LEGALTECH: GOVERNMENT STRATEGIES IN AI TECHNOLOGICAL SOLUTIONS IN LATIN AMERICA

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Abstract
Currently, there are advancements in the field of LegalTech, but there is a lack of understanding regarding the impact of these new digital technologies on lawyers and the justice system. The purpose of this study was to determine the state of affairs in the political-technological environment. A quantitative legal research was conducted using secondary sources referencing the OECD's digitalization objectives to transition from e-government to digital government. The state scenario includes Brazil, Colombia, Argentina, Chile, Mexico, Costa Rica, Ecuador, Peru, Bolivia, and El Salvador through a Bayesian analysis of contingency tables using the software –JASP- Version 0.16.3. The results show that sixty (60%) percent of the analyzed countries exhibit significant correlation values between (P2-P5), displaying a Log median (OR=0.943), a (BF0+=1.379), and a (BF+0=0.725) with a credibility interval (CI) of (95%) ranging from [0.046, 2.984]. It is concluded that the Bayesian probability of governments having a national strategy for adopting AI solutions is (1.379) times more likely than the existence of technological solutions supporting judicial procedures based on artificial intelligence.
Keywords: LegalTech, government strategies, governmental technological solutions (AI).

Introduction

The importance generated by technological advances in all sectors of society has led to development; therefore, these technologies should not only be disseminated but also applied to obtain social and economic benefits. The emergence of new knowledge technologies in all fields, their dissemination, and their application for social or economic benefit are essential activities for the progress of society worldwide (Salmerón-Manzano, 2021). The development of new technologies has impacted various areas due to the efficient solutions they offer (Yarlequé Marcelo & Burgos Juarez, 2022). The term "legaltech" originates from the combination of two key words, "legal" and "tech," from the English language, with the latter being an abbreviation for "technology," to identify technological advances that have been facilitating the provision of legal services. The development of new technologies has impacted various areas due to the efficient solutions they offer. Law has not been immune to this digital revolution, leading to implementations of technological tools known as Legaltech (Yarlequé Marcelo & Burgos Juarez, 2022). In recent years, lawyers have embraced legal technology (legaltech), facilitating the digital transformation of the sector.

The relationship between artificial intelligence and legality raises significant questions, summarized into two main groups: "artificial intelligence in the practice of law" and "law in the practice of artificial intelligence" (Luna et al., 2022). Thus, there is an apparent duality or conflict in the interactions between law and artificial intelligence, stemming from the necessity for legislation to evolve in line with scientific, social, and global progress. Artificial Intelligence (AI) systems are transforming the economy and society, stimulating legal debate regarding the regulatory activity of these systems (Leitão & Belchior, 2022). Artificial intelligence is a mathematical technique that automates learning and pattern recognition from data (Mack et al., 2022). Although it may vary by country and region, the growth of LegalTech in Latin America is gaining momentum. In the region, some countries such as Brazil, Mexico, and Colombia have been leaders in legal technology adoption, and there is an increasing number of startups and emerging companies offering LegalTech solutions for various aspects of the legal sector, including case management, contract review, legal research, and dispute resolution. Legaltech becomes

an indispensable tool for e-government aimed at optimizing the legal system and all dependencies within a Public Administration (Silva Andrade et al., 2022).

However, the concept is much broader than merely technology for a specific economic sector. Legaltech encompasses all disruptive projects aimed at changing the traditional way of offering and receiving legal services. Legaltech is not just an abstract concept; it involves many technological and developmental aspects for the proper delivery of legal services through technology implementation (Rincón Cárdenas & Martínez Molano, 2022). In addition to basic technological solutions, it also includes disruptive methodologies focused on user experience, such as legal design. These methodologies have changed the way solutions to various legal problems are proposed, making them more user-friendly for inexperienced users without necessarily involving the development of new technologies. These methodologies have transformed the resolution of legal problems, making it more accessible for non-specialized users by simplifying processes without requiring new technologies. Technological innovation is relational in the sense that it depends not only on the attitudes or decisions of the user for its adoption but also on the qualities of the digital solutions (Durczak et al., 2021).

Finding relevant judicial decisions is a cornerstone of legal research. It is a time-consuming part of lawyers' work when preparing for litigation (Orosz et al., 2022). Legal Tech presents itself as an essential tool for anticipating legal decisions by analyzing trends in specific case databases. It is also useful for verifying signatures, creating accessible contracts for clients, and managing court filings with transparent information for judges. LegalTech relies on AI to offer advanced capabilities in data analysis, processing, and automation of legal processes. Beyond the possibilities that a rapidly approaching future holds, it is important to consider the space that artificial intelligence has increasingly occupied within the field of law (Cárdenas, 2021).

LegalTech platforms offer services such as automatic contract review, prediction of legal outcomes, efficient jurisprudence search, and assistance with legal document drafting thanks to AI. This makes AI a crucial part of the LegalTech industry as it helps streamline and improve accuracy in a variety of legal tasks. LegalTech projects can be defined as open and creative organizational processes aimed at creating digital platforms; authorized by a preliminary decision, they comprise market, professional, and organizational strategies (Dubois, 2021). AI-based LegalTech refers to tools designed to achieve specific objectives to improve legal services using artificial intelligence (Soukupová, 2021). AI and robotics are no longer science fiction, as they are now present in homes and workplaces worldwide (Pasvenskienė & Astromskis, 2020).

Methodology

The quantitative research method complements traditional legal research to investigate the complexities of law, legal actors, and legal activities. The following section provides a country-by-country description, expressing the likelihood of an event of interest occurring using probabilities, specifically the odds ratio (OR). The OR indicates whether the probability of the event or occurrence (P2 – P5) is significant. Here, P2 represents the government having a national strategy for adopting AI solutions, and P5 indicates the existence of technological solutions (products/services) that support judicial procedures based on artificial intelligence. Since this information is descriptive and without interpretive limits, when the confidence interval (CI) does not include 1, it is statistically significant due to its association.

A Bayesian evaluation of the significant correlation values of P2-P5 Log median (OR = value) is developed using the computational statistical software JASP. Based on the interpretation of the Bayes factor, we have (BF+0) when it favors positive correlation and (BF0+) when it is against positive correlation. Consequently, the credibility interval (CI) is at (95%) [value 1, value 2].

Results

This dataset, "Countries," is used to determine, from the state-level perspective in the political-technological environment, which governments have AI solutions in legal services with the following variables:

P2: The government has a national strategy for adopting AI solutions (Yes = 1, No = 0).

P5: There are technological solutions (products/services) that support judicial procedures based on Artificial Intelligence (AI) (Yes = 1, No = 0).

Country: Territories constituted as sovereign states, with the state scenario including 10 countries: Brazil, Colombia, Argentina, Chile, Mexico, Costa Rica, Ecuador, Peru, Bolivia, and El Salvador.

Table 1 Bayesian Contingency Table of Strategies Versus Technological Solutions

	P5 - There are technological solutions (products/services) that support judicial procedures based on Artificial Intelligence. (Yes = 1; No = 0		
P2 - The government has a national strategy for adopting AI solutions. (Yes = 1; No = 0)	0	1	**Total**
0	*1*	*3*	*4*
1	*2*	*4*	6
Total	3	7	10

Note. Contingency Table of questions P2 - P5 from the state-level perspective in the political-technological environment, indicating governments with artificial intelligence (AI) solutions in legal services.

From the state-level perspective in the political-technological environment of governments with artificial intelligence (AI) solutions in legal services, the analysis of question P5—"Are there technological solutions (products/services) that support judicial procedures based on Artificial Intelligence?"—cross-referenced with question P2—"Does the government have a national strategy for adopting AI solutions?"—revealed the following for the 10 countries surveyed:

- Of the total governments in the sample that have a national strategy for adopting AI solutions, six (6) out of ten (10) represent sixty percent (60%) of the total countries.
- Of the total governments in the sample that do NOT have a national strategy for adopting AI solutions, four (4) out of ten (10) represent forty percent (40%) of the total countries.
- Of the total governments in the sample where there are technological solutions (products/services) that support judicial procedures based on artificial intelligence, seven (7) out of ten (10) represent seventy percent (70%) of the total countries.
- Of the total governments in the sample where there are NO technological solutions (products/services) that support judicial procedures based on artificial intelligence, three (3) out of ten (10) represent thirty percent (30%) of the total countries.

From the state-level perspective in the political-technological environment of governments with artificial intelligence (AI) solutions in legal services, the following findings were observed when cross-referencing question P5—“Are there technological solutions (products/services) that support judicial procedures based on Artificial Intelligence?”—with question P2—“Does the government have a national strategy for adopting AI solutions?”:

- Of the total governments in the sample that do NOT have a national strategy for adopting AI solutions, and where there are NO technological solutions (products/services) that support judicial procedures based on AI, this accounts for twenty-five percent (25%) within the row.
- Of the total governments in the sample that do NOT have a national strategy for adopting AI solutions, but where there ARE technological solutions (products/services) that support judicial procedures based on AI, this accounts for seventy-five percent (75%) within the row.
- Of the total governments in the sample that HAVE a national strategy for adopting AI solutions, but where there are NO technological solutions (products/services) that support judicial procedures based on AI, this accounts for thirty-three point three three three percent (33.333%) within the row.
- Of the total governments in the sample that HAVE a national strategy for adopting AI solutions, and where there ARE technological solutions (products/services) that support judicial procedures based on AI, this accounts for sixty-six point six six seven percent (66.667%) within the row.

The Bayesian contingency table test was then conducted for each country, yielding the values for each country and their totals. The subscript in the Bayes factor notation indicates which hypothesis is supported by the data. H1: The government has a national strategy for adopting AI solutions and there

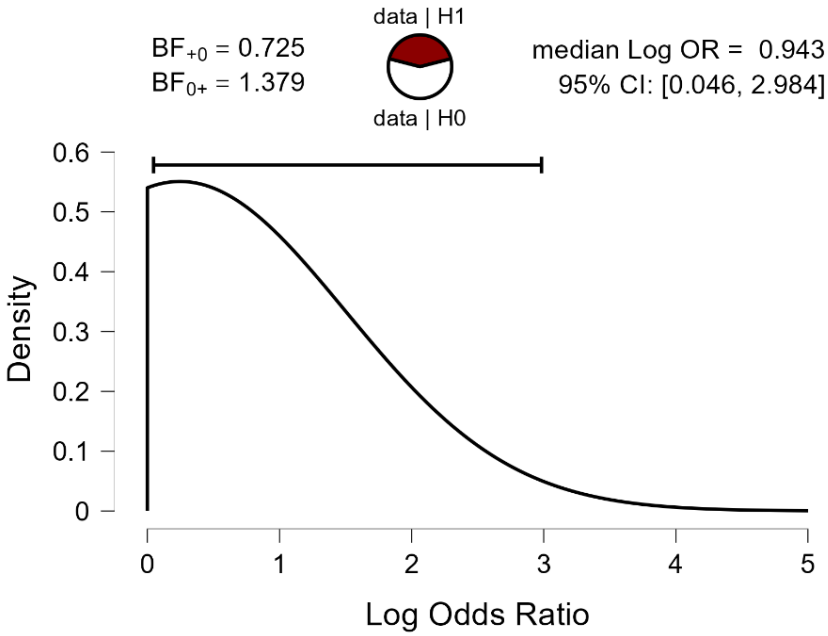
is a probability of the existence of technological solutions (products/services) that support judicial procedures based on AI.

The results of the Bayesian contingency tests by country are as follows:

- Total Log (BF_{+0}): Independent multinomial (-0.321) for the countries N = 10.

Figure 1

Bayesian Probability Analysis for State-Level Scenarios in Brazil, Colombia, Argentina, Chile, Mexico, Costa Rica, Ecuador, Peru, Bolivia, and El Salvador (P2 – P5)



Note. The graph represents the Bayesian probability analysis of the countries Brazil, Colombia, Argentina, Chile, Mexico, Costa Rica, Ecuador, Peru, Bolivia, and El Salvador between (P2-P5) with their Log median OR, BF0+, and BF+0 using the statistical software JASP (Version 0.16.3) [Computer software]. Below is the description for the countries used as the state-level scenario: Brazil, Colombia, Argentina, Chile, Mexico, Costa Rica, Ecuador, Peru, Bolivia, and El Salvador. In this scenario, the Log odds ratio (OR) expresses the likelihood of an event occurring of interest using probabilities (P2–P5). It is calculated as the ratio between the number of occurrences and the number of non-occurrences. Here, P2 represents whether the government has a national strategy for adopting AI solutions, and P5 represents whether there are technological solutions (products/services) supporting judicial procedures based on artificial intelligence. As interpretation is not limited, the information provided is descriptive. Consequently, when the confidence interval (CI) does not include 1, it is statistically significant due to its association. The results obtained using the computational statistical software JASP for Bayesian evaluation of significant correlation values between P2 and P5 show a Log median OR of 0.943, a Bayes Factor (BF0+) of 1.379 in favor of positive correlation, and a Bayes Factor (BF+0) of 0.725 against positive correlation, with a credibility interval (CI) of 95%, ranging between [0.046, 2.984].

Conclusion

Considering justice as a basic human right, governments must strive to have a national strategy for adopting AI solutions. This will enable them to establish a roadmap and promote the existence of various technological solutions that support different judicial procedures, such as virtual courts based on artificial intelligence (AI).

Following Martínez (2012) in "Artificial Intelligence and its Application to the Field of Law," countries like Brazil, Colombia, Argentina, Chile, Mexico, Costa Rica, Ecuador, Peru, Bolivia, El Salvador, and others, utilize technology in legal practice. Beyond merely utilizing legal informatics for documentation and management, there is potential to explore meta-documentary informatics, aiding judges in structuring their reasoning to resolve cases.

Martínez (2012) suggests that legal knowledge engineers can model programs to simulate cognitive processes. The majority of the governments in the sample have technological solutions supporting

judicial procedures based on artificial intelligence. Therefore, the Bayesian probability suggests that governments having a national strategy for adopting AI solutions are 1.379 times more likely to have technological solutions supporting judicial procedures based on artificial intelligence.

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