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Tracking the New Demand for Justice in the Big Data Ecosystem

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Abstract

Many studies have focused on the possibilities that organizations have to mine and analyze, through computational analytics, the huge amount of structured and unstructured data that is now available, to determine correlations and thus reveal patterns, trends, and associations to predict human behavior, as well as to transform this information into knowledge for companies and governments—that is, solely from the point of view of the suppliers of goods and services. In this paper, we contribute to the Law and Economics literature by showing that the logic of Big Data, access to the Cloud, and the use of Artificial Intelligence are drastically changing the ordinary citizen's way of making decisions in the field of justice; and that this new paradigm in the Demand for Justice will mean improvements in terms of both equity and efficiency, and ultimately an improvement in social welfare.

Keywords: Litigation, Justice, Legal, Courts, Law and Economics, Big Data, Ecosystem, Demand.

Introduction

Big Data logic and solutions are increasingly penetrating all economic and productive industries. They provide a wide range of benefits, including innovation, communication, and freedom of expression. And as the Big Data ecosystem deepens its incorporation into everyday life, economic, and social activity, it generates value and provides actionable intelligence for governments, businesses, and individuals.

Both the definition and the scope of Big Data have evolved exponentially in a short period of time. Big Data and the use of Artificial Intelligence allow us to convert that enormous amount of structured and unstructured data into knowledge, which can be of great help in making decisions in any field. For example, many applications have been developed in the business environment, ranging from increasing and assessing the performance and productivity of businesses—enabling them to leverage data of different types and optimize their warehousing—to improving security for companies across all industries.

As Siegel (2016) points out, predictive analytics may help find ways to increase consumer buying, limit bank loan defaulting, anticipate employees quitting, or predict which people will drop out of school, cancel a subscription, or get divorced before they are even aware of it themselves. And of course, these applications include how insurers use life expectancy estimates to make policy approval and pricing decisions; how the state of Maryland (US) uses predictive models to detect inmates who are most at risk of becoming perpetrators or victims of murder; or how software like PredPol predicts progressions that could lead to waves of crime.

Today, Artificial Intelligence tools are used in a wide range of areas such as national security, disaster and resource management, climate change, conflict prevention, disease eradication, economic development, good governance, management of cities, and many government economic policy instruments. On an individual level, an overwhelming majority of citizens participate in Big Data on a day-to-day basis. To begin with, having their lives so digitalized, ordinary citizens continuously transmit a huge amount of data about where they are, how long they stay in each place, what device they are using, what they are doing with it, what they are searching for, what kinds of physical or virtual products they are interested in, etc. And at the same time, Big Data allows them to receive personalized suggestions on purchases, know the arrival time of the next bus, automatically include an upcoming trip in their agenda, receive alerts (from official sources or other drivers) about traffic jams on the road, know the problems a patient has faced at a hospital they plan to visit, or view real-time photos taken by tourists with their mobile phones and posted on tourist services websites—in addition to all the information shared on social networks. Almost without realizing it, humanity produces and sends millions of bytes to the Internet every second.

Various interesting applications already exist in the field of justice. For example, a large number of Cloud-based legal practice software applications have appeared, enabling lawyers to improve their performance by reducing search time for

legislation and legal precedents, including tools for time tracking, billing, and case management, among others. In addition, using the tools of Collective Intelligence, some researchers have conducted a crowdsourcing study that predicts Supreme Court decisions. And other studies look at how Big Data techniques are impacting environmental justice activism or how predictive policing software can contain and generate biases as pernicious feedback loops are created.

Surprisingly, little attention has been paid to the effect of Big Data, access to the Cloud, and the use of Artificial Intelligence on the demand for judicial and legal services. The aim of this article is to show that the logic of Big Data and these technologies are drastically changing the way the average citizen makes decisions in the field of justice; and that this new paradigm in the Demand for Justice will mean improvements in terms of both equity and efficiency, and ultimately an improvement in social welfare.

In the next Section, we briefly discuss some examples of the breakthroughs that the use of Big Data has had in various spheres of the economy and society, showing the challenges that it still presents; and in the third Section, we describe the use of Big Data and Artificial Intelligence (AI) in the field of justice in general. In the fourth Section, we analyze the effect that the Big Data ecosystem has on litigation. Finally, the last section presents some conclusions and final ideas on the new risks that its use can bring to the generation of new statistics in this field and to decision-making in general.

The Big Data Breakthroughs

Although the first reference to the term Big Data at an academic level appears in Cox and Ellsworth (1997), the widespread use of Big Data as we know it today dates back only to 2012 (a lifetime ago in Internet time).

In this short space of time, the definition of Big Data has evolved significantly. The initial concept incorporated only a flat definition, which associated it merely with the existence of large volumes of structured and unstructured data that could not be processed with traditional tools. Later on, the concept was expanded to include not only the data itself, but also the set of technologies that allowed data mining and its conversion into useful information, and into tools for making business decisions using Artificial Intelligence (AI).

In the business world, during the last 30 years, we have spoken of Business Intelligence (BI) to make reference to the set of strategies and tools that a company has at its disposal to analyze the data of its organization. We also talk about Data Mining, which uses mathematical analysis to derive patterns and trends in data, making it possible to extract actionable information from large datasets (Puyol Montero, 2014). We now use a broader concept, which incorporates a change in the way in which a diversity of areas of society—such as trade in goods and services of all kinds, industry, technology, healthcare, education, arts, humanities, and social sciences, among many others—will develop in the coming years, thus becoming a

paradigm shift in the use of information. As Hilbert (2016) writes, "the key feature of the paradigmatic change is that analytic treatment of data is systematically placed at the forefront of intelligent decision-making. The process can be seen as the natural next step in the evolution from the 'Information Age' and 'Information Societies'... to 'Knowledge Societies'".

During these years, a good part of the effort related to Big Data has concentrated on the development of software that allows the management of this enormous amount of data—not only according to its volume, but also according to the many and diverse sources from which it could come—and on the possibility of not hosting these data in a centralized way (which at first was thought to reduce costs), but distributed across many nodes. This eventually led to the introduction of Blockchain technologies that, having their origin in the management of Bitcoin, added advantages in terms of information security and transactions.

Recognition of Big Data's scope has also grown significantly in this short period of time. The first practical advantages of Big Data were evident in its ability to predict customer behavior, both regarding the type of products to be consumed (which allows the organization of the production structure) and the quantity, place, and dates of consumption (to speed up the distribution of goods in those places and moments where they will be demanded). This has made it clear that a substantial part of a company's revenue flow depends on the data provided by customers. In the digital age, the most valuable resource is data; so since the dawn of this new era—the Big Data era—it became clear that the first requirement for selling in the Cloud was to convince potential customers to share their data.

At this point, it is also worth mentioning that, in parallel with this development, and particularly in recent years, various sources of concern have arisen from governments, citizens, and experts in these technologies regarding both personal data privacy and ecological impact, as well as the inability of legacy computer security systems to counteract new methods of cyberattack. According to Kate Crawford, principal researcher at Microsoft, it is dangerous to think that Big Data sets—even large-scale data—are inherently objective, anonymized, and include tacit or explicit consent or an opt-out function; research by computer scientists continues to show that even anonymized data can be reidentified and attributed to specific individuals.

Much of Big Data's potential lies in discovering, with the help of the fastest equipment and new analytical techniques available today, the hidden correlations that may exist between the hundreds or thousands of existing variables in these enormous volumes of data. This allows patterns, trends, and associations to be revealed, with the aim of predicting human behavior. One of the best-known pioneering examples is Amazon, which, in order to increase book sales, used to rely on a team of editorial advisors. This team, after studying the past purchases of each individual client, offered recommendations for purchasing other publications. This sales incentive system was not only expensive—as it was very intensive in the use of qualified personnel working

individually on each former purchaser—but its effectiveness was not very high, as it generally resulted merely in recommending titles similar to those already purchased by each client. When Amazon began to use its own Big Data, compiled from the data of hundreds of thousands of its customers (incorporating not only past purchases but also countless personal characteristics), purchase recommendations became significantly more profitable. First, it allowed a wide variety of editorial suggestions, which converted into actual purchases at a higher rate. In addition, being the result of digital algorithms, the service could be offered massively at very low cost and in a very short period of time.

Big Data's ability to predict future behavior has been one of the main arguments for promoting the massive use of technologies to harness its potential. In some cases, this fervent defense of its use has gone to extremes, with proponents claiming that these technologies will replace the statistical-econometric analyses that study causality. The underlying argument would be that it is no longer necessary to know *why* things happen. To give an example from the health sector, if Big Data can predict when the next peak in purchases of anti-flu drugs will occur, knowing how the virus entered the country or spread among the population might seem irrelevant to the pharmaceutical company. In our view, however, it is quite clear that the sole predictive capability of Big Data does not solve the health problem. Although the possibility of predicting which people will develop cancer in the future has enormous value for early diagnosis, it does not solve the underlying problem. In order to obtain a cure or vaccine for this disease, it is necessary to study its mechanism; in other words, in order to finally discover how to reverse the process from its origin, it is necessary to analyze how the disease originates and spreads in the organism. As Dunham (2015) writes, "problems arise when decision makers rely solely on data and omit vital knowledge about the subtleties of citizens and processes".

These limitations of Big Data for problem-solving extend to almost any other field, including, of course, the field of justice. While it is true that the possibility of predicting a sudden peak in demand for judicial services in a given geographical area could be very useful in the early allocation of support staff, it is clear that this short-term measure will not solve the structural problems of judicial delay at all, as the increased supply of court services will most likely lead to a subsequent increase in litigation, largely offsetting the benefits of the allocated reinforcements. This feedback effect between supply and demand—which explains why continuous increases in the resources devoted to justice do not usually reduce delay—is well known in the field of Law and Economics, and only addressing it will help mitigate it. Thus, the mere prediction of future litigation levels based on new correlations generated by Big Data, although very useful for the study of new causal relationships, is not sufficient to solve existing problems. As Google's chief economist Hal Varian says, "It's not the ingredients that are critical, it's the recipe... the algorithms, the analysis, the business decisions that come from looking at that data and analyzing and understanding it".

Despite these shortcomings, the potential of predictions offered by Big Data logic, along with the use of AI, is huge. And the scope of these technologies can be endless. For example, it is now publicly known that, using AI technologies, the US National Security Agency analyzes foreign communications, including screening locations, keywords, and transactions in Internet searches obtained from a range of sources, including US-based communication providers such as Microsoft, Yahoo, Google, and Facebook (Cumbley and Church, 2013). The justification given is that the analysis of that unstructured data, including facial recognition technology, has helped prevent many terrorist attacks. Also, with the use of AI, banks and insurance companies are improving their credit scoring systems, and tax offices increase the detection of benefit fraud or tax evasion cases. In addition, these technologies make it possible to predict some macroeconomic variables ahead of official statistics, allowing for earlier economic policy actions. And the use of Big Data, Cloud, and AI applications in the field of justice is no exception. We focus on this subject in the following Section.

The Current Use of Big Data and Artificial Intelligence in the Field of Justice

Forty years ago, Prendergast (1977) offered the first insights into how data processing could benefit legal practitioners. Of course, the World Wide Web did not exist at that time, and there was no mass gathering of information. However, this author showed that it was already possible to visualize the potential that the systematization of information could have, as well as the reluctance of some legal professionals to rely on the results obtained.

For years, many professionals have not considered data as a source of value, but only as a source of more work. And although there were already some advocates, in the legal area mistrust of the potential of digital tools emerged long before the current concerns about the problems that the Cloud and AI could pose for personal data security.

What benefits has the current use of Big Data brought in the legal and judicial sphere? The IT tools associated with the Big Data ecosystem offer cost, time, and labor savings, as well as increased profitability for law firms. As Prendergast (1977) forecasted, "with an understanding of data processing, the attorney will be able to provide better service to his clients at reduced cost and handle complex cases involving masses of information. Using the technology available, he can effectively and efficiently marshal the masses of data at his disposal and correlate this data to his legal knowledge of the case; and this combination will be highly effective".

In recent years, a large number of cloud-based legal practice software applications have appeared, enabling lawyers to improve their performance by reducing time spent searching for legislation and legal precedents, including tools for tracking time, billing, and case management, among others. According to Nelson and Simek (2013), analytics software can speed up management tasks, such as distributing cases, projecting revenues, projecting case budgets, and—most important of all—predicting outcomes and making fee estimates based on previous matters involving similar

factors. With all this, it is also possible that law firm budget forecasts may be more reliable. Moreover, in recent times, as a result of the increasing power of computers, large law firms have started to incorporate Big Data into their private activities and internal operations, gathering information from thousands of their own prior clients, which allows them to estimate their chances of success in each specific case depending on which court the case has been assigned to and other specific factors.

In addition, although its use has not spread too widely, there are several interesting essays that apply Big Data and Collective Intelligence in the field of justice. For example, as mentioned above, a group of researchers has conducted the largest crowdsourcing study to predict Supreme Court decisions. Players of Fantasy SCOTUS (an online fantasy league) do not need any special qualifications, but as Katz et al. (2017) have shown, crowds can make surprisingly successful predictions, sometimes even better than the smartest individuals among them. In fact, these types of results led these authors to construct a model designed to predict the behavior of these courts in a generalized, out-of-sample context, achieving outstanding results (70.2% accuracy at the case outcome level).

In addition, as in the commercial field, AI tools are beginning to help advertise legal services more effectively. At the same time, they increase the quality of services offered to clients by allowing lawyers easier access to more information on precedents and legislation (Vargas Pérez and Peñaloza Figueroa, 2017).

Of course, although its potential is enormous, the logic of Big Data and AI cannot do without the expert judgment of lawyers and legal analysts. It is necessary to make sense of the data in order to transform that information into knowledge and make efficient decisions. And that should be the goal of any Artificial Intelligence software applied to the field of justice. As Ford (2016) states, after observing patterns and trends of behavior, we need theoretical frameworks to interpret that behavior: "Once the goals are defined, the attorney, with the assistance of data processing personnel, can work backwards from these goals and define, step by step and in minute detail, exactly how the computer is to use the information to reach those goals. This process results in the systems design". That is, we need what Wang (2013) calls Thick Data: "Big Data delivers numbers; Thick Data delivers stories. Big data relies on machine learning; Thick Data relies on human learning".

Finally, it should be remembered that the quality of justice received by the average citizen does not depend solely on the services received from their legal representatives. The functioning of justice depends on many other factors, with delay being particularly worrying. This is why the study of the supply and especially the demand for court services has occupied a large part of the economic analysis of law in the last forty years. The demand for justice in the new Big Data ecosystem is what we will discuss in the next Section.

The Potential of the Big-Data Ecosystem in Litigation

The way citizens approach the world of justice is changing. The lack of information, as a barrier to access to justice, is disappearing thanks to the thousands or millions of users who exchange experiences on the Internet. Thanks to the Internet of Things (IoT) and other connected devices, we all contribute to Big Data on a regular basis and can make use of existing information on the Internet and the advantages of Artificial Intelligence. And there is not a big distance between asking other Internet users about the characteristics and properties of an item for sale and asking them about hiring one lawyer or another, or about the convenience of filing a lawsuit versus reaching an out-of-court settlement.

In the last decade, the Internet has replaced the telephone—and even part of face-to-face direct communication—as the basic, bidirectional, general-purpose means of communication. Cloud computing allows on-demand self-service of information, and most individuals now have instant access to vast amounts of information, which provides a wide range of benefits.

Unlike the legal business environment, where an investment in software and, above all, a change in the mindset of lawyers may be necessary to make intensive use of Big Data logic in their daily work, this obstacle no longer exists for ordinary citizens. A large part of the population, at least in developed countries, owns a smartphone or another device for accessing the Internet and is increasingly used to turning to it for information, opinions, and experiences of other citizens on various subjects.

In the last 40 years, several papers have examined the possible determinants of the demand for court services. Decisions on whether or not to go to trial depend on, among other factors, estimates of trial costs, estimates of the chances of winning, estimates of waiting times to obtain a court judgment, the belief that obtaining a judgment means that the defendant will automatically pay what the sentence states, or the belief that no tax must be paid on the amounts received after the trial (which includes the winning party's costs paid by the losing party). That is, the demand for court services crucially depends on the information parties have (and the estimates they make) regarding different variables that are often unknown to a greater or lesser extent and/or factors that are not under their control, even after filing the lawsuit and during legal proceedings (Vargas Pérez and Peñaloza Figueroa, 2017).

In the first place, with respect to estimating the chances of winning the case, Voigt (2016) concludes that if both parties have a "realistic" evaluation of their chances of winning (and losing) the case, then we should not observe any civil trials, as a pre-trial bargain is expected to be systematically cheaper than taking the case to court. On the other hand, Pastor (1993) states that agreements occur when perceptions of results coincide, or when both parties are very pessimistic. As demonstrated in Vargas Pérez and Peñaloza Figueroa (2017), such negotiation does not depend on whether their estimates are realistic or not, but on the relationship (and difference) between such estimates. To a great extent, in the absence of more information, those estimates depend on information transmitted by lawyers to their clients and, in general, on the

amount of information that the parties possess. But now, in the Big Data ecosystem, these estimates will become increasingly similar—as this same information will be available to both parties—which is likely to increase the number of cases resolved through out-of-court settlements and lead to a reduction in the demand for court services.

In the second place, when estimating litigation and settlement costs, clients usually have much less information than lawyers about the stages of the proceedings, the time that can elapse until a final judgment is reached, the private costs of the proceedings, or the possibility of an out-of-court settlement. With such a lack of information, estimates may be influenced by the strategic behavior of lawyers, as their incentives to go to trial or bargain may differ from those of their clients. However, the increasing use of Big Data logic not only allows for more and better information obtained from "real users", but also changes the way clients deal with legal proceedings. When ordinary citizens make use of Big Data logic, they can get first-hand information about court proceedings and other possible ways of resolving conflicts, as well as the costs incurred by hundreds of users in the past—all in real time, detailing the type of matter, the amount at issue, the jurisdiction, or any other variable that may alter the outcome; variables that may influence their decision to go to court and the strategies to follow.

Also, the Big Data ecosystem not only changes the "estimates" of proceeding costs, but the costs themselves—especially those relating to lawyers' fees—for a couple of reasons. First, as the market becomes more competitive, fees per case tend to fall; and second, because in the Big Data environment, pricing moves toward contingency fees.

In addition, as shown in Vargas Pérez and Peñaloza Figueroa (2017), this lack of information causes consumers of court services to face a number of asymmetric information issues, including adverse selection and moral hazard/principal-agent problems, which have important effects on the possibility of reaching out-of-court agreements. Nevertheless, with greater access to the Big Data ecosystem, the problem of adverse selection will be reduced, as potential clients will be able to obtain extensive information from previous clients about the type and quality of services offered by different law firms, allowing them to better choose the services they need. And although individual citizens may have few additional tools to monitor their own attorney's performance, by making use of Big Data logic, they can draw from other clients' experiences. This will be perceived by law firms as greater oversight of their work and will change lawyers' performance, courtroom strategies, and overall effectiveness, thereby reducing moral hazard issues.

Moreover, the fact that citizens can study in depth the conditions they will face in a potential lawsuit, from their own home or office, encourages clients to be more adventurous in hiring new services or professionals with whom they have not previously dealt, allowing new law firms and lawyers to establish a place in the market. This further enhances competition, allowing customers to access lower prices

and services closer to their preferences, thereby increasing efficiency in the professional services market.

Besides, the new exchange of information between users of justice will allow the number of disputes initiated by overly optimistic expectations to be reduced, so that some inefficient disputes will disappear (thus reducing the inefficient collapse of courts). In turn, this will allow courts to resolve cases for other citizens or companies that genuinely require a judicial solution in a shorter period of time.

In addition to the benefits mentioned above, this new access to Big Data logic will encourage ordinary citizens to have greater incentive to learn about their rights and options for action in society. The integration of the Big Data ecosystem into the environment of the potential user of justice will allow them to better understand the content and meaning of laws in general, and the law applicable to their particular case, while improving their confidence in having made the right decision.

Finally, with access to Big Data and the use of Artificial Intelligence tools, potential users of the legal and judicial system begin to make decisions with a broader knowledge of existing alternatives and the results achieved in cases similar to theirs. This can be interpreted as a better-informed decision-making process (which increases the efficiency of actions taken), greater and better access to justice in its broadest sense, and an incentive for users to become more involved in the process and take greater responsibility for the results.

Therefore, it is clear that although Big Data and the use of AI are generating enormous efficiency improvements—with a consequent increase in profits—for suppliers of goods and services, considering Big Data as useful logic solely for companies and governments underpredicts the great potential that changes in human interactions with new technology have for the well-being of the average citizen. In short, this new Big Data ecosystem promotes greater information symmetry, broader access to services that meet consumer needs, freer entry for new professionals, lower costs, increased competition, better legal representation for clients, and superior decision-making by and for citizens. Overall, it represents a clear gain in terms of efficiency and equity, and ultimately an increase in social welfare.

Final ideas

Access to the Internet, the Cloud, and the Big Data ecosystem, as well as the use of Artificial Intelligence, is significantly changing the demand for court and legal services. It is not just a matter of having more data to make decisions. As we have seen, it is a new strategy that complements—in important ways—the information usually offered by lawyers, who typically provide a specific recommendation on which option to choose. This set of external yet valuable experiences allows potential court users to participate more fully in deciding how to resolve initial conflicts, reduces uncertainty and information asymmetry, enables them to make better-informed decisions, and encourages them to play a more active role in the decision to

litigate (or not) and in the steps to be taken at each stage of the process. At the same time, through a variety of mechanisms, the market for professional legal services is becoming more competitive, improving service quality, reducing client costs, and allowing greater market access for younger law firms. Thus, the new Big Data ecosystem is increasing the quality of court and legal services, improving access to justice, and enhancing efficiency in the judicial sphere, which ultimately leads to an increase in social welfare.

Of course, we still need to remain aware that these technological changes, which will soon penetrate the judicial sphere, can be a double-edged sword. In addition to known risks coming from ecological impacts, invasion of privacy (blurred in the increasingly confusing distinction between private and non-private data), and the risky temptation to mistake "correlation" for "causality" discussed earlier in this paper, immersion in the Big Data ecosystem introduces new challenges.

Although the results of an algorithm, such as those arising from Artificial Intelligence applied to Big Data, carry the appearance of being completely rational and objective, we must bear in mind that their application may introduce new biases. For example, in crime prevention, even minor offenses threaten to skew analysis, because once this data flows into a predictive model, more police are drawn to those areas, making them more likely to arrest more people. This may lead to the conclusion that crime has increased in the monitored area, whereas in reality, it is the application of the algorithm that introduces bias into the resulting crime statistics, in addition to reinforcing discriminatory criteria. As Neff (2013) claims, "Data are not neutral... Put simply, data is only data in the eye of the stakeholder". Such biases can be extrapolated to any field, from detecting new needs for judicial services to locating potential clients or identifying underperforming employees or departments in a law firm. If Big Data algorithms are applied blindly, without accounting for this feedback loop and without expert oversight by domain specialists, distorted statistical data will be generated, leading to biased corrective or preventive measures and flawed decisions in general. Not only will the potential benefits of Big Data be largely offset, but new problems will be unknowingly introduced, reducing citizen welfare and corporate profits.

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