

# How Technology Is (or Is Not) Transforming Law Firms

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## Keywords

technology, artificial intelligence, law firms, legal profession, transformation, organizational complementarity

## Abstract

In this review, we explore the impact of technology on US and UK law firms, focusing in particular on the recent machine learning wave of artificial intelligence. Technology has not so far ushered the end of law firms as we know them. Adoption of artificial intelligence/machine learning is in its early stages in the sector, and its impact has been constrained by the scope of use cases for which it is so far well-suited. Technology is nevertheless transforming law firms, in the sense of leading to material changes to their current forms, in the following novel ways: (a) deployment not only in the back office but in the front office, affecting lawyers' core tasks of advising clients; (b) opportunities for lawyers to pursue alternative career paths with different skill sets across the profession; and (c) emerging options for law firms to adopt business models creating value from nonhuman capital and nonlegal human capital.

## 1. INTRODUCTION

What is the impact of technology,<sup>1</sup> including artificial intelligence (AI), on law firms? This is a question both legal practitioners and academics ask.<sup>2</sup> We answer it by considering technology more generally while focusing on the recent wave of AI, namely machine learning (ML) made possible by a step-change in computing power and the availability of big data.<sup>3</sup> Together with COVID-19, which is associated with an extensive increase in law firms' technology use (Sako & Parnham 2021, p. 5), advances in AI/ML have stimulated greater interest in the topic.<sup>4</sup> This explains the "why now?" question for our review.

We first describe the types of technology law firms may use and specifically the key features of emerging AI/ML use cases in legal services (Section 2). We then examine how this technology is transforming—or could transform—what lawyers do (Section 3), before addressing the central topic of this review, its impact on law firms (Section 4). We review evidence primarily from two major English-speaking countries, the United States and the United Kingdom, large legal services markets in which law firms are expected to be materially impacted by technology (Henderson 2014, pp. 7–12; Ribstein 2010, pp. 780–87; Susskind & Susskind 2022, pp. 84–89). Our focus is on large law firms acting for corporate clients or other big organizations rather than for individuals or small businesses.<sup>5</sup> This is because the former segment has a higher reported rate of technology adoption (Armour & Sako 2023, pp. 54–55) and a history of institutional change in adjacent areas, such as human resource practices (Sherer & Lee 2002, pp. 115–16) and cross-border legal work (Smets et al. 2012, p. 880). We cast a wide net to identify key insights from articles published in top journals in law and in management studies. We also consider industry surveys for evidence on the topic.<sup>6</sup> Following our substantive review of the literature, we draw readers' attention to further research on issues for which there are not yet good answers or evidence.

What do we mean by technology transforming law firms? First, according to the Oxford English Dictionary, a "transforming" process involves a change from one form into another, that is, a change over time beyond the incremental or evolutionary, resulting in a material difference and an essentially different state (Sackmann 1989, p. 464). For law firms, this might lead to a new configuration of commonly associated attributes. Galanter & Palay (1994, p. 4), for example, identified law firms transforming along these lines by showing how big firms emerged through changes in six categories: partners, other lawyers, relations to clients, work, support systems, and knowledge. These big firms were materially different from the law offices that had preceded them, although they were still recognizable as a related form. In this review, we consider whether technology

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<sup>1</sup> By technology, we mean digital technology and all that goes with it. See Ceruzzi (2013) for a historical account of the concept.

<sup>2</sup> For examples of legal practitioners exploring the issue, see, for instance, interview quotations in work by Brooks et al. (2020) or Armour et al. (2022). Our review addresses academics' consideration of this question throughout.

<sup>3</sup> This review focuses on the uses, impact, and implications of AI and ML (which we refer to as AI/ML to distinguish it from other approaches to AI, such as rules-based expert systems) for law firms. It does not set out to consider the technology itself in depth. For this, see Jordan & Mitchell (2015), who review the emergence of ML and its core methods. On deep learning, a popular subset of ML, see LeCun et al. (2015). The textbook for AI more generally is that by Russell & Norvig (2020).

<sup>4</sup> This is evident from our review of the academic literature (see the Methodological Appendix for more details), showing a notable weighting toward materials on the topic after the emergence of AI/ML.

<sup>5</sup> In making this distinction, we follow the research of Heinz and colleagues (Heinz & Laumann 1982, Heinz et al. 1998), reporting that the legal profession is divided into two "hemispheres" along these lines. For a consideration of how technology may (not) level the playing field between the two, see Armour & Sako (2023).

<sup>6</sup> See the Methodological Appendix for details of our review process and its outcomes.

might lead to material changes to law firms' current forms, transforming them into legal service providers no longer called law firms. In this sense, we review whether technology could lead to the "end of law firms" as much as the "end of lawyers" (Susskind 2008) as we know them today.

Second, other factors beyond technology impact law firms and bring pressures for change, with implications for their transformation process and its outcomes. These other factors may be external to law firms, coming from sources such as clients (Gilson 1990, pp. 901–3; Gilson & Mnookin 1984, pp. 381–83; Regan & Heenan 2009, pp. 2138–39; Ribstein 2012, pp. 308–9), competitors (Dzienkowski 2013; Linna 2015, pp. 393–94; Ribstein 2010, pp. 765–67), or governments (Thornton 2021, pp. 246–47) and regulators (Barton 2013, Hadfield 2007). Or they may be internal to law firms, such as changes in individuals' working practices (Smets et al. 2012), their interpretations of organizational structures (Cooper et al. 1996), or the rise of new functions like legal operations (Keuning & Rainhart 2018, pp. 77–83). Our interest in this review is limited, in so far as is possible, to the role of technology. So, we are not comprehensive in covering these other factors and refer to them only when relevant to our central topic.

Third, when we talk about technology transforming law firms, it is shorthand for the complex range of scenarios in which agents—individuals, organizations, or others—introduce, use, or otherwise interact with technology in a way that results in material change. Notwithstanding difficulties with causal inference in social science more generally (Pearl & Mackenzie 2018) and legal studies in particular (Ho & Rubin 2011, p. 20), identifying a causal impact of technology alone on law firms' transformation is particularly challenging. Law firms are field settings in which researchers rely on quasi-experimentation for causal inference rather than randomized controlled trials (Cook & Campbell 1979). Access to law firms' sensitive information, such as volume of billable hours, is difficult to obtain (Brivot et al. 2014, p. 816), and lawyers themselves can be challenging research subjects (Danet et al. 1980, Flood 2022, Mungham & Thomas 1981). Moreover, the most recent wave of technology adoption (ILTA 2021, Sako & Parnham 2021), the focus of this review, can be understood only in the broader context, with the diffusion of computers in law firms since at least the 1990s (Braithwaite 1991, pp. 1113–14). We therefore use the phrase "technology transforming law firms" in this review, mindful of these difficulties with causal identification, hoping that it makes our review more accessible.

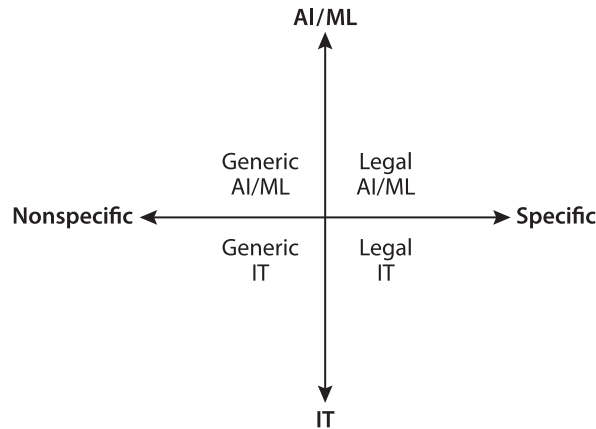
At the outset, we make an important caveat. AI/ML technology is continuing to develop rapidly, as is evidenced by the dramatic increase in performance very recently achieved by large language models such as OpenAI's ChatGPT. This means the literature studying its impact will likely trail its actual impact, as it takes time for data to be generated and studied. Our conclusions therefore are likely biased toward a conservative assessment of technology's impact.

## **2. LAW FIRMS' TECHNOLOGY TYPES AND LEGAL AI/ML USE CASES**

This section presents a typology of law firms' technology and overviews their uses of AI/ML. Technology is categorized according to its technical architecture and specificity of function. We then consider emerging use cases within one of these categories, namely, law firms using AI/ML in the practice or business of law.

### **2.1. Law Firms' Technology Types**

We take a law firm perspective, rather than considering legal technology more generally, as others have done (Whalen 2022), to classify their technologies into categories. Our typology is based on technical basis and specificity of function. First we consider technical basis, by which we mean the technological components, subsystems, and platforms that enable a focal application to fulfill a particular purpose (Barley 2020, p. 81). ML is a general-purpose technology distinct



**Figure 1**

Typology of law firms' technology. Abbreviations: AI, artificial intelligence; IT, information technology; ML, machine learning.

from pre-ML information technology systems (which we refer to as IT), with the latter relying on manually coded computer programs and the former applying an ML algorithm to training data (which we refer to as AI/ML) (Brynjolfsson & Mitchell 2017, pp. 1530–31). So, there are two potentially relevant technical bases: IT and AI/ML.

Second, we consider specificity of function, by which we mean the extent to which a technology supports or enables law firms' provision of legal services or its distinct business processes (Armour & Sako 2023, p. 51). A technology that is nonspecific to supporting or enabling law firms' provision of legal services or its distinct business processes may be used for other functions, whereas one that is specific to it is typically limited to use in legal practice or business. So, adopting a binary approach for simplicity, we can categorize this into four categories: nonspecific IT (Generic IT), nonspecific AI/ML (Generic AI/ML), specific IT (Legal IT), and specific AI/ML (Legal AI/ML). This typology is presented in **Figure 1**.

In this typology, our primary focus is on Legal IT and Legal AI/ML. We contrast this simply with Generic Technology, encompassing both Generic IT and Generic AI/ML, because it is in practice difficult to distinguish between these in a law firm context. They often use platforms such as Microsoft's (ILTA 2021), which intertwine different technology types (Bonina et al. 2021). Although we note and appreciate the potential importance of Generic Technology, we concentrate our analysis below more on the transformative impact or potential of technology specific to legal practice or business.

**2.1.1. Generic Technology.** Generic Technology has been widely used in law firms for a long time (Braithwaite 1991; Marcus 2008, p. 1833). Computers, the Internet, and associated applications, for example, transformed work in law firms in the 1990s and early 2000s, although it has not been possible to assess their direct effects cleanly given other pressures for change at the time, such as those coming from clients (Marcus 2008, pp. 1834–35). Emerging Generic Technologies law firms may now also use include infrastructures like cloud computing (Curran et al. 2019, Goncharov 2021) or applications like video conferencing (Skjølsvik & Breunig 2018, Wolters Kluwer 2021). For example, Microsoft's platform, which can combine both of these with traditional productivity tools such as word processors, spreadsheets, or slide decks, appears from an industry survey to be a central foundation of many law firms' technology stacks (ILTA 2021).

In short, law firms use Generic Technology—like they did non-digital technologies such as telephones or typewriters before (Galanter & Palay 1994, p. 7)—and this once again has the potential to transform them.

**2.1.2. Legal IT.** Legal IT applies non-AI/ML digital technology specifically to support or enable the provision of legal services or business. Legal IT typically addresses problems Generic Technology does not adequately solve for law firms. For example, it may be used for legal research (Wall & Johnstone 1997, p. 103), for knowledge management (Brivot et al. 2014, Janes et al. 2014), or to record billable hours (Parker & Ruschena 2011, p. 622). An example of Legal IT is iManage’s document and email management system, Work, which aims to provide a safe and secure mode of legal content creation, storage, and retrieval (<https://imanager.com>). Legal IT may also integrate with technologies in other categories. For instance, iManage’s Work integrates with Microsoft’s platform, a Generic Technology (iManage 2022). In other words, Legal IT is a means of using non-AI/ML digital technology, which law firms may use when they consider that Generic Technology must be supplemented or adapted to support or enable them to provide services to their clients.

**2.1.3. Legal AI/ML.** The third category, and today’s technological frontier, is Legal AI/ML. Law firms may use this to apply algorithmic, data-driven AI/ML to enable outcomes such as automation, pattern recognition, or prediction (Lehr & Ohm 2017, p. 671). Within law firms, Legal AI/ML typically is typically used to find specified items in a large volume of material, such as in technology-assisted review (TAR), due diligence and contract analytics, legal research, or billing and utilization (Armour et al. 2022, pp. 86–91). A contemporary example related to due diligence and contract analytics is Litera’s contract review platform, Kira, which automatically extracts potentially relevant provisions in merger and acquisition (M&A) or contract management scenarios (Kira 2022). Law firms using Legal AI/ML may do so together with Generic Technology or Legal IT to help marshal the data they need. For example, Litera’s Kira integrates with Intralinks, a provider of virtual data rooms that may be used in a due diligence process (Kira 2021). Although Legal AI/ML differs from Legal IT as respects the underlying technology, it is similarly used by law firms to fill gaps in the capabilities of Generic Technology for supporting or enabling the provision of legal services.

## 2.2. Legal AI/ML Use Cases

Legal AI/ML is still at a relatively early stage of adoption in legal services markets (Armour et al. 2022, p. 106). It may be used both for legal practice and for law firms’ business for a variety of reasons (Brooks et al. 2020, p. 150).<sup>7</sup> The primary areas of Legal AI/ML application, or use cases, are in TAR for discovery, due diligence and contract analytics, and legal research—all related to legal practice—and billing and utilization, related to law firms’ businesses (Armour et al. 2022, pp. 85–91). We overview salient aspects of these use cases below.

**2.2.1. Legal AI/ML for legal practice: technology-assisted review for discovery.** TAR involves using ML to find potentially relevant material during a discovery exercise (see Armour et al. 2022, pp. 87–88). The data come from items collected for discovery purposes (e.g., from custodian repositories), and ML’s deployment is motivated by data volume, as smaller-scale productions could make TAR economically inefficient (Engstrom & Gelbach 2020, p. 1054). TAR primarily uses a supervised learning approach, with lawyers overseeing iterative rounds of coding, but may

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<sup>7</sup>For example, Sako & Parnham (2021, p. 28) found in a recent survey of English solicitors in law firms that the three top purposes for lawyers’ use of technology were to “improve service quality” (71.5%), “improve efficiency of workflows” (70.9%), and “allow staff to work more flexibly” (43.9%).

also include unsupervised clustering of items (Ashley 2018, p. 1122). ML algorithms process the data and form a model that predicts whether a given item is potentially relevant. The output is a set of potentially relevant items, which are then handled in accordance with the procedural and ethical protocols of the discovery exercise and the parties' preferences.

In certain circumstances, TAR can be more effective and efficient than manual review (Grossman & Cormack 2011). It is hardly surprising that lawyers and legal professionals in the surrounding legal services environment generally attribute its rise to cost cutting and improved performance (Kluttz & Mulligan 2019, pp. 872–77). Yet, the scale of the work appropriate for this use case may limit the extent of its impact on law firms, with research finding that lawyers in large firms spent only 4.1% of their time on document review (Remus & Levy 2017, p. 531). As the authors themselves note, however, their “data suffer[ed] from a number of limitations”—for instance, that the task codes they used to arrive at the figures gave “lawyers significant discretion in how they record their time, painting at best a rough picture of time usage,” and that it failed to include time spent by law firms' contract lawyers or specialist document review providers, which may have been substantial when their data were collected in 2012–2015 (Remus & Levy 2017, pp. 504–5, 507).<sup>8</sup> Data on the extent of TAR's use within law firms in practice are also limited. An industry survey found that 14% of respondents in law firms used “e-discovery/e-disclosure/technology assisted review” (Sako et al. 2020, p. 7), but this again presents a rough picture: How often and to what extent law firms currently use TAR on their cases remain uncertain. In sum, there is evidence that TAR is more effective and efficient than manual review in certain circumstances, but we cannot be sure that lawyers in large law firms still spend vast amounts of time on the types of work for which TAR substitutes. Nor can we yet be sure how often or to what extent law firms use TAR on their cases.

**2.2.2. Legal AI/ML for legal practice: due diligence and contract analytics.** This use case involves using ML to help find potentially relevant information in a due diligence or contract analytics exercise (see Armour et al. 2022, pp. 88–89). The data generally come from items collected from a structured repository (e.g., from a virtual data room) but may be collected ad hoc and structured as part of the use case. It is not necessarily the volume of data that motivates ML's use but rather the volume of data points that must be extracted from it for analysis (whether in one go, as in a due diligence scenario, or iteratively, as in a contract analytics scenario, such as extracting features from M&A documents to keep up with market trends). Like TAR, this use case primarily uses a supervised learning approach. ML algorithms process the data and utilize a model, which may have been pretrained on publicly available data (in which case, it may be said to work out of the box). Systems of this type predict whether given items represent potentially relevant data points. These are then handled primarily according to law firm users' preferences, with procedural or ethical protocols governing their use rarely being important at this stage.

As with TAR, evidence suggests that ML can be more effective and efficient than manual review in this context (McPeak 2019, pp. 466–67). However, the extent of its impact on law firms may be again limited by the scale of the work appropriate for this use case, with research finding that lawyers in large firms spent only 2% of their time on due diligence (Remus & Levy 2017, p. 531). As noted above, however, this study relied on a data set that painted a rough picture of law firm lawyers' use of time and did not include that of contract lawyers or alternative legal service providers (ALSPs). Although a useful guide, therefore, such figures must also be treated with caution. Once more, data are also limited on the extent of this use case within law firms in practice,

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<sup>8</sup>The expense of document review is still thought to be a major component of litigation costs (Kluttz & Mulligan 2019, p. 863).

although the same industry survey cited above found that 18.2% of respondents in law firms used AI-assisted legal technology for “due diligence” and 10.2% for “contract analytics” (Sako et al. 2020, p. 7). Accordingly, we find much the same thing for this use case as for TAR’s: evidence for its effectiveness and efficiency as compared to manual review in certain circumstances, but potentially a limited scope for its application within law firms connected with the small amount of time lawyers spent working on matters associated with it, and—where we can find data on it—relatively patchy adoption figures.

**2.2.3. Legal AI/ML for legal practice: legal research.** This use case involves using ML to help find potentially relevant information in a legal research exercise (see Armour et al. 2022, pp. 89–90). The data come from items collected from databases such as legal judgments, complete with metadata like citations or keywords. Motivation for using ML may be due to the research exercise’s size, and so actively selected, or it may be a passively received recommendation. This use case may deploy approaches that are either supervised (e.g., for mapping research queries to their answers) or unsupervised (e.g., for clustering citations). ML algorithms process the data and utilize a model, which has sometimes been pretrained on publicly available data or trained internally on proprietary data, which predicts a given item’s potential relevance to a user’s legal research. The outcome is typically a set of potentially relevant suggested next steps, which are handled according to user preferences. Recently emerging tools go further, by analyzing a brief and finding a list of relevant cases (e.g., Casetext’s CARA AI product) or even generating a first draft of a legal research memo (e.g., Alexsei in North America).

In an industry survey, 25% of respondents in law firms said they used AI-assisted legal technology for “legal research” (Sako et al. 2020, p. 7). This suggests that it is the most widely adopted Legal AI/ML use case in law firms’ legal practice. Although until recently Legal AI/ML for legal research typically helped only at the periphery of the process—for instance, by identifying and retrieving potentially relevant cases or statutes (Baker 2018, p. 21)—the latest developments succeed in actually generating legal arguments, moving much closer to the core of the workflow.

**2.2.4. Legal AI/ML for law firms’ business: billing and utilization.** This use case involves using ML to help with law firms’ billing and utilization processes (see Armour et al. 2022, pp. 90–91). The data may come from items collected from lawyers (such as time-recording entries), clients (such as their bills), or another data source relating to a law firm’s business. A law firm’s motivation for using ML on this use case is typically to improve business performance and may involve outcomes aimed at putting together effective fixed fees or other output-based pricing models. Like for legal research, this use case may use approaches that are either supervised (e.g., mapping utilization data to a fee schedule) or unsupervised (e.g., clustering billing narratives for further analysis). ML algorithms process the data and utilize a model, which has sometimes been pretrained on publicly available data or trained internally on proprietary data, which predicts whether items are potentially relevant to a firm’s billing and utilization processes. The typical outcome of this use case is a set of potentially relevant suggested next steps, then handled according to a firm’s preferences.

In an industry survey, 10.2% of respondents in law firms said they used AI-assisted legal technology for “fee-earner utilization analytics and/or predictive billing” (Sako et al. 2020, p. 7). This suggests that law firms have so far focused on using Legal AI/ML more for legal practice use cases than to support their business.

## **2.3. Law Firms’ Make-or-Buy Decisions**

The basic make-or-buy problem is as follows: Which transactions are conducted more efficiently within a firm than in a market (Coase 1937)? Law firms face this problem when it comes to



technology. They can develop it themselves internally, buy it from external vendors, or both. For Generic Technology, law firms generally have a simple solution: Buy it. This is because they do not have any special requirements or knowledge to bear on the problem. However, for Legal IT and Legal AI/ML (or, together, Legal Technology), they might well have both. This, together with the wider increase in their use of technology, makes the question of whether to make or buy Legal Technology increasingly relevant to law firms.

Law firms generally have the resources and capabilities to make Legal Technology. Armour et al. (2022, p. 107) found little evidence of capital constraints posing problems for law firms' investment in technology. When it comes to human resources and capabilities, an industry survey found that 78% of respondents said their firms had internal technological development capabilities, with an additional 15% saying they used outside resources to do this work: Only 6% said they had little or no need for this type of work (Linna & Curle 2020, pp. 8–9). This implies a historic tendency to develop custom software internally or to configure existing solutions.

Law firms may be moving away from this approach. A recent industry survey found “the ‘buy’ component of the ‘build versus buy’ decision winning in most cases [for law firms]” (ILTA 2021, p. 24). There are several possible explanations. First is the emergence of cloud-based architectures within the legal services market (Goncharov 2021) and their use by professionals within law firms (Bostick 2012, p. 1375). Legal Technology is now being offered on a software-as-a-service basis, as is Generic Technology more generally, presumably at competitive prices given their uptake by law firms. This may limit law firms' customization or configuration options by raising the associated costs, pressuring them toward standardized offerings. Second is the emergence of Legal AI/ML. As noted, this builds on a step-change in computing power and the availability of big data. This may challenge firms' existing technological development capabilities, for instance, through new requirements for technical infrastructure (e.g., interoperability) or skills (e.g., data science). Accordingly, law firms may move toward buying technology that incorporates AI/ML rather than making it internally.

Still, despite some publicly available industry surveys (and more behind paywalls), academic research on law firms' technological make-or-buy decisions is limited. We know little about law firms' options or how they take their decisions about it. For instance, are law firms substantively different from other organizations in this regard, or are they more or less the same? Further research on this topic may help shed light not just on law firms but on the make-or-buy decision for professional services firms more generally in view of cloud and AI/ML technology.

### 3. FUTURE OF WORK FOR LAWYERS

In this section, we examine the impact of digital technology through the lens of the future of work for lawyers (that is, what work and tasks lawyers do) and law firms' relationship with nonhuman capital. We first spell out the three separate effects of digital technology, namely, substitution, augmentation, and new task creation. We then provide evidence that law firm adoption of Legal AI/ML technology is associated with the existence of multidisciplinary teams (MDTs). Such MDTs can take different forms, including lawyers themselves becoming coders and lawyers working with nonlegal experts, and there is evidence that the United States and United Kingdom have taken a slightly different route to achieving MDTs. Finally, we note that alternative career models are emerging within law firms and that lawyers may have a generally positive attitude toward them.

#### 3.1. Technology's Impact on Lawyers: Substitution, Augmentation, and New Task Creation

Legal services are traditionally provided by lawyers, highly skilled professionals trained in the law (Armour et al. 2022, p. 73). Will this continue? Some commentators argue that advances in



Generic Technology, Legal IT, and especially Legal AI/ML will transform legal services by making lawyers obsolete or less pervasive (Alarie et al. 2018, Katz 2013, McGinnis & Pearce 2014, Susskind & Susskind 2022). Others have argued that these claims are overstated or have produced evidence that does not show this transformation (Hunter 2020, pp. 1213–21; Markovic 2019; Remus & Levy 2017). This debate centers on the question of whether machines can replace lawyers. Yet, technology has a more nuanced impact on lawyers. Its deployment may impact lawyers' work in three ways (Armour et al. 2022, p. 75; Sako 2020, p. 26). First, it may substitute for lawyers in legal tasks for which it is capable and cost effective. Second, it may augment lawyers' capacity to perform associated legal tasks by enabling them to focus on aspects of the tasks for which they have a comparative advantage. Third, it may create new tasks for lawyers in producing Legal AI/ML, applying their legal expertise to augment the technology.

The nature and extent of each of these impacts, however, remain to be determined fully. Despite conceptual frameworks (Armour & Sako 2020, p. 31) and increasing empirical research on the topic (see the Methodological Appendix and citations throughout this review), our appreciation of how lawyers actually understand and use Legal AI/ML for legal tasks in practice (Kluttz & Mulligan 2019, p. 870) and what tasks are actually being substituted, augmented, or created by technology in law firms (Sako et al. 2022, pp. 166–67) remains limited. In terms of extent, as noted above, there are indications that the substitution effect for lawyers associated with technology has been less, or at least slower, than some might have expected. For instance, in their study of large US law firms, Remus & Levy (2017) found that lawyers there spent only a small fraction of their time on document review or due diligence (although, as noted, this may have been done by contract lawyers, specialized document review providers, or ALSPs, which were outside the scope of their study), at least according to billable hours invoiced to clients. This implies a relatively small scope for potential substitution of traditional lawyer roles in law firms based on current technology, as these areas are at the forefront of Legal AI/ML use cases. Similarly, Faulconbridge et al. (2021a, pp. 217–18; 2021b, p. 8) found few signs of Legal AI/ML displacing existing professionals in their study that included medium and large law firms in the United Kingdom, finding instead that lawyers were learning to work with it and that it was creating new tasks for them. This suggests a tendency toward augmentation of both lawyers' capacities and the technology itself. Still, deployment of Legal AI/ML is generally thought to be at an early stage within law firms (Armour et al. 2022, p. 106) and has not yet deeply affected the practice of law (Nissan 2017), so such findings are perhaps better treated as useful waypoints on our journey toward better understanding technology's impact on lawyers, rather than the story's end.

### 3.2. Multidisciplinary Teams

As Legal AI/ML substitutes for lawyers, augments their capacities, or creates new tasks for them, it may also bring them into contact with other professionals. These professionals have skills from disciplines other than law (Armour et al. 2021, pp. 75–78)—for example, IT or legal innovation specialists, legal project managers, data scientists, or process-mapping experts. When lawyers work on a day-to-day basis with such professionals, they can be said to be working as part of an MDT.

There is evidence that the adoption of Legal AI/ML technology in law firms is associated with the existence of MDTs. In their study of UK lawyers, for example, Sako et al. (2020, p. 3) found a strong association between MDTs and Legal AI/ML: Lawyers working in them were more likely to use it for due diligence, contract analytics, and legal research than those not working in them.<sup>9</sup>

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<sup>9</sup>It is not yet clear, however, whether MDTs cause the deployment of Legal AI/ML or if the deployment of Legal AI/ML causes MDTs, nor—if it is the former—through what mechanism(s) MDTs facilitate its deployment.

Similarly, Faulconbridge et al. (2021a, pp. 217–18; 2021b, pp. 24, 26–28) found that technologists were emerging within law firms as a new group responsible for AI procurement, installation, running, and problem solving, as well as data curation. In their in-depth look at TAR, a primary Legal AI/ML use case, Kluttz & Mulligan (2019, p. 889) found that lawyers relied on nonlawyer support staff and vendor judgment for various tasks, including system selection, configuration, and model testing and evaluation, and concluded that “the broader set of complex, ML-based legal technologies entering the profession has brought new entities and technical experts into the legal services ecosystem who are mediating the relationship between lawyers and clients.”

Such MDTs can take different forms, including lawyers themselves becoming coders and lawyers working with nonlegal experts. For lawyers themselves, this seems to be a nonissue. Sako et al. (2020, pp. 15–16) explored lawyers’ preferences between these skills mix types by asking to what extent they agreed with the statement “I prefer to work with ‘lawyer coders’ than with ‘nonlawyer technologists.’” They found no overall preference, with most respondents being neutral on the issue. However, it may be more of a practical issue for law firms, which anecdotally face the decision when forming an MDT between teaching lawyers enough about technology for them to get by or teaching nonlegal experts enough about legal services work. There does not yet seem to be a clear answer for law firms one way or the other. When, how, and why do—and, perhaps, should—law firms go about developing technology-facilitating MDTs and get them to work effectively? These are important questions for further research.

There is also evidence that US and UK firms have taken slightly different routes to implementing MDTs. In their analysis of online job adverts, Sako et al. (2022) found (among other things) a significant difference in the proportion of job ads for lawyers and paralegals specifying digital skills: During 2014–2021, the proportion remained higher in the United States than in the United Kingdom. This suggests that US law firms may be relying more on using lawyers with digital skills to facilitate MDTs, whereas UK law firms are more prone to rely on nonlawyers for digital skills in MDTs. Moreover, lawyer jobs with digital skills commanded higher pay than those without in the United Kingdom, whereas they attracted lower pay in the United States. The lower pay in the United States could relate to the nature of digital skills specified, e.g., more substitutable digital tasks (such as labeling and annotation) in the United States than in the United Kingdom. But the overall US–UK difference may also be related to differential professional control: The United States has tighter rules set by the American Bar Association than does the United Kingdom with its Legal Services Act 2007, making it harder for US law firms to recruit and retain nonlegal talent than their UK counterparts. Thus, factors like professional control may influence the development of MDTs and, consequently, the impact of technology on law firms.

### 3.3. Changing Careers in Law Firms

A traditional view of law firm careers is that of the “tournament,” in which young lawyers are hired with a view to the most proficient becoming partners and the others leaving under the “up or out” principle (Galanter & Henderson 2008, p. 1873; Galanter & Palay 1990). Empirical research from a decade or so ago found that, although the up or out principle still operated as the customary norm, alternative career models—such as Of Counsel, Permanent Associates, or Professional Support Lawyers—may be “justified on rational grounds as being consistent with new business conditions” but that “few associates are attracted to these roles” (Malhotra et al. 2010, pp. 1410–11).

However, there are reasons to think not only that the range of alternative career models is expanding, in line with the new business conditions brought about in part by technological change, but also that associates’ attitudes are changing. First, we consider alternative career models. Some claim that technology will lead to new jobs for lawyers, including (among others)

the legal knowledge engineer, the legal technologist, the legal hybrid, the legal process analyst, the legal project manager, the legal data scientist, the research and development worker, the online dispute resolution practitioner, the legal management consultant, and the legal risk manager (Susskind 2017, p. 135). Research has found contemporary law firms recruiting for roles such as “Legal Solutions Specialist Paralegal” and “Data Analyst” (Sako et al. 2022, p. 151), and anecdotal evidence suggests a range of new roles for lawyers in, e.g., legal project management, legal operations, and innovation. Second, we consider changing associates’ attitudes. Admittedly, much less evidence exists for this beyond the anecdotal. However, in interviews with lawyers in these emerging alternative career models, we have found a generally positive attitude toward them (although we should note that we have had less contact with associates or counsel without a connection to technology in law firms).

Our sense is that some of these alternative career models in, for example, innovation or legal operations are considered relatively high-status and sought-after positions viewed as generating particularly valuable human capital for participants. Further research to establish the nature and extent of alternative career models connected with Legal Technology, or the attitudes of the lawyers in their firms toward those in these emerging roles, may be useful. This might illuminate potentially interesting items, such as the nature of professional status and how it changes, or have broader implications for our understandings of the “tournament of lawyers.”

## 4. TRANSFORMATION OF LAW FIRMS

In this section, we first spell out the nature of what we call the legal technology business model, which relies significantly on nonhuman capital, as an alternative to the legal advisory business model that relies almost solely on human capital. Second, we examine complementary organizational practices to this new business model in the form of MDTs, career paths, and ownership forms. Third, we draw implications of combining business models for how law firms draw their organizational boundaries. These three steps touch, but do not dwell, on a potentially long list of facilitators of and barriers to law firms’ technology adoption.

### 4.1. Law Firms’ Business Models

As noted above, law firms may rely increasingly on nonhuman technological capital for value creation. Law firms’ traditional human capital–centric business model and its traditional organizational form (i.e., lawyer-only partnership) have not ceased to exist (Armour et al. 2022, p. 75; Callier & Reeb 2015, pp. 858–60; Greenwood & Empson 2003), although some argue that it is breaking down in places (Kobayashi & Ribstein 2011, pp. 1217–18). We call this the legal advisory business model (Armour & Sako 2020, pp. 32–34). In it, lawyers meet customer needs by providing bespoke, customized advice to clients’ legal problems, typically using input-based pricing such as the billable hour, relying on their firm’s reputation and clients’ trust to win and retain business (Armour & Sako 2020, p. 33).

Yet, alternative business models may exist for law firms. By business model, we mean how organizations create and capture value (Teece 2010). These alternatives include what we call the legal technology business model (Armour & Sako 2020, pp. 33–34). Firms adopting this model do not provide clients with bespoke, customized legal advice but instead deliver legal services through productized, technological solutions. Subscription or licensing replaces input-based pricing. Such firms win and retain business by relying on technical platforms with superior intellectual property to meet their clients’ requirements (Armour & Sako 2020, p. 34). As we have shown elsewhere (Armour & Sako 2020, pp. 38–40) and others have found too (e.g., Spring et al. 2022, pp. 599–605), law firms are adapting to and experimenting with this legal technology business model in practice. Legal technology deployed by law firms essentially consists of software

tools for a variety of use cases, such as matter management and legal research (see Section 2); a selection of the technology has the characteristics of a transactional platform (Cusumano et al. 2019), in which buyers and suppliers are brought together in a marketplace. For example, on-demand lawyer platforms, used by lawyers to find project-based work in either law firms or corporate departments, exhibit network effects in which the larger the coverage of both sides of the market, the better the matchmaking benefits to users.

Given network effects, this platform-based business model gives incentives to scale, because value creation opportunities increase with scaling. Consequently, we predict that if the adoption of the legal technology business model diffuses, then a likely impact on the legal services industry structure is consolidation and concentration, at least in the market segment serving corporate clients.

## 4.2. Organizational Complementarities

To derive the full benefit from adopting new business models, it is necessary to consider what other organizational practices must coexist as complements (Brynjolfsson & Milgrom 2012). Two or more activities or practices are complementary if the marginal benefit of each increases in the level of the others (Siggelkow 2002). Specifically, we identify three key organizational practices as complements to the legal technology business model: MDTs with lawyers and nonlawyers working together; career progression paths offered to both lawyers and nonlawyers; and ownership forms that offer both lawyers and nonlawyers a stake in managing and owning the firm.

First, well-functioning MDTs require an organization structure in which human capital of all types—not just lawyers but also project managers, process mapping experts, legal engineers, and data scientists—is given opportunities for reward and promotion. As discussed in Section 3, recruitment and retention of nonlegal talent are challenging in traditional law firms in which the associate-to-partner route is the only institutionalized promotion path. As an organizational complement to the legal technology business model, we would expect law firms to offer career paths for nonlegal talent, for example, in the form of hiring trainees in legal engineering.

Moreover, the lawyer-only partnership is a barrier to implementing MDTs as a prerequisite for Legal AI/ML adoption. Technology adoption that is facilitated by MDTs is easier for providers that are not law firms, organized using the corporate form, because this ownership form provides reward and recognition for employees who are lawyers as well as for those who are not. It also enables access to financial capital from sources other than partner equity. This organizational complement, however, requires changes to traditional restrictions on lawyers profit sharing with nonlawyers, for example, the alternative business structures permitted by the Legal Services Act 2007 in England and Wales.

## 4.3. Implications for Organizational Boundaries

The above discussion implies a proposition concerning organizational boundaries. Given different and potentially conflicting organizational complementarities required by each business model, combining more than one business model under one roof is challenging. One solution to this dilemma is for law firms to adopt a single business model. A single-business model firm is likely easier to manage than a multi-business model firm. Thus, if a law firm decides to retain the legal advisory business model, the firm can focus on recruiting and retaining top legal talent; the easiest way to access legal technology in this case is via buying in technology and outsourcing its development and maintenance. By contrast, a firm deciding to focus on a legal technology business model could promote the adoption of all the complementary organizational practices necessary to derive value from the chosen business model. Some of the so-called ALSPs are exemplary in

exploiting the complementary practices of MDTs, with multiple career paths and limited liability or public limited company ownership forms. ALSPs provide services that include legal operations, legal technology-enabled services, and consulting on operations and technology.

A 2021 study of ALSPs identified three types of players in the sector: independent ALSPs, law firm captive ALSPs, and the Big Four auditing and accounting firms. Among these, independent ALSPs are by far the largest segment (with revenues of approximately \$12 billion), and law firm captive ALSPs—those entities created within law firms—are the smallest (with approximately \$480 million in revenues). Interestingly, however, law firm captives are also the fastest growing segment of the market, having grown by approximately 60% over two years. This growth rate suggests some law firms are attempting to preempt the threat of ALSPs by creating competitive services of their own using the ALSP model (Jones & Sako 2021). The same study also found extensive usage of ALSPs: 79% of law firms surveyed said they were using ALSPs, along with 71% of corporate law departments.

Adopting both business models—legal advisory and legal technology—under one roof is not impossible and has been attempted by major law firms. But the firm would be challenged by the ambidexterity needed to keep all resources—human, technological, and financial—integrated and aligned. This challenge is met in part by law firms partnering with ALSPs and legal technology providers. Various partnering possibilities are also explored and experimented with in state-level regulatory sandboxes in the United States.

## 5. CONCLUSION AND FUTURE RESEARCH

Technology has not yet ushered the end of law firms as we know them today. Adoption of Legal AI/ML, for instance, is in its early stages, and its impact is constrained by the limited use cases for which it is so far well-suited. That is not to say that it could not lead to this outcome, only that the evidence available so far shows that it has not yet done so. Technology is nevertheless transforming law firms, in the sense of leading to material changes to their current forms. Indeed, it has been doing this incrementally for the past half century. But as we have found and sought to demonstrate, what distinguishes the current phase of transformation are (a) the use of technology not only in the back office but in the front office, affecting what lawyers do in relation to core tasks of giving advice to clients; (b) the resulting opportunities for lawyers to pursue alternative career paths with different skill sets within or across the profession; and (c) the emerging option for law firms to adopt business models that rely on value creation from nonhuman capital and nonlegal human capital. Law firm transformation, and perhaps their survival or death, depends on how they manage governance and other organizational complementarities within the firm. It also depends on how law firms draw their organizational boundaries and navigate various alliances and partnerships with technology and data providers in an increasingly complex ecosystem.

Given these findings and conclusions, topics for future research might include the following (beyond those already raised above). How does the use of technology affect what lawyers do in relation to their core task of giving advice to clients? What opportunities are there to institutionalize alternative career paths for those working in law firms, for both lawyers and those with other skill sets? How and why do law firms make decisions about or implement business models that rely on value creation from nonhuman capital or nonlegal human capital? How and why do they identify and manage organizational complementarities within the firm? What is the process by which law firms draw their organizational boundaries and navigate their technology alliances and partnerships? When does it make sense for a law firm to take on an alternative organizational structure or form? In short, future research should continue to investigate the question of technology's impact on law firms and how it is (or is not) transforming them. There is still much to be done.

**Table 1 In-scope industry surveys**

Author	Survey name	Published date	Survey date	Survey methodology
American Bar Association (ABA) (Goncharov 2021)	<i>2021 ABA Legal Technology Survey Report</i>	October 21, 2021	April to June 2021	The ABA's Legal Technology Resource Center conducted a survey of more than 40,000 private practice attorneys from April through June 2021.
Bloomberg Law (2022)	<i>Legal Ops + Tech Survey</i>	2022	March 2022	Bloomberg Law surveyed 190 legal professionals (113 law firm and 77 in house) about legal operations and legal technology, including technology usage, efficiencies, barriers, metrics, decision-making responsibilities, and practice management.
Dashboard Legal (2022)	<i>Attorney Technology Satisfaction Survey</i>	2022	May 2022	Participation was solicited via legal-specific Instagram accounts, and Starbucks gift cards were raffled to incentivize responses. Typeform was used to collect responses to 21 questions, where respondents were asked to self-identify as attorneys (verified by email addresses) before replying to the survey; 954 respondents partially completed the survey, and 558 answered all 21 questions.
International Legal Technology Association (ILTA 2021)	<i>ILTA's 2021 Technology Survey</i>	August 2021	Not specified (annual report)	The survey focused on law firm technology; 460 firms responded, including 134 firms of fewer than 50 lawyers and 38 firms of more than 700 lawyers. A total of 250,000 users were represented.
Legatics (2021) (funded by Innovate UK)	<i>Barriers to Legal Technology Adoption</i>	June 2021	Not specified (research project ran from August 2019 to April 2021)	The survey was answered anonymously by 133 lawyers across at least 10 leading law firms. Although participation predominately was from UK-based transactional lawyers, Legatics circulated the survey through LinkedIn; subsequently, the results may include some responses from lawyers outside the UK or from different practice areas.
Litera (2022)	<i>The Changing Lawyer Report 2022</i>	August 2022	Not specified (annual report)	The survey covered 300 lawyers at law firms (80 employees minimum) and 100 "allied professionals" in law firms, working in operations, data management, or project management and other roles. The respondents were based in North America, the UK, DACH (Germany, Austria, Switzerland), France, Benelux, and Italy.

(Continued)

Table 1 (Continued)

Author	Survey name	Published date	Survey date	Survey methodology
University of Oxford commissioned by the Solicitors Regulation Authority (SRA) (Sako & Parnham 2021)	<i>Technology and Innovation in Legal Services: Final Report for the Solicitors Regulation Authority</i>	July 2021	April 2021	Researchers conducted an online survey of SRA-authorized firms to ask about innovation, the current and future uses of legal technology, and the drivers and barriers faced by innovators and adopters of legal technology. In total, 891 valid responses were received.
Thomson Reuters (in collaboration with Northwestern University's Daniel W. Linna Jr.) (Linna & Curle 2020)	<i>Large Law Firm Technology Survey: Law Firm Leader Perceptions of the Value of Technology</i>	2020	June to September 2019	This research consisted of 112 survey interviews with legal technology decision makers in 66 different global large law firms. All respondent firms had a minimum of 100 attorneys and averaged 1,409 attorneys. Of the firms, 45% had fewer than 1,000 lawyers, and 55% had 1,000 lawyers or more; 60% were based in North America and 40% in the UK. The vast majority of respondents were partners.
University of Oxford (in association with the Law Society of England & Wales) (Sako et al. 2020)	<i>Lawtech Adoption and Training: Findings from a Survey of Solicitors in England and Wales</i>	March 2020	November 2019 to January 2020	The online survey yielded a total of 353 valid responses. It focused exclusively on the lawtech experiences and needs of qualified solicitors regulated by the SRA.
Wolters Kluwer (2021)	<i>The 2021 Wolters Kluwer Future Ready Lawyer</i>	June 2021	March 2021	The survey included insights from 700 legal professionals across 9 European countries and the US. The survey examined issues and trends affecting the future of law as organizations work to both rebound from the challenges of the past year and position themselves for higher performance ahead.

## METHODOLOGICAL APPENDIX

To conduct this review, we first searched in three databases for law or management studies journals (HeinOnline, Scopus, and Web of Science) using keywords (““artificial intelligence” OR “machine learning” OR “legal tech\*” OR “legaltech” OR “lawtech” OR “law tech” AND “law firm\*”” in Scopus and Web of Science, and only ““legal tech\*” AND “law firm\*”” in HeinOnline, due to its limited search capabilities). We conducted this exercise on July 12–13, 2022. After de-duplication, this provided a set of 743 journal articles. By excluding items from 2009 or before to focus on the most recent wave of AI, and by retaining only items from journals listed in the Academic Journal Guide 2021 for management studies, or in the top 400 (US) or 100 (non-US) of the Washington and Lee Law Journal Rankings 2021 for law, we were left with 210 journal articles (law, 123; management studies, 87). We read and analyzed those judged as most relevant in relation to our focus on US and UK law firms, forming a substantive part of the literature reviewed for this piece. Of the 210 items, more than 10% are cited as references to this review (24 in total).



Second, we set out to identify potentially relevant recent “industry surveys” to seek concrete evidence on this topic (Mania 2023). In the absence of a searchable repository for these industry surveys, we first searched the academic literature for any systematic reviews of survey evidence and found one book chapter, albeit on a slightly different topic (Weinstein 2022). We considered the survey sources used in this book chapter. We also did a Google search for “legal technology survey” and considered results that were *prima facie* relevant for inclusion in the review. The basic criteria for inclusion were as follows: (a) The survey’s dominant purpose related to the research question; (b) it had sufficient responses to give us confidence in its reliability (a rule of thumb was that it needed 100 or more responses); (c) it was published in or since 2020, to keep the information up to date; and (d) for surveys annually, we used the most recent version at the time of writing (Summer 2022). For industry surveys behind paywalls, our approach was to use publicly available material from these paywall-protected items (an executive summary for ILTA’s 2021 Technology Survey, and a series of TechReports for the 2021 ABA Legal Technology Survey Report). Following this approach, we had 10 in-scope industry surveys, listed in **Table 1**. Third, we supplemented this systematic search and identification of industry surveys with materials that we considered from experience particularly relevant to the research topic. This involved including articles, books, and reports that were not necessarily responsive to our search parameters but that still merited inclusion based on our subjective views of their impact, contribution, or other potentially relevant factors. Ultimately, this approach has enabled us to cast a wide net to identify key insights from across the law or management studies literature, while also retaining the flexibility to draw on other sources of evidence where necessary.

## DISCLOSURE STATEMENT

The authors are not aware of any affiliations, memberships, funding, or financial holdings that might be perceived as affecting the objectivity of this review.

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