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ARTIGOS

MATURITY 4.0 IN THE LAW SERVICE: A SYSTEMATIC REVIEW OF THE LITERATURE

MATURIDADE 4.0 NO SERVIÇO JURÍDICO: UMA REVISÃO SISTEMÁTICA DA LITERATURA

ABSTRACT

This paper aims to identify maturity models in Industry 4.0 for application in law firms' services through a systematic literature review. It used the Web of Science and Scopus databases from 2017 to 2022 and divided them into three stages: planning, preparation, and reporting, using an exploratory sequential mix to later explain the difference in their results. The search results showed a compendium of 11 relevant papers. This work contributes significant information for managers of law firms, encouraging a sequence of research on the subject in search of strengthening and expanding such initiatives. The study is unprecedented and original because, although there are several maturity models of 4.0, there is nothing specific for law firms. The findings will contribute to future studies, such as the development of a maturity model for law firms, as well as for the decision-making of Managers/Lawyers when implementing 4.0 in the corporate environment.

Keywords: industry 4.0; maturity 4.0; services; law; digital transformation; innovation.

RESUMO

Este artigo tem como objetivo identificar modelos de maturidade em Indústria 4.0 para aplicação em serviços de escritórios de advocacia por meio de uma revisão sistemática da literatura. Utilizaram-se as bases de dados Web of Science e Scopus, no período de 2017 a 2022, e dividiu-as em três etapas: planejamento, preparação e relatório, utilizando um mix sequencial exploratório para, posteriormente, explicar a diferença em seus resultados. Os resultados da pesquisa mostraram um compêndio de 11 artigos relevantes. Este trabalho contribui com informações significativas para os gestores de escritórios de advocacia, incentivando uma

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sequência de pesquisas sobre o tema em busca de fortalecer e ampliar tais iniciativas. O estudo é inédito e original, pois, embora existam diversos modelos de maturidade 4.0, não há nada específico para escritórios de advocacia. Os achados contribuirão para estudos futuros, como o desenvolvimento de um modelo de maturidade para escritórios de advocacia, bem como para a tomada de decisão de Gestores/ Advogados quando da implementação do 4.0 no ambiente corporativo.

Palavras-chave: indústria 4.0; maturidade 4.0; serviços; direito; transformação digital; inovação.

1 INTRODUCTION

New technologies, especially digitalization, have had a strong impact on all areas of the economy, including law firms. Moreover, evolution is a typical characteristic of humanity, as throughout its history there have been distinct changes that have influenced the behaviour, social and economic structures in society. However, these processes happen at a different pace associated with the degree of maturity of the economy and its investment opportunities and innovation culture (MARIANI; BORGHI, 2019).

The concept of Industry 4.0 (I4.0) effectively relates the work of man versus the work of machines. Just as the first industrial revolution improved the functioning of factories, the second introduced electricity and the third automated the uniform tasks of line workers, the fourth improved information management and decision-making (ALMEIDA, 2019).

The term Industry 4.0 commonly known nowadays, was publicly unveiled in 2011 at the Hannover Fair as the name for the joint initiative of representatives from business, politics, and science, promoting the idea of strengthening the competitiveness of German industry (STEVAN JÚNIOR, 2018). Since its emergence, governments, industry, leaders and policymakers have paid special attention to 4.0 due to the new concepts and use of technology into which it is integrated (HAJOARY, 2020). The systematic presented by Industry 4.0 has made companies realize that this new era has a favorable environment for changes (GAJSEK *et al.*, 2019), mainly changes that increase their competitiveness in the market through productivity improvement and economic gains.

The I4.0 fundamentals of the industry vary according to the author, and Schwab (2018, p. 35-36) includes twelve sets of technologies: artificial intelligence and robotics (AI) additive manufacturing, neuro technologies, biotechnologies, virtual and augmented reality, new materials, energy technologies, as well as ideas and capabilities whose existence we do not know yet. Stevan Junior (2018), meanwhile, lists as pillars of I4.0: the Internet of Things (IoT), cybersecurity (CPS), augmented reality, big data, *cloud computing,* system integration, simulation, additive manufacturing, and autonomous robots.

Although Industry 4.0 is expanding worldwide, in Brazil the evolution is still in its infancy, according to data from the National Confederation of Industry (CNI) published in 2018. Thus, there has been an increasing number of Brazilian industries that are in Industry 4.0 in recent years. It is observed that these are at an early stage (CONFEDERAÇÃO NACIONAL DA INDÚSTRIA, 2018).

Directing the analysis towards the service sector, more specifically Law Firms, the data reveals that the most widespread use of technology considers only basic tools for organizing and registering information (financial and procedural management software) and not advanced tools that assist the legal activity itself, according to a recent survey entitled technology. Professions and Legal Education, conducted by the Centre for Education and Research and Innovation – CEPI da FGV Direito SP (PESQUISA…, 2018).

In this paper, one must differentiate between the service and industrial sectors. While the service sector delivers, in the words of Wirtz, Hemzo and Lovelock (2020, p. 18), "benefits without ownership", industries make use of a "manufacturing process that involves the

assembly of machinery, equipment, methods, tools, inputs, raw materials, industrial facilities, and all resources necessary for the manufacture and a product" (ALMEIDA, 2019, p. 49).

According to the IBGE (2022), the services sector is characterized by activities that are quite heterogeneous in terms of company size, average remuneration, and intensity in the use of technology. In recent decades the performance of the activities that make up the sector has stood out for their dynamism and growing participation in Brazilian economic production.

Moreover, through the Annual Services Survey (PAS), IBGE collects data sources to understand the behavior of the formal market from the perspective of the supply of non-financial services in Brazil. In 2014, PAS estimated the existence of 1,332,260 companies whose main activity belonged to the field of non-financial services that totaled R$1.4 trillion in net operating revenue, employed 13 million people, and paid R$289.7 billion reais in salaries, withdrawals, and other remuneration. The services sector spent, in 2014, a proportion of 49.1% of value added in the form of personnel expenses, with charges representing 30.0% of total such costs.

Among the segments of activities that make up the scope of the survey, it was noted that professional, administrative, and complementary services, in addition to their representativeness in net operating revenue, accounted for the largest share of occupied personnel, wage bill, and gross value added among the service segments investigated by PAS. Its activities generated R$285.3 billion in value added (33.9%) and were responsible for 40.5% of the occupied people (5,279,378) and 36.1% of the wage bill paid in the sector (R$104.5 billion).

Wirtz, Hemzo and Lovelock 2020) add that industry once accounted for 40% of the economy in Brazil and now accounts for 20.5%, while the service sector went from 40% to 50% in the 1990s and currently exceeds 70%, categorically placing Brazil among the countries where the service economy predominates.

Furthermore, the services sector in Brazil and the fact that professional services, among which legal services are included, rank second in the number of companies and revenue generated, the study on maturity 4.0 is necessary and urgent. He also reports that powerful forces are changing the services market, among them advances in information technology. Thus, it is possible to list the pillars of I4.0 in Advocacy in Table 1.

Table 1 - Pillars of I4.0 in Advocacy

Pillars of I4.0 in Advocacy	Concept
Relentless connectivity	This refers to systems that together prevent lawyers from entirely disengaging from their clients and the workplace
Document automation	Generate relatively polished and customized versions of documents within minutes
Workflow and project management	Using workflows to start and end tasks more efficiently
Machine prediction	Ability for machines to make predictions
Eletronic legal marketplace	Online reputation systems, which allow clients to share their opinions about their lawyers' performance and service levels
Blockchain	Allows data and documents to be stored in a more secure way and only be shared between authorized users.
Natural language processing	Possibility for lawyers to communicate using human language and not code, in addition to being used to summarize, interpret and analyze documents written in natural human language.
Legal plataforms	Creation of platforms such as Amazon, eBay, aimed at lawyers, as an online community or document automation provider or online dispute resolution service.

Source: adapted from Susskind (2023).

Bringing the elements of I4.0 to the reality studied, Susskind (2023) explains that disruptive technologies will change the way services are provided, resulting in better, cheaper or more convenient services for customers. In this sense, the author compares current and future legal services, as shown in Table 2.

Table 2 - The shift in legal paradigm

Today's legal paradigm	Tomorrow's legal paradigm
Legal service advisory service	Legal service infromation ervice
One-to-one	One-to-many
Reactive service	Proactive service
Legal focus	Legal process
Print-based	IT-based legal systems
Legal problem solving	Legal risk manegement
A dedicated legal profession	Legal specialist and information engineers
Defensive	Pragmatic

Source: adapted from Susskind (2023).

Thus, the use of I4.0 technologies can increase competitiveness and efficiency in the legal services sector in various ways: from data analysis for the filing of more assertive lawsuits and evaluation of the time of the process/profitability; artificial intelligence to increase productivity in the execution of tasks through automation of activities and drafting of legal documents; cloud computing, for greater integration, accessibility, and data security; integration systems, so the manager is aware of all the information in real-time.

Over these ten years of I4.0 development, several 4.0 maturity models have been proposed to assess the level of maturity of companies. However, there are no specific I4.0 maturity models for the services sector, thus creating a gap in the literature and the need for in-depth studies on the subject.

As a result, this paper aims to propose an industry 4.0 maturity model for law firms through a systematic literature review. This study is unprecedented and original because, although there are several models of 4.0 maturity, there is nothing specific to the service sector or law firms. The findings will contribute to future studies, as well as to the decision-making process of managers/lawyers when implementing 4.0 in the corporate environment. Finally, the article is divided into theoretical foundation, methodology, results, and conclusion.

2 THEORETICAL FOUNDATION

2.1 INDUSTRY 4.0 IN SERVICES

In 2011 the "*Communication Promoters Group of the Industry-Science Research Alliance"* introduced the term "Industrie 4.0" representing the widespread integration of information and communication technology in industrial production. The "4.0" alludes to the potentially revolutionary impact of this trend and moves in the same direction as the three previous industrial revolutions (SCHUH *et al.,* 2020).

Almeida (2019) reports that it all started as an institutional program involving companies, universities, and government aimed at increasing the competitiveness of German industries, as well as modernizing local industries.

Schwab (2018, p. 35), founder of the World Economic Forum, adds that the Fourth Industrial Revolution is a way of describing "a

set of ongoing and imminent transformations of the systems that surround us" occasioned by the "increasing availability and integration of extraordinary technologies."

Wirtz , Hemzo and Lovelock (2020, p. 20) define services as:

> Economic activities performed by one party for another usually based on time these executions generate the desired results for recipients' objects or other assets in exchange for money time effort customers of services expect to derive value from access to labour skills in expertise goods facilities networks and systems. They also point out that the size of the service sector is increasing in almost every country in the world and that, for most highly developed nations, services account for 65 to 80% of GDP.

Wirtz, Hemzo and Lovelock (2020, p. 18) add that services are "benefits without possession" unlike the industrial sector which makes use of a "manufacturing process involving the assembly of machines, equipment, methods, tools, inputs, raw materials, industrial facilities and all the resources necessary for the manufacture and a product" (ALMEIDA, 2019, p. 49).

Stevan Junior (2018) point out that although the term industry 4.0 has been used and seen only for manufacturing, currently I4.0 also refers to several other segments such as smart transportation, smart buildings, oil and gas, health services, among others, aiming at better performance and efficiency. He adds that Services 4.0 is a new approach that can help companies meet growing customer demands by fundamentally transforming the way services are offered and delivered. The author organized a comparative table between services 2.0 and 3.0 and services 4.0, as shown in Table 3.

Table 3 - Evolutionary comparison between Industry 2.0, 3.0 and 4.0 services

Services 2.0 e 3.0.	**Services 4.0**
Reactive	Proactive
Specified, separate	Integrated, packaged
Estandardize	Customised
Based on experience	Data-driven
Explicit, physical interface	Implicit, virtual interfaces
Pre-finded paths	Dynamically adaptable (real-time) paths
Remote servisse centre	Ubiquitous services
Separate / independent infrastructure	Shared infrastructure

Source: adapt by Stevan Júnior (2018).

To Stevan Junior (2018), the term services 4.0 is used for technologies and concepts in organizations with support functions that make use of new technological concepts such as data and analytics, bionic computing, ubiquitous connectivity and internet of things, cloud computing, cognitive computing, smart devices, automation of robotic processes, virtualization and augmented reality. He adds that Services 4.0 is a new approach that can help companies meet customer needs by changing the way services are offered and delivered.

Susskind (2019) adds that technology can disarticulate and revolutionize conventional work habits and bring about radical change - doing new things rather than doing old things in new ways. Technology will enable us to perform tasks and deliver services that would not have been possible or even conceivable in the past. Transformation brings a disruptive tone, while automation sustains traditional ways of working and can result in better or cheaper, or more convenient services for customers (SUSSKIND, 2017).

Drucker (2019) points out that entrepreneurial management needs guidelines and practices in four main areas: a reception for innovation and willingness to change; systematic measurement; specific practices regarding organizational structure; and some "dont's" (things that should not be done in entrepreneurial management).

Almeida (2019) adds that in I4.0, the work of data intelligence generates more efficiency, increased agility, reduced costs, and the creation of new business models and services that span the entire development cycle of a product, allowing companies to achieve levels of accuracy and responsiveness to customers that were not possible before.

Rogers (2020) points out that digital technologies have changed the way we connect with customers and offer them value, even transforming the way we face competition. Thus, we increasingly compete not only with rival companies in our own industries but with businesses in other industries that steal our customers with their new digital offerings.

Finally, considering that law firms are included in the concept of services, and according to data from IBGE (2022), occupy second place in the services sector, all technology applicable to Services 4.0 is equally applicable to lawyers.

2.2 INDUSTRY 4.0 MATURITY MODELS

According to Poppelbub and Roglinger (2011), maturity is composed of a chain of descriptive, comparative, and prescriptive levels that connects and traces a path from the initial state to maturity. A maturity model describes the current state of the system, in which entities are evaluated using criteria (GAJSEK *et al.,* 2019). The organisation uses these criteria to identify the weakest competencies in both Information Technology (IT) and Human Factor (LI; LAU, 2019). Brodny e Tutak (2021) outline digital maturity as a state of social and economic awareness that enables companies to implement digital technologies to achieve their goals. The maturity of a company is the perceived state of progress of internal and external conditions under the concepts of horizontal, vertical, and end-to-end I4.0 engineering integration initially based on manufacturing systems (SCHUMACHER; EROL; SIHN, 2016). Bruin *et al.* (2005) describes three types of maturity models presented in Table 4.

Table 4 - Types of Maturity Models

Types	Features
Descriptive	The application of this model only allows for identifying the level of the organization. It does not present ways of improving maturity and has no relationship with performance. It is used to evaluate the present and the real situation of the organization.
Prescriptive	The focus of this model is directed toward business performance, indicates the way to the next levels of maturity, and provides advantages to the business by establishing a roadmap for improvement.
Comparative	It consists of a process of searching for best practices across industries or regions. Such a model would be able to compare similar practices across organizations in order to benchmark maturity within different industries. The comparative model will recognize that similar levels of maturity across industries may not translate into similar levels of business value. Although this type of model may be seen as different, they actually represent the evolutionary stages of a model's life cycle. To use a comparative model, it should be applied across a wide range of organizations in order to achieve sufficient data for the comparison to be valid.

Source: adapt Bruin *et al*. (2005).

Raber, Winter and Wortmann (2012), meanwhile, highlight the most important characteristics that a maturity model should present, which are described in Table 5.

Table 5 - Main characteristics of maturity models

Features	Description
Object of assessment	Allow the maturity assessment of a variety of different objects. Most frequently, the objects assessed are technologies/systems, processes, people/workforce, and management resources such as project management or knowledge.
Maturity	Dimensions are specific capability areas that describe different aspects of the maturity being assessed. Dimensions should preferably be exhaustive and distinct from each dimension of a maturity model.
Dimension	Specified by a series of characteristics (practices, measures, or activities) at each level.
Levels	The levels are archetypal states of maturity of the assessed object. Each level should have a set of distinct characteristics (practices, measures, or activities per dimension) that are empirically testable
Maturity Principle	Maturity models can be continuous or scaled. While continuous models allow the scoring of characteristics at different levels, scaled models require that all elements of a distinct level are achieved.

Source: adapt by authors (2022).

Becker, Knackstedt and Pöppelbuß (2009) emphasize the need for the organization to make its objectives explicit and further add that this development occurs through the dimensions of the organization. In other words, technological growth will occur from the beginner level to the highest, either with partial or total implementation to achieve the objective, dividing the approach into eight stages: 1) identification of the problem; 2) selection of maturity models; 3) design of the relevant dimensions and levels; 4) implementation of the maturity model; 5) evaluation of the results; 6) priority and execution of action plans; 7) validation of the action plans; and 8) existence of the maturity model.

Schumacher, Erol and Sihn, 2016) point out that maturity models are commonly used as an instrument to conceptualize and measure the maturity of an organization or process relative to some specific target state. In the Manufacturing domain, readiness and maturity models have been proposed, for example, in energy and utility management, eco-design manufacturing, or lean manufacturing. Regarding the Industry 4.0 domain, the models and tools to assess readiness or maturity published were: IMPULS - Industrie 4.0 Readiness (2015) VDMA, RWTH Aachen, IW; Empowered and Implementation Strategy for Industry 4. 0 (2016) proposed by Lanza et al.; Industry 4.0/ Digital Operations Self-Assessment (2016) PricewaterhouseCoopers; The Connected Enterprise Maturity Model (2014) Rockwell Automation and I 4.0 Reifegradmodell (2015) FH - Oberösterreich.

Poon and Swatman (1999), Martin and Matlay (2001), and Willcocks *et al.* (2000) highlight e-business maturity models for small and medium-sized companies that are sensitive to integration and that focus mainly on the technological integration of internal and external systems. In these models, e-commerce is usually only a stage of e-business implementation.

Chaston *et al.* (2001) and Burgess, Sellitto and Wenn (2005), on the other hand, overleaf the customer-aware e-business maturity models, and in this model, e-commerce is the only e-business operation of the company. These models predominantly aim at client-side communication and website development. The basic idea is to develop the company's website to allow customers to select products and services, transmit purchase orders, and make payments online. In contrast to integration-aware models, these models deal exclusively with e-commerce planning.

On the other hand, in interaction-sensitive e-business maturity MODELS (RAO; METTS; MONGE, 2003; DANIEL; WILSON, 2002; MAGAL; KOSLAGE; LEVENBURG, 2008), digital technology supports the interaction of multiple actors, and their main objective is to guide Small and Medium-sized Enterprises (SMEs) in the adoption of e-business applications that increase the efficiency and effectiveness of the company's interaction with all its stakeholders, not only its customers.

Kaariainen *et al.* (2020) highlight Digi Maturity, a free digitalisation self-assessment tool for organizations created for directors, managers, and experts to better understand the concept of digitalization and assess their current level of digital maturity. The Digi Maturity tool contains questions for companies structured in six dimensions: strategy, business model, customer interface, organization and processes, people and culture, and information technology. Therefore, it measures the status of digitalization from a broad perspective, not just technological aspects.

The National Academy of Science and Engineering - ACATECH, on the other hand, has developed an Industry 4.0 maturity index to help companies to determine their current stage of digital transformation from a technological, organizational, and cultural perspective. For the academy, it is necessary to know the strategic objectives of the organization for the coming years, which areas it intends to add value through the pillars of I4.0, establish which technology and systems have already been implemented, and by analyzing the gap found, it is possible to compare the current capabilities of the company with the strategic objectives that one wishes to achieve.

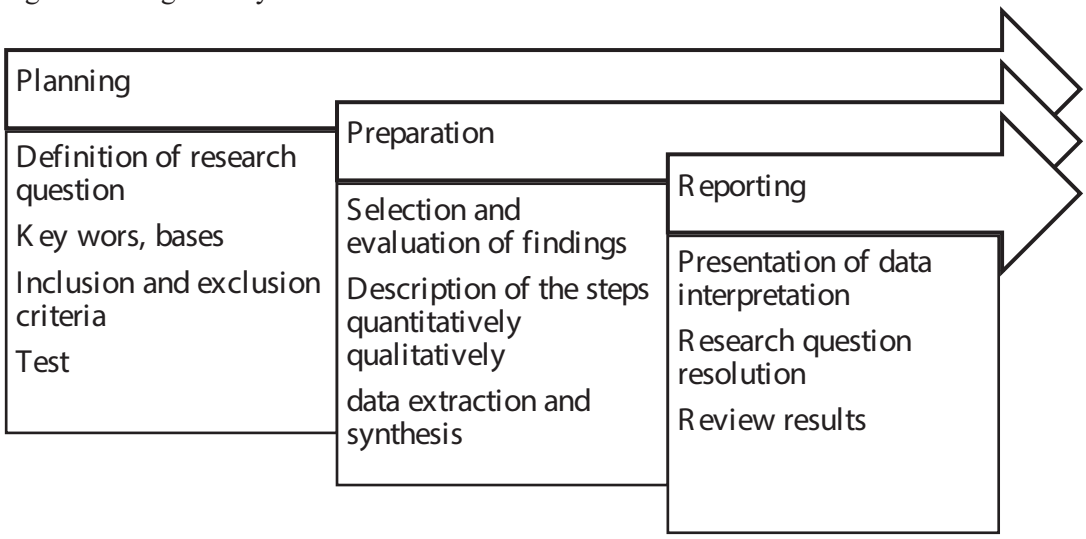
Some models that are aimed at small and medium-sized companies but do not have the specificities necessary to evaluate law firms.

3 METHODOLOGY

This research is exploratory in nature, based on a systematic literature review, which consists, in the words of Marconi and Lakatos (2021), of a summary, as complete as possible, in a logical sequence, regarding the work and the data relevant to the topic. To this end, the use of bibliometrics is made, which is a set of research methods used to map the structure of knowledge in a scientific field through a quantitative and statistical approach to various bibliographic data (VANTI, 2002).

Using the systematics of Kitchenham and Charters (2007), the research was divided into three stages: (1) planning, (2) preparation and reporting, married with the approach of Galvão et al. (2017), which enables a mixed sequential exploratory review, i.e., measuring the effects of actions, interventions or programs in a quantitative way and subsequently explaining the difference in their effects qualitatively, as evidenced in figure 1.

Figure 1 - Stages of Systematic Literature Review



Source: the authors (2022).

The question used as the column for this study was: **What are the features of the maturity model and Industry 4.0 for law firms?** The keywords were carefully matched to the research question. Preliminary tests were carried out to check whether the selected keywords were placed in the appropriate order, i.e., by extracting the main titles of works on the first page of the databases.

In the second phase, the action of all the work planned and prepared to generate the results was initiated. The combinations used both in the Scopus base and in the Web of Science were: industry 4.0 and services; maturity model and digital transformation; maturity model and services; digital transformation and services, according to Table 6.

Table 6 - Key-word scheme

TOPIC DESCRIPTION	CONECTIVE AND/OR	TOPIC DESCRIPTION
industry 4.0	*and*	*services*
DESCRIPTION ALL FIELDS	**OR/AND**	**DESCRIPTION ALL FIELDS**
maturity model	*and*	*transformation digital*
maturity model	*or*	*services*
transformation digital	*or*	*services*

Source: the authors (2022).

Regarding the time frame, we chose to select the articles published from 2017 to 2022 since they refer to the most recent studies on the topic. As inclusion and exclusion criteria, the following parameters were used, according to Table 7.

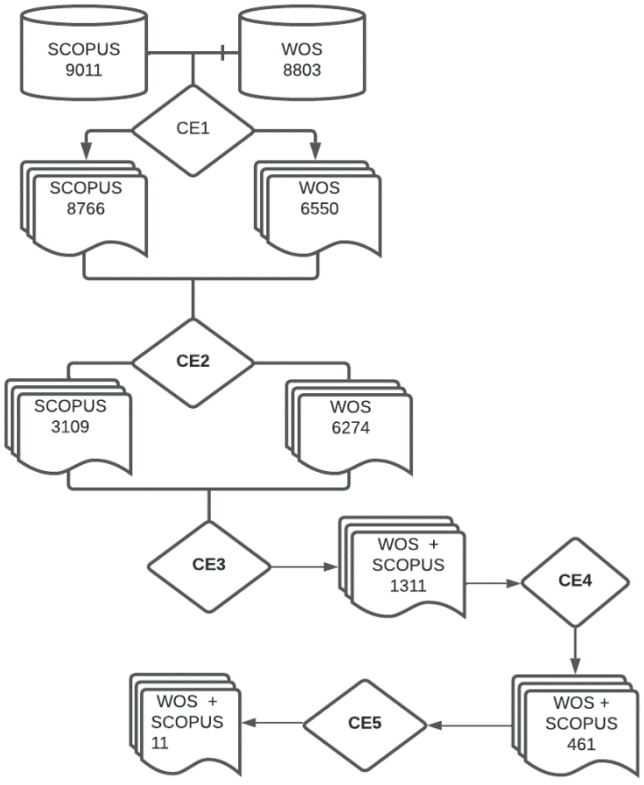
Table 7 - Inclusion and exclusion criteria

ID	Inclusion criteria	ID	Exclusion criteria
CI1	Papers that are related to Industry 4.0 and services; maturity model and digital transformation; maturity model and services; digital transformation and services	CE1	Articles that are not related to the subject of this study in the title or abstract.
CI2	Articles published between 2017 and 2022	CE2	Any work outside this time frame
CI3	Articles exclusively in English	CE3	Papers written in any language other than English and Duplicate papers
CI4	Articles related to management, business and law.	CE4	Titles and abstracts outside the scope of this research

Source: the authors (2022).

Using the Inclusion filters (CI1, CI2, CI3, CI4) and exclusion filters (CE1, CE2, CE3, CE4, and CE5), it was possible to go from 17,814 articles to 11 articles that form the basis of the Industry 4.0 maturity model for law offices. The search was conducted in May 2022, and after using the first filter (CI1), 8,803 articles were found on the Web of Science and 9011 in Scopus, totaling 17,814 articles. After applying CI2, 6,550 articles remained in the Web of Science and 8,766 in Scopus. After applying CI3, 1311 articles remained; after CI4, 461 articles. Finally, after applying the exclusion criteria, only 11 fell within the scope of the research, according to Figure 2.

Figure 2 - Database filtering process



Source: the authors (2022)

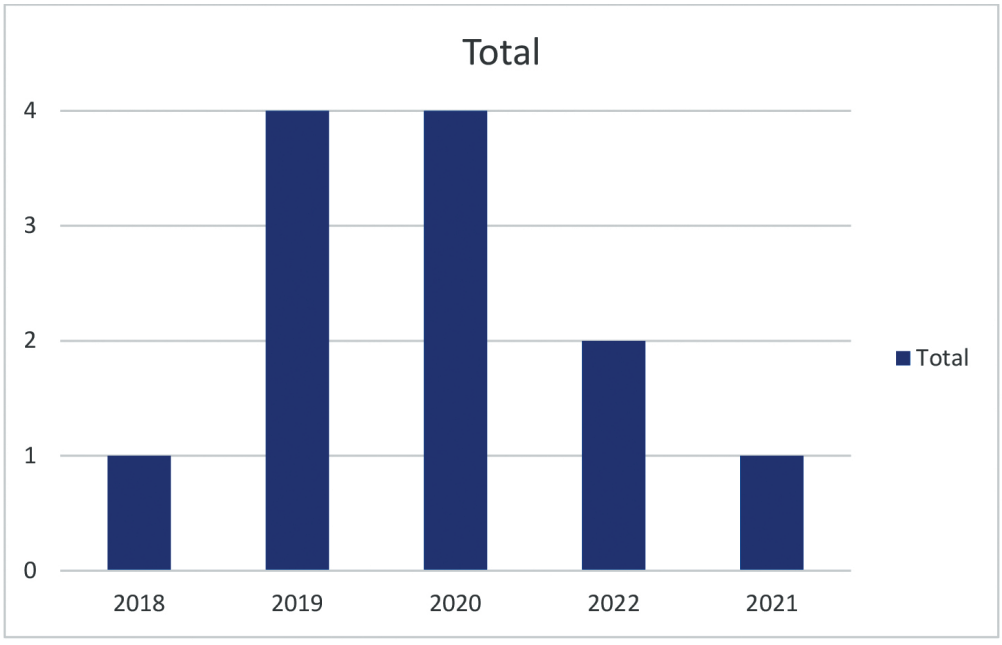
4 RESULTS

Based on the systematic literature review, descriptive and narrative analyses were performed on the 11 selected articles.

4.1 DESCRIPTIVE ANALYSIS OF SELECTED PAPERS

Of the 11 final articles selected from 2017 to 2022, the years 2020 and 2019 had the most publications, with four (4) articles in 2020 and 3 in 2019, followed by 2022, 2021, and 2018. It suggests that research on the topic has sparked increasing interest, particularly following the COVID-19 pandemic that brought the need for streamlining the implementation of digitization processes, as seen in graphic 1.

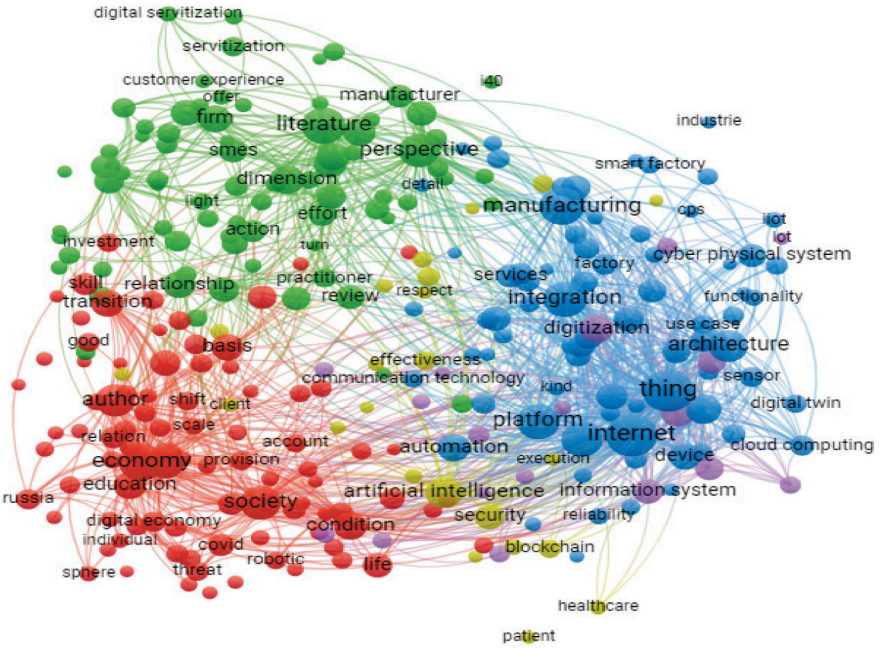
Graphic 1 - Count of publications per year



Source: the authors (2022).

When analyzing the keyword connection of the final 11 articles used as a basis for the search in VOSviewer, one can observe the focus on economics, integration, manufacturing, services, society, and digitalization.

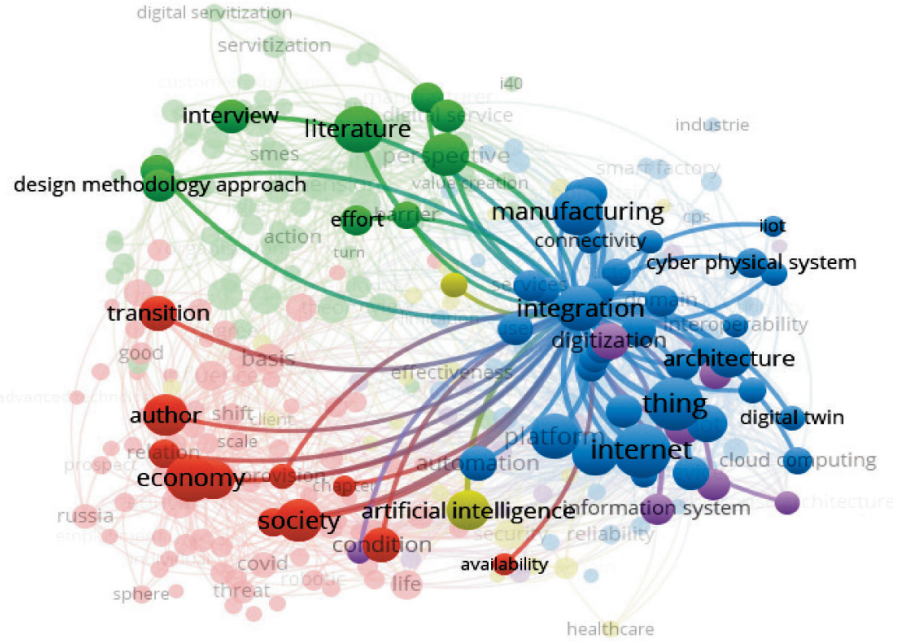
Figure 3 - Keyword analysis in VOSviewer



Source: the authors (2022).

When performing the same search in VOSviewer, centering the cursor on the word integration, the network of connections makes a strong correlation between integration, internet, manufacturing with economy, society, and transition.

Figure 4 - Interrelations between words using the word integration as base



Source: the authors (2022).

Finally, the descriptive analysis presents in Table 8 a detailed description per article identified as the year of publication, keywords, place of publication, and area.

Table 8 - Descriptive data

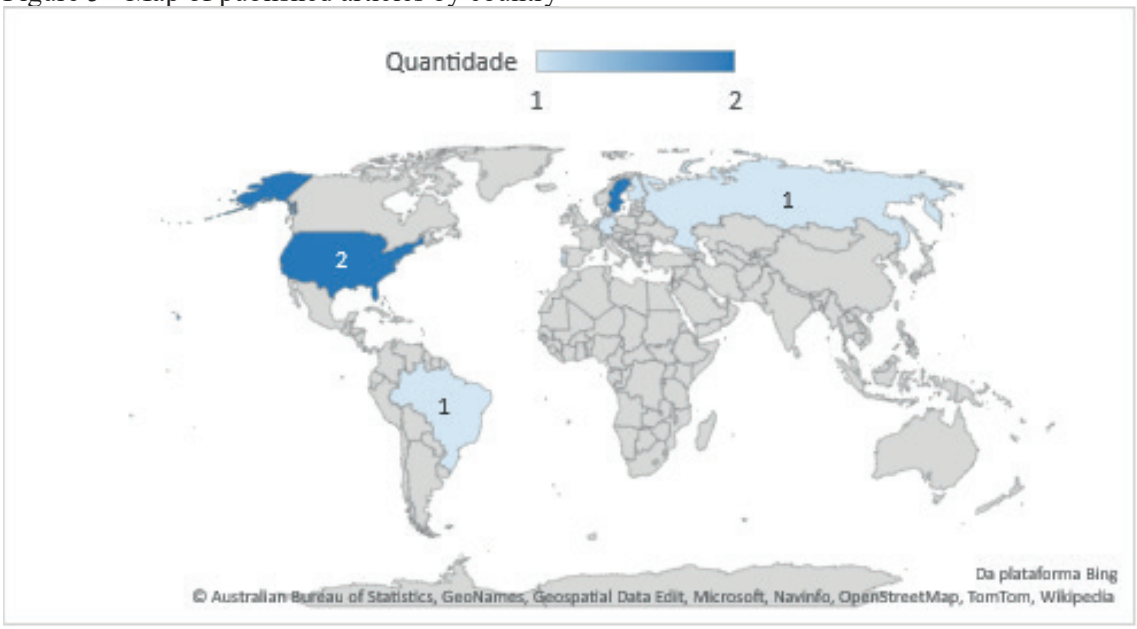
Autores	Ano de Publicação	Título do Artigo	Tipo de documento	Palavras-chaves	Cidade	Categoria
Corvello, De Carolis, Verteramo, Steiber.	2021	The digital transformation of entrepreneurial work	Journal	Digital transformation; Entrepreneurs; Work organization; Small- and medium-sized enterprises; New technologies	USA	Business; Management
Endres, Huesig, Pesch.	2022	Digital innovation management for entrepreneurial ecosystems: services and functionalities as drivers of innovation management software adoption	Journal	Adoption; Digitization; Digital transformation; Digital innovation management system; Entrepreneurial ecosystem; Innovation management; Digital services; New product development performance	Germany	Management
Depaoli, Za, Scornavacca.	2020	A model for digital development of an interaction-based approach	Journal	E-Business; SMEs; Entrepreneurs; Maturity model; Digital technologies; Digital competences	USA	Business
Gustafsson, Snyder, Witell.	2020	Service Innovation: A New Conceptualization and Path Forward	Journal	service innovation; research agenda; new service development; service design	Sweden	Business
Artemenko.	2020	The roles of top management in digital transformation	Conference	Digital transformation; Big Data; Chief Information Officer (CIO); Chief Digital Officer (CDO); Machine Learning; Predictive Analytics; Artificial Intelligence; Internet of Things	Russia	Management
Kaariainen, Pussinen, Saari, Kuusisto, Saarela, Hanninen.	2020	Applying the positioning phase of the digital transformation model in practice for SMEs: toward systematic development of digitalization	Journal	digitalization; digital transformation; SME; positioning phase; digital maturity; digital transformation model	Finland	Management
Zaki	2019	Digital transformation: harnessing digital technologies for the next generation of services	Journal	Big Data; Strategy; Customer value; Customer service; Service encounters; Business model; Digital; Service; Customer experience; Digital economy; Digital transformation strategy; Data-driven business models; Machine learning; AI; Digital technologies	England	Business
Gochermann, Nee	2019	The Idea Maturity Model-A Dynamic Approach to Evaluate Idea Maturity	Journal	Idea definition; idea assessment; idea management; maturity model; maturity level; new product development	Germany	Management
Ivancic, Vuksic, Spremic.	2019	Mastering the Digital Transformation Process: Business Practices and Lessons Learned	Journal	digital transformation; digitization; digital business; digital transformation model; digital model; talent management; human capital; innovation management; change management; case study	England	Management

Fonseca.	2018	Industry 4.0 and the digital society: concepts, dimensions, and envisioned benefits	Conference	Industry 4.0; 4th Industrial revolution; cyber-physical production systems; internet of things; smart factory	Portugal	Business
Sehlin, Truedsson, Cronemyr.	2019	A conceptual cooperative model designed for processes, digitalisation, and innovation	Journal	Business processes; Conceptual modelling; Digital innovations; Digitalisation; Innovation; Model creation; Process management	Sweden	Management
Menchini, Russo, Slavov, Souza.	2022	Strategic capabilities for business model digitalization	Journal	Enterprise architecture; Maturity in digital business models; Sociomateriality	Brazil	Management

Source: the authors (2022).

The works selected for this Systematic Literature Review are mostly articles published in management and business journals. Finally, from the map analysis, one notices a higher concentration of publications in Europe, followed by the United States of America.

Figure 5 - Map of published articles by country



Source: the authors (2022).

4.2 NARRATIVE ANALYSIS: MATURITY MODELS OF SELECTED PAPERS

In this section, the analysis of the selected articles will be carried out, essential for the identification of the similarities and differences of the research.

Fonseca (2018) conducted research aiming to present an overview of the various industrial revolutions with an emphasis on Industry 4.0 and its underlined dimensions. He added that Industry 4.0 promotes new human and production organization systems and new organizational business models, impacting the overall value chain, society, and the environment. Contributions to these new business models that can support Industry 4.0 are proposed with anticipated potential benefits such as shorter operations cycle times, quicker delivery times, faster time to market for new products and services, improved quality and

personalization of products/services, and greater consumer engagement and loyalty. It further reports that I4.0 can help organizations address new and emerging markets through a differentiation strategy or even create disruptive business models. However, it is still in the early stages for most companies, and digital transformation will require strong leadership, the right human skills, and overcoming various barriers for its successful implementation. And while this will lead to a significant improvement in job creation, there will also be considerable job losses for low-skilled employees.

Zaki (2019) examined digital transformation and its four trajectories - digital technology, digital strategy, customer experience, and data-driven business models - that can shape the next generation of services. It includes a discussion of whether the market and organizations are ready for digital change and what opportunities will enable companies to create and capture value through new business models. For the researcher, the phrase "Test, test, test, and don't be afraid to fail" is not just a phraseology taken from a business textbook. Companies know they need to have eyes in the back of their heads to see what the next wave of innovations in their business flows might be and adopt these new advances somewhere in the future. The author concluded that today's digital technologies affect the organization externally and internally, enabling the creation of new business models and transforming the customer experience and incumbents are aware that they need to transform strategically - to build new networks and value chains.

Ivancic, Vuksic and Spremic (2019) explained that due to its unique characteristics and accessibility, the focus of digital technology implementation is no longer just to improve internal operations, but to expand internal dimensions, reaching external customers and partners, affecting services, integrating processes, disrupting markets, and fundamentally change industries. The authors conducted holistic research on digital transformation in companies, using a series of in-depth interviews to inform comprehensive case studies of three large companies from different industries that are at different stages of digital transformation. In the end, they concluded that beyond technology adoption, important factors for a successful digital transformation are an organization's ability to change and operational excellence in integrating external digital services with internal IT support.

Sehlin, Truedsson and Cronemyr (2019) conducted a study whose objective was to create a framework for small and medium-sized enterprises to become more efficient by starting to digitize their business processes with the expertise of an external innovation partner. The study was conducted in a case company with an abductive approach where both deduction and induction were used to study the empirical findings and formulate new theories concerning the recognized theory. Qualitative methods were used in the empirical study due to their flexibility and the fact that the focus of information gathering was on creating a context. And the results indicated that a certain level of process maturity can be placed to a certain level of innovation and a certain level of digital change. According to a process maturity model, an adaptive process could better respond to changing customer demands, which can be related to changes in the business and societal domain. The research resulted in a cooperative conceptual model based on the three domains of the study. The model was validated through project reviews with the case company, a consultancy, and together with an innovation partner.

Depaoli, Za and ScornaVacca (2020) conducted a literature review and proposed a non-linear digital development model for SMEs that considers the interactions between digital technologies and organizational processes. The model is applied to three cases

using a qualitative research approach. The authors emphasize that the fact that SMEs tend to adopt technology discontinuously, making a non-linear, stage-by-stage progression path makes it necessary to build more representative models that assist in overcoming the mechanisms approaches. Instead of a model based on a linear sequence of technology stages, the authors proposed a model in which an entrepreneur may choose to aim for a certain "interaction level", which is aligned with the current mix of digital and non-digital "relational skills". Once updated, it will allow the company to better serve its current customers and acquire new ones. The model developed by the authors may be useful for policymakers to circumvent the technology bias when assessing the current state of e-business development in the SME universe and therefore assist in formulating the actions needed to support SMEs in developing a digitally oriented business.

Kääriäinenet *et al.* (2020) studied small companies in Finland seeking to identify how SMEs can be supported in their digital transformation process, using the DT model, which consists of four consecutive phases to support the systematic development of companies' digitization. The article focuses on the first phase of the DT model, positioning, where the digitization status of the company is analyzed in detail, and development ideas are identified. To this end, three digitization status analysis tools (positioning phase) were used: DigiMaturity, DigiSWOT, and DigiTriangle. The study encompassed 19 SMEs, and the results indicated that the process and tools used were suitable to support SMEs in analyzing their digitization status and identifying areas for improvement. The DT model and pilot tools have been published as a free online service ApuaDigiin.fi to facilitate their widespread use in the future.

Gustafsson, Snyder and Witell (2020) studied how service innovations challenge existing offerings and business models, shape existing markets and create. To enable the study the article addressed three fundamental questions about service innovation: (1) What is it and what is not? (2) What do we know, and what do we not know? and (3) What do we need to know to advance service research? In doing so, the paper offered an updated and comprehensive definition of service innovation in addition to providing a research agenda to suggest a way forward. They highlight that we need to know more about the effects of service innovation on key outcomes for customers, businesses, and other stakeholders and for society at large. In addition, they warn about the lack of research on innovations not linked to monetary value (e.g. social or welfare innovations) and what makes them successful. Instead of empirical illustrations and anecdotal case studies, research should shift to more extensive studies that can provide a more accurate picture of the effects of service innovations on customers, employees, companies, ecosystems, and society.

Artemenko (2020) highlighted that digital transformation is a change in business processes based on data analytics. Not external resources, as previously believed, become the main source of this data, however, but the internal processes of a company. Besides technologies, the key factor of a successful digital company is people. It is human capital that acts as the main resource in shaping a data-driven business model. He concludes that digitalization is not a replacement for real business processes but is a complement to them.

Corvello *et al*. (2021) explored the impact of digital transformation on the work of owners in entrepreneurial firms and observed that the digital transformation of entrepreneurial work is an evolving, practice-based phenomenon rather than the result of rational design. The use of different digital tools is interrelated and depends on the characteristics and dynamics of the surrounding environment. The authors add

that the research findings are relevant for entrepreneurs interested in understanding the dynamics of their working practice, for software development companies interested in entrepreneurs as customers, and institutions interested in the education of entrepreneurs. A multiple case study design was applied, selecting eight cases of entrepreneurial firms, defined as firms that bring new products and services to the market by creating and seizing opportunities to maximize case diversity. The sample included small and medium-sized firms, as well as high and low-tech firms in equal numbers. Finally, it provides insights into how the interconnected dimensions evolve, thus contributing to the understanding of the work of entrepreneurs and, consequently, the dynamics of entrepreneurial firms in the context of the digital transformation of organizations.

Endres, Huesig and Pesch (2022) evaluated whether Innovation Management Software can promote Entrepreneurial Ecosystems by consolidating an organization's innovation programs, stakeholders, and resources in one place. In the study, the authors particularly focused on the factors influencing the adoption of a specific class of software tools called Innovation Management Software (IMS) or Digital Innovation Management System to support innovation management methods and activities. In the research, they used an online questionnaire, whereby they collated survey data from 199 innovation managers from German companies with more than 50 employees and concluded that although overall IMS adoption is found to positively affect new product development (NPD) efficiency, the results indicate that especially idea management functionalities and services for updates and upgrades improve IMS adoption. Surprisingly, offering complementary consulting services along with IMS offerings to support the digitization of innovation processes reduces the likelihood of IMS adoption.

Menchini *et al.* (2022) carried out a study whose objective was to understand the association between the ability to use enterprise architecture tools and the effectiveness of business model digitalization in companies. To this end, the authors used two research strategies - survey and focus group - to analyze the relationship between maturity in the use of enterprise architecture (EA) and digital maturity from the perspective of socio-materiality. In the end, they observed that the use of EA is not a strategic competence that contributes to the construction of sustainable competitive advantage in the process of digitalization of the business model. On the other hand, the determination and clarity of top management, expressed through their sponsorship of strategy communication, contribute to the integration, engagement, and adaptability of those involved and are responsible for greater maturity in the digitalization of business models.

4.3 DISCUSSION OF RESULTS

The search keywords included in the systematic literature review reported some related findings but not exactly in the same line of research as planned, which proves the gap in the literature, and the need to highlight the topic. No study was found to present a maturity model developed for law firms.

At the end of the systematic literature review, 11 articles were obtained, and although some of them were conducted in large companies, which is somewhat different from the pattern of law firms, the majority of which (69.5%) are made up of autonomous lawyers or small and medium-sized firms (SALES; SOUZA; PAIVA, 2021), all the findings maintained are relevant for supporting the construction of a maturity model. Based on the models cited in the studies, the data were tabulated in Table 9 for visualization and comparison.

Table 9 - Synthesis of maturity models

Models	Institution/Source	Evaluation Approach
DT Model	Kääriäinenet *et al.* (2020)	It uses a set of tools for the positioning phase, analyzing everything from digital maturity to digitalization development visions for the company. The pillars of DT are: (1) position the company in digitalization; (2) review the current state; (3) roadmap for digitalization; and (4) implementation with technical support. For this, it makes use of DigiMaturity, DigiSWOT, and Digi Triangle.
Non-linear development model	Depaoli *et al*. (2020)	It uses as pillars: interaction integration; intertwining between technology and the organization, and an updated definition of e-business. It makes use of three key areas of interaction: 1) input interaction area, in which the SME relates with individuals and organizations that provide intermediate goods and services; 2) output interaction area, focusing on customer relationship management; 3) core interaction area, in which company processes transform relevant inputs into meaningful outputs.
Construct model US Government Accountability Office (GAO)	Menchini *et al.* (2022) utilizaram o modelo de Hite (2002)	The GAO identifies five stages for measuring maturity in the use of enterprise architecture (EA). The first stage shows awareness of EA; the second assesses the foundation for EA management, consisting of people, leadership, technologies, qualification level of professionals, etc. The third stage adds formal policies and documentation to ensure continuous use of EA; the fourth stage completes the product architecture, assessing the suitability of investments for the intended purposes of EA; and the fifth stage manages change, establishing an EA steering committee and metrics to evaluate benefits.

Collaborative conceptual model	Sehlin *et al*. (2019)	The aim of the first stage of the model is to assess how an organization currently works within the three main areas of digitization, processes, and innovation. First a Strengths, Weaknesses, Opportunities, and Threats (SWOT Matrix) analysis is performed. The second step is Prioritisation which aims to gather a better understanding of where to start a digital transformation. In the third step, the Digital Roadmap includes the path to possible digital solutions. The last step of the cooperative conceptual model involves the establishment and implementation of selected digital solutions. To establish digital solutions, a proof of concept can be carried out. If the proof of concept is successful, the digital solution will be implemented and fully integrated. To monitor implementation, process-related KPIs are observed and measured in the process.

Source: the authors (2022).

From the analysis of the maturity models described above, it is observed that the human factor is a determining factor for implementation and success. Sehlin, Truedsson and Cronemyr (2019) propose a model very similar to the one proposed by Kääriäinenet *et al.* (2020) since they started the digital transformation from the SWOT analysis. In the cooperative conceptual model proposed by Sehlin, Truedsson and Cronemyr (2019), the criteria are related to process maturity, process independence, and changeability, and by ranking the importance of the criteria, the processes realize a prioritization value based on these criteria to better visualize the totality of the processes shown in the QFD. The model of Kääriäinenet *et al.* (2020), on the other hand, is more complete because it has three ready-made tools for the analysis of Strengths, Weaknesses, Opportunities, and Threats (DigiSWOT), the DigiMaturity, which assesses the maturity level of companies through a free online questionnaire divided into six sections: strategy, business model, customer interface, organization and processes, people and culture and information technology. The DigiTriangle, on the other hand, summarizes the visions of digitalization development for the company. These visions are digitization targets that the company wants to develop over a short- or long-term period.

The GAO model used by Menchini *et al.* (2022) in their study has similar functionalities to those discussed above, although it is more bureaucratic, talking a lot about business architecture, which does not apply to law firms since, according to data from the Law Census 2021 (SALES; SOUZA; PAIVA, 2021) most of them are self-employed (45.8%) or small and medium-sized firms (23.7%). Finally, Depaoli, Za and ScornaVacca (2020) focus their study on e-business, that is, on the businesses carried out through electronic means, which are not yet the basis of law practice.

From the above models, this paper proposes a maturity model, using as a basis the primary characteristics that a maturity model should have described by Raber, Winter and Wortmann (2012), consistent in the following steps and described in Table 10.

a) raising lawyer awareness to better serve and deal with digital opportunities;

b) ealuation of the maturity level by means of a customized questionnaire covering the following dimensions: strategy, business model, client interface, organization, and processes, people and culture, and information technology;

c) the score for each dimension will be defined;

d) the model to be implemented will be continuous, as it allows for evolution at different levels and does not present a requirement to fulfill all the elements presented at each level;

e) procedures for digital transformation in 6 stages: definition of priorities, implementation roadmap, deployment and establishment, and monitoring and adjustments.

Table 10 - Proposed maturity model

Features	Description
Object of maturity assessment	Tecnologias, sistemas, processos, pessoas e gestão de recursos de projeto ou gestão do conhecimento.
Dimensions	Strategy, business models, client interface, organization, process, culture, people, information technology, investments
Levels	Each dimension will have a specific score to be defined
Maturity principle	A continuous model will be used
Evaluation	It will be carried out through quantitative approaches (questionnaires).
Procedures for TD	Definition of priorities, implementation roadmap, implementation and establishment and monitoring and adjustments.

Source: the authors (2022).

5 CONCLUSION

This systematic literature review did not identify a specific maturity model that can be applied to law firms; however, the DT Model and the Cooperative Conceptual Model are the closest to the key issues involved, with the DT Model having the advantage of using free and online tools such as DigiMaturity. In this way, the objective of proposing an industry 4.0 maturity model for law firms through a systematic literature review was achieved.

Furthermore, the need to study this topic is justified by the fact that the existing maturity models do not specifically contemplate the legal area, being directed to companies in a generic way, and it is necessary to elaborate a personalized maturity model that will bring new approaches under different expectations, users, and managers. The need for a specific maturity model for law firms is justified, as the services sector has peculiarities that other sectors do not have, and identifying the stage of maturity is essential for firms to remain competitive in the digital age.

Hence, this theme is extremely important for the theory and practice of law firm management and can contribute to the increase of firm competitiveness, cost reduction, greater productivity, and sustainability, bringing academic contributions with the identification of the research gap. It is also a subject of social interest since, considering that the services sector is the most responsible for the GDP of each country, the development of law firms will have an impact on the growth of the economy and on the possible generation of jobs.

As a result, the business contribution is evidenced by the need to improve some management practices from the perspective of Industry 4.0/Service 4.0. It should be added that this work is original, as no exclusive maturity model for advocacy was found. The findings are relevant, as they contribute directly to the construction of the model's proposal, with the main limitations being the small number of databases, despite being a world reference, and the concentration of the search with words exclusively in English. As a limitation of the study, when searching for the chosen keywords, perhaps some specific studies on the subject have not been filtered, requiring future research.

Finally, the authors intend to conduct a future study using a survey to assess the maturity of law firms and propose a guide for digital transformation.

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