TECHNOLOGICAL SOLUTIONS -IA- IN CENTRAL AMERICAN GOVERNMENT STRATEGIES

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Abstract
Although there are great advances regarding technological trends in the development of products for legal work in the world of law. The purpose of the study was to determine from the state scenario in the political-technological environment, the governments of Costa Rica, Salvador and Mexico have a national strategy for the adoption of AI solutions. Based on the measurement of quantity by applying the statistical method of Bayesian analysis of contingency tables. A Bayesian test of association was performed using the statistical computational software -JASP- Version 0.16.3. The results show that from the state scenarios in the political-technological environment of the governments with significant values of the correlation of (P2-P5) for Costa Rica has a Log median (OR=1.989), a (BF0+=0.751) and a (BF+0=1.332) with a credibility interval (CI) of (95%) with values between [0.104, 5.931]; for the country of Salvador shows a median Log of (OR=2.013), a (BF0+=0.754) and a (BF+0=1.326) with a credible interval (CI) of (95%) for values between [0.105, 6. 007] and the country of Mexico shows a median Log of (OR=2.033), a (BF0+=0.745) and a (BF+0=1.342) with a credible interval (CI) of (95%) with values between [0.107, 6.040]. It is concluded that the Bayesian probability of the governments of Costa Rica, Salvador and Mexico having a national strategy for the adoption of AI solutions is 1.332, 1.326 and 1.342 times more likely to have technological solutions that support judicial procedures based on artificial intelligence.
***Keywords**: Technological solutions, adoption of AI solutions, judicial procedures based on artificial intelligence.*

Introduction

The business environment in Central America is facing a combination of challenges and opportunities. Economic forecasts suggest moderate growth in the region, characterized by a gradual recovery in the global scenario, and partly due to the use of technology. One of the problems related to innovation in the Central American region is that spending on Research and Development by companies is very low for most countries (Cuchillac, 2017). Science, technology and innovation have been key areas of attention by different actors to promote development policies in the world (De la Cruz Rios et al., 2021). In Central American governments and academia, the importance of science, technology and innovation (STI) as drivers of long-term sustainable growth for the region is increasingly recognized (Casalet & Buenrostro, 2014).

The use of information and communication technologies (ICT) has transformed interactions with all government actors (Pardo et al., 2012). Among the technological solutions that Central American governments have been using is LegalTech, which consists of using technologies and software to offer legal services in a more efficient and accessible manner. Its importance for the field of law is recognized due to the fact that, as will be explored in this study, it is considered that it should be regulated due to the foreseeable social impact of its application (Trejo Rodríguez, 2019). The world is in the fourth industrial revolution where extensive automation is taking place, the use of artificial intelligence has been growing exponentially and Central America cannot be left out of this revolution. Improving economic growth and competitiveness requires not only technological advances, but also a workforce capable of facing the coming challenges of what has been called the "Fourth Industrial Revolution" (4IR). (Egana-delSol et al., 2022).

Therefore, we cannot ignore the advances in artificial intelligence that have been generated in the digital era. These advances offer the state technological tools that can improve management and understanding. It is crucial that these innovations are fully integrated into the public sphere to improve overall governance. In recent years, significant technological advances in artificial intelligence (AI) have generated great expectations in policy formulation (Kitamura et al., 2022). Central American governments could implement strategies that leverage AI as a strategic factor in their government policy plans.

There is currently a gap in technological adaptation in both the business sector and public administrations, as well as among states that have achieved better integration into digital economies. It is essential to promote the creation of conditions and opportunities for an increasingly digital society. Digitalization is considered a strategic priority, at the core of a digital transformation is digital transformation, which implies transformations in government policies (Useche et al., 2022). The Central American region can drive the harmonization of information systems, taking into account that in recent years efforts for the adoption of international standards have intensified (Artigos, 2016).

In recent years there have been steps to obtain technological solutions, such as Costa Rica that automates processes and case management for efficiency and cost reduction, Ecuador is oriented to automate processes, case management achieving efficiency and productivity, Mexico, seeks with LegalTech more diligence to access justice with the help of online platforms, mobile applications, case management without leaving the automation of processes. Costa Rica in the LegalTech world, targeting law and technological innovation, as interpreted by Lopez (2022), who narrates, the government gave course to large technological facilities not only for lawyers but also for users. In order to achieve the implementation of technological solutions, it is necessary to implement macroeconomic policies to be able to develop as a nation. Within the policies, innovation, science and technology with environmental sustainability should be encouraged (Castillo, 2019).

Giving rise to the commitment to public deeds through the digital window of the National Registry, digital signature, presentation of indexes digitally and judicial writings using the website of the Judiciary. In addition, Costa Rica in its Bicentennial gives course to digital transformation strategies, this is created under the need to improve the way of planning, procurement and delivery of services to citizens and businesses online digital. In addition, there is the need to obtain and develop technological tools in the state apparatus and the development of training programs to validate new digital skills for the different sectors of society. Therefore, the implementation of technology in law firms in Costa Rica is a priority for the excellent practice of law and its application. Undoubtedly, López Echeverría, as a country in general and as a legal country, we are moving towards a rapid technological transformation, implying new challenges in terms of innovation and legislation, because, as technology is permanently transformed, so is the profession. The exchange of experiences in science, technology and innovation (STI) public policies is of major relevance (Bonilla Landaverry, 2018).

As for El Salvador and other States, artificial intelligence does not cease to be an important technological advance for humanity, not only a challenge for science but also for law, leaving in turn risks, which it represents, evidence in that order, violation of human rights, however, there are different answers that are invoked from the law to contract the problem. El Salvador, among the countries that deal with the subject, has common goals in spite of what has been said, such as security, protection, transparency, justice and other human values that are claimed by human values within artificial intelligence systems. E-government is seen as a tool for governments to update their procedures, optimize their communication with citizens and reduce the existing digital divide. The use of ICTs radically changes the way in which governments manage and execute their internal processes, and opens the possibility of improving and increasing the channels of communication with citizens (Armas Urquiza & Armas Suárez, 2011).

The State of Nuevo León in Mexico has a virtual court structure, seen as an electronic or virtual information processing system, which is used for the substantiation of jurisdictional matters handled by the Judicial Branch of the State. This, according to the Code of Civil Procedures, article 44 in Mexico. It is pointed out, as the tools operated in the digital justice back -or ce and the front -or ce, when interconnected with each other, are integrated achieving to improve the development of digital judicial services, in such a way, it allows a reengineering of the institutions that are part of the judicial sector.

There are several models of legal expert systems, which, according to Martínez (2021) following the British development, include the system based on production rules, a model of explicit underlying positivist scope, constructivist applied in Mexico by the UNAM, a model of legal reasoning based on cases, Slit up, supported by rules and neural networks assumed in Australia, and Expertius developed by the UNAM. Regarding public and private online justice or the combination of these, require a guide of good practices in the use of new technologies in the context of the administration of justice, without being an exception Mexico evaluates and weighs internal and external experiences of "digital justice", suggesting recommendations for the practice of judicial powers, every judge needs to avoid a lack of motivation in their sentences. Finally, it is understood how artificial intelligence (AI) covers a wide range of subfields, including both general purpose areas and online government modernization, being relevant for future Central American government reforms. Artificial intelligence (AI) synthesizes and automates intellectual tasks, making it potentially relevant to any area of human intellectual activity. In this context, it is considered a truly universal field (Russell and Norvig, 2004).

It highlights the need to educate users and encourage the participation of legal experts to ensure proper and ethical implementation of artificial intelligence in the field of justice. When implementing information systems using artificial intelligence, it is crucial to provide computer literacy programs for users (Luna et al., 2022).

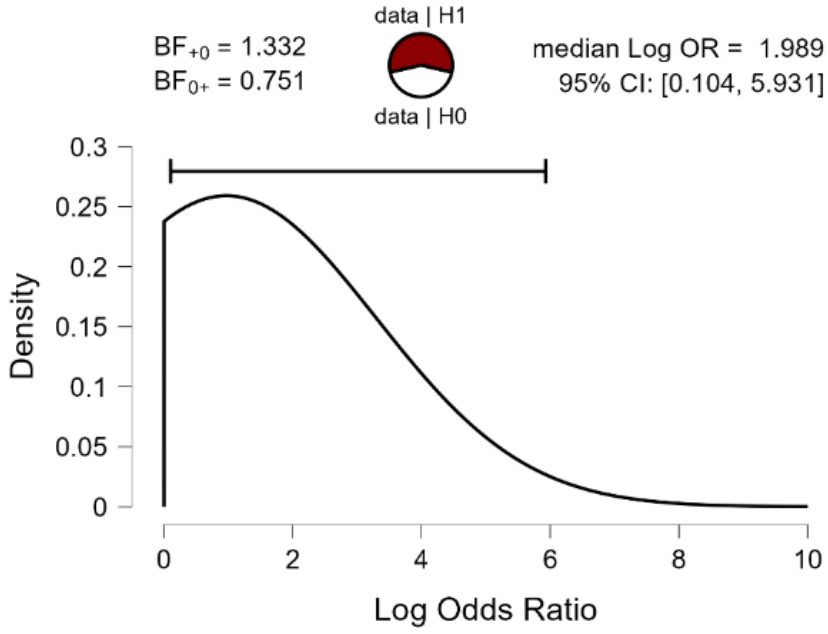
Methodology

The quantitative legal research method has advantages such as: 1) the quantitative data were collected using statistical techniques based on the principle of mathematics and probability. 2) Statistical tests of significance give credibility in terms of interpretations of the findings. 3) Quantitative data provide a basis for description and analysis. 4) Quantitative data volumes are analyzed relatively quickly, based on planning. 5) Charts effectively organize quantitative data. Guidelines oriented to the analysis with the open source statistical software JASP, article structure with the statistical software JASP Team (2022) is attached. JASP (Version 0.16.3) [Computer software]. Independent Samples T-Test was applied; Test of Normality (Shapiro-Wilk) Binomial Test, Vovk-Sellke Maximum p -Ratio: Based on the p -value, the maximum possible odds in favor of H_1 over H_0 equals $1/(-e\ p \log(p))$ for $p \leq .37$.

Results

The following is the value of the Bayesian contingency tests according to the countries: Costa Rica with Log (BF_{+0}) Independent multinomial of (0.286); El Salvador with Log (BF_{+0}) Independent multinomial of (0.282); Mexico with Log (BF_{+0}) Independent multinomial of (0.294).

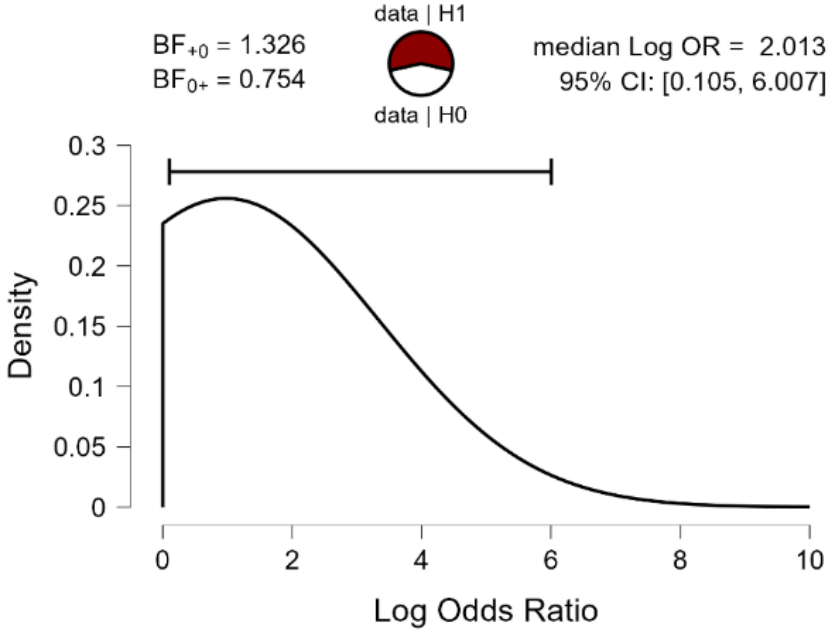
Figure 1 Bayesian Probability Analysis of the Country Costa Rica (P2 - P5)



Note: The graph represents the Bayesian probability analysis of Costa Rica between (P2-P5) with its Log median OR, BF0+ and BF+0 with the statistical software JASP (Version 0.16.3) [Computer software].

The following is the description for the country of Costa Rica, where Log odds ratio (OR) expresses the possibility of occurrence of an event of interest using probabilities (P2-P5). As a quotient between the number of events and the number of non-events. Where P2: The government has a national strategy for the adoption of AI solutions. And P5: There are technological solutions (products/services) that provide support to judicial procedures based on artificial intelligence. Since there are no limits to its interpretation, the information is descriptive; therefore, when the confidence interval (CI) does not include 1, it is statistically significant given its association. The results obtained using the JASP computational statistical program of the Bayesian evaluation of significant correlation values of the correlation of (P2-P5) show a Log median (OR=1.989), a (BF_{0}+=0.751) in favor of the positive correlation and a (BF_{+0}=1.332) against the positive correlation with a credible interval (CI) which is at (95%) where it yields values between [0.104, 5.931].

Figure 2 Bayesian Probability Analysis of the Country El Salvador (P2 - P5)

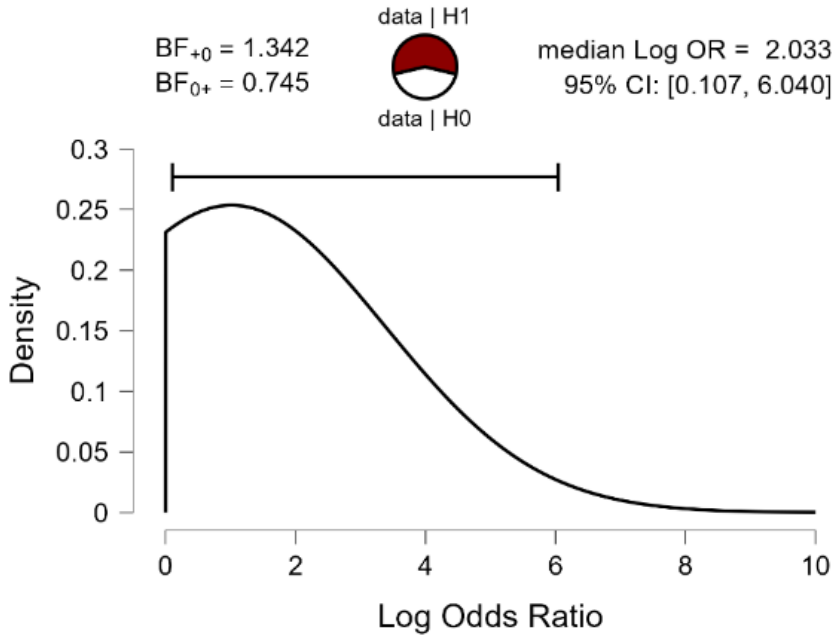


Note: The graph represents the Bayesian probability analysis of El Salvador between (P2-P5) with its Log median OR, BF0+ and BF+0 with the statistical software JASP (Version 0.16.3) [Computer software].

The following is the description for the country of El Salvador, where Log odds ratio (OR) expresses the possibility of occurrence of an event of interest using probabilities (P2-P5). As a quotient between the number of events and the number of non-events. Where P2: The government has a national strategy for the adoption of AI solutions. And P5: There are technological solutions (products/services) that provide support to judicial procedures based on artificial intelligence. Since there are no limits to its interpretation, the information is descriptive; therefore, when the confidence interval (CI) does not include 1, it is statistically significant given its association. The results obtained using the JASP computational statistical program of the Bayesian evaluation of significant correlation values of the correlation of (P2-P5) show a Log median (OR=2.013), a (BF_{0+}=0.754) in favor of the positive correlation and a (BF_{+0}=1.326) against the positive correlation with a credible interval (CI) which is at (95%) where it yields values between [0.105, 6.007].

Figure 3

Bayesian Probability Analysis of the Country Mexico (P2 - P5)



Note: The graph represents the Bayesian probability analysis of Mexico between (P2-P5) with its Log median OR, BF0+ and BF+0 with the statistical software JASP (Version 0.16.3) [Computer software].

The following is the description for the country of Mexico, where Log odds ratio (OR) expresses the possibility of occurrence of an event of interest using probabilities (P2-P5). As a quotient between the number of events and the number of non-events. Where P2: The government has a national strategy for the adoption of AI solutions. And P5: There are technological solutions that provide support to judicial procedures based on artificial intelligence. Since there are no limits to its interpretation, the information is descriptive; therefore, when the confidence interval (CI) does not include 1, it is statistically significant given its association. The results obtained using the JASP computational statistical program of the Bayesian evaluation of significant correlation values of the correlation of (P2-P5) show a Log median (OR=2.033), a (BF_{0+}=0.745) in favor of the positive correlation and a (BF_{+0}=1.342) against the positive correlation with a credible interval (CI) which is at (95%) where it yields values between [0.107, 6.040].

Conclusions

According to Henríquez (2022) who refers to the "Application of information and communication technologies (ICT) in law: threat or opportunity?

“It warns that this should not imply violations of due process, access to justice, or the protection of personal data in the judicial sphere. Despite the challenges that this digital transformation entails, in the administration of the public service of justice, the protection of legal certainty and constitutional and legal principles must prevail, articulating the measures that allow to obtain the maximum benefit, without distorting the foundations on which the law is based”.

The research concludes that "legaltech tools are a novel and beneficial implementation for legal operators and users. It is important for the lawyer to know the facilities they provide and to understand that, although these will require a high economic investment, they allow reducing the time and cost at the time of carrying out the different legal tasks".

Where a sequential analysis by comparing the Bayes factor (BF) evaluates the evidence in favor of an alternative hypothesis (H1), compared to the null hypothesis (H0) according to the BF values provided, this Bayesian test of association found a significant result concludes that the Bayesian probability of the governments of Costa Rica, Salvador and Mexico using the JASP computational statistical program of the Bayesian evaluation of significant correlation values (P2-P5) have a national strategy for the adoption of AI solutions which are (1.332), (1.326) and (1.342) times more likely that there are technological solutions that provide support to judicial procedures based on artificial intelligence with a relevant credibility interval (CI).

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