Scientific Research Publishing

Beijing Law Review, 2024, 15, 2498-2517
https://www.scirp.org/journal/blr
ISSN Online: 2159-4635
ISSN Print: 2159-4627

Scientific Evidence and Its Challenges in the Brazilian Legal System

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How to cite this paper: Pizzol, P. M., & Zauli, G. A. (2024). Scientific Evidence and Its Challenges in the Brazilian Legal System. *Beijing Law Review, 15,* 2498-2517.
https://doi.org/10.4236/blr.2024.154137

Received: October 17, 2024
Accepted: December 27, 2024
Published: December 30, 2024

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Abstract

This article analyzes the growing relevance of scientific evidence in Brazilian civil procedure, with emphasis on the role of the judge as the ultimate recipient of the evidence and the pursuit of the factual truth. The work addresses the technical complexity surrounding this type of evidence, such as expert reports, highlighting the judge's responsibility to properly interpret the data presented, always in observance of the principle of human dignity. The interaction between judges and experts, the principle of free evaluation of evidence, and the new challenges posed by the use of artificial intelligence and digital evidence in the judicial sphere are also discussed. It concludes that, although scientific evidence stands out as a fundamental tool for building a fair and well-reasoned decision, its application demands rigor in evaluation and necessary precautions to avoid injustices and ensure the protection of the fundamental rights of the parties involved.

Keywords

Evidence, Code of Civil Procedure, Scientific Evidence, Expert Reports, Artificial Intelligence, Human Dignity

1. Introduction

The search for the truth has always been a difficult objective for the Judiciary to achieve in resolving the conflicts of its clients. The exposure of different versions of the same fact has often given the judge the difficult task of seeking the so-called "real truth" for the correct protection of the specific case.

Often, the evidence presented by the litigating parties brings with it interests and versions of the facts that are favorable only to the parties presenting them,

and is sometimes flawed or insufficient to convince the magistrate.

In this scenario, the possibility of evidence being produced by experts who are exempt from the procedural relationship stands out as an extremely important solution, capable of directly influencing the outcome of the case by providing impartial and technical guidance on the right in dispute.

With regard to this type of evidence, Brazilian civil procedural law has evolved significantly over the years, especially with regard to the use of scientific evidence.

In this sense:

> "What is certain is that, in the dynamics of the virtual environment, social relations are increasingly developed, making it common to improve the obligation bond by simply sending an electronic message. From email to WhatsApp or Telegram, it can be seen that electronic communication presents itself as the protagonist of the influence of new technologies in everyday life. In the same way, the so-called E-commerce is spreading on a large scale, trivializing the conclusion of deals whose proof often consists of the printing of a screen or virtual page displayed after the confirmation of the contract. It seems inevitable, in this context, to recognize the importance, as possible sources of evidence, of the documents purely electronic, regardless of signature, as in the case of printed copies of virtual pages and electronic messages." (Tepedino & Viégas, 2017: pp. 551-566)

The aim of this article is to address the relevance and challenges posed by scientific evidence in Brazilian civil proceedings, highlighting the role of the judge as the final recipient of evidence and the importance of his or her role in the search for the real truth, with a focus on the proper interpretation of expert opinions and other technical data.

In addition, this paper analyzes the interaction between magistrates and experts, highlighting the judicial responsibility to rigorously evaluate such evidence, in accordance with the principle of human dignity, as well as the new challenges arising from artificial intelligence and the use of digital evidence.

2. The Recipient of Evidence in Brazilian Civil Procedure: Instructional Powers and the Search for the Real Truth

In Brazilian civil procedure, the magistrate plays a fundamental role in conducting and evaluating the evidence, and is considered by a large part of the doctrine to be its final recipient.

This characteristic is revealed not only by its function of judging the dispute on the basis of the evidence produced, but also because it has instructional powers that allow it to order the taking of evidence ex officio, bringing up relevant discussions about the balance between impartiality and the active search for the real truth.

In order to better elucidate the ideas contained in this article, it is necessary to conceptualize evidence in Brazilian law.

Proof derives from *probatio*, which means to prove, to test, to verify. It comprises the means or instruments intended to demonstrate the veracity of the facts asserted in court (objective sense), as well as the conviction as to the veracity of the facts asserted (subjective sense).

According to João Batista Lopes, proof should be understood as: "Under the objective aspect, it is the set of means that produce legal certainty or the set of means used to demonstrate the existence of facts relevant to the process. Under the subjective aspect, it is the very conviction that is formed in the mind of the judge regarding the existence or non-existence of facts alleged in the case." (Lopes, 1999: pp. 21-22; Lopes, 2017: p. 236).

In the words of Moacyr Amaral Santos, proof is the sum of the means by which intelligence arrives at the discovery of truth (Santos, 1983: p. 1).

Barbosa Moreira considers evidence to be the decisive crossroads of the process (Barbosa Moreira, 1984: p. 178). According to the Philippine Ordinances, Liv. III, Tit. 63, it is the beacon that must guide the judge in discovering the truth (Santos, 1983: pp. 449-461).

Cândido Rangel Dinamarco defines proof as "the demonstration of the veracity of an allegation as to the facts relevant to the judgment." (Dinamarco, 2005: p. 324).

Finally, Luiz Rodrigues Wambier, Flávio Renato Correia de Almeida and Eduardo Talamini define proof as "the way in which the magistrate forms a conviction about the allegations of facts that support the parties' claim". (Wambier, Almeida, & Talamini, 2006: p. 392).

As for the immediate recipient of the evidence, it is important to stress that although the purpose of the evidence is to form the judge's conviction, it is not only intended for the judge but also for the process, considering that the court decision can be appealed, which can lead to the evidence being re-examined by other judges. Furthermore, it should not be forgotten that the parties are also the recipients of the evidence, either because they have the right to understand the court decision (for spontaneous compliance or challenge) and motivation presupposes analysis of the evidence relating to the facts, or because the evidence can be produced solely to convince the party. With regard to the latter aspect, it is enough to think of the early production of evidence for the purpose of obtaining clarification as to whether or not to file a future action of knowledge or execution or to use another means of resolving the conflict, such as self-composition or arbitration (art. 381 of the CPC).

On this subject, Nelson Nery Junior teaches that the recipient of the evidence is the process, and it is up to the party to provide the evidence so that it can be acquired by the process. Thus, "once the evidence has been provided, it is up to the party to convince the judge of the existence of the fact and the content of the evidence. Even if the judge is convinced of the existence of the fact, he cannot dispense with the evidence if the fact is disputed, there is no proof of said fact in the case file and the party insists on the evidence. If he dismisses the evidence in these

circumstances, there will be a curtailment of the defense" (Nery Junior & Nery, 2016: p. 1070, comments on art. 369).

As William Santos Ferreira states, "the destination of the evidence is the case file, but the recipients are anyone who can, within the legal limits, make use of the body of evidence" (Wambier et al., 2015: p. 992).

For Moacyr Amaral Santos:

> "[…] Judicial evidence has an object, a purpose, an addressee; it uses its own methods. 1) The *object of* judicial evidence is *the facts of the case,* i.e. the facts deduced by the parties as the basis of the action or objection. 2) Its *purpose* is to form a *conviction* as to the existence of the facts of the case. It thus aims, in the first place, to verify whether the facts asserted are *certain, in other* words, to create *certainty* as to their existence. […] 3) The judge is the *recipient of* the evidence." (Santos, 2004: pp. 337-338).

The Brazilian Code of Civil Procedure (2015), in its article 370, reaffirms and strengthens the role of the judge (process) as the recipient of evidence, giving the magistrate the possibility of taking the initiative in relation to the collection of all the elements necessary for the formation of his conviction and, consequently, the judgment of the case. The article states: "It shall be incumbent on the judge, ex officio or at the request of the party, to determine the evidence necessary for the judgment on the merits".

This determination is primarily aimed at ensuring that the judicial decision is handed down based on the real truth and not just the formal truth produced by the parties.

Regarding formal truth, also known as procedural truth, we can define it as that which strictly conforms to procedural limits and forms, resulting from the evidence and allegations presented by the parties within the process.

It is, therefore, a question of veracity based on what is demonstrated and not the absolute reality of the facts.

On formal truth:

> "Unlike the notion of substantial truth, here there is no need for the extracted concept to be absolutely identified with the essence of the object. The concept of formal truth is much more identified with a "fiction" of truth. Once the rules of the burden of proof have been obeyed and the instructional phase of the action has been completed, the judge must consider the historical reconstruction promoted in the process to be complete, considering the result obtained to be the truth—even if he knows that this product is far from representing the truth about the case under examination." (Arenhart, 2005: p. 5)

This type of "truth", due to its nature of being linked to the procedure and not to the facts, was the object of severe criticism, as Carnelutti illustrates:

> "What I am forced to note here, on the other hand, is how this legal discipline of the process of searching for disputed facts, by altering its purely logical

> construction, no longer allows the search for the truth in the individual case to be considered as the aim, or rather, as the result, of the process itself. It may be, as I have already pointed out, that this happens precisely because of an attempt to make the search more economical and safer in the average case; but this attempt, even if it can be achieved with the means indicated, does not prevent the system of limits on judicial searches from reacting profoundly to the result of the search itself, when considered in the specific case. The concept of this reaction is commonly summed up in the significant antithesis of material truth to formal or legal truth; the result of the legally limited or disciplined search is no longer the material truth, or, as we would say with an effective truism, the true truth, but a conventional truth, which is baptized formal truth, while with it a search regulated by the forms is conducted, or legal truth, while it is sought through legal laws, not only through logical laws, and only by effect of these legal laws is it substituted for the material truth" (Carnelutti, 1947: p. 29)

In turn, the real truth aims to discover the facts as they occurred in reality, regardless of procedural limitations and the allegations of the parties. In civil proceedings, the search for the real truth often implies a greater role for the judge in conducting the investigation of the case, encouraging, for example, the production of evidence ex officio and encouraging a broad and in-depth investigation of the facts, which can lead to questions about the principles of impartiality and equality.

Regarding the real truth:

> "The real truth, or material truth, is the analysis of the facts in a more complete way, that is, beyond the allegations brought by the parties in the judicial process. For the real truth, the focus is on the investigation, that is, the search for the reality of the facts in a more effective way. The judge goes beyond the allegations, taking into account the evidence that is within his reach to analyze." (Granito, 2024)

Also about this concept:

> "The best doctrine advocates seeking, not only in criminal proceedings, but also in civil proceedings, compliance with the principle of real truth, which is that the judge must investigate and assess any and all evidence, as well as evaluate all the probative material, so that the facts and circumstances that are decisive to allow him to be convinced, emerge from them with the maximum correspondence in relation to what actually occurred." (Neto, 2018)

Once these concepts have been addressed, it is necessary to analyze whether, according to the Brazilian legal system, judicial protection should be provided based on evidence produced exclusively at the initiative of the parties (formal truth) or whether the judge can also take the initiative in relation to evidence, determining ex officio that it should be produced, in search of the real truth. With regard to the subject of this article, it is worth questioning whether, especially in

relation to scientific evidence, the judge should not use all available means to form his conviction and decide based on a more robust body of evidence, enabling a better quality, fairer and more appropriate judgment.

On the distinction between formal truth and real truth, Patricia Pizzol states:

> "With regard to the collection of evidence, the doctrine confronts the principles of the device and the free investigation of evidence, as well as the formal truth and the real truth. Traditionally, the first principle (dispositive) has always been linked to pre-trial proceedings in civil cases and the second (free investigation of evidence) to pre-trial proceedings in criminal cases. Thus, the more orthodox doctrinaires state: in civil proceedings, on the one hand, the judge must be satisfied with the evidence brought to the case by the parties, that is, the judge must judge according to the formal truth, that which is extracted from the elements contained in the case file; on the other hand, in criminal proceedings, the judge must, using the instructional powers that the legal system confers on him, seek the real truth, and cannot be satisfied with the allegations and evidence presented by the parties." (Pizzol, 2019)

3. The Importance of Scientific Evidence

What does scientific evidence consist of? Is it a means of proof other than expert, testimonial or documentary evidence?

As João Batista Lopes states, scientific evidence is not a special means of proof, but evidence (expert, testimonial, documentary, etc.) "endowed with scientificity, i.e. it goes beyond the knowledge of the average man" (Lopes, 2022: p. 1). The author also points out that expert evidence is not to be confused with scientific evidence and gives examples:

> "A mechanic, because of his knowledge and experience, can act as an expert to resolve a dispute about the functioning of a car engine; a coffee grower can express his opinion on the quality of the product or its deterioration; a renowned lawyer, appointed as a court expert in an action for the arbitration of fees, is able to estimate the appropriate amount to pay for professional work in the case. In these cases, there can be no question of technical rigor or scientific proof. No matter how much one recognizes the capacity and competence of the expert, there will always be room to discuss the validity of their report. On the other hand, if, for example, there is a discussion about heart disease, affirmed by a medical expert and confirmed by laboratory tests, this is unquestionably scientific evidence. Likewise, research carried out by a recognized university, published by a specialist medical journal and approved by a community of experts. Proof of pollution can also be done using the scientific method. In these cases, the judge cannot, sic et simpliciter, disregard the evidence produced, but must make use of other elements, also scientific, if he intends to contradict it" (Lopes, 2022: p. 2).

According to Italian jurist Paolo Tonini, scientific evidence should be interpreted as being that which "starts from a proven fact and uses a scientific law to prove a fact unknown to the judge. The law extracted by scientific means, that is, by methods and experiments that individualize the margin of error and that are submitted to the criticism of the community of *experts*, has this characteristic". (Tonini, 2000: p. 38).

As already discussed in this article, the Brazilian legal system allows the judge to take the measures he deems necessary to form a conviction that is as close as possible to the real truth. This prerogative is especially relevant in the context of scientific evidence, whose complexity and technicality often escape the understanding of the parties and their representatives, justifying a more technical and reasoned intervention by the judge. It should be noted that the CPC is express about the judge's power to order a new expert opinion (art. 480) and to replace expert evidence with simplified technical evidence (art. 464, §10) and to carry out a judicial inspection (art. 481).

With regard to the judge's instructional duties and powers, William Santos Ferreira explains that:

> "With regard to pre-trial proceedings, this phase should be seen as a collective search for clarification of the facts, and preclusion for one party should not simply mean the release of the member of the other party or of the State-judge itself, all wrongly guided by the comfortable and temporally inconvenient reading of the burden of proof, which encourages passive, non-collaborative attitudes." (Ferreira, 2014: p. 245.)

According to Taruffo, the Brazilian system, inserted in the context of civil law countries, understands evidence in a comprehensive way, as anything or anyone that provides usable information for the elucidation of the facts: "Evidence comes into its own as a means of proof when reference is made to all the things or people that provide usable information for the purposes of settling the facts." (Taruffo, 2014: pp. 75-87).

Producing evidence in civil proceedings can involve, among other measures, appointing experts, carrying out judicial inspections and requesting documents and technical reports, which are essential for clarifying controversial aspects of the dispute.

However, the mere production of scientific evidence does not in itself guarantee the best judicial protection, and it is essential to verify the expert's technical competence so that the magistrate's decision is not based on mistaken or insufficient technical opinions.

Regarding the assessment of scientific evidence, as stated on the website of the Portuguese Official Gazette, the following requirements must be met:

> "The evaluation of the scientific and technical parameters used normally involves verifying: 1) the relevance and scientific acceptance of the theories and techniques used to reach the conclusions; 2) the use of applicable quality

standards and norms; 3) the identification of the percentage of error or the measure of uncertainty in the results; 4) the use of significant and relevant facts and not mere samples."[1]

Delton Carvalho, for his part, discusses the instrumental function of the process and the importance of using scientific evidence responsibly:

"This process of decoding non-legal information in order to produce a legal sense of damage (or risk) must be rationalized based on evaluative criteria that act as cognitive sensors. These criteria end up facilitating this process of (cognitive) sensitization of the Law to scientific or technical information, triggering a process of weighing evidence based on the relationship between scientific credibility and legal validity.

These criteria for valuing scientific evidence in the formation of judicial conviction can be distinguished into substantial and procedural criteria. While the former emphasize the content and merit of the technical opinion that will be part of the judicial process of diagnosing environmental damage or risks, the procedural criteria highlight the need for and legal valuation of evidentiary instruments that have been guaranteed due process (legal, environmental and scientific) for the analysis and technical construction of environmental damage (or even for the declaration of intolerability and unlawfulness of the environmental risk)." (Carvalho, 2020)

However, it is worth noting that, although the expert report provides the court with relevant technical information to form its opinion on the case, the result of the report is not binding on the outcome of the case and the judge may, provided that the reasons for his decision are duly explained, rule contrary to the report.

In this sense:

"The 2015 CPC does not repeat the wording of the previous procedural code, but requires the judge to indicate the reasons that led him to consider or not consider the conclusions of the expert report (art. 479), taking into account the method used by the expert. With regard to the examination of the body of evidence, art. 371 states that "the judge shall assess the evidence contained in the case file, regardless of who provided it, and shall state in the decision the reasons for his decision". (Da Silva, 2018: pp. 11-30)

Otherwise:

"If the magistrate had to be bound by the conclusions of the expert report, the expert would end up becoming the true judge of the case, especially in disputes where what is essential for the decision depends on what is found in the expert examination." (Marques, 1967: p. 461)

As João Batista Lopes states, when dealing with the importance of scientific evidence and the advancement of science and technology:

[1]https://diariodarepublica.pt/dr/lexionario/termo/valoracao-prova-pericial-processo-civil.

> "Indeed, scientific advances in fields such as electronics, for example, have markedly reduced the value of testimonial evidence. Consider the proof of guilt in traffic accidents, which nowadays can be done by radars (e.g. prohibited overtaking, speeding, breaking red lights, etc.) or with the use of new technologies by the so-called vehicle forensics. The recording of telephone conversations or the "prints" obtained from computers are also precious elements to support the reasoning of the sentence. However, this does not mean that the value of scientific evidence is absolute. In any case, it will be up to the judge to assess the evidence presented to contradict it, and it will be up to him to justify the reasons that formed his conviction" (Lopes, 2022: p. 2).

Therefore, while scientific evidence is an important tool for enabling the provision of judicial protection that is as close as possible to the real truth, its correct production and interpretation are extremely important factors, otherwise the opposite result to that intended will be achieved, causing tremendous injustice and insecurity.

4. The Magistrate's Assessment of Scientific Evidence: Criteria, Challenges and Interaction with Experts

Once we have discussed the importance of evidence for the correct judgment of a given dispute, we will move on to analyze the ways and means of evaluating the evidence, with two main currents prevailing on the subject. For the first, the evaluation of evidence is based on the application of criteria previously established by law. For another, this evaluative activity must be carried out based on the intimate conviction of the judge.

The system of legal or tariffed evidence is based on the fact that the magistrate has no freedom to evaluate the evidence, regardless of his or her conviction in the specific case, since he or she is obliged to follow what is established in the legislation regarding the burden of proof. When this system is adopted, there is a hierarchy of evidence.

The rules in force in this system establish the cases in which the magistrate must or must not consider certain facts as proven and whether there is full or partial evidence. There is a real pricing of evidence, since each one has a pre-established value for a given fact or right, which the magistrate cannot escape when issuing his decision. The judge is seen only as an enforcer of the rule, bound by formalism and the stipulated values of the evidence. The legal rules of valuation should be understood as both those that determine the value of a certain means of proof and those that indicate that a given right can only be proven by a specific means (Aroca, 2011: p. 593).

With regard to the system of intimate conviction, which is completely opposed to the system of legal evidence, the judge is given complete freedom to decide without the need to justify his choices, even allowing him to judge contrary to the evidence presented in the case if he deems it appropriate.

In such a system, the outcome of the evidence would depend solely and exclusively on the personal perception of the judge, who could decide based on the impression formed during the process, even if this impression could not be rationalized even by himself (Mendes, 1961: p. 306). This system could even be considered irrationalist and intuitionist by dispensing with the need to substantiate a decision based on evidence, since evidence can be intuitive and consequently impossible to demonstrate or express externally.

In evolution to the two systems presented, there is the system of the judge's free or motivated conviction or rational persuasion, in which the judge must make a decision on the matter based on the conviction formed by analyzing the various means of proof. After collecting the evidence and following a rational evaluation, he reaches his conclusions in accordance with the impressions obtained during the collection of the evidence and considering the practical principles relevant to the case.

The principle of motivated free will, or simply motivated conviction, adopted by the Brazilian legal system, allows the judge to base his decisions on the evidence that he believes has the greatest capacity for an impartial and correct solution to the dispute, and motivation based on all the elements presented by the parties is not mandatory.

In the words of Nelson Nery Junior: "The judge is sovereign in analyzing the evidence produced in the case file. He must decide according to his conviction. The judge must give the reasons for his conviction. A decision without reasons is null and void (CF 93 IX). He cannot use generic formulas that say nothing. It is not enough for the judge, when ruling, to state that he or she grants or rejects the request for lack of legal support; he or she must state which provision of the law prohibits the party's or interested party's claim and why it is applicable in the specific case". (Nery Júnior, 2004: p. 519).

In this scenario, scientific evidence is often used to clarify issues that require a great deal of specific knowledge, such as an engineer's expertise to verify the existence of possible construction defects in a particular property.

In this example, when judging a claim, based on the principle of free will, the judge may base his decision on a technical report produced by an expert appointed by the court, failing, if necessary, to consider possible evidence submitted by the parties, because in his perception, the report produced by an expert outside the procedural relationship provides solid and impartial elements for the formation of his conviction.

However, although it is an important tool in forming the magistrate's opinion, scientific evidence, due to its technical nature, requires careful analysis by the judge, who must make use of all available resources to fully understand its content.

This means that although the judge has the prerogative to value the evidence, he must seek the assistance of experts to correctly interpret the scientific evidence presented, thus avoiding the production of a judicial decision influenced by an inadequate understanding of the scientific data.

The Brazilian legal system does not adopt the system of legal or priced evidence, but it can be said that, in some cases, it makes concessions to this system by requiring documentary evidence for certain facts or by providing that, if there is documentary evidence, other evidence will be rejected. It is important to stress that, when dealing with scientific evidence, we are not referring to the adoption of the system of legal evidence (see Lopes, 2022: p. 4).

Furthermore, our procedural system admits the use of all means of proof, whether provided for by law or not, as long as they are morally legitimate, that is, as long as the constitutional limit of the prohibition of evidence obtained by unlawful means is observed (art. 5, LVI, of the Federal Constitution). Thus, scientific evidence, which is a type of evidence provided for by law, is characterized as that produced using scientific methods capable of producing a scientifically verifiable result. As with other evidence produced in the process, scientific evidence must be assessed by the judge.

João Batista Lopes, on the relativity of scientific proof:

> "Although they are highly credible in forming the judge's conviction, scientific evidence, as has been said, does not have absolute value. In fact, the whole of the case may lead to a different result from that revealed by the scientific evidence. For example, the diagnosis presented by a neurosurgeon can be disputed on the basis of research published in journals recognized by the scientific community such as The Lancet and Nature Reviews. Even in the aforementioned example of DNA testing, the production of other evidence is admissible and will have to be assessed by the judge. For example, the defendant may have confessed, in letters to the plaintiff, to the paternity she claims. For example, fraud or malpractice in the performance of the test could also be proven. In any case, the judge must act with great prudence and discretion when discussing the validity of scientific evidence, and must consult experts to resolve complex issues raised in the case. As is clear, the judge, a layman in the matter under discussion, cannot be allowed to reject scientific evidence on the basis of personal impressions or mere indications, but must base his decision on sufficient technical elements to authorize a different conclusion from that derived from the evidence" (Lopes, 2022: p. 3).

Thus, it is important to clarify that, even when there is a possible expert report indicating a certain result, the judge is not bound by this position, and in this case it is up to him to justify his decision by demonstrating the arguments that convinced him to the contrary.

In these terms:

> "The judge is not bound by the expert's report due to the principle of free and reasoned judgment, and may base his decision on other evidence. In other words, the judge is not bound by the grounds and conclusion reached by the expert in the report, nor by the opinions of the parties' technical assistants, under the terms of article 479 of the Code of Civil Procedure." (Dantas, 2022)

The Superior Court of Justice's position on this possibility is as follows:

"Social security and civil procedure. Offense to art. 535 of CPC/1973 not established. Accident benefit. Causal link and work incapacity recognized. Expert report. Judge's free will. Claim for re-examination of evidence. Súmula 7/STJ.

1) With regard to the alleged infringement of the provisions of art. 535, item II, of the CPC/1973, the judgment under appeal does not suffer from an omission, since it decided the quaestio brought before it in a reasoned manner, and cannot be considered null and void merely because it is contrary to the interests of the party. 2) A case in which the Court of origin, based on the factual-probatory context, considered that the grant of the aid sought was due. In this way, reviewing the conclusion reached by the contested judgment is unfeasible in the Superior Court of Justice, given the obstacle of Precedent 7/STJ: "The claim to simply reexamine evidence does not give rise to a Special Appeal." 3) The STJ has a firm and consolidated jurisprudence that, on the basis of motivated free will, the judge may go against the expert report if there is other evidence in the case file to the contrary that supports his decision. 4) Special Appeal partially known and, in this part, not upheld."[2]

It is true that, as a rule, expert evidence has technical elements capable of substantiating and justifying the result obtained. If the magistrate is to decide against the result, it is necessary to substantiate the reasons that led him to decide in such a way, which most of the time is due to a lack of attention to the limitations of the subject matter of the dispute.

By way of example, let's imagine a situation in which the magistrate orders an accounting expert to carry out an examination of a bank loan agreement in order to verify any charges that are not in line with the terms agreed in the contract. However, instead of using the interest rates stipulated in the contract, the expert uses the average interest rates published by the Central Bank, generating a result that is at odds with the purpose of the claim.

In such a situation, due to the free will of the judge and contrary to what happens in the system of tariffed evidence, the expert report produced is not hierarchical over any other type of evidence, and the judge is allowed to decide in the opposite way to its result, as long as his arguments are duly substantiated.

It is also worth mentioning the situation that occurred in the labor lawsuit registered under case 0001598-18.2013.5.03.0036[3], in which the judge, when passing sentence, dismissed the defendant company's claim for payment of sums resulting from the additional unhealthy working conditions assessed by the court expert, as a result of a court inspection carried out at the workplace, which allowed the magistrate to find that the plaintiff did not enter the cold room while performing her

[2]REsp n. 1.658.344/PE, rapporteur Minister Herman Benjamin, Second Panel, judged on 28/3/2017, DJe of 18/4/2017.

[3]JUSBRASIL. Judicial inspection overturns expert report. JusBrasil (2016). Available at: https://www.jusbrasil.com.br/artigos/realizacao-de-inspecao-judicial-derruba-laudo-pericial/165334526. Accessed on: 08 Oct. 2024.

work, dismissing the claim.

If, therefore, it is true that the judge is not bound by the expert report and that expert evidence is subject to evaluation by the judge, as is the case with the other evidence that makes up the body of evidence, what criteria can the judge use to make this evaluation?

João Batista Lopes discusses the criteria on which the judge can base his assessment of scientific evidence. The author refers to the work of Colombian proceduralist Liliana Damaris Pabón Giraldo, who indicates some requirements recommended by the doctrine for the evaluation of scientific evidence: "1) that the technique is empirically verifiable; 2) that it has been submitted to criticism by the scientific community in a specialized publication; 3) that it indicates the potential margin of error; 4) that it meets strict standards of official laboratories" (GIRALDO, Liliana Damaris Pabón. El papel del juez en el proceso. In: RÚA, Mónica María Bustamante (Coord.). Derecho probatorio contemporáneo prueba científica y técnicas forenses. Medellín: Universidad Medellín, 2012. p. 284)". (Lopes, 2022: p. 4).

He also cites a monographic work on the subject, in which the author Victoir Soneghetti presents the criteria used by the US Supreme Court three decades ago, in the judgment of an action for damages brought by Daubert vs. Merrel Dow Pharmaceuticals: "the U.S. Supreme Court ruled that, for scientific evidence to be admissible in a lawsuit, one must ascertain the controllability and falsifiability of the scientific theory or technique on which the evidence is based; the percentage of notorious or potential error and respect for the standards relating to the technique employed; the fact that the theory or technique in question is the subject of scientific publication and is therefore under the control of the party and other professionals; and whether there is general consensus in the scientific community concerned. It should also be noted that the criteria listed by the Supreme Court are merely examples, intended to guide the judge in his role as gatekeeper." (Soneghetti, 2012: p. 48).

Antonio Carlos Araújo Cintra also says: "it is up to the magistrate to assess the scientific authority of the expert, as well as his moral suitability; to verify whether the method used is accepted by the scientific community; and, finally, to analyze the expert's arguments from the point of view of coherence and logic." (Cintra, 2003: p. 237).

Regarding the evaluation of scientific evidence, Carlo Brusco states that it is different from other evidence because the judge is not usually endowed with the necessary knowledge and cannot, as a rule, evaluate it without the mediation of the expert. The author also points out that scientific evidence can be used to value other evidence, such as documents consisting of digital photographs. In addition, he points out that evidence is valued according to the existing knowledge9 at the time of the decision, even if it can later be disproved by more advanced research (Brusco, 2008: pp. 2-3).

Therefore, the evaluation of scientific evidence in civil proceedings is not an

isolated task, but rather a process that often requires ethical and effective collaboration between different actors in the justice system, so that the judge can properly integrate technical knowledge into his decision-making process, and must always prioritize the elucidation of the grounds that led to the decision made. As already pointed out, all decisions must be motivated, under penalty of nullity (articles 93, IX, of the Federal Constitution and 489, §1, of the CPC), and motivation is essential for several reasons: to prevent discretionary (based on convenience and opportunity) and arbitrary action by the judge; to allow the parties to understand the decision, which makes it possible to accept it or challenge it through appeal (endoprocedural function of motivation); to allow society to understand judicial decisions and, in some way, monitor the actions of the Judiciary (extraprocedural function of motivation).

5. The Principle of Isonomy and Impartiality of the Judge in the Analysis of Evidence

As we have seen, in the Brazilian procedural system, the judge plays a fundamental role in producing and evaluating evidence. However, this prominent position requires strict compliance with the principles of isonomy and impartiality, in order to guarantee justice and fairness in the provision of judicial protection.

Constitutionally enshrined isonomy ensures that all parties involved in the process have equal access to justice and the production of evidence. Likewise, impartiality, as a structuring principle of due process, imposes on the magistrate the duty to judge without prejudice or favor.

The impartiality of the judge, however, has been questioned in situations in which the exercise of instructional powers by the magistrate is required to determine the production of evidence ex officio.

Although the Code of Civil Procedure grants the magistrate the prerogative to conduct the production of evidence that he deems necessary to form his conviction (art. 370), such action should be seen in a subsidiary manner, and the judge's instructional powers should be seen as complementary or integrative, given that the main evidentiary activity is that of the parties, as Cambi (2016: p. 640) argues.

Therefore, the exercise of instructional powers by the judge cannot replace the responsibility of the parties in conducting the evidence, under penalty of violating the principle of procedural equality, as taught by Bedaque (2001: p. 159):

> "As such, the magistrate must also carry out evidentiary activity, not in place of the parties, but together with them, as one of the parties interested in the outcome of the case. The judge's greater participation in the investigation of the case is one of the manifestations of the 'instrumentalist stance that surrounds procedural science'. This attitude undoubtedly favors the 'elimination of differences in opportunities based on the economic situation of the subjects'. Finally, it contributes to the 'effectiveness of the process', making it possible for the state instrument for resolving disputes to be a real means of access to a just legal order."

Along these lines, the judge's evidentiary role must always be interpreted in such a way as not to infringe on isonomy, being complementary to the initiative of the parties and directed towards the search for the real truth, and cannot be confused with assistance, especially in relation to the most vulnerable parties, since in such a case it could compromise the procedural balance, damaging the necessary principle of impartiality.

However, the mere fact that the judge orders the production of evidence ex officio, when necessary to clarify the facts, does not in itself constitute a violation of impartiality, given that the outcome of this evidence is uncertain and unpredictable, only corroborating the search for the real truth, ensuring that justice is effectively provided in an impartial and equal manner.

Thus, the judge's role in analyzing evidence, especially in the context of scientific evidence, requires not only technical care, but also a rigorous commitment to the constitutional principles that underpin civil procedure, ensuring that procedural truth is achieved without compromising the isonomy and impartiality essential to a fair trial.

6. Scientific Evidence, Human Dignity and the Future of Civil Procedure: Artificial Intelligence and Digital Evidence

Like any other act practiced in the Brazilian legal system, the production and use of scientific evidence must always respect the fundamental principle of the dignity of the human person, enshrined in article 1, III, of the Federal Constitution, imposing that civil proceedings be a means of promoting justice, without violating the fundamental rights of the parties involved.

This is especially critical in cases involving scientific evidence, such as medical examinations, genetic tests or any other evidence that could directly impact the physical or psychological integrity of the litigants.

Regarding the dignity of the human person, Rabenhorst (2001: p. 14) explains:

> "[…] the term 'dignity' comes from the Latin dignitas, which designates everything that deserves respect, consideration, merit or esteem. The dignity of the human person is, above all, a moral category; it means the particular quality or value that we attribute to human beings on the basis of their position on the scale of beings. […] Dignity is an attribute of what is irreplaceable and incompatible, of what, because it has absolute value, is priceless."

Thus, while scientific evidence is a powerful tool in the search for the real truth, its use must be balanced with the protection of human rights, preventing the judicial process from becoming a mechanism for exposure, oppression or injustice.

Respect for the dignity of the human person takes on a new dimension with the advance of digital technologies and artificial intelligence, which raise increasingly complex questions about privacy, data security and the transparency of legal proceedings.

Due to this evolution, Portugal, for example, has included in its legal system the

Portuguese Charter of Human Rights in the Digital Age, Law 27/2021, of May 17, 2021, which expressly states in Article 9, entitled "use of artificial intelligence and robots" that:

> "1—The use of artificial intelligence must be guided by respect for fundamental rights, guaranteeing a fair balance between the principles of explainability, safety, transparency and accountability, which takes into account the circumstances of each specific case and establishes processes designed to avoid any prejudice and forms of discrimination" (Portugal, 2021).

In this scenario, digital evidence, which includes everything from electronic messages to data obtained through monitoring technologies, also presents new challenges for civil justice.

Nowadays, it is not uncommon to come across fake news and images generated by artificial intelligence content, which already represents a huge challenge for today's society and it certainly won't be long before the Judiciary also has to deal with this issue, and must be able to discern between true evidence and any untrue material generated with the sole intention of altering the reality of the facts.

The spread of fake news has unfortunately become routine in our current society. According to the DataSenado Institute[4], 72% of Brazilians have come across fake news on social networks in the last six months, and of these, 81% believe that this fake news has the power to significantly affect the electoral result.

In this way, the future of Brazilian civil procedure will depend to a large extent on the ability of the judicial system to adapt to new technological realities, without losing sight of the fundamental principles of justice and dignity.

7. The Judicial Inspection Procedure in the Code of Civil Procedure: An Instrument of Corroboration for the Magistrate's Conviction

Faced with this increasingly challenging scenario, an important (but still little used) ally in the search for the real truth is the judicial inspection procedure, provided for in articles 481 to 484 of the Brazilian Code of Civil Procedure.

This procedure can be considered an important tool at the magistrate's disposal in the search for the truth, as it allows the judge to directly observe facts, people, places or things related to the dispute, providing him with a more in-depth understanding of the issues in dispute and, consequently, a more solid and reasoned conviction.

According to article 481 of the CPC, "the judge, ex officio or at the request of the party, may, at any stage of the proceedings, inspect persons or things in order to clarify facts of interest to the decision of the case".

This provision highlights the active nature of the judicial function, allowing the magistrate not only to judge on the basis of the evidence produced by the parties, but also, and above all, to personally seek proof of the disputed facts.

[4]https://www12.senado.leg.br/noticias/materias/2024/08/23/para-brasileiros-noticias-falsas-impactam-eleicoes-revela-datasenado, accessed on September 30, 2024.

Luiz Guilherme Marinoni and Sérgio Arenhart point out that "judicial inspection is a means of proof that allows the judge to obtain direct knowledge of the object of the dispute, avoiding the possible distortions that can be brought about by documentary or testimonial evidence" (Marinoni & Arenhart, 2022).

The judicial inspection procedure is particularly useful in situations where documentary or expert evidence proves insufficient to elucidate certain factual circumstances, such as in cases of disputes over the physical characteristics of real estate, traffic accidents, or even to verify the state of health of a person involved in the dispute.

When conducting the inspection, the judge not only observes, but also has the power to directly question the parties, experts and witnesses present, broadening his perception of the facts and the reality of the conflict, eliminating intermediaries and therefore reducing the risk of distortions that may arise in the transmission of information.

Luiz Wambier and Eduardo Talamini, when dealing with the importance of judicial inspection, observe that:

> "As a rule, the judge learns about the facts of the case indirectly, i.e. through oral (witnesses, parties, experts, etc.) or written (documents, technical reports, etc.) evidence. Thus, he receives the news 'filtered', intermediated. This is not always sufficient or adequate, because the probative result is influenced by the person who is transmitting the information to the judge (the witness, the expert, the author of the document, etc.). There are situations in which only the judge's direct contact with the thing, place or person can dispel the doubts raised by the narrative of the facts.
>
> Judicial inspection is the means of proof by which the judge himself directly examines people, things or places that may be useful in clarifying facts that are relevant or pertinent to the case." (Wambier & Talamini, 2022)

However, it is essential that the judicial inspection is always conducted with due caution, respecting the fundamental rights of the parties, such as the right to privacy and the dignity of the human person, as discussed above, given that carrying out an inspection that may infringe on these rights may not only compromise the validity of the evidence, but also generate procedural nullities or even constitute a violation of constitutional rights.

As judged below, in addition to being an important tool for forming the magistrate's opinion, judicial inspection can also act as a tool to facilitate access to justice and reduce costs for the parties, and may, depending on the specific case, replace expert reports:

> "Aggregation of Instrument-Compliance with judgment-Reintegration of possession-Intention to reform the decision that recognized compliance with the obligation to do on the part of the defendant, considering valid the indication of a dividing line and the absence of construction and fencing in the strip of land—Appointment of a technical expert—Judicial expert who

estimated fees at an excessively high amount—Agreement of the parties with the replacement of the expert evidence by a judicial inspection—Representative of the plaintiff who did not attend the event, although duly summoned—Decision upheld—Appeal dismissed." (TJ-SP-AI: 20751187920228260000 SP 2075118-79.2022.8.26.0000, Rapporteur: Maria Laura Tavares, Date of Judgment: 23/08/2022, 5th Chamber of Public Law, Date of Publication: 23/08/2022).

With regard to the waiver of expert evidence, it is important to note that the judge may use the maxims of experience in assessing the evidence, with the exception of the rules of technical experience, the expert examination (art. 375 of the CPC).

Thus, the judicial inspection procedure, when properly used, is a powerful tool for corroborating the magistrate's conviction, allowing him to form a more robust conviction anchored in direct evidence, given the magistrate's greater proximity to the reality of the facts, contributing decisively to obtaining a fairer and more equitable sentence.

8. Conclusion

As a result of the evolution of technologies, it is a fact that in recent years litigation in Brazilian civil proceedings has become increasingly complex, requiring more and more the aid of new tools and techniques for the production and evaluation of evidence.

In this context, scientific evidence has come to the fore, as it is generally seen as an instrument capable of providing objective and technically grounded information, giving the magistrate the means to exercise the judicial function, guiding his decisions towards the real truth.

However, as we have seen, the efficiency of this type of evidence depends on several factors, such as the qualification of the experts, impartiality in the collection of information, without removing the judge's ability to understand and critically evaluate the data presented, always in strict compliance with the basic principles of the process, especially respect for human dignity, so that the use of scientific evidence does not become a tool of injustice or oppression.

Thus, with the use of scientific evidence, Brazilian civil procedure is moving towards a more precise search for the real truth, which contributes to fairer and more well-founded decisions. However, this evolution needs to be accompanied by strict criteria to control and validate this evidence, ensuring that civil proceedings continue to be an effective means of justice, combining the balance and technicality of the evidence with the protection of the fundamental rights of the parties involved.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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