominent and developed in the Kingdom of Saudi Arabia. The legal system in Saudi Arabia is a prime example of how quickly technology is changing. Through national transformation projects, the Saudi government has pursued strategic goals, such as the development of a sophisticated judicial infrastructure founded on the principles of justice and openness, as part of its Vision 2030.

By offering a variety of communication channels, technical solutions, and service centers and platforms provided by the Ministry of Justice, the Kingdom has accomplished several goals related to this goal, including achieving prompt justice, improving the quality of services rendered to citizens, facilitating remote litigation processes, and improving access to justice. (Alaa El-Din Rasha, Arab Experiences with the Digitalization of the Judiciary).

Additionally, the Saudi regulator has made it possible for plaintiffs to electronically submit memoranda and defenses, which are currently governed by the Saudi Sharia Procedure System, as well as to file and register cases electronically. This is on top of the Kingdom's adoption of digital certification, electronic evidence, electronic signatures, and cybersecurity regulations.

The Kingdom certainly has a wealth of expertise in this regard. By using technological protection against hacking and piracy, such as transforming text into encrypted digital codes, it has put in place several steps to provide exceptional security for data and documents belonging to the court and litigants. Through several processes, including sender and receiver verification, it has also guaranteed the secrecy of information.

Subsection II: Applications for Digital Transformation in Judicial Organizations

Through accelerated transactions and more transparency, digital transformation has brought about several applications in the legal sector that have greatly improved court efficiency. Judicial systems may better meet the needs of the digital era by embracing ideas like electronic litigation, remote litigation, and the use of digital signature, certification, and artificial intelligence technology. These applications include, for instance:

Subsection II: Applications for Digital Transformation in Judicial Organizations

First, E-Courts, or electronic courts

These use digital technology, including case filing, electronic pleadings, and online session scheduling, to handle cases without requiring in-person participation. The 'Portail du justiciable' platform, which enables electronic case tracking, is used in France to achieve this. Partially established in Egypt, the 'Digital Justice' system allows anyone to make judicial petitions from a distance. The 'Najiz' platform, which oversees court functions online, is the name given to it in the Kingdom of Saudi Arabia. (B. Defains, 2019).

Second, virtual sessions and electronic pleading

This makes it possible for parties to a case to use video conferencing technology to remotely enter pleas and submit memoranda. It is used in many nations and has benefits including lowering court traffic and saving money and time.

Third, Judicial Case Management Systems (CMS)

These sophisticated software applications allow judges and attorneys to efficiently monitor cases by organizing litigation and managing documents and rulings online. They are used in the Kingdom of Saudi Arabia as the 'Digital Ministry of Justice' system, which provides electronic access to case data, and in France as the 'Télérecours' system for electronic case tracking. (Goodwin, S., Hannigan, Burford, N., Bedard, M., & Carrigan, E.).

Fourth, Judicial Data Analysis and Artificial Intelligence

This includes analyzing legislation, extracting legal texts, and predicting rulings based on court precedents using Artificial Intelligence (AI) systems. Additionally, it facilitates the quick analysis of millions of legal papers and speeds up legal research. The 'Predictice' initiative in France serves as an illustration, employing artificial intelligence to forecast court rulings. Alaa Artificial intelligence in forensic science: invasion or revolution, El-Din Ahmed, E. (2022).

We can concentrate on one example that has lately generated jurisprudential discussions—the electronic court—to avoid expanding the conversation about these applications and their effects on judicial activity.

2.3. Courts in the Digital Age: Electronic

First and foremost, if properly applied, artificial intelligence (AI), a technology of digital transformation, may greatly benefit the legal system. It can eventually provide one or more answers based on precise data input if it is given suitable alternatives and is developed and refined to accord with good legal standards and higher ideals. This makes it possible for AI to accomplish what legal scholars have referred to as "predictive justice." (GUÉVEL, D. Artificial Intelligence and Legal Decisions. Quaderni, 2019.)

Judiciary and jurisprudential circles may find it unexpected that certain judges have voiced their support for artificial intelligence (AI) judges to take the place of human judges. In fact, a few nations have worked to create "smart courts." This idea

calls for the use of electronic courts, which would have the same standing and power as traditional courts, to replace litigation procedures and actual courts.

Using a tiered structure, it initially enables litigants to evaluate their problems by entering data into the computerized system, which classifies them and offers pertinent details, prospective remedies, and other essential information. Second, it entails, where possible, settling conflicts out of court using non-judicial techniques like conciliation and mediation. In nations like the Netherlands, AI is already being used to help couples settle their differences out of court by providing them with advice and direction.

If it doesn't work, it gives them the information they need to resolve the matter in court. Smart trials and electronic submissions for online dispute settlement are part of the third tier, and all court facilities are streamed online. (GUÉVEL, D. Artificial Intelligence and Legal Decisions. Quaderni, 2019.)

the actual courtroom, where jurors, attorneys, and judges are all represented by three-dimensional projections. He recommended giving participants and attendees the option to attend in-person court hearings if they desired. He contends that doing so would greatly lessen the psychological strain of moving the entire trial online. Among other benefits, he thinks it would streamline court attendance and lower expenses for plaintiffs by doing away with the need for travel or physical conveyance.

There is no denying that we find this viewpoint to be somewhat exaggerated. The concept of artificial intelligence taking the place of human judges is unacceptable in all cases for several reasons that make such solutions difficult to implement:

First, judges play a more comprehensive role in education, awareness-raising, and society than just deciding cases. This role includes evaluating the circumstances of the parties involved, weighing their needs against those of society, and offering support when judicial discretion is needed. Automated digitization is inherently incompatible with this aspect of judgment in all of its manifestations.

Second: Electronic Judicial Decisions Lack Foundations for Accountability: Who is accountable for an automated court decision? Is it the software itself, or the person who entered the algorithms? Furthermore, given that programmers, not judges or even lawmakers, are responsible for the input process, symbols, codes, and the like, how can it be certain that the process itself was carried out in a way that upholds justice, the higher ideals of the law, and the constitution?

Third: Endangering the Values of the Judiciary: Major judicial concepts including transparency, publicity, the judge's conviction developed through sessions, the session management system, and confronting opponents with evidence would all be threatened by the adoption of an artificial intelligence justice system.

Fourth: Translating Accurate Legal documents: Who will translate exact legal documents into symbols? The results of these translations can be altered by a letter or an exception tool.

Fifth, the importance of justice is not guaranteed by literal obedience to texts, and the legislator and the court are ultimately responsible for pursuing justice, not engineers and technologists who are also accountable for its non-realization.

Sixth: An Evolution in the Idea of Court Decision Oversight: What is the appeal process for a decision rendered by an artificial program? This suggests a conflict of algorithms, particularly if the judge's judgment is not included. (Tania Sourdin. Judge vs. Robot? Judicial Decision-Making with Artificial Intelligence (2018).

The concept of artificial intelligence taking the place of judges is seriously hampered by all these factors. Although we oppose exaggeration, this does not imply that we should reject artificial intelligence.

On the other hand, China has set up an electronic court that uses a sophisticated computer software at a city in the eastern province of Shandong. Potential conviction conditions, aggravating and mitigating factors for punishment, and relevant legislation and court decisions are all stored on this computer. More than two thousand rulings have been rendered by this court using this program, in which the judge is an electronic judge rather than a human one.

After being given particular facts and information, the software makes its decisions. After presenting the criminal, civil, or disciplinary case with its data and requests on CDs, the defense presents its requests and arguments at the start of the case. The data is then loaded into the software intended for the electronic litigation process, which makes a direct decision. However, before rendering a decision, this software can ask the human judge for their opinion on certain elements of a unique type that could have to do with human factors.

This indicates that the concept is that case files are decided by an electronic computer program. The human judge is consulted in some situations at the program's request. As a result, this approach restricts the function of the human judge to situations in which their opinion is particularly sought. This suggests that the electronic computer program—now known as "artificial intelligence" is the main arbiter.

In light of all of this, we draw the conclusion that artificial intelligence has the potential to greatly advance the area of justice, especially in the context of what are known as judicial duties (as has been the case in the US) that come before the judgment issuance stage. As a result, it can significantly influence court decisions. Three ways, according to some judges, artificial intelligence can advance the evolution of judicial judgment:

1. Artificial intelligence is being used to assist, inform, and direct litigants as well as to streamline their pre-trial administrative processes.
2. Employees performing administrative duties related to judiciary, especially those with low performance rates or those who produce difficulties that hurt plaintiffs and lead them to lose their interests, can be replaced by artificial intelligence.
3. Through properly used algorithms, artificial intelligence can help change the judge's convictions, which inevitably impacts judicial justice.

Indeed, the first and second tiers have been the focus of recent justice reforms. We think that this will therefore improve the third level's quality. On the other hand, artificial intelligence will improve the caliber of court rulings. Numerous judicial services have already been established using artificial intelligence, such as handling judicial territorial jurisdiction concerns, completing case files, filing lawsuits, and automatically sending them to the court circuit. Nowadays, a lot of litigants use computerized tools to submit their cases, choose the appropriate court venue, pay costs, and set up sessions. Through the internet and digital applications, litigants and others can obtain court rulings for study and use after the fact. (The Rise of Robots and the Law of Humans, by Horst Eidenmueller, ZeuP, 2017). Tania SOURDIN. Robot vs. Judge? Judicial Decision-Making and Artificial Intelligence (2018).

Section II: The Impact of Digital Transformation on Judicial Trial Guarantees

The influence of the digital transformation on the procedural regulations of judicial trials will be examined in this part after we have examined the idea of digital transformation within its legal framework. Procedural controls frequently encounter enduring administrative difficulties. As shown below, we will show how digital transformation may help to mitigate these issues and free up judges to concentrate on their objective technical task of applying legal texts and principles to the facts that are brought before them.

Subsection I: The Effect of Digital Transformation on the Procedural Controls of Judicial Justice

Norms operate as the authoritative representation of substantive legal norms. According to certain jurisprudents, the legal system as a whole is maintained by procedural norms. Therefore, their main goal is to ensure that justice is served quickly and affordably while protecting people's rights and liberties from infringement. As a result, certain legal formalities must be followed in procedural activities. The following outcomes have resulted from the introduction of digital transformation in the procedural system: (Jabbar Amr, Mechanisms for Introducing Digital Transformation in the Judicial System, 2024).

The first is the shift from paper to digital:

The digital judiciary relies on digital technology for all aspects of litigation, from filing cases, alerting parties, and holding sessions to electronically executing decisions, which does away with paper files. This is in keeping with the goal of online litigation, which is to create a society of paperless transactions, by eliminating the need for paper documents in all processes and communications between litigants.

Therefore, electronic messages will become legal papers that litigants may rely on in disputes, replacing paper supports. Additionally, there are several benefits to employing electronic papers and records, including their generation, storage, transmission, and retrieval using a variety of technologies. Most notably, it does away with the enormous amounts of paper files that clog courtrooms, thus cutting down on their handling and storage while avoiding haphazard file storage and the losses that follow. Compared to paper files, electronic papers and records are easier to access and retrieve.

Without a question, litigation that makes use of contemporary technology and communication tools advances quickly inside the overworked legal system, which is loaded with mundane, administrative, and bureaucratic tasks. Court overcrowding is greatly reduced by digital transformation, which also speeds up case registration, paper circulation, document submission, and the payment of penalties and judicial costs. Judges gain from this since it saves them time, speeds up the adjudication of cases, and makes it easier for them to retrieve papers, preventing problems like damaged, illegible, or erroneous data. To protect the integrity of documents and evidence and to stop hacking and piracy, courts use technical and cybersecurity safeguards. Mechanisms for Bringing Digital Transformation to the Judicial System (Jabbar Amr, 2024).

2.4. Speed of Document Delivery and Reception

Electronic records, documents, and messages may be transmitted electronically over the internet, allowing for the instant delivery of documents such as electronic reports and studies. It also facilitates services like expert requests in electronic litigation and legal consultations. These services use uploading technology, which is transmitting data or programs to another organization, in addition to downloading technology. As a result, electronic transmission devices are essential to the legal implementation of electronic litigation procedures. They help the court with notice, announcement, and document exchange between litigants or their legal representatives, as well as collecting, storage, and preservation. Time optimization is made possible by this feature.

2.5. Quickness of Judicial Procedure Implementation

Increasing the speed at which lawsuits are filed and decided is one way that digital transformation aims to speed up processes. Lawyers no longer need to physically appear in court to file lawsuits and execute other judicial tasks thanks to digital judiciary. Without having to appear in court, lawsuits may be filed in a few easy steps using an electronic application, and case-related documents can be received and distributed 24/7. Judges can also study cases and related papers at any time thanks to this technology.

2.6. Electronic Litigation Procedures Are Easy to Prove

If they comply with legal criteria, paper records serve as comprehensive proof and symbolize the actual presence of conventional transactions. As evidential law has developed, digital certifications, electronic signatures, and electronic documents all have full evidentiary validity and may be used as the foundation for defining duties and establishing each party's legal duty. As a result, current information technology has invaded every nation, without exception, through the spread of contemporary communication tools like telegrams, telex, and fax, as well as audio tools like normal and cell phones. Given this, we can imagine the extent of the judicial system's transformation—from a world where everything is done on paper to a future where everything is done electronically, including conflicts, obligations, requests, evidence presentation, opposing evidence, and even case filing, witness testimony, obtaining judgment copies, and filing appeals! To prevent the law from being criticized for being antiquated and its processes from being seen as inflexible and unable to adapt to the technology era, legal experts have been forced to integrate this developing system into the legal framework and provide the groundwork for it.

2.7. Service Quality Offered to Litigants

There are many benefits to digital judiciary, such as lessening court traffic, improving the quality of services for litigants, reducing the amount of space needed for court file storage, increasing workflow efficiency, improving public access, and making it possible to link case information across courts. A variety of databases and apps created to support court operations are used by case management systems in distant litigation. To disseminate important case data both inside the court and outside parties, these programs are used to gather, arrange, process, and store data. These programs promote staff productivity and improve performance. They provide information that supports court administration through electronic stages, including case numbers, circuit identity, data duplication prevention, scheduling, and notifications; they also expedite and shorten procedures and improve public services. The court may also monitor the filing, type, and preparation of cases without additional personnel work and with great accuracy. It can also generate precise and comprehensive reports and statistics for notification, supervision, and control, track the causes of case adjudication delays without going through files and records, and print a variety of case-related documents, such as notices and fee assessment orders. Numerous electronic applications enable all of these operations.

2.8. Greater Anti-Corruption and Transparency

Reducing court system corruption is facilitated by the adoption of digital judiciary. Artificial intelligence and contemporary technology reduce the need for human interaction, especially in legal proceedings. Conventional judicial procedures may promote dishonest conduct, deceit, and carelessness, which may result in the destruction or loss of documents. Digital litigation, on the

other hand, increases openness and builds confidence between litigants and the legal system. Through the fulfillment of its promises, it may be claimed that the digital revolution in the legal sector has brought government. These assurances eliminate the role of middlemen and personnel who leak information, among other problems, and allow for ongoing monitoring of judicial activity, assessment of court performance, and access to case schedules and processes. (Alaa El-Din Rasha, Arab Experiences with the Digitalization of the Judiciary).

Subsection II: Challenges Facing the Judicial System in the Realm of Digital Transformation.

We may look at the concrete effects of digital transformation technologies in the judicial sphere, which have been adopted in many judicial systems, by accurately estimating their reach. These effects include the following:

1. Strengthening Judicial Autonomy to Maintain Neutrality

Public administration's practice of assigning cases to courts has frequently sparked questions about impartiality and the preferential treatment of circuits or judges. When applied carefully and impartially, artificial intelligence can successfully allay these worries.

2. Boosting Public Confidence in the Court System

The spread of communication channels, especially social media, has recently eroded public confidence in the court by exerting pressure on judges based on public opinion. Given the possibility of influencing the views of attorneys, defendants, and their families, this has raised concerns about whether judges should use social media. In response to disciplinary charges taken against certain judges for their social media behavior, American jurisprudence has developed standards for judges' usage of social media. (ANDRADE, Guilia DE ROSSI. The challenges of using artificial intelligence in the Brésilian legal system. *Revue International de droit des données et du numérique*, 2020).

3. Cutting Down on the Time Litigants Spend in Court

In addition to staff delays and administrative complications, litigants frequently invest a significant amount of time in finishing case files and procedural procedures prior to case adjudication. With its extensive capabilities, artificial intelligence drastically cuts down on this time.

2.9. Artificial Intelligence Technology's Detrimental Effects on the Legal System

Although there have been many noteworthy benefits from the digital judicial transition, as was already said, there have also been certain drawbacks that the courts and jurisprudence need to address going forward, specifically:

1. Judges granting legitimacy to technologies they don't fully comprehend

Judges occasionally approve innovations whose specifics they do not completely understand. This happened in Mexico, where it was later discovered that a for-profit private corporation was running a decision-support system that gave judges recommendations on whether claimants qualified for social security or pensions. Judges' supervision was hampered because of the system's criteria deviating from legal norms and remaining unclear to them.

2. A decline in the discretion of the judiciary

In certain U.S. jurisdictions, the use of risk assessment tools—which utilize data to forecast defendants' future danger—has grown in popularity. These automated results include information on things like parental separation, gender, postal code, city of residence, and education—are used to inform court judgments. Similar procedures are used in the UK for decisions about pretrial detention. Jurists worry that judges depend just on the results of these systems since they don't fully comprehend them. This undermines judicial independence and, in the opinion of some jurists, threatens their professional identity as it frequently results in pretrial detention or release decisions based on computerized data. (Monika Zahneriute). Courts and Technology (2021)

3. Undermining Transparency of the Judiciary

Judicial independence and impartiality are challenged by digital technologies, especially automation and machine learning programs, mainly in transparency. Judicial independence and integrity are irreconcilable with the opaqueness of these instruments' operations, which is sometimes excused by "trade secrecy" doctrines. Therefore, open-source software should be utilized if technology is to support judges. Judges who don't properly comprehend expert testimony shouldn't accept or tolerate it.

Subsection III: The Judicial System's Obstacles in the Age of Digital Transformation

Judicial protections like the concept of confrontation and the norm of open court sessions, where access to sessions is granted via a link given by the court president, have not been disregarded by electronic or distant litigation. By using email and SMS messages as accepted and defined notification mechanisms, remote litigation has also made court notification easier. (Alaa El-Din Rasha, Arab Experiences with the Digitalization of the Judiciary).

The difficulties that judicial systems encounter in the context of digital change differ from one another. The difficulties that the Egyptian court faces, for instance, are more severe than those that the Saudi judiciary faces, which are different from those that the French judiciary faces. Different nations' experiences with digital transformation have led to different problems and results for every system.

Without a question, the judicial system has difficulties as it moves toward digital transformation as a component of the larger state structure. These challenges include those related to the judge's work, such as concerns about limiting their discretionary authority, especially regarding hearing litigants and forming convictions during witness testimony, which may compromise equality and equal opportunity, as well as technical and programming difficulties. As a result, these difficulties fall into the following categories:

First: Challenges in the Law

1. Lawmaking Amendments

There is a discernible lag in the creation and modification of procedural laws in many nations, including Egypt, despite governments' attempts to use digital transformation in the legal sector. The procedural evolution that has taken place is restricted to kinds of cases and conflicts, especially those involving investments and the economy.

Furthermore, current laws are frequently out of date, and there is insufficient attention paid to the necessity for their serious improvement. Without sacrificing essential guarantees of a fair trial or going against established territorial jurisdiction principles, lawmakers should reform civil procedure legislation to include digital transformation mechanisms into its provisions, acknowledging it as the bedrock procedural law. Methods for Bringing Digital Transformation to the Judicial System, Naji Amr, 2024.

Judges occasionally cannot completely depend on electronic papers as replacements for traditional documents due to statutory inadequacies, especially in important business concerns like negotiable instruments and forgery problems. The concept of freely bringing defenses before the court may be compromised in personal status matters, as judges encounter challenges in

creating electronic evidence without presenting the court with the original paper papers.

2. Lack of a Law Framework Protecting Individual Rights

The use of digital technology in courts calls for regulations that safeguard the private information of litigants and people, such as the General Data Protection Regulation (GDPR) in the EU or comparable laws in other nations. A lack of a legislative framework may result in a number of issues. Significant legal breaches may arise from privacy violations brought on by inadequate cybersecurity and the absence of legal accountability for mistakes or infractions committed by digital service providers. Additionally, these procedures may lead to unfavorable prejudice against people, particularly if judgments are made by artificial intelligence that ignores unique situations.

Second: Administrative Difficulties

1. The inability to integrate all legal regulations into a single, cohesive administrative system

Judges and attorneys find it difficult to connect non-digital components with the digital framework due to the complexity of combining several laws into a single digital system. Conflicting laws are one of the issues that result from this, undermining the consistency of legal texts applied to the contested facts. Additionally, it could open up legal gaps that some people take advantage of in order to avoid accountability, infringe upon rights, and break the law.

2. Electronic Application's Insufficiency for This System

To make it easier to submit judicial enforcement requests and to access all enforcement process procedures, legislative texts, and court rulings, it is essential to create one or more electronic apps as needed. People should be able to see all the fines and penalties that have been imposed on them as well as how to appeal them. This would have a beneficial effect on the legal system and lessen its responsibilities and operational complications by drastically cutting down on time, effort, and expenses. Methods for (Bringing Digital Transformation to the Judicial System, Naji Amr, 2024).

3. Public Budget Deficit

Due to financial limitations, development is slowed down or delayed, resulting in phased implementations that are insufficient for projects involving automation, digitization, and digital transformation. This is especially true given the high costs of digitization and the lack of self-funding within the legal system.

4. The judicial staff's lack of technological proficiency

Due to civil service rules, court officials frequently get low pay, which limits their capacity to advance their careers and make use of new technology. Because they worry about being held accountable for mistakes made while performing their jobs, they are also afraid to use technology in the workplace.

Third, Structural Difficulties

1. Weak Infrastructure and Communication Networks

A sizable portion of the populace may not be able to exercise their right to sue due to their poor computer skills, as well as their inability to use email and the internet.

2. Cybersecurity

To ensure a fair trial, courts take case-specific data into account. As a result, all information pertaining to cases needs to be safely kept. This calls for tackling the inherent hazards associated with technology, such as the spread of electronic infections and the absence of reliable technical assistance. If strict measures are not taken, judges' and court staff's lack of knowledge about cybersecurity procedures and their dependence on outside programmers for technological support might leave private information vulnerable to illegal exposure.

3. IN CONCLUSION

The importance of digital transformation, with its many technologies, in improving the legal system has been examined in this study. We have proven its ability to provide all-encompassing answers to problems that many people believe are unsolvable, such as backlogs of cases, lengthy court proceedings, and administrative corruption in the legal system. The implementation of digital transformation has produced notable outcomes, such as the creation of the term "digital justice" and the introduction of innovative trial tools like electronic service of process through contemporary communication channels, remote testimony via video conferencing, and electronic archiving systems, which have decreased the use of paper and allayed worries about document tampering or damage.

Among other things explained in this research, certain judicial systems have even advanced to the point where they have entirely electronic courts (electronic judges), indicating a move beyond merely providing judges with technical support to one in which technology itself plays a judicial function. The idea of judicial digitalization is not without its difficulties, though; in fact, it encounters significant barriers, albeit to differing degrees depending on the court system. For instance, the legal systems in Saudi Arabia, Egypt, and France face different difficulties as they undergo digital change. As this research explains, overcoming these obstacles calls for a coordinated effort encompassing legislative, administrative, political, and software-related measures to support the process of digital transformation.

4. FINDINGS

1. The judicial system is greatly advanced by digital transformation and its variety of technology. It provides all-encompassing answers to problems that were thought to be unsolvable in the past, such as backlogs of cases, delays in the legal process, and administrative corruption in the court system.

2. The adoption of digital transformation has produced very important results, such as the creation of the term 'digital justice' and the introduction of new trial tools like electronic service of process through contemporary communication channels, remote testimony through video conferencing, and electronic archiving systems, which have decreased the use of paper and allayed worries about document tampering or damage.

3. Among other things explained throughout this research, certain judicial systems have advanced to create entirely electronic courts (electronic judges), indicating a move beyond merely providing judges with technical help, wherein technology itself takes on a judicial role.

4. Nevertheless, the idea of judicial digitalization is not without its difficulties; in fact, it encounters significant barriers, albeit to differing degrees in various legal systems. For instance, the legal systems in Saudi Arabia, Egypt, and France face different difficulties as they undergo digital change. As this research explains, overcoming these obstacles calls for a coordinated effort encompassing legislative, administrative, political, and software-related measures to support the process of digital transformation.

4.1. Suggestions

1. Several suggestions and recommendations are the result of this research, the most important of which are listed below: 1. Lawmakers in legal systems who want to make the make of digital transformation technology and capabilities should proactively create a thorough and unified legislative framework. To speed up case settlement and reduce legislative ambiguities and disputes, this framework should integrate the legal system as a single, indivisible entity and make it easy for judges, attorneys, and litigants to access it.
2. Lawmakers ought to pass laws that guarantee true equality and prohibit discriminatory actions, especially in fields where artificial intelligence systems are used for data analysis and decision-making.
3. Given the intrinsic and universal character of the right to privacy, lawmakers should create clear legal responsibility restrictions pertaining to cybersecurity threats to digital data that might compromise privacy.
4. To improve the digital literacy of court employees and attorneys, this study promotes the delivery of sophisticated and superior cybersecurity and digital data retrieval training programs.

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