Impacts of Artificial Intelligence on legal careers: a systematic mapping of international scientific production

Impactos da Inteligência Artificial nas carreiras jurídicas: um mapeamento sistemático da produção científica internacional

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RESUMO
O artigo objetiva identificar na literatura científica internacional os principais temas estudados ao se tratar dos impactos do uso da Inteligência Artificial nas carreiras jurídicas e contribuir para a conformação de um panorama do atual estado da arte. A pesquisa foi realizada por meio de revisão de literatura denominada mapeamento sistemático, do tipo meta-análise qualitativa, com a aplicação da abordagem de Okoli & Schabram (2010). Os critérios básicos adotados na definição da pesquisa obedeceram à taxionomia de Vergara (2007). Os achados só confirmaram que a implementação da inteligência artificial traz impactos que podem variar tanto em função da reação das forças organizacionais quanto da velocidade do desenvolvimento da tecnologia.

Palavras-chave: Inteligência Artificial; carreiras jurídicas; administração pública; *soft skills;* mapeamento sistemático de literatura.

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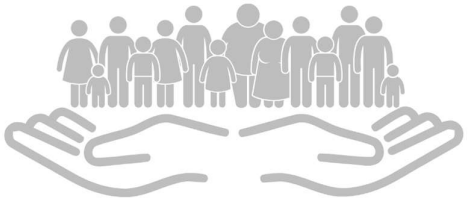


ABSTRACT
This work aimed to identify in the intemational scientific literature the main topics studied when dealing with the impacts of the use of Artificial Intelligence in legal careers and contribute to the conformation of an overview of the current state of the art. The research was carried out through a literature review called systematic mapping, of the qualitative meta-analysis type, with the application of the approach of Okoli & Schabram (2010). The basic criteria adopted in the definition of the research followed the taxonomy of Vergara (2007). The findings only confirmed that the implementation of artificial intelligence brings impacts that can vary both depending on the reaction of organizational forces and the speed of technology development.

Keywords: Artificial intelligence; Legal careers; public management; soft skills; systematic mapping of the literature.

1 INTRODUCTION

In recent years, particularly during the Coronavirus pandemic, information and communication technologies have advanced significantly. The interdependencies and complementarities between emerging technologies and work organization, already present in contemporary societies, have intensified and become increasingly apparent.

New technologies, characteristic of the Fourth Industrial Revolution (Schwab, 2016), influence how society, businesses, and governments relate and sustain themselves. Increasingly, computer systems that employ artificial intelligence are gaining greater relevance and becoming a current part of social and economic relations.

This trend has generated profound social transformations, establishing new forms of communication and introducing additional social actors into communicative processes. These developments have clear implications for ethics, culture, the economy, and the relationship

between the State and individuals.

Advancements in information technology, particularly Artificial Intelligence (AI), have recently influenced routine activities and automated manual and repetitive jobs. These technologies are now also affecting skilled and strategic professions.

As computers and information systems have become more sophisticated, jobs and careers across various sectors, including the legal profession, have been affected by these technological innovations.

Legal careers, which had already been using new technologies for some purposes, had to, in a short period of time, migrate to remote work (telework) and adapt to the new reality imposed by the pandemic (Lima, 2024). The use of technology forced the revision of dogmas that seemed insurmountable, brought agility and quality to legal practices, and also allowed the justice system to continue functioning during the public health emergency.

In this context, Artificial Intelligence, even in its early stages, has become integrated into the daily routines of legal professionals and has been adopted by both public and private organizations.

Artificial Intelligence is experiencing exponential growth, leading to the emergence of new realities. The transformation resulting from this technological revolution, which affects daily life and professional practices, is irreversible. Legal professionals are increasingly recognizing these changes and are seeking to broaden their expertise and enhance legal and judicial practices.

The arrival of Lawtechs and Legaltechs - which operate in areas of legal content and consulting, automation and document management, online dispute resolution, professional networks, management of law firms and legal departments, analytics and jurimetrics, creation and management of online legal documents - has increased interest in the benefits that Artificial Intelligence tools can bring to legal careers (Andrade, Rosa and Pinto, 2020).

Given the rapid evolution of this topic, ongoing debates in the legal field, the lack of

consensus on definitions, and the absence of prior mappings within this specific scope, this article employs systematic mapping to identify the principal themes addressed in the international scientific literature regarding the impacts of Artificial Intelligence on legal careers. The objective is to provide an overview of the current state of the art.

This article seeks to elucidate the current state of the art concerning the impacts of Artificial Intelligence on legal careers by mapping the profile of international scientific publications and identifying the primary themes explored.

Accordingly, the article is structured into five sections. Following this introduction, Section 2 presents the theoretical foundation for understanding the topic and is divided into four subsections. Section 3 details the methodology, specifically systematic literature mapping and the protocol developed by Okoli & Schabram (2010). Section 4 discusses the data analysis and its interpretation. The article concludes with final remarks.

2 THEORETICAL FRAMEWORK

2.1 The Fourth Industrial Revolution and Artificial Intelligence

The Fourth Industrial Revolution, also called Industry 4.0, follows three transformative historical processes. The first marked the shift from manual to mechanized production between 1760 and 1830. The second, around 1850, brought electricity and enabled mass manufacturing. And the third occurred in the mid-20th century, with the arrival of electronics, information technology, and telecommunications (Lima; Mendes, 2023). The fourth change occurs in the 21st century, which brings with it the trend towards the total automation of factories, characterized by the integration of technologies, the advent of new concepts, and the availability of new tools such as artificial intelligence, robotics, the Internet of Things, autonomous vehicles, 3D printing, nanotechnology, biotechnology, materials science, energy storage, and quantum computing, to name just a few (Schwab, 2016).

The term Fourth Industrial Revolution was coined in 2016 by Klaus Schwab (2016), president of the World Economic Forum in Davos, to describe the technological revolution that has fundamentally altered the ways we live and work, as well as established new ways of relating. In his teachings, three reasons are given for the Fourth Industrial Revolution. The first is speed, because unlike previous industrial revolutions, "this one evolves at an exponential and non-linear pace. This is the result of the multifaceted and deeply interconnected world in which we live." The second reason is described as breadth and depth, which are based on the digital revolution, and combine various technologies, leading to unprecedented paradigm shifts in the economy, business, society, and individuals." In this sense, the revolution being witnessed is so profound that it modifies "not only 'what' and 'how' we do things, but also 'who' we are." Finally, the third cause is the aforementioned systemic impact, which "involves the transformation of entire systems between and within countries, in companies, industries and throughout society" (Schwab, 2016).

The characteristics highlighted by Schwab (2016) demonstrate the scope and depth of the changes this revolution has brought about. The changes are so profound that, from the perspective of human history, there has never been a moment so potentially promising or dangerous. Within this perspective, all social systems will be, or already are being, impacted by new technologies. Eric Brynjolfsson and Andrew McAfee (2014) argue that we are facing a transformation similar to that inaugurated in the 'era of the first machine,' when technological developments at the end of the 18th century exponentially doubled the curve, and that a 'second machine age' is imminent due to immeasurable growth, digital information, and combinatorial innovation. In this context, Artificial Intelligence emerges as a disruptive technology, driving profound change in how society operates globally and impacting sectors including the legal profession.

2.2 Artificial Intelligence and its history

The history of Artificial Intelligence dates back more than 50 years and includes periods of stagnation (often referred to as 'AI Winters') as well as acceleration (Burgess, 2018).

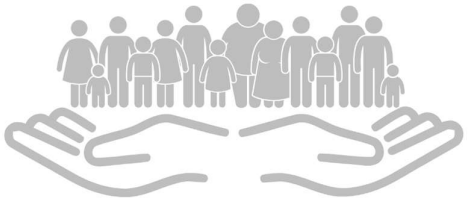
The historical milestone of the beginning of the use of the expression "Artificial Intelligence" was in 1956, during a conference held at Dartmouth College, in New Hampshire, United States, on which occasion the computer scientist John McCarthy first used a new field of knowledge that, since the 1940s, sought to produce mathematical models that simulated the functioning of brain neurons" (Tunes, 2019). These mathematical models, which later became fundamental to the development of artificial neural networks, are based on the architecture of human neurons and intended to reproduce learning by developing systems that learn from training examples (Furtado, 2019).

From then until now, the development of Artificial Intelligence has gone through advances, stagnation, and recovery (Tacca and Rocha, 2018). The first high point in the relationship between Artificial Intelligence and legal careers occurred during the 1980s and 1990s, a period when researchers worked on specialized legal systems to provide cheaper, faster, and less error-prone legal advice. The technology of the time involved what are called "symbolic" systems, that is, those that depend on the symbolic representation of legal rules and cases that can be manipulated by various types of reasoning algorithms. However, with the failure of symbolic systems, the initial enthusiasm of legal careers for Artificial Intelligence diminished (HUNTER, 2020).

Over the last decade, fueled by a larger and more complex dataset, with greater variety, speed, and volume (the three Vs), known as 'big data', Artificial Intelligence has become more practical, accurate, fast, and relatively inexpensive, and has been developing at an accelerated pace (Burgess, 2018).

The immense volume of data (structured and unstructured) has proven to be the perfect raw material for the development of one of the branches of Artificial Intelligence, namely, 'machine learning'.

Machine learning enables machines to learn from data without explicit human intervention. It uses algorithms that "learn on their own" to formulate a type of non-human reasoning construct.



These "advanced machine learning algorithms" are integrated by various technologies (such as deep learning, neural networks, and natural-language processing) used in supervised and unsupervised learning and operate guided by lessons from existing information (Araújo, Zullo, and Torres, 2020).

Today, there are basically three types of 'machine learning': supervised, unsupervised, and reinforcement. In supervised machine learning, the data is "labeled" to instruct the machine on which patterns it should look for. The system is previously fed with data that has been refined and chosen by humans. In its "unsupervised" form ('unsupervised learning'), the data lacks labels; the machine searches on its own, among the provided inputs, for patterns it can detect.

The most recent frontier of 'machine learning' and the one that arouses the most interest today is 'reinforcement learning'. This type of algorithm learns by trial and error to achieve a given goal. It tries many different solutions, and is rewarded or penalized, depending on whether its behavior helps or prevents it from achieving its goal (Araújo, Zullo, and Torres, 2020).

Given its multiple potential applications and its ability to enable automated decision-making based on large volumes of data, 'machine learning' has revived interest in Artificial Intelligence within the legal field.

2.3 Artificial Intelligence and its concept

Currently, Artificial Intelligence encompasses a wide range of subfields, from general (learning and perception) to specific tasks such as playing chess, proofreading mathematical theorems, creating poetry, driving a car on a busy road, and diagnosing diseases (Russell and Norvig, 2013).

Artificial Intelligence is relevant to any intellectual task and is truly a universal field (Russell and Norvig, 2013). For this reason, formulating a definition for Artificial Intelligence is not a trivial task.

The literature itself does not present a clear conceptualization of Artificial Intelligence. Russell and Norvig (2013) divide certain definitions, based on various authors in the field over the decades, into 4 main sections. The first understands Artificial Intelligence as an approximation to the act of thinking like a human. In the second, there is the concept of a machine thinking rationally in order to make decisions and act. The third evokes the perspective of acting like a human, even performing tasks that people currently perform better. Finally, the fourth aspect concerns acting rationally, namely designing intelligent agents that make decisions autonomously.

Artificial Intelligence would consist of developing systems that recognize their surrounding environment and take steps to achieve their goals. For a system to be considered Artificial Intelligence, it would have to, in addition to manipulating data, possess the ability to deduce or infer new knowledge and relationships about facts and concepts from existing knowledge (Russell and Norvig, 2013).

2.4 Artificial Intelligence and Legal Careers

With the promise of artificially replicating human decision-making processes and generating better, more efficient results than those of an individual, Artificial Intelligence has definitively integrated itself into the organizational landscape and, without much questioning, has been introduced into the daily lives of legal professionals.

The advances promoted by information technology, combined with the development of metadata analysis software, have made it possible to overcome challenges such as the slowness of procedural analysis and the reduction of the time to resolve demands.

In this way, they contributed to reducing congestion indicators and promoted a real increase in productivity, exponentially increasing efficiency, even allowing a review of the number of public agents needed to perform certain tasks (Araújo, Zullo, and Torres, 2020).

Accompanied by numerous challenges, a new era of policies and decision-making was

inaugurated. Issues relating to inequalities in access to information, the conception, limits, and use of Artificial Intelligence, and problems such as a lack of structure, inefficiency, and disconnection from reality emerged. The need for coexistence and adaptation of legal reasoning, complex by nature, with techniques specific to Artificial Intelligence tools emerges, alongside adjustments to normative constructions that involve terminological and factual interpretation, rather than just the optimal combination of algorithms (Araújo, Zullo, and Torres, 2020).

There is also the consistent challenge in the operationalization of new technologies by professionals in the field, who need continuous training, especially because Law, traditionally, is based on the interpretation of situations and the chaining of procedural acts constructed in a less technical and more phenomenological way (Andrade, Rosa, and Pinto, 2020).

In the case of public advocacy, it is still necessary to reflect on the challenges and possible obstacles this transformation will entail for the classic paradigms of Administrative Law. A first question that arises concerns the possibility of "delegating" a state decision-making activity to an automated decision-making process (Valle, 2020).

In this context, it will be necessary to identify which decision-making centers are eligible for delegation. Which state activities could be transferred to a non-human decision-making process? Could only bureaucratic activities be subject to delegation, or also the typical State activities performed by State careers? (Araújo, Zullo, and Torres, 2020).

There are also issues related to the legislative delegation of discretionary judgment and accountability. Regarding legislative delegation, it is necessary to examine whether the parliamentary decision to transfer to the administration the exercise of an integrative definition of what constitutes the public interest implicitly allows a "sub-delegation" to a non-human decision-making structure. Intrinsically related to this debate is the question of whether the eventual legislative delegation includes the transfer of that same delegation, originally undertaken in favor of a structure that integrates the administration, to a private agent who will design the AI-based

system. In terms of accountability, the issue is that, especially with AI mechanisms based on deep learning, there is no initial clarity about the path the tool itself took to achieve that result. We then have a case of technical discretion where the reasons that would legitimize the decision may be hidden. (Valle, 2020).

2.5 Impacts of the use of Artificial Intelligence on legal careers

The increased use of Artificial Intelligence in routine and repetitive decision-making processes has reduced uncertainty, increased efficiency, yielded better results than those obtained by humans, and fueled the idea of overcoming bounded rationality (Simon, 1997).

Publications on the future of legal careers, almost entirely, focus their analyses on the impacts of the use of artificial intelligence on work, practices, the structure of the profession, and the provision of legal services (Sussekind, 2017; Kowalski, 2012; McGinnis; Pearce, 2014; Brescia et al., 2015; Terry, 2008; Jones, 2018; Alarie, Niblett; Yoon, 2017).

In general, the authors convey the message that Artificial Intelligence and automation have already transformed many aspects of the profession and that significant changes are arriving rapidly. In the literature, there is consensus that automation will shift most of the legal work that lawyers normally do towards 'commoditization' in areas such as legal research, e-discovery, summary and memo generation, forecasting, and legal analysis (Sussekind, 2017; Kowalski, 2012; McGinnis; Pearce, 2014; Brescia et al., 2015; Terry, 2008; Jones, 2018; Alarie, Niblett; Yoon, 2017).

However, there is disagreement about the extent to which the very structure of the legal profession may change, that is, to what extent the use of technological tools will lead to the loss of legal jobs and whether this would signal the end of the profession as it is known today.

The latest developments in Artificial Intelligence and the labor market reveal the destruction of human jobs, driven by automation and robotization, as well as a reduction in purchasing power.

This process of change, a consequence of the emergence of Artificial Intelligence, presents some developments such as insufficient job opportunities, large-scale human migration, and polarization (Barnhizer, 2016).

Barnhizer (2016) predicted job losses at all levels, the growth of tens of millions of unemployed and unemployable people, and a radical increase in political and income inequality due to an emptied middle class. In line with the author's thinking, Hunter (2020) predicts that the migration of legal work to legaltechs will cause a decrease in the number of professionals.

McGinnis and Pearce (2014) signaled a trend of polarization in the labor market: growing demand for high-paying cognitive jobs on one side and low-paying manual jobs on the other, with a bimodal wage distribution favoring a smaller group.

In light of all these changes, researchers are investigating the extent to which Artificial Intelligence could, in theory, mimic and surpass human intelligence, or whether its increased use could replace the complex human workforce. Some, such as Susskind and Susskind (2015); Brescia et al. (2015); Pasquale (2019); Alarie, Niblett, and Yoon (2017), are optimistic about the changes that legal careers are experiencing as a result of the use of various Artificial Intelligence tools.

These scholars believe that technological innovation will continue to develop positively in the coming years without much difficulty. Furthermore, they state that machines – whether autonomous or used by non-specialized users – will become increasingly capable and take over many tasks currently within the domain of legal professions. The great novelty would be the absence of repetitive and less complex tasks. As a result, knowledge, expertise, and logical reasoning would be valued and could be employed more effectively in complex matters, where intellect is vital (Susskind, 2018). McGinnis and Pearce (2014), Terry (2008), and Jones (2018) are extremely optimistic about automation and project industrial trends in the legal profession. They believe that information technology will increase the transparency and quality of legal

services at a lower cost.

These developments characterize a democratization of law and an empowerment of ordinary individuals (Katz, 2013). The authors draw on the work of legal software vendors, who tend to view traditional legal practice as inefficient and law as executable software commands. Furthermore, they tend to see much of the law as little more than a transaction cost imposed on job-creating businesses (Christensen, 2013).

In this way, these theorists explore the conservative pro-market rhetoric against liberal professions and the leftist distrust of elites. From this perspective, they consider the elevation of the legal system above the fallibility of any person and the reduction of legal obligations to computer code as a positive evolutionary step towards the realization of the rule of law. A way to literally achieve the ideal of "a rule of law, not of men," with the total dispensation of the people who implement or interpret the law (Radin, 1989).

Others are more cautious, arguing that the extent of the change depends on how legal careers will react to Artificial Intelligence (Munisami, 2019), because, in addition to not being particularly innovative, they tend to be risk-averse and resistant to change due to their own training (Rodriguez, 2015).

There are still those who have a pessimistic or even skeptical view regarding the use of Artificial Intelligence in legal careers. Remus and Levy (2017) argue that much of the legal work could not be performed by automated systems and that it is unlikely that machines will develop such capabilities anytime soon. They raise concerns about transparency and state that, without regulation, there would be no increase in access to justice, as both the development and adoption of Artificial Intelligence would be driven by the market. They argue that unequal access to technology could introduce new types of injustice or even abuse. They argue that reducing legal work to predictive accuracy could threaten, or even prevent, the development of Law. Bennett Moses (2020) adds that without creative thinking, professional judgment, and critical analysis, the

predictive accuracy of Artificial Intelligence tools would not be sufficient.

Although it is impossible to predict how Artificial Intelligence will impact legal careers, due to the various variables to be taken into account, including the possibility of disruptive innovation, as argued by Christensen (2013). The friendly rivalry among Artificial Intelligence researchers sheds new light on political debates about the future of automation in law, making a systematic mapping of the literature necessary to identify the current state of the art.

3 METHODOLOGY

This investigation was conducted through a systematic literature review of the qualitative meta-analysis type (Siddaway, Woos, Hedges, 2019). According to Pereira (2004), meta-analysis aims to aggregate results from multiple studies to provide a more accurate representation of knowledge in a given research area. It emerges as a way to combine, quantitatively, the results of several studies, aiming to control the bias and subjectivity of qualitative analyses.

The form of review adopted in this study was Systematic Literature Mapping, which is used when it is not necessary to answer specific questions in depth, but rather to provide a broader overview of a given area (Moher, Stewart, & Shekelle, 2015).

For the systematic literature mapping proposed in this article, the systematic review approach developed by Okoli & Schabram (2010) was used, which is applicable across a wide variety of domains and to this form of systematic literature review.

The search began on November 26, 2022, and ended on February 13, 2023. The databases selected to identify the main impacts of Artificial Intelligence on legal careers were Google Scholar, Web of Science (WoS), and Social Science Research Network (SSRN).

The article was limited to 60 publications that met the specified characteristics and were

distributed between 2013 and 2023.

By performing an initial search for the strings "Artificial Intelligence" + "legal profession" + "law" in the abstract, title, or keywords, without subject or year limitations, a total of 62 results were obtained on SSRN, spanning 2013-2023. Two articles were excluded because they were not available for download: one American and one Russian, leaving 60 publications in the sample.

To ensure that the selected articles provided a minimum set of information for examination, a first analysis of the publications was conducted to select those that aligned most closely with the objective of this article.

This step was carried out by opening the document and performing a basic review of the title, abstract, and introduction to filter for relevant results.

Exclusions were made based on recurring criteria, such as publications that addressed Artificial Intelligence but did not discuss its impacts on legal careers, those without any reference to Artificial Intelligence, or those without any connection to the research objective.

The research was limited to 20 articles, which were classified by author, journal, year of publication, research method, country of publication, and perspective on the use of Artificial Intelligence in legal careers.

The selected publications address studies directly or indirectly related to the impacts of artificial intelligence on legal careers, and their approaches will be contextualized within the analyzed data.

4 RESULTS AND DISCUSSION

The article demonstrates that the topic of Artificial Intelligence and legal careers has become increasingly relevant as this technology spreads. In the selected publications covering the last 10

years (2013/2023), a significant increase in interest in the subject is observed between 2019 and 2021. There is a slight decrease in publications in 2020, likely reflecting the COVID-19 pandemic.

The greatest contributions to understanding the topic are found in Richard Susskind's book, 'Tomorrow's lawyers: an introduction to your future', published by Oxford University Press in 2017, as well as in the article by John O. McGinnis and Russell G. Pearce, 'The great disruption: how machine intelligence will transform the role of lawyers in the delivery of legal services', dated 2014 and available on SSRN.

It is also noted that 65% of the articles were written by a single author and that the methodology adopted was qualitative. The only exceptions were the articles 'Augmented Lawyering' and 'Can Robots Be Lawyers? Computers, Lawyers, and the Practice of Law, which adopted a mixed methodology, that is, both qualitative and quantitative.

A thorough reading of the articles made it possible to identify the joint occurrences, which allowed us to infer the main themes addressed when studying the relationship between Artificial Intelligence and legal careers: the future of the profession, machine learning, education, 'legaltech', digital responsibility, ethics, automation, and regulation.

It was also possible, through the 2 (two) year period, to observe the evolution of the topic over the last 10 (ten) years. The main themes studied during the 2013/2014 period included systems, privacy, human rights, and uncertainties. In 2015/2016, the debate began around regulation, copyright, privacy, and the legal responsibility of artificial agents. In the 2017/2018 biennium, the impacts of AI began to be explored in research, and issues related to diagnostic problems, privacy, and security in decision-making emerged: the right to explanation, injustice, discrimination, and intellectual property. In 2019/2020, the theme continues to revolve around regulation, but new topics emerge for debate, such as: opacity, biases, ethics, efficiency, governance, knowledge management, education, machine learning, neural networks, risks, opportunities, and applications. Finally, from 2021/2022, studies have focused on the impacts of

legaltech and lawtech, digitalization, performance, prediction, decision support, and deep learning.

The initial stage of the work's maturation and the perception that the studies are still incipient within the academic universe are corroborated by both the diagnostic effort and the absence of metrics for systematizing the theme. In the selected articles, an effort to diagnose the situation, theorize, and classify is evident; however, both the analyses and the metrics are quite dispersed and vary in scope. Among other reasons, this is due to the lack of a common basic definition/conceptualization of Artificial Intelligence within the field, as already observed by Russel and Norvig (2013).

It is also noted that, although the legal career is composed of several actors, practically all publications restricted their analysis to the impacts on the legal profession. The literature lacks studies that specifically address the impacts of artificial intelligence in the judiciary, the public prosecutor's office, public advocacy, and support for legal professionals. The few studies that address the impacts on these actors treat the issue peripherally when addressing the governmental impacts of the change. In this sense, Alarie, Niblett, and Yoon (2017) highlight that the government can employ limited resources more efficiently in litigation and believe that Artificial Intelligence will assist public lawyers in evaluating administrative claims, managing litigation risk, contesting claims, reaching settlements, and developing strategies.

Hunter (2020) assesses that the Government's hiring of lawyers will likely not be affected as significantly, although the range of governmental and administrative services carried out by deep learning systems is wide. Regarding judges, he predicts a decrease as the use of Artificial Intelligence in online dispute resolution systems increases. Bennett Moses (2020) highlights the need for human decision-makers in the judiciary and bureaucracy to provide reasons for decisions. Zuckerman (2020) sees a risk to the integrity of legal institutions in the use of machines for adjudication rather than human judges. Kigwiru (2019) argues for the need for courts to prepare to resolve disputes that may arise between regulatory bodies and legal service providers

(Legaltechs).

A significant fraction of the articles was dedicated to characterizing the state of the art of technological change and its relations with legal careers, with the aim of developing a framework capable of accurately predicting the likelihood that jobs or tasks will be fully or partially replaced by machines. Intuitively, it can be deduced as a reference model that: (a) routine human tasks are more susceptible to replacement by computers compared to non-routine tasks, and (b) routine tasks increase the marginal productivity of inputs in non-routine tasks. Thus, computers are substitutes for routine tasks and complements for more cognitive tasks (McKamey, 2017; Pascale; Cashwell, 2015; McGinnis; Pearce, 2014; Gravett, 2020; Alarie, Niblett, Yoon, 2017).

The polarization of jobs and wages has been a constant theme in discussions about the future of the legal profession. McGinnis and Pearce (2014) predicted a trend of labor market polarization, with growing demand for high-paying cognitive jobs on one hand and low-paying manual jobs on the other, leading to a bimodal wage distribution with a smaller group being better paid.

In this direction, Barnhizer (2016) predicted job losses at all levels and a radical increase in political and income inequality due to a hollowed-out middle class. However, some authors believe that this trend may change in the coming years. Armour, Parnham, and Sako (2020) highlighted that although automation reduces the demand for some existing functions, it increases demand for others and creates new opportunities. The emergence of new roles would likely increase the value of human capital and productivity.

The adequacy of regulatory frameworks has also been the subject of several studies. Hunter (2020) highlights the importance of regulators demarcating the appropriate boundaries of the legal profession. Sundquist (2021), Armour, Parnham, and Sako (2020) advocate for a new legal model. Knake Jefferson (2021) argues for the need to regulate new professional conduct (ethics) and to establish rules for protecting individuals amid innovation. Alarie, Niblett, and Yoon (2017) advocate for new standards of professional responsibility.

Kigwiru (2019) points out that technological innovations in the legal sector raise regulatory concerns, including the regulation of unlicensed legal service providers and the regulation of prices and competence. Other issues include the interaction between innovation in legal services and professional regulations, the implications of the current legal profession for market competition, and the role of competition authorities in enforcing competition in the legal market. The author argues for the creation of regulatory bodies for legaltechs and foresees the end of the legal profession's monopoly. Munisami (2019) highlights that the arrival of legaltechs would be a unique opportunity to review the traditional structures of the legal profession and break the 'glass ceiling' for women.

The effects of automation on education have also been investigated by several authors. Hunter (2020) predicted a new profile of graduates with strong technological skills and a reduction in law schools and in the demand for degrees, in the face of declining job-market opportunities. Sundquist (2021) highlighted the need to include technological skills in the curriculum and to adapt legal education, both to help students take their place in this new world and to support the management of artificial intelligence tools.

The need for digital literacy among established professionals was observed by Alarie, Niblett, and Yoon (2017), Bennett Moses (2017), Hunter (2020), and Sundquist (2021).

Armour, Parnham, and Sako (2020) predicted a risk of change in the very meaning of "legal knowledge", and Bennett Moses (2020), a risk to the development of Law.

Based on the results presented in this article, an overview of the potential impacts of the use of Artificial Intelligence on legal careers can be drawn:

In the organization of work and legal practices: 'commoditization' in areas of legal research, electronic discovery, generation of abstracts and memos, legal forecasting and analysis (Sussekind, 2017; Kowalski, 2012; McGinnis; Pearce, 2014; Brescia et al., 2015; Terry, 2008; Jones, 2018;

Alarie, Niblett; Yoon, 2017); absence of repetitive and less complex tasks (Susskind; Susskind, 2015; Susskind, 2010, 2013; Pasquale, 2019; Alarie, Niblett; Yoon, 2017); appreciation of knowledge, expertise and logical reasoning (Susskind, 2018); Intrusion of work into personal life (Munisami, 2019); remote work (Hunter, 2020; Sundquist, 2021); the need for digital literacy among established professionals; the flexible workforce model (Hunter, 2020; Alarie, Niblett, and Yoon, 2017; Bennett Moses, 2017); and the reduction of legal work (Bennett Moses, 2020).

In the provision of services: democratization of information (Kigwiru, 2019), increased vulnerabilities for users (Jacobowitz; Ortiz, 2018); new types of services with the arrival of legaltechs (Munisami, 2019); increased analysis and decision-making systems to evaluate administrative complaints, manage litigation risk, develop strategies, propose agreements and contest complaints (Alarie, Niblett; Yoon, 2017), increased efficiency, transparency and access to justice (Pasquale, 2019); cost reduction (Pasquale, 2019); outsourcing (Alarie, Niblett; Yoon, 2017; Hunter, 2020; Sundquist, 2021); increased productivity (Armour, Parnham and Sako; 2020); increased systems for 'online' dispute resolution (Hunter, 2020).

In education: a reduction in law schools and demand for degrees, given the decline in job market opportunities (Hunter, 2020); graduates with strong technological skills (Hunter, 2020); the need for digital literacy among established professionals (Hunter, 2020; Alarie, Niblett, and Yoon, 2017; Bennett Moses, 2017); a shift in the very meaning of "legal knowledge" (Armour, Parnham, and Sako, 2020); the need to adapt legal education and include technological skills in the curriculum to allow for a better understanding of algorithm formation and the identification of biases in predictive analyses (Sundquist, 2021); atrophy of legal skills due to lack of practice (Gravett, 2020), and a risk to the development of law (Bennett Moses, 2017).

In the structure of the profession: new roles for people with legal training (Armour, Parnham and Sako; 2020); automation and robotization, affecting professionals differently (Pascale, 2019; Munisami, 2019); technological unemployment (Lau, 2019); polarization of the labor market

(Mcginnis; Pearce, 2014); income inequality (Barnhizer, 2016); the end of the profession in its current form (Mcginnis; Pearce, 2014); new entrants to the labor market (Munisami, 2019); new standards of professional responsibility (Alarie, Niblett; Yoon, 2017); the need for regulation of new professional conduct (ethics) and rules for the protection of individuals amidst innovation (Knake Jefferson, 2021); The breakdown of the monopoly of the legal profession and the need to create regulatory bodies for legaltechs (Kigwiru, 2019), and the risk to the integrity of legal institutions, with loss of legitimacy and damage to the rule of law (Zuckerman, 2020).

5 CONCLUSIONS

With the purpose of analyzing the state of the art of the impacts of the Fourth Industrial Revolution, caused by the introduction of Artificial Intelligence in the daily lives of legal professionals, this study carried out a form of literature review, called systematic mapping, which had the general objective of understanding the current state of the art of the impacts of the use of Artificial Intelligence by legal careers, and as a specific objective, to characterize the profile of international scientific productions that deal with the subject; to identify the main themes studied when addressing the impacts of the use of Artificial Intelligence by legal careers and to contribute to the formation of an overview of the current state of the art.

After a brief historical overview of the Fourth Industrial Revolution, which gave rise to the new disruptive technology, the history and concept of artificial intelligence, the process of integrating this technology into legal careers, and the impacts caused by its use were presented.

There was a noticeable increase in articles on the subject, especially between 2019 and 2021, with a slight decrease in publications in 2020, likely reflecting the COVID-19 pandemic.

The diversity of publication origins demonstrated that the topic has been the subject of debate internationally.

In addition, through systematic literature mapping, it was possible to highlight the initial stage of maturation of the works and their incipient nature within the academic universe. An effort at diagnosis, theorization, and classification was observed; however, both the analyses and the metrics were quite dispersed and of varying scope. In this sense, the need to develop studies using mixed-methods approaches, both qualitative and quantitative, involving specialists from various areas, is highlighted to better understand the phenomenon.

It was also noted that publications on the future of legal careers unanimously affirm that Artificial Intelligence and automation have already transformed the profession in many aspects and that significant changes are occurring (Sussekind, 2017; Kowalski, 2012; McGinnis; Pearce, 2014; Brescia et al., 2015; Terry, 2008; Jones, 2018; Alarie, Niblett; Yoon, 2017). There are optimistic views of varying shades, as well as pessimistic ones regarding the issue.

The divergence among researchers is specific and limited to the extent to which automation will lead to the loss of legal jobs and whether this would signal the end of the profession as it is currently known. Despite a clear prevalence of more optimistic approaches over pessimistic and/or skeptical ones, the selected studies only confirm that the implementation of Artificial Intelligence has impacts that may vary depending on the reactions of organizational forces and on how the technology is developed.

It was observed that actors in the legal field need to question the consequences of Artificial Intelligence use and rethink the legal system as a whole to ensure the correct political choices are made. Although it is not possible to fully control the course of events, options can be discussed and some undesirable consequences avoided (Zuckerman, 2020). As important as the future of the legal profession is its degree of regulation or deregulation (Pasquale; Cashwell, 2015), which should aim, in addition to increasing efficiency in the production, distribution and supply of goods and services, to promote innovation, maximize the efficient allocation of resources, protect users, create an environment conducive to investment, promote competitiveness and adopt best

international competition practices (Kigwiru, 2019).

One of the biggest challenges of Artificial Intelligence in legal careers is the need for more research and investment in the field, which will, in turn, lead to greater knowledge of the issues that remain unanswered or insufficiently considered.

It is hoped that this article will contribute to improving the organizational and management model of legal careers; serve as a starting point for future studies investigating whether the reference model, intuited after the systematic review, can be tested in quantitative research; serve to guide qualitative research in case studies to refine findings and expand the systematic review/mapping with articles in Portuguese, for example.

It is also intended to stimulate multilateral dialogue; foster debate on the creation of public policies for the regulation and training of qualified personnel; and direct changes in the regulation and governance of Artificial Intelligence in legal careers, in order to anticipate and avoid the mass destruction of jobs.

It is concluded that, given the multiple possibilities enabled by Artificial Intelligence in legal careers, the topic should be included in the main research agenda. There is a need for a better understanding of the phenomenon, methodological refinement, the development of objective metrics, and reforms in education and regulation to ensure that the development, adoption, and use of Artificial Intelligence in legal careers are governed by norms that align with the underlying values of the legal system (Remus; Levy, 2017).

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