Trajectories of legal work in the context of machine learning AI: conceptualising mediated evolution

James Faulconbridge, Lancaster University, UK (email: j.faulconbridge@lancaster.ac.uk)

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Abstract

This paper explores the impacts of machine learning (ML), as one form of artificial intelligence, on legal work by examining three questions. First, it considers *trajectories* and how ML is being used in legal work. Actually existing use cases are examined to reveal how ML is changing legal work. Second, it considers questions about the barriers that are standing in the way of different *trajectories*, with the more rapid adoption of tried and tested forms of ML and some of the more radical changes that have been predicted being contingent on a range of factors. Third, this paper considers how evolution might change *spaces* of legal work and the legal profession. It examines both what ML might do to reconfigure the role of the lawyer within law firms and other *spaces*, and how lawyers might respond to this as the professional project adapts to the challenge of artificial intelligence. Through the analysis the paper develops the concept of mediated evolution which is a way of conceptualising change in legal work that is material and meaningful, but which is also path dependent and non-linear and thus needs to be understood through situated analysis of the enactment in practice of change

Keywords: artificial intelligence, machine learning, law, legal work, law firms

Introduction

Perhaps one of the most notable shifts in recent years in discourse about the effects of artificial intelligence (AI) has been the focus on the impacts on knowledge workers and occupations previously assumed immune to automation and replacement by algorithms (Davenport and Kirby, 2016; Kronblad, 2020). The legal profession is one of the occupations that has come into focus, with AI being one of the key disruptive aspects of the context in which lawyers now practise. Whether it be professional bodies responding to perceived opportunities but also threats (Law Society, 2018; Paykin, 2023), technology consultancies advocating for the uptake of AI (Deloitte, 2017), or academic research unpacking possibilities and implications (Björkdahl and Kronblad, 2021; Faulconbridge et al., 2023, 2024; Rodgers et al., 2023; Spring et al., 2022; Villasenor, 2024), a growing body of literature seeks to understand the impacts of AI on legal work. And in some ways, debates about the impacts of AI on legal work are nothing new. One of the most vocal voices, Richard Susskind, has been foretelling radical change for over twenty years (e.g., Susskind, 2000; Susskind and Susskind, 2015, 2023). An important element of Susskind's argument is the potential created by the transformation of legal work into something more akin to data science. A statistical approach allows analysis of legal documents and precedent, as well as prediction of outcomes, that utilises the capability of algorithms to detect patterns in large datasets (e.g., Katz, 2012; Katz et al., 2017; Oster, 2021).

Recent years have, however, seen the realisation of the potential for AI driven evolutions because of the rapid development of the computing power needed to enable data processing. The potential impacts of AI are, therefore, now more widespread than ever before, but also still emergent as AI continues to evolve as a technology. Indeed, as a category AI covers a range of different forms of computing architectures. It is, in particular, developments in machine learning (ML), and the possibility to use it in combination with natural language processing and large language models, that has driven some of the most significant changes. And whilst the potential of other applications of AI have informed some of the more hyperbolic predictions of disruption in the legal profession, actually existing use cases in legal work are almost exclusively based around the use of ML. As outlined below, understanding the role of ML is important because it has a number of distinctive features that are relevant when considering how legal work evolves, these features determining use cases and thus the trajectory and limits of change.

This paper, therefore, explores the impacts of ML on legal work through the concepts of *professional trajectories, professional spaces, contexts* and *professional projects* developed by Caserta, Haagensen and Masden (this issue). Specifically, first, the paper uses empirical study of actually existing use cases to consider *what* is evolving. Here the focus is on questions about *trajectories* and how ML is being used and the components of legal work that are evolving. The paper considers, in particular, applications of ML that have gained relatively widespread use, rather than hypothetical possibilities, given the potential for over-estimation of the actual changes happening in the everyday work of lawyers. Second, this paper considers questions about *if* evolution will occur. Here the paper examines the barriers that are standing in the way of different *trajectories*, with the more rapid adoption of tried and tested forms of ML and some of the more radical changes that have been predicted being contingent on a range of factors. Issues ranging from data and ethics to professional identities and conservatism are considered because they help define *trajectories*. Third, this paper considers *how* evolution might change *spaces* of legal work. It examines both what ML is doing to reconfigure the role of the lawyer and how we might understand the evolving role in more relational ways as lawyers develop new interdependencies with ML and other occupational groups. The paper also explores how lawyers are responding to this as the *professional project* adapts to the challenge of AI. Here the focus is on the active institutional agency of legal professionals as they navigate the opportunities and threats of ML in a way designed to maintain professional interests but through evolving professional *spaces*.

The overarching message is that, like over the past 100+ years, the legal profession will evolve, but the *trajectories* invoked by ML will emerge as a result of interactions between both the opportunities created by new technology and the strategic responses of professionals and professions. It is argued that there is and will be *mediated evolution* - this being change that is moderated and given direction by interactions between the characteristics and possibilities of ML and the institutions, priorities and particularities of the legal profession. *Mediated evolution* is a way of conceptualising change in legal work that is material and meaningful, but which is also path dependent and non-linear and thus needs to be understood through situated analysis of the enactment in practice of change.

The analysis below is based on insights from both primary and secondary data sources. Primary data comes from research in the English context between 2018 and 2024 examining the adoption of ML by law firms. As part of a number of projects over 70 interviews have been conducted with lawyers, other members of law firms such as

technologists responsible for implementing AI systems, and technology providers. The lawyers interviewed worked in firms from the very largest global law firms through to small/medium sized firms across the UK. The firms predominantly focused on corporate work, although some also provided consumer services such as matrimonial and litigation advice. The purpose of the interviews was to understand the actually existing evolutions resulting from the adoption of ML and factors influencing adoption and non-adoption. All interviewees consented to participate in interviews and signed an informed consent form. Ethical approval for the data collection was received from XXXX University Research Ethics Committee.

What is evolving – legal work in the context of ML

An important first step in understanding *trajectories* of change is to consider the characteristics of the *context* – here the characteristics of ML technologies and their deployment and interaction with legal work being the main concern. Whilst there has been significant hype about the potential for AI to transform legal work, analysis often reveals much more limited evidence of actual adoption and change (Rodgers et al., 2023; Spring et al., 2022). It is, therefore, important to consider the evidence base relating to what the *context* looks like and the actually existing changes in legal work. What is ML, as one form of AI, what possibilities does it offer, how is it being used in legal work and what are the implications for the *trajectory* of change?

Key features of ML in legal work

As a first step, it is important to be clear about the characteristics of ML that influence its use in, and impacts on legal work. In particular, it is the development of widely accessible forms of natural language processing and large language models (i.e., the ability to make-sense of written text) that are powered by ML capabilities that is driving change. ML uses "large sets of data inputs and outputs to recognize patterns and effectively 'learn' in order to train the machine to make autonomous recommendations or decisions" (Helm et al., 2020: 69). It is worth unpacking these features of ML as they have implications for how legal work evolves.

The first key feature of ML is the use of datasets and pattern recognition. Algorithms rely upon access to large datasets representing whatever kind of legal matter they are tasked

to analyse. Typically, in law this takes the form of a dataset made up of similar document types (e.g. commercial leases; land title documents) or documents relating to similar cases (e.g., road traffic accident litigation). ML is used to identify patterns in the text in the documents. The algorithm learns about common patterns and then uses this learning when it encounters similar documents to interpret the text and make determinations (e.g., this pattern of text indicates a break-clause in a commercial lease) or predict outcomes (e.g., this bundle of litigation documents contains patterns that suggest the case is likely to lead to an award of compensation to the value of x) (see for example, Alarie et al., 2018; Chen, 2019).

As ML algorithms encounter datasets, learning can occur in multiple ways. We adopt the widely used distinction (for a summary see Royal Society, 2017) between supervised, unsupervised and semi-supervised or reinforcement learning to characterise the learning process and consider the implications for change in legal work.

Supervised learning involves a dataset being labelled by a human. In law, this typically involves a bundle of contracts or other documentation being labelled by a lawyer, the labels indicating different clause types and aspects of the documents important in informing legal decision-making and outcomes. The algorithm then learns about the structure of the labelled data and uses this learning to identify similar instances in other datasets (e.g., similar clause types or similar set of patterns across clauses) and/or predict actions and outcomes when similar patterns are found. As such, supervised learning is a process in which a lawyer 'shares' their expertise with the algorithm by helping it to learn about the patterns in text that are salient in legal decision-making.

Unsupervised learning occurs without human involvement. It involves ML detecting patterns in a dataset and clustering data according to similarities and differences in ways that allow future datasets to be interpreted based on convergence and divergence with the datasets learned from. Unsupervised learning has become important for large language models used in generative ML associated with tools such as ChatGPT. It is used to 'digest' and learn from large quantities of documents available on the internet, or in more contained ways in software as service solutions to learn from existing databases, in law examples being the precedents, practice notes and clause banks held by providers such as Lexis Nexis and Thomson Reuters. Unsupervised learning allows the scale of learning required for generative ML solutions, the scale being difficult to replicate using supervised learning alone.

Increasingly, many ML based solutions rely on what the Royal Society (2017) term reinforcement or semi-supervised learning. This approach combines supervised and unsupervised learning. Once supervised learning has taught the algorithm to recognise patterns that relate to key data types, such as legal constructs in documents, the algorithm continues to learn every time it encounters new text that fits with the patterns it has been taught to recognise and based on feedback from the user. New encounters and feedback allow the algorithm to recognise more and more subtle variations in the patterns, for example associated with different legal constructs, enhancing its ability to interpret text and/or predict outcomes. Feedback from the user can take the form of corrections when the user deems the machine learning outputs to be incorrect (e.g. a clause coded as a break clause when the user indicates it is not a break clause), when additional labelling occurs (e.g. the output is reviewed and missed clauses labelled), corrections to text generated or requests for refinements to the outputs.

The use of supervised, unsupervised and semi-supervised learning is important because it also has implications for *trajectories* of change in legal work, the legal profession and law firms. In particular, as noted in the next section, the combination of approaches influences the relationships between human lawyers and ML, the 'black box' nature of ML and the risks associated with its use, and how lawyers respond to the use of ML. We consider these issues further below, but before doing this we summarise current ML use cases in the UK law firms studied.

Uses of ML in corporate legal work

Table 1 provides a summary of some of the more established ways that *extractive* ML is used in legal work and the software as service providers involved in developing tools for the legal profession. As the name suggests, extractive ML is used to extract insights from datasets, which can then inform decision-making or statistical predictions. In an extractive form, the main application of ML is to automate the process of identifying relevant aspects of a document/extracting information needed for decision-making. As table 1 summarises, this is most commonly part of discovery, due diligence or initial review stages (including for contentious work whether to accept a matter as a viable case). It has also been most commonly used in corporate legal work because of the benefits when handing large volumes of documents/contracts that are often involved in corporate work, ranging from commercial property leases to procurement contracts and financing arrangements.

[Insert table 1 here]

Most recently, generative ML has gained attention, as illustrated through ChatGPT and similar tools. The key different between extractive and generative ML is that the latter can not only extract data but also generate new content, in the form of written text but also images, based on insights gained from a dataset. In the legal profession, like in all aspects of economy and society, the possibilities of generative ML have spurred debate about the implications for work and questions about how generative ML might be used. To date, law firms have been focused on identifying the possibilities and equally important precautions needed when using generative ML - not least because of what are now commonly referred to as generative ML 'hallucinations' when mistakes are made as a result of flawed pattern associations developed through unsupervised learning. In a 2023 survey of the top 50 law firms in the UK, 50% were not considering the use of generative AI (Womack 2013). By 2024 things have undoubtedly moved-on. Firms are both experimenting with more generic generative ML solutions, such as the large language models that can be accessed through cloud solutions such as Amazon Web Services and Microsoft Azure and Co-Pilot, and with software as service solutions that have generative ML embedded within them. Table 2 provides a summary of some of the key uses in UK law firms. As can be seen in table 2, a key development with generative ML has been the expansion of the range of use cases, including into smaller scale corporate work and into some aspects of consumer legal work.

[Insert table 2 here]

Tables 1 and 2 thus provides examples that can already be found across a number of law firms, and which do not require firms to themselves engage in the development of in-house algorithms and do not require the capability to design computing infrastructures to support bespoke AI solutions. Whilst a few, often the largest firms, are able to engage in such bespoke development work and are further ahead with generative ML experiments, for the majority of lawyers and law firms it is 'off the shelf' applications, such as those in tables 1 and 2, that are driving evolutions in legal work. Hence the examples in tables 1 and 2 apply to smaller and medium sized firms as well as larger firms. The rest of the discussion is, therefore, based on our original empirical research with UK law firms using the technologies outlined in tables 1 and 2. Based on the interviews conducted, and in some cases observations of lawyers using

the ML technologies, we identify cross-cutting insights about impacts and trajectories of change that apply across the different types of ML use summarised in tables 1 and 2.

The impacts of ML on legal work

Examining the use of ML in the ways described in tables 1 and 2 reveals a number of insights into the way *context* and the development of ML as a new disruptive technology is helping to define *trajectories* of change in legal work. One set of insights relates to the scale at which evolution occurs. When ML is used it predominantly has impacts at the level of specific tasks, rather than the job as a whole. This distinction is important because one of the limitations of tales that predict the demise of a profession or occupation is that they fail to distinguish between the tasks AI might be able to complete and those that remain untouched (see for example, Brynjolfsson and Mitchell, 2017; Lichtenthaler, 2018).

In legal work, Abbott's (1988) distinction between the diagnosis, inference and treatment tasks of professionals has proven to be a valuable way of understanding what lawyers do in their work. The distinction has been used in work examining the impacts of AI on *trajectories* of change in the legal profession (see Köktener and Tunçalp, 2021; Spring et al., 2022) and has focused attention on how ML primarily affects diagnosis tasks – i.e., tasks that "take information into the professional knowledge system" (Abbott, 1988: 40). The kinds of applications of ML outlined in tables 1 and 2 involve the completion of analysis work that informs latter inference and treatment work, when respectively the nature of the problem/opportunity and the best response are formulated. For example, extractive ML "can be trained to help lawyers classify potentially relevant documents for a case but would have a much harder time interviewing potential witnesses or developing a winning legal strategy" (Brynjolfsson and Mitchell, 2017: 1533).

A key critique of predictions of the demise of professional work has, therefore, been the failure to recognise that AI cannot substitute for some of the aspects of the work of professionals that adds most value from a client perspective. For ML this relates to inference and treatment work and also extends to the role of empathy, trust and reassurance that a lawyer provides to their client (see for instance Goodman, 2019; Pettersen, 2019). Being precise about which tasks ML affects and which is does not is, therefore, the starting point for understanding *trajectories* of change. In particular, such precision helps reveal the way that

AI results in some aspects of what lawyers do in their work being emphasised as the basis for claims of expertise, and some other aspects being deemphasised as AI can change the tasks.

A second set of insights relates to the interactions between changes to legal work invoked by automation and augmentation. Automation implies "machines take over a human task" whereas augmentation implies "humans collaborate closely with machines to perform a task" (Raisch and Krakowski, 2021). Understanding what automation and augmentation operating in tandem look like in legal work is crucial. For instance, Spring et al. (2022) show that automation using ML involves transforming diagnosis tasks from a manual process completed by lawyers into a more automated process. The examples in tables 1 and 2 primarily relate to tasks that involve reviewing significant volumes of legal documentation or producing reports. Typically, this would be completed by a more junior lawyer and would involve either a paper-based process or digitised documents and PDF annotation and document production tools. The task of the lawyer is, for example, to review the documents to identify relevant material – whether that be particular clause types, liabilities, risk factors or other relevant information. The output would be a combination of marked-up documents, datasets containing relevant clauses and information, and/or a summary report identifying key areas for focus in subsequent stages of work, another (usually more senior) lawyers then reviewing and acting on the report, or a client receiving the report. Automation results in ML completing a significant proportion of such diagnosis work. By setting analysis criteria, a lawyer can use ML to search digitised document datasets, for example to identify relevant clauses and information which are then collated into outputs that mirror in many ways those that a lawyer would have produced using a manual process.

Indeed, a key debate has been the implications for the junior lawyers who would typically complete the diagnosis work that ML can automate. ML has the potential to reduce the number of trainee and/or junior lawyers needed, this feeding debates about reductions in the size of the legal profession (Law Society, 2021). Questions thus focus on how the training typically completed through diagnosis tasks might be reproduced. Many diagnosis tasks, such as document review, are seen as a crucial way of allowing trainees to develop their skills and experience. If such tasks are automated by ML, training will need to take different forms. Many firms are still working through the implications of such as change, and concerns feature as one of the factors potentially slowing adoption (more on which below). However, one important way to understand the impacts is through recognition of how ML does not just automate. Automation leads into augmentation and hence a crucial question is how trainees

might learn through new tasks associated with working alongside ML (See Faulconbridge et al., 2023, 2024).

Lawyers use the diagnosis outputs of the algorithms to inform inference and treatment work. Whilst then, there is evidence of algorithms replacing human tasks, when ML is used, the algorithms only replace certain tasks and hence collaboration with lawyers is needed to deliver advice to clients. Junior lawyers can often move from spending many hours collating data to spending much more time interpreting the implications of the diagnosis outputs of ML. This can provide training that potentially removes more unproductive time, such as hours spent sifting documents to identify relevant issues. Considering the examples in tables 1 and 2, we found in our research that automation that leads to augmentation results in lawyers:

- Spending less time collating and summarising key facts and information but more time reviewing summarised information and identifying further lines of enquiry to inform decision-making and 'treatment'.
- Being able to spend more time refining, and making bespoke for clients, key documentation with less time spent producing boilerplate contractual/legal structures.

In addition, ML can provide new kinds of insight as part of diagnosis work because of its comprehensive and instantaneous nature – i.e., its ability to review large datasets quickly and efficiently, rapidly generating outputs (Kellogg et al., 2020). Specifically, the opportunity to review more documents during diagnosis work and to complete the task of producing a report more quickly allows lawyers to enhance their offering to clients in two keyways.

First, lawyers can use the ability of ML to identify patterns in large document datasets to not only find important information but also to predict the likely impacts of the patterns detected, such as the value of compensation in an insurance litigation or the risks or opportunities associated with a set of contractual obligations. Second, when using ML lawyers can transform their role from problem solver to problem anticipator and preventer. The comprehensive and instantaneous nature of algorithms means that it is possible to conduct diagnosis work that would have previously been too slow and costly to complete. The insights can then be used to identify forward-looking actions that can benefit a client by reducing risk or exploiting an opportunity. In this approach lawyers become trusted advisors in a new sense that moves beyond responsiveness to a bounded legal matter. For example, in

our research we found lawyers using the comprehensive and instantaneous nature of ML to analyse documentation relating to employment disputes in a large retail organization that resulted in a court case. The patterns identified allowed a risk profile to be developed for each branch and in turn lawyers provided the client advice about anticipatory action to reduce the risk of future disputes.

These kinds of augmentation have important implications for the *spaces* that lawyers work within. They result in the reimagining of the boundaries that define the protected work of lawyers as new advisory services, more closely aligned to what other occupations such as management consultants might provide. Whilst services might still be produced and delivered within law firms, the kind of services offered and the domains they serve change, as might the client base for these services.

If evolution occurs – professionals' responses to ML

The discussion above highlights that the *trajectories* of change of legal work should be understood as a multi-level process. Change occurs at the level of particular tasks, involves a combination of automation and augmentation, and results in both continuity and change in the key ingredients of legal decision making. However, this assumes that technologies are/will be widely adopted by lawyers. This should not necessarily be taken for granted. The most advanced augmentation led changes are currently only found in a smaller number of first-mover firms, with many firms beginning the journey of ML adoption and negotiating the challenges involved, these challenges creating far from linear processes of change to legal work.

The data challenges of AI adoption

The applications of ML to legal work outlined in tables 1 and 2 use ML to automate legal analysis and prediction in ways that are comprehensive (utilising big datasets) and instantaneous (rapidly generating outputs) (Kellogg et al., 2020). ML uses its ability to review large datasets to make processes such as discovery more comprehensive than ever, given that algorithms can almost instantaneously review datasets that would take a lawyer days or weeks to identify. However, our research found that lawyers face a number of fundamental data challenges. ML requires access to large datasets that are organised and

curated in a fashion that allows supervised and unsupervised learning. In some cases, software as service providers use their own data to train ML. But in many cases, ML needs access to the firm's data files in order to generate outputs that are specific to a client (e.g., their existing contracts) or a law firm (e.g., their approach to contract drafting). An initial challenge is, therefore, producing such datasets. Whilst many lawyers have no shortage of documents – in paper or digital form – that could be the basis of a dataset, few have documents organised in a way that are useable by ML algorithms. Significant investment is, therefore, needed to produce data warehouses. But this then triggers a series of further challenges. As well as basic data security questions, our research identified a series of questions that lawyers asked, the answers to which were often unclear and impeded the building of data warehouses:

- Have clients consented to their data being used for ML?
- What are the implications of advising one client using insights from ML that are based on the data of another client?
- Does ML 'leak' client data, if for example the algorithm uses learning from data provided by other law firms to inform is inferences and uses the data ingested during use in firm x as part of semi-supervised learning to further refine the language model and in turn inferences offered to other uses at firms y and z?

When extractive ML is used the risks are lower than generative ML, as the algorithms do not produce recommendations that may contain insights from the datasets used. But as generative ML becomes more significant, concerns about confidentiality are growing.

In addition, questions quickly emerge about the potential risks of using ML when the reasoning behind outputs from algorithms is unclear. The applications of ML to legal work outlined in tables 1 and 2 use ML to automate legal analysis and prediction in ways that are interactive (an active form of agency influencing users) and opaque (the algorithm and the determinations made are black boxed) (Kellogg et al., 2020). ML algorithms are interactive in that they define through their outputs what the lawyers comes to focus on in decision-making, and hence what they are also blind to. The algorithms are also opaque in that the reasons for certain elements being extracted and/or generated, and others ignored, cannot be explained or rendered visible. Sometimes this is referred to as the lack of 'explainability' associated with ML. The interactive and opaque nature of ML thus poses significant ethical challenges that can lead to lawyers being reluctant to adopt the technology (see for example, Swansburg,

2017; Yu and Ali, 2019). Nowhere is this more apparent than in relation to what have come to be known as 'hallucinations' – when generative ML makes errors due to false associations in statistical models. The most highly publicised case in law involved two lawyers being fined after submitting fake citations, generated by ChatGPT, in a legal case in New York (Milmo, 2023). This followed the well-known case of biases in Amazon's AI recruitment tool, that led to male candidates being viewed as preferable (Dastin, 2018). Lawyers are, then, rightly cautious about using ML. The largest firms with the most significant resources have begun to develop large language models based on their own proprietary datasets as part of efforts to overcome some of the data security and hallucination risks (Womack,2023). But few firms have such resources, and the black-box risk remains as the way algorithms make determinations using the data is still opaque.

Furthermore, the way ML uses data implies some important changes to the DNA of legal work. The work of lawyers has typically focused on analysis of written contract and related documentation, alongside precedent, code and/or judgements. Whilst ML and the kinds of use outlined in tables 1 and 2 continue to focus on such written words, there is also a transformation occurring. The analyses that ML conducts transform documents into statistical patterns and probabilities. ML uses patterns identified in datasets to make determinations and predictions in ways quite different to a lawyer reading and summarising. As such, ML changes the basis of legal analysis in ways that few have begun to grapple with. A related change is the transformation of diagnosis through new types of output that utilise the statistical analysis conducted by ML. The examples in tables 1 and 2 can generate outputs from diagnosis including graphs and visual representations of datasets, as well as statistics relating to patterns in the dataset (e.g., clustering of clause types; risks levels for different contracts) and predicted implications (e.g. likely award level in an insurance litigation). Lawyers come to rely on interpretation of statistical patterns and possibilities, this creating new opportunities that change the range of factors considered in inference and treatment work, but also as noted earlier opportunities due to ML's opacity to miss other factors. Such changes to legal work reveal, then, that *trajectories* of evolution are closely tied to the specificities of ML and the way such technologies act.

Changing tasks, changing professional tenets

It is widely recognised that the adoption of new technologies like ML is influenced by not only the technical affordances of the technology but also by interactions with the users and the situated context they operate within (Orlikowski, 2000; Chen and Reay, 2020). In particular, new technologies are consequential for professional practices, practices being "what individuals actually do in their everyday work" (Smets and Jarzabkowski, 2013: 1280). And for lawyers it has been shown that "legal process ripe for automation are seen by many as absolutely fundamental to the business of being a lawyer and thus more sensitive to change" (Law Society, 2018). It is, therefore, crucial to examine how the possibilities that ML present in terms of changing legal work are responded to by lawyers, what influences these responses and the implications for *trajectories* of change. In particular, a key characteristic of lawyers as professionals is their exertion of high degrees of autonomy in their work (see for example, Faulconbridge and Muzio, 2008; Freidson, 2001), this meaning that change is negotiated rather than imposed and partnerships are often conservative and slow to change (Hinings et al., 2018). In addition, professionals are known to recurrently protect their interests through strategies designed to ensure privileged access to resources such as reserved access to legal work (Faulconbridge et al., 2023; Rodgers et al., 2023). These two key characteristics have important implications for how lawyers respond to the changes that ML invokes.

As noted earlier, ML changes the approach to diagnosis work, both automating tasks and transforming them as part of augmentation through statistical analysis (Katz, 2012). These tasks are an institutionalised part of professional identities and occupational affiliations, being tied to processes of learning (Beane, 2019) and the foundations for a lawyer's ability to reassure that all necessary information has been analysed and considered when making decisions and advising clients. Disruptions to tasks by ML are thus responded to in ways influenced by the impacts of change on the sense of self as a lawyer. This means resistance is a common response "because professionals have 'deeply held' beliefs…they tend to strongly resist practices that may conflict with their profession's core tenets" (Bourmault and Anteby, 2023: 2). In other professions studies have shown this leads to attempts to conserve existing work and the mourning of lost work (Chen and Reay, 2020). Or professionals engage in 'contorted coordination' as they try and work around change to maintain what is valued about particular tasks (Pine and Mazmanian, 2017). In our research we found:

- Concerns about whether ML can be trusted, with questions about what might be missed by extractive ML and the implications for a lawyer's liability.
- Questions, as noted above, about what junior lawyers lose in terms of learning and tacit expertise when only reviewing the collated outputs of ML compared to primary engagement with legal documents.
- Uncertainty about how to use and evaluate the outputs of generative ML, particularly when it is unclear whether text in reports is produced using extractive approaches (i.e. copy/paste from a document source) or generative approaches (i.e., new text created by ML based on the algorithm's inferences).
- Anxiety about the impacts of ML on the lawyer-client relationship, when ML becomes a new actor in the relationship, for example present in client meetings (to produce summary notes) and contributing to documents (e.g. review reports) that are the basis for advice.

Specifically, when ML threatens to change lawyers' diagnosis and other tasks, the acceptance of the changes required for the technology to be adopted is not guaranteed. Lawyers are sceptical of the changes and, as a result, the adoption of AI technologies has been shown to be often limited in scale and scope (Rodgers et al., 2023). If ML technologies are to be widely adopted, lawyers must therefore not only change their tasks, but also change key aspects of their institutionalised identity to embed ML within their professional *spaces*. Armour and Sako (2020) describe this as the transition to 'next generation law companies.' Such change to both tasks and identities has been seen in other professions - for example, librarians reinvented their identities when search technologies replaced their information discovery roles (Nelson and Irwin, 2014). However, lawyers and law firms remain conservative and slow to change (Rodgers et al., 2023). The role of autonomy in professional work results in decision-making about means and ends sitting with professionals, and hence they direct how change occurs, and can equally prevent change when it is considered a threat to their interests. This mediating role for autonomy plays an important role in determining the impacts of AI in law firms. Like other PSFs, law firms and their governance through partnership structures evolve in a considered and often slow fashion as partners scrutinise changes, evaluate their justification and seek to protect their interests (Hinings et al., 2018). As a result, our research, like that of Rodgers et al. (2023), found slow and often compartmentalised adoption restricted to one team or practice group and mainly the

automation aspects of ML being used, as part of cost saving efforts, with some of the more advanced augmentation possibilities yet to emerge.

A further implication of the adoption of ML relates to the multi-disciplinarity challenge of deploying algorithms in legal work and the implications for law firms as *spaces* of legal practice. Law firms have been multi-disciplinary spaces for a number of years, in the UK this being facilitated by alternative business structures that allow non-lawyer partners. And across multiple generations of digital technology, it has been observed that professionals have increasingly found themselves working in multi-disciplinary teams, alongside those responsible for deploying technologies (e.g., Barrett et al, 2012; Huising, 2015). In legal work the antecedents of multi-disciplinarity can be found in the era of computer-based knowledge management systems (Brivot, 2011) when lawyers encountered both pressures to codify their knowledge but also to work with knowledge managers to develop tools enhance organisational learning. ML extends the multi-disciplinarity challenge because of the need within law firms for individuals – often referred to as technologists - with the skills and knowledge associated with managing ML, the data it needs and its use (Sako et al., 2022). This goes beyond what an IT department has provided historically, because the individuals play an active role in legal work by configuring and supporting the use of ML. Examples of the active role of technologists in legal work identified in our research include:

- Designing templates for and training lawyers how to prompt generative ML tools, with this prompt engineering influencing the kinds of outputs generated by the tool.
- Creating workflows and routines that lawyers must follow to allow the data to be assembled for ML tools to analyse.
- Setting up sample and review datasets, which influence the data used by ML to make determinations.
- Designing and overseeing the supervised learning process within firms when the process uses firm-specific datasets, which influences how ML develops its understanding of patters and in turn the outputs when used by lawyers.
- Attending client meeting to explain to clients how ML is used and how to interpret the outputs.

The pivotal role of technologists in the use of ML in law firms can challenge both the autonomy and protected jurisdiction of lawyers (Armour and Dicker, 2019). Negotiating

ways to collaborate with technologists and finding ways to redraw boundaries around legal work to define a role for technologists and redefine what is reserved for practicing lawyers creates challenges that need to be addressed (Faulconbridge et al., 2023, 2024). Reluctance and resistance to such change is to be expected, and how partnerships find effective ways to accommodate technologists and their careers inside the protected *space* of law firms remains unclear and challenging in the same way that 'non-lawyer' or non-partnership track careers have always challenged law firms (see Malhotra et al., 2016).

Combined, then, the effects of changes to lawyers' tasks and the data related challenges of adopting AI mean that it is appropriate to ask whether evolution will occur, and if it does occur how the *trajectory* will be mediated by professionals, rather than to assuming it will occur in a teleological fashion. As described earlier, during previous rounds of disruption legal professionals have responded by mediating change in a way that served their interests and resulted in slow and 'sedimented' (see Cooper et al., 1996) forms of evolution as things that lawyers value were protected and change permitted when considered less controversial. The disruptive effects of AI are being responded to in similar ways and, to date, this is resulting in slower and less pervasive change than many projected (Rodgers et al., 2022). This does not mean change is not occurring. But it does mean that change has to be carefully configured to respond to the challenges and concerns associated with law firms, legal partnerships and the specifics of legal work. Table 3 shows how the firms we studied have sought to configure the change process, such approaches slowing adoption and taking time to establish. It suggests the question to pose is what the *trajectories* of change look like as *mediated evolution* occurs, this mediation resulting from the kinds of concerns discussed here and the responses illustrated in table 3.

[Insert table 3 here]

Mediated evolution

Whilst, as outlined in the previous section, there are many factors to consider when analysing the effects of AI on legal work, evidence suggests that changes are occurring, albeit in more subtle forms than 'the end of lawyers' rhetoric might suggest. This section, therefore, considers what a *trajectory* of change characterised by *mediated evolution* involves and the

implications of such a trajectory for how we conceptualise changes to legal work. *Mediated evolution* is a way of conceptualising change in legal work that is material and meaningful, but which is also path dependent and non-linear and thus needs to be understood through situated analysis of the enactment in practice of change.

The material and meaningful nature of evolution draw attention to the importance of understanding how the specificities of the technology mediate change. This paper has documented how ML and its statistical inference capabilities changes legal work materially and meaningfully in relation to what Abbott (1988) classified as diagnosis tasks. For example, the days of the lawyer reading hundreds or thousands of documents as part of discovery or diligence processes, and even producing summary reports relating to key areas of concern for a client or drafting contracts from templates, seem numbered. This implies a refocusing of the attention of lawyers on inference tasks – as Abbott (1988: 48) outlined, these being tasks that relate "professional knowledge, client characteristics and chance in ways that are often obscure". In particular, inference tasks allow the insights from diagnosis work to be transformed into an understanding of the type of problem that exists, why it is a problem for the client and the significance of the risk.

The path dependent and non-linear nature of *mediated evolution* draws attention to how the priorities and norms of the legal profession intervene in the adoption process and also influence how the possibilities of ML are harnessed, with harnessing serving the dual purpose of realising and controlling ML's potential. In particular, this paper shows that controlling the adoption process is important because ML has implications for what lawyers value in terms of their work, the boundaries of the profession and its project, partnerships in law firms and, perhaps most fundamental to the legal profession, the management of risk as data and its opaque analysis by ML creates ethical risks that needs to be managed through careful use and recognition of both flaws (e.g., hallucinations) and the transformation of legal reasoning into a statistic exercise.

Figure 1 summarises the key features of *mediated evolution*. The path-dependent and non-linear characteristics of *mediated evolution* are particularly important because they provide an explanation of the *trajectory* of ML adoption that is somewhat less radical than might be hypothesised. For some, generative ML is capable of generating interpretations and recommendations that reflect the kind of inference work that a lawyer would typically complete following diagnosis, and arguably even extend into the treatment work that Abbott

(1988) describes as the final task in professional activities – i.e., the step that "gives results to the client" and then recommends actions that should be taken to achieve the desired endpoint. The potential for generative ML to engage in both inference and treatment is the basis for the 'end of the lawyer' narrative that has perpetuated in some circles (see for example Fabian, 2020; Wu, 2019). However, to date, most lawyers are not using generative ML to engage in inference and treatment work and software as service providers have focussed on tools that enable lawyers to more quickly assemble in report form the information needed to engage in inference work, even though in theory large language models could answer questions about what a client should do in a given situation. The concept of *mediated evolution* in part helps explain why this theoretical potential of ML is not manifesting itself in the radical change some have predicted. As figure 1 summarises, it results from combinations of the path-dependencies associated with the norms of the legal profession and non-linearity generated by the risks associated with MLs opaque statistical approach. These generate anxiety, concerns and conservative responses that are designed to mitigate risks (see table 3) and prevent change considered too problematic. As figure 1 summarises, this mitigation and mediation creates feedback loops that influence the use cases for generative ML and the way data, interactivity and opaqueness characteristics of ML are managed, the latter being intimately connected to the former and creating further forms of recursive feedback. Hence, *mediated evolution* means there is a disconnect between what ML could theoretically do and how it is being used in actually existing ML applications in law firms.

[Insert figure 1 here]

Indeed, although there is a strong argument that ML will become more refined over time and some of the risks described here might be mitigated, this does not necessarily mean path-dependencies and non-linearity will disappear. As noted above, ML potentially leads to the reemphasising of some roles for lawyers, as well as the deemphasising of others that ML can automate. In particular, it is widely recognised that professionals such as lawyers have a role that goes beyond their technical expertise. At one level, professionals offer human reassurance, empathy and peace of mind that AI cannot deliver (Goodman, 2019; Pettersen, 2019). This is more than a point about human-to-human interaction. It is the way interaction with someone who can reassure and empathise because they have expertise and judgement that legitimates trust and belief in the advice provided as part of a two-way relationship (Legg

and Bell, 2019; Wendel, 2019). Professionals and clients value this relational dimension, and this path-dependency is unlikely in the near future to be fully eroded. Indeed, Pakarinen and Huising (2023) describe 'relational expertise' as the basis for the continuation of some key aspects of the role of human professionals despite MLs rapid and ongoing progression. Relational expertise has three dimensions.

First, relational expertise involves understanding the assemblage of different actors and systems that matter beyond the technicalities of matter at hand. For lawyers this can mean understanding the particularities of a local court or even judge and the implications for a case, the likely response of a counterparty, how an action might interact with particular circumstances faced by the client, and an array of other relational influences on decision about the right response to any diagnosis and inference work. Such expertise is opaque to ML's pattern recognition (as it is not documented in datasets) and thus difficult if not impossible to replicate. Second, relational expertise is associated with an ability to convince someone to follow the prescribed advice. Understanding how to convince different clients of the merits of a course of action, addressing their misgivings and adapting when prescriptions are not followed in intended ways is a crucial part of ensuring successful outcomes. Such adaptive ability, in communication and responding to the actions of a client, seems somewhat removed from the abilities of AI. Finally, third, relational expertise is a result of ecological settlements that have developed over time which locate privilege but also accountability at the level of a profession, as an exclusive and protected *space,* and its individual practitioners. Lawyers are trusted because of the accountability system that differentiates them from, for example, consultants, this system existing because of the recognised risks for clients when dealing with legal matters (Abbott, 2005). The ecology of professions and their different domains of accountability have developed over centuries and whilst not full proof, provide a level of surety that does not exist for ML systems. Debates continue about how to regulate AI, but for the foreseeable future the value of the professions and their regulatory infrastructure seem likely to remain high. Indeed, proposals often focus on regulating lawyers using AI, this challenge seeming quite different and arguable more manageable than the challenge of regulating an AI system itself (e.g., Medianik, 2017; Remus and Levy, 2017).

There are, then, many questions about how legal work and the *project* and *space* of the legal profession will evolve. This article has argued that the *trajectory* of change is likely to see more lawyers working with AI, and ML specifically, but with twists and turns as both the opportunities, limitations and risks of AI emerge as part of *mediated evolution*.

Conclusions

Advances in the capabilities of ML are without doubt one of the most significant developments in the *context* in which lawyers practise. The ability of extractive and generative ML to perform some of the tasks of lawyers is driving a *trajectory* of change that is disruptive and will define the future of the legal profession. In this article it has been argued that the *trajectory* of change invoked by ML is best viewed as *mediated evolution*. Questions should focus less on 'how many jobs' or the 'life or death of the lawyer' and more on the way the tasks and role of a lawyer will evolve, in particular as some aspects of what a lawyer does is deemphasised because of the capabilities of ML, whilst other aspects are emphasised as automation and augmentation work hand-in-hand alongside lawyers to deliver the best possible services to clients. *Trajectories* of change will be mediated by the legal profession itself as it responds to the opportunities and threats experienced. Studies thus need to focus on actually existing uses of ML and not just the theoretical potential and hype that often surrounds discussions of change.

Future research will, then, need to track *trajectories* of change to understand how lawyers, law firms and the legal profession respond to the disruptive force that is AI. Change will not be teleological and hence careful analysis of what is and isn't changing, the effects of the responses by lawyers, and the implications for the role of lawyers in society will be required. Without doubt, the factors relevant when considering *mediated evolution* will change over time as ML continues to develop in its capabilities and approach to inference and prediction. The task, then, is to understand in an ongoing manner how as one set of mediators recedes others emerge and the implications for change. The framework developed here, which combines consideration of path-dependencies alongside non-linearity, is suggested as a way of conceptualising what inevitably will be a dynamic and ongoing story of evolution.

Data access statement

Due to ethical and commercial issues, data underpinning this publication cannot be made openly available.

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Table 1: The use of extractive machine learning in law firms

'Off the shelf' tools	Legal work changed	Examples of use
Kira Luminace LegalSifter Casetext ThoughtRiver	Discovery phase including document review	Automation of previously manual reviews to identify relevant clauses and concerns. Opportunity to increase the scope of review to more documents (e.g. from a sample to 100% review process) Pro-active reviews of document datasets to identify opportunities or risks (e.g. post-merger review of inherited commercial lease agreements)
LawGeex ContractSifter HotDocs	Contract review automation to identify areas of concern and proposed amendments	Automation of initial reviews with lawyers using output of AI. Client self-service for basic contract review, with lawyers focused on addressing problems identified and most complex contractual drafting.
Relativity Logikcull Exterro Everlaw Visallo	Investigatory processes and collation of evidence from a range of sources.	Automated assembly of evidence base (e.g. all of the property and titles data in pubic records as part of commercial lease contract negotiations). Assemble of data in response to disclosure and freedom of information requests.
Premonition CaseText Gavelytics	Case diagnostics and identification of key insights that inform likely approach to a case.	Identification from datasets key variables that influence likely value of compensation in a litigation case. This is used to decide whether to accept the work and/or approach to litigation (e.g. whether to contest a case depending on financial implications of a settlement).

Table 2: Emerging uses of generative machine learning in law firms

Use case	Use of generative ML	Impacts on legal work
Review report production (e.g. lease title documents)	Searching document bundles, identifying relevant clauses/materials and collating insights into review report	Lawyers no-longer collate and review documents. Main diagnostic task is to review report produced by generative ML, address omissions and verify key facts and their provenance.
Client file note production (all types of work)	Meetings and telephone/videoconference conversations recorded and summary produced which can be added to client files.	Lawyers no-longer make notes and type file note. Main task for lawyer is to review and amend note produced by generative ML to correct misinterpretations or inappropriate contents. Can include consumer legal work, from initial case initiation meetings to witness statements.
Client triage process (matrimonial and personal advisory services)	Clients asked to respond to pre-design questions that allow the most appropriate lawyer to be identified and to provide an initial indication of the main areas of concern.	Lawyers no-longer offer initial consumer client guidance about most appropriate source of advice and key areas of concern for client. Instead, they use the initial ML diagnostic work to skip to latter stages of diagnosis where issues identified by ML are further examined.
Legal drafting (all types of work)	Productive of draft legal documentation using generative ML which draws on firm-specific precedent banks alongside standard documents and practice notes in commercial databases.	Lawyers works from first draft rather than producing first draft. Draft edited and adapted based on lawyer's understanding of specificities of client needs.

Table 3: Responses to the challenges of machine learning adoption in law firms

Impacts of and responses to concerns about changes to lawyers' professional practices
Data literacy – campaigns to make lawyers aware of the value of the data held, if the data is appropriately stored and organised. Use of awareness raising to convince lawyers of the benefits of more carefully managing data. Development of understanding within the firm of how to use ML in ways that restricts data used for supervised/semi-supervised/unsupervised learning and prevents data being used by algorithms for learning that feeds into public databases.
Compartmentalised adoption - within one practice group/team, with intense efforts to address concerns within the group/team in a way not feasible across the entire firm. Often technologies only used by a sub-set of lawyers within a team (e.g. trainees; those completing particular diagnosis tasks), minimising disruption to a small number of lawyers.
Sceptical review – treating the outputs of ML as provisional and uncertain, with full review by a lawyer. For trainees, emphasis on use of ML to only replace less useful aspects of manual processes (e.g. typing of notes from a meeting, assembling draft from clause bank), with all other aspects of a fact-checking, justification of interpretations and questioning of information that both facilitate learning and ensure rigour given additional emphasis and presented as something that can be done more carefully using time released from manual processes.
Risk education – developing understanding of how ML operates and the differences between extractive and generative forms and the professional scepticism needed. Firm policies on ML use provide guidance and boundaries designed to mitigate risks.
Client enrolment – engagement with clients to understand their appetite for the use of ML and expectations about use by lawyers and to develop understanding of ML's role as actor in legal work.
Technologist-partner dyad formation – efforts to break down barriers between lawyers and 'non-lawyers' through close working relationships between partners and technologists who collaborate to direct use of ML. Use of dyadic relationship to legitimate input of technologists into decision making, but in a way shaped by understanding developed from working with a partner. Sometimes complemented by a partner interested in technology converting to a lead technologist/innovation role, this status as a partner creating legitimacy and providing a direct line into partnership boards and decision-making.

Figure 1: Machine learning and the mediated evolution of legal work