

eBOOK

## **Document AI:**

**A business user's guide to using natural language processing for document review and analysis**

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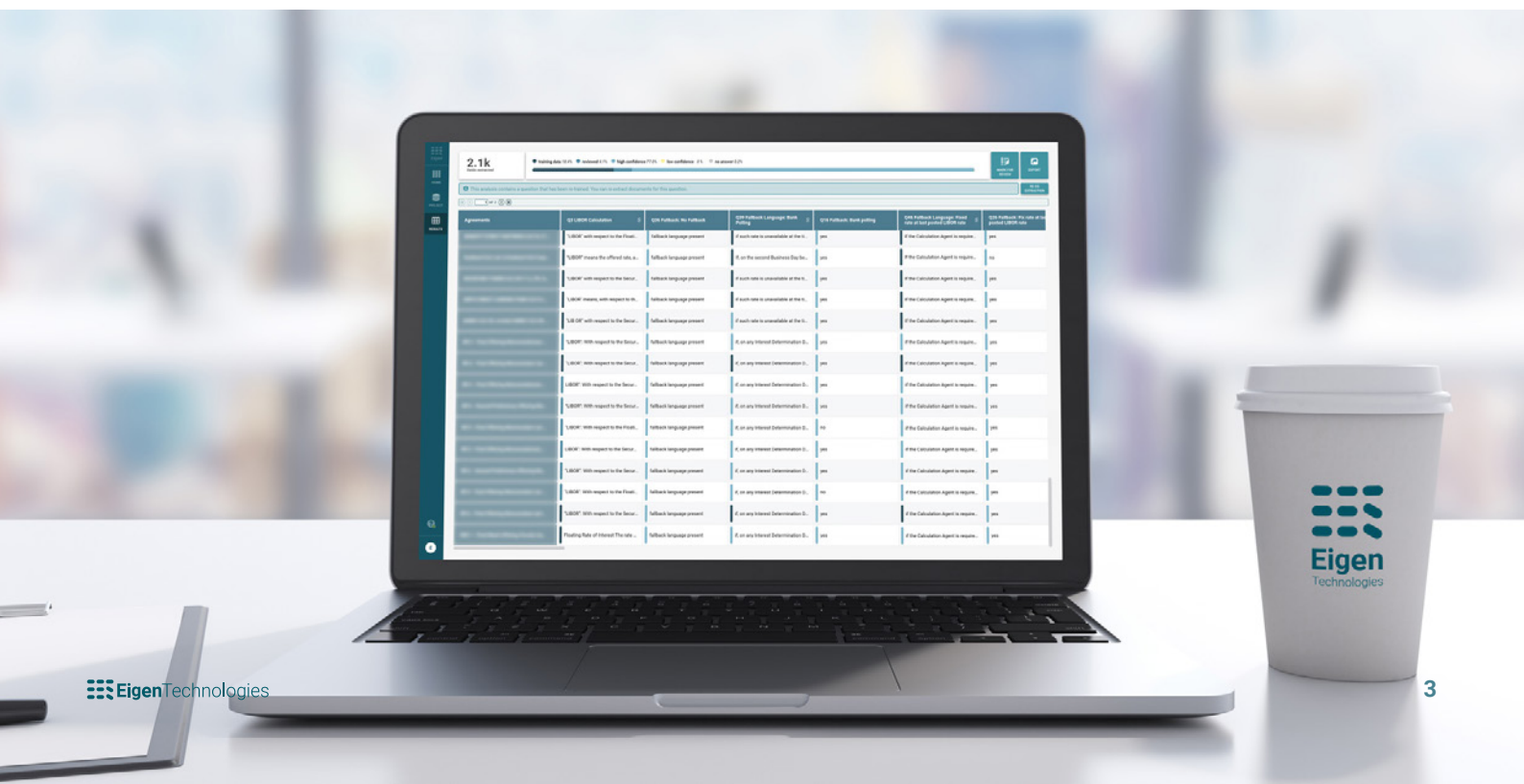
## EXECUTIVE SUMMARY

As the world becomes increasingly digital and reliant on technology, there has never been more data at our disposal or challenges around analyzing it. Data is a precious commodity, and companies worldwide in every industry are grappling with how to unlock the power of their data in ways that enable their human workforce to reach new heights of success. Artificial intelligence (AI) plays a crucial role in meeting this challenge providing businesses with a tool to help them locate and analyze the right information and use the resulting insights to improve decision making.

Document review and processing is an especially challenging endeavor that AI can solve. Many organizations need a better way to extract value from their documents. Experts estimate that approximately 80% of a company's data is unstructured: written text containing dates and numbers that are locked inside unstandardized files. By extracting, analyzing, organizing and interpreting data buried in digital and paper documents, Document AI can transform how we review, process, and ultimately gain valuable insights from text-based documents. This technology is being adopted by financial services firms who need to understand and analyze diverse types of documents at scale to understand things like provisions, restrictions, governing law, key dates etc. And the events of 2020 have accelerated the adoption rate as businesses have had to assess emerging risks

and opportunities and find new ways of working. More than ever, businesses need an in-depth understanding of critical information trapped in their documents to effectively manage risk, seize opportunities, automate processes and scale operations. Using machine learning techniques, Document AI learns from experience, adjusts to new inputs and performs the document analysis faster, and cheaper than humans can and with fewer errors. It provides a repeatable and scalable solution to a myriad of unstructured data and document-related problems, making it an essential component in the tech stack for companies implementing digital transformation initiatives across their enterprise.

In the following pages, we will demystify Document AI, explain how it can increase efficiencies across your business. We will share examples and use cases to demonstrate how the technology works and the results clients have seen across various projects and processes. We'll provide a guide for selecting a Document AI provider, including the questions to ask and what to look out for in terms of red flags. We'll also cover the subject of straight-through processing before wrapping-up with how Document AI can accelerate your digital transformation initiatives across your enterprise.



## 2. What is Document AI, and how can it help your business?

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In every legal TV drama, there's a scene where a crack team of lawyers arm themselves with yellow highlighters and scour boxes of documents around the clock in search of a specific piece of information. After spending several sleepless nights at this task, someone finds the proverbial needle in the document haystack that eventually wins the day. While this tension might be entertaining to watch, the reality for those that have experienced it is much less fun. It's also highly likely that the crack team of lawyers didn't find all the salient information in just a few days/nights. Sorry if we just ruined the illusion, but the process of manually reviewing reams of documents is incredibly slow and inefficient. It's also expensive and prone to error.

In the real world, most documents now exist electronically and, more importantly, technology has evolved to eliminate the need for manually reviewing documents altogether. This technology is called Document AI, and it can be used in any industry that needs to transform data that is siloed and unstandardized into a structured, usable format at scale. Document AI enables organizations to quickly and precisely extract and classify data whether its legal paperwork or financial reports as well as a myriad of different document types so they can make better, faster decisions.

### But what exactly is Document AI technology?

Let's start with the AI component of Document AI. Artificial intelligence (AI) is the use of any computer method to 'train' machines to mimic human intelligence so they can complete repetitive or complex tasks for us or predict outcomes. AI is already present in our day-to-day lives powering things like auto-correct on our phones, ride-hailing apps like Uber and Lyft, online purchase recommendations and facial recognition on Facebook.

Machine learning (ML) is the process of using patterns in data to 'teach' the machine, so its performance and predictions become more effective and accurate over time. Natural language processing (NLP) is the branch of AI focused on leveraging ML techniques so the machine can understand and interpret human language. The diagram below shows the relationship

between AI, machine learning and NLP.

In the case of Document AI, ML and NLP are used to train a computer to simulate a human subject matter expert's review of a set of documents. The result is a computer capable of 'understanding' the contents of documents, including the contextual nuances of the language within them. The technology can then accurately extract information and insights contained in the documents as well as categorize and organize the documents themselves. A Document AI platform sits on top of the technology enabling users with no previous AI, ML or NLP experience to quickly train the computer to extract the specific data they need from different document types. The platform puts the power of machine learning in the hands of non-technical teams like lawyers, analysts and accountants.



## ARTIFICIAL INTELLIGENCE:

Using machines to complete complex tasks. Any technique that enables computers to mimic human intelligence. Example: self-driving cars, AlphaGo



## MACHINE LEARNING:

Statistical techniques that enable machines to improve tasks with experience by learning from and making predictions based on "patterns. Get computers to act without being explicitly programmed. Example: recommendation engines



## NATURAL LANGUAGE PROCESSING:

Machine learning techniques to understand and interpret human language. Example: chat bots, document review

Figure 1: The relationship between AI, ML and NLP

## Why might your business need Document AI?

We are six decades into the information age and, by any measure, data has become a competitive currency in business. Yet, experts estimate that more than 80% of a company's data is unstructured. This data typically takes the form of written text containing dates and numbers located in reports, contracts, memorandums, emails etc. Manually collating this information requires people who are familiar with the data to spend their time searching for it and preparing it to be analyzed before the actual analysis can be performed. Companies operating this way are underutilizing their most important and expensive resource – their human talent.

Document AI provides organizations with a better way to extract value from their unstructured data. Repetitive, manual document processing is expensive and inefficient. And many businesses have reached a tipping point, where the scale, complexity and speed of incoming data exceed the capacity and cost of manual processing.

At Eigen, we help organizations primarily within financial services with many different document and data-related challenges. For some clients, it's the capability to analyze previously inaccessible data across an entire portfolio so they can optimize their capital or prevent losses. For others, it's the ability to automate existing manual document processes relating to deal execution and loan operations so they can do more business. Or for some, it's being able to handle one-off regulatory exercises or ongoing record-keeping and reporting requirements without having to hire in lawyers or consultants to review the relevant paperwork.

## How does document AI work

Most businesses are inundated with data on a daily basis, with it coming in from a variety of sources, but implementing another system may seem daunting. Eigen's Document AI platform is easy to use and can be fully integrated with upstream document repositories and downstream databases to create seamless processes.

Clients can also choose how much support they want and can either have Eigen train their ML models or do it themselves. Non-technical users with no previous ML experience can easily handle this process; all they need is an understanding of the documents and data they need to extract. Here's a step-by-step guide on how Document AI works:



### 1. Scope and Agree Requirements

Eigen works closely with the client to understand their document challenges, their data needs, their internal capacity and overall goals. Based on this information, Eigen will recommend a service package with deployment and client support options to meet the client's specific requirements.



### 2. Upload and Label Documents

Documents are uploaded to the platform, and the relevant data for extraction is labeled by either Eigen (full-service) or the client (self-service) to train the machine learning model. Logic can be applied to output answers based on the information located in the documents. However, if a client wants to get started immediately, they can choose to use Eigen's existing warmed-up models and question templates.



### 3. Machine Learning Model Created

Using the labels, the machine learning model is automatically built to meet the client's specific requirements. The model is flexible and can be trained and re-trained to provide additional data points or answers at any time by repeating step 2 above.



### 4. The Documents are Analyzed

The model analyzes all new documents to retrieve the correct data points and provide answers to questions. The platform guides users to verify any low-confidence answers, which is used to further improve accuracy levels.



### 5. Data Extracted and Exported

The extracted data is exported or sent directly to other systems via APIs. Legacy or new documents can be processed through the platform as often as required.

For those new to Document AI technology, it's worth noting that it requires only a few documents to train the machine learning model. This enables clients to gain value from the platform and be able to answer questions about their specific data rapidly.

### 3. AI and human synergy:

The value of combining Document AI with subject matter experts

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Since the Industrial Revolution in the 1700s, machines have been introduced into the workplace to increase productivity. Back then, it was the invention of steam power that was the catalyst for change. Goods previously made in small batches by hand could be mass-produced in factories through the implementation of steam-powered mechanized production. Fast forward to today, and it's the service industries that are transforming with the adoption of AI. Solutions powered by AI are changing the way people work in the financial, legal and professional services sectors, making them more efficient and effective.

#### Say goodbye to costly manual document review

There are many reasons why financial services firms need to gather and analyze data from agreements, contracts, prospectuses, reports and other documents. These include credit risk analysis, regulatory changes, capital optimization, litigation, due diligence, claims handling, financial reporting requirements and industrializing information retrieval for better planning, decision-making and service delivery. In the past, when firms needed to access and understand information buried in their documents, the only option was to read and review their contents manually. The nature, scale and deadline of the exercise would dictate the resources required to complete the review. If you had an internal team with the right specialist knowledge, you could have them review the documents; otherwise, you'd be compelled to hire temporary staff or outsource the work to a legal service provider or consulting firm.

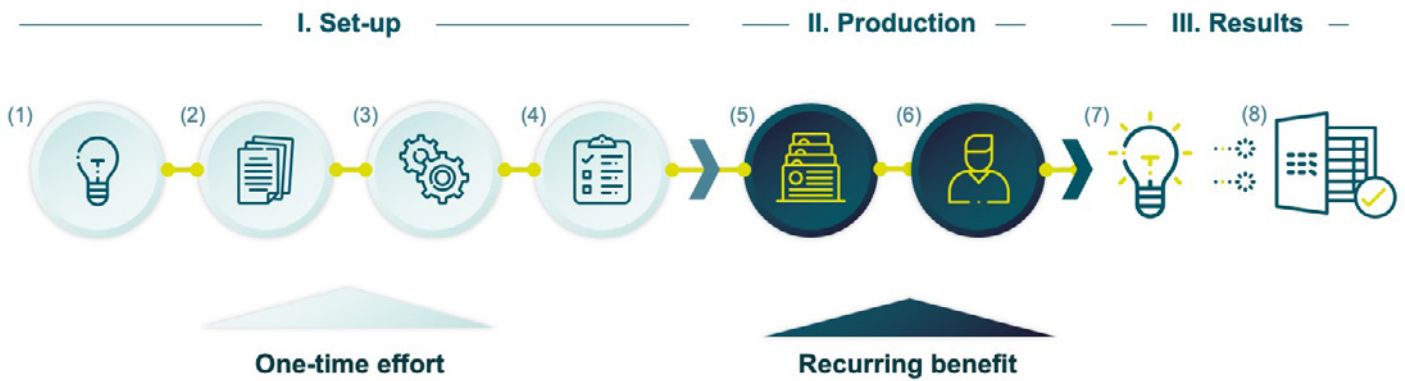
Manual document review may not be too onerous or expensive if you're dealing with a small number of documents but if you need to review 100s or 1,000s of them, the hours and costs quickly add up. And if the nature of the review requires the judgement of a lawyer, the critical eye of an analyst or the experience of a consultant, then those costs may be excessively high. Thankfully manual document review is no

longer a necessity, and Document AI technology can do the heavy lifting in terms of getting to the facts and answers faster and cheaper. It's now possible to extract information and gather insights from documents on an industrial scale and create or enrich databases to give you full data transparency. And because the relevant subject matter experts train the underlying machine learning model, the Document AI platform systematizes and augments their knowledge in the process.

## Say hello to repeatability and increased productivity

By using Eigen's platform, clients can scale the specialized knowledge of one or more experts across entire teams. For example, a credit analyst at an investment bank can train Eigen based on their expertise to provide data and answers to questions that are vital to monitoring the performance of loans across an entire portfolio. Or a paralegal at a hedge fund can train the platform to identify all linked

contracts and triage them based on their remediation needs to fast-track a LIBOR transition program. In both instances, Eigen's Document AI platform produces a comprehensive set of data for 1000's of documents utilizing the specific knowledge of the relevant subject matter experts in a fraction of the time it would take to do so manually. The diagram below shows the typical workflow using Document AI.



### Example workflow steps

- (1) A subject matter expert determines the data and answers required.
- (2) A sample of documents are collated and uploaded to the platform for training purposes.
- (3) A subject matter expert trains the platform using the results of steps 1-2.
- (4) A subject matter expert verifies the training results. If results need improving, the subject matter expert provides more training examples until the performance improves sufficiently to move to production.
- (5) Once production ready, all the documents are uploaded to the platform.
- (6) Machine processes all the documents and flags any low confidence answers for human review. Subject matter expert reviews and corrects responses.
- (7) Machine outputs the data and answers from each of the documents.
- (8) Data can be exported directly from the platform or sent via APIs to other systems or users.

Figure 2: Example Document AI workflow

Combining advanced natural language processing (NLP) technology with subject matter expertise gives organizations the ability to tap those knowledge sources in a highly efficient way that minimizes the human effort. By reducing the human effort, you take out considerable cost, especially in those circumstances where you would typically employ external experts to manually review your documents. The platform can be trained to handle new documents

and data requirements giving you a flexible and scalable solution that can be applied to multiple use cases, further increasing the return on investment. Companies can now afford to extract and organize data from all their documents to give them a near real-time view of previously unknown risks and opportunities. But is the quality and accuracy of data the trade-off when using Document AI technology versus human manual review?



## Achieving better data accuracy with machine plus human

As the saying goes, computers are only as good as the data we put into them. They are not 100% accurate. But then neither are humans. Humans are not built for repetition and multitasking. When we perform repetitive or complex tasks that require the same parts of our brain over and over, we become stressed, and consequently, our performance suffers. We've witnessed this first-hand by conducting large-scale exercises in which our platform reviewed hundreds of thousands of documents and benchmarked them against human performance. The exercises showed that human accuracy usually tops out around the 80% mark.

AI doesn't suffer from the same cognitive impairment that we do when completing repetitive tasks. Conversely AI produces better results with more use, 'learning' as it processes. By using cutting-edge NLP and machine learning (ML) techniques, Eigen can achieve results way above the 80% accuracy threshold achieved by humans and at a much greater speed. The AI will also 'own up' to not knowing something and will flag data points and answers as 'low confidence' when it's unsure. These flagged responses can be easily checked and, if necessary, corrected in the platform. This flagging and follow-up process produces results that are more accurate than human or machine alone. In fact, when a human subject matter expert performs this final review step, the results achievable are closer to the 100% accuracy mark.

AI is transforming how we work today, enabling businesses to scale-up operations, automate processes and capitalize on new opportunities as steam-power did back in the 18th century. In the case of Document AI, it's possible to significantly reduce the time, effort and cost involved in reviewing and extracting information from documents. And as a result, your experts can spend more of their time on crucial higher-value work.

## 4. Industry adoption:

Who is using Document AI in financial services and how?

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Companies have more data at their disposal than ever before, and Document AI is becoming the go-to solution for financial services firms who need to understand and analyze diverse types of documents at scale. But who is benefiting from using this technology and how?

Any business handling large volumes of documents can benefit from the technology, but banks, asset managers, insurers and credit funds are seeing a significant return on investment. These firms need a solution that can automate cumbersome and costly existing processes as well as extract and structure data they've been unable to access and analyze in the past. The platform's capabilities mean it can handle virtually any text-heavy document and gather data points for any use case or user. Typical use cases include loan processing, compliance, regulatory reporting, capital optimization and risk analysis. By automating processes and leveraging data previously unexplored, clients spend less time and money on these tasks, freeing up their resources to tackle other work.

We've compiled a few examples below.

### Regulatory Compliance:

A global bank saves time and money by automating the identification and triage of contracts impacted by a change in regulation

The Wholesale Banking Division of a multinational bank headquartered in Europe needed a quick, accurate and cost-effective way to identify credit agreements referencing the LIBOR interest rate benchmark that's scheduled for retirement at the end of 2021. The bank's back book extends to thousands of loans, and each agreement needed to be reviewed, which would take, on average, almost 70 minutes to complete manually.

A regulatory exercise like this would previously have involved a large team of highly skilled and highly paid in-house specialists or external consultants. On this scale, it would have been a prolonged and expensive exercise to carry out manually yielding somewhat inconsistent and error-prone results. The bank used Eigen's Document AI technology to extract answers

from all their loan documents to identify which ones needed remediation and their relative priority as well as the exact clauses that needed to be amended. The platform successfully extracted all the relevant information which amounted to 7,500 data points delivered in a spreadsheet to the Front Office team to inform their remediation plans.

The net result of using Eigen was a reduction in costs of 60% and a time saving of 75% as well as an increase in data quality compared to manual review efforts. Eigen's team of Legal Product Consultants carried out the model development and training, so the bank's teams could focus on other priorities. It's worth noting that bigger cost savings could be realized by performing the machine learning model training in-house, a task easily done by non-technical users

providing they are familiar with the documents and data requirements. The bank is now using Eigen to automate loan fulfillment processes, driving further efficiency gains and cost savings.

## Loan Operations:

A global investment firm closes new deals faster by automating analysis, data entry and cross-checking processes

The Operations team at a large, global investment firm was overwhelmed with the volume of new deals. Their manual processes were proving to be inefficient and scaling them to meet increased demand wasn't cost-effective or desirable. The rigorous review procedures and the inconsistent nature of the paperwork meant that processing a single transaction could take many hours and involve several different people. The firm wanted to use AI to automate these processes but needed a solution that was easy to implement, maintain and use so they wouldn't need internal IT support or in-house machine learning experience.

During an initial pilot project, the client trained Eigen's machine learning model to accurately extract 50 key terms from a batch of 100 loan documents. The accuracy of the data compiled by the platform was on a par with levels attained by the team through manual review.

## Capital Optimization:

An insurer benefits from lower capital requirements by determining which bonds are eligible for relief using data automatically compiled

A global asset management firm managing assets on behalf of an insurance client wanted a scalable tech-led solution to determine which bonds within a pool of 1,000 were eligible for capital relief under Solvency II matching adjustment (MA) rules. They wanted to speed up the process of collating the relevant information to identify the assets meeting the MA criteria. This involved reviewing product prospectuses and associated publications to pull out the correct data on asset characteristics. They wanted a repeatable solution that leveraged the knowledge of experts and the power of AI.

Applying MA is a complex process requiring the specialized knowledge of an actuary. The asset managers engaged a consulting firm to help them with their implementation project who partnered with Eigen to automate the assessment of eligibility for

Pleased with the results of the pilot and the platform's ease of use, the firm has integrated Document AI into their workflow for processing new loans.

The efficiency gains using Eigen have been significant, reducing the average loan transaction processing time by two-thirds. The Eigen platform has enabled them to automate several processes, including document analysis, data entry, cross-checking and eliminating the need for multiple approval steps. The Operations and Treasury teams are now able to handle the busy periods around month-end as well as other peak times, closing deals faster to bring revenue in sooner. The firm is now piloting Eigen for a regulatory compliance use case, helping them to manage the document review process in-house so they can avoid the cost of hiring lawyers or consultants.

assets and compile the necessary data to demonstrate compliance as well as perform benefit calculations. The actuaries defined the information required to assess eligibility as well as the data required for the later stages of the process. They were able to quickly train the platform using a sample of documents to analyze their contents and pull out those that matched the eligibility criteria and extract the required data. In the diagram below, you can see an example of the results table showing the answers the platform retrieved as well as those requiring further attention by the actuary.



Q1 Maturity Date P	Q2 Optional Redemption [Clause]	Q8 Optional Redemption - level of make whole spread	Q4 Par Call	Q9 Par Call Date defined term
<ul style="list-style-type: none"> <li>November 1, 2045</li> <li>November 1, 2045</li> <li>November 1, 2045</li> </ul>	Optional Redemption T he notes ...	20 basis points	If the notes are redeemed on or af...	Answer not found
<ul style="list-style-type: none"> <li>February 15, 2023</li> <li>November 15, 2024</li> <li>7 more answers...</li> </ul>	Optional Redemption We may red...	<ul style="list-style-type: none"> <li>10 basis points</li> <li>15 basis points</li> <li>3 more answers...</li> </ul>	At any time on or after the 2023 P...	Optional Redemption We may red...
<ul style="list-style-type: none"> <li>March 11, 2022</li> <li>March 15, 2024</li> <li>4 more answers...</li> </ul>	Optional Redemption; No Sinking ...	<ul style="list-style-type: none"> <li>5 basis points</li> <li>8 basis points</li> <li>3 more answers...</li> </ul>	At any time on or after February 1...	At our option, we may redeem the...
<ul style="list-style-type: none"> <li>November 7, 2024</li> <li>November 7, 2029</li> </ul>	Redemption Optional Redemption...	<ul style="list-style-type: none"> <li>10 basis points</li> <li>15 basis points</li> <li>3 more answers...</li> </ul>	<ul style="list-style-type: none"> <li>On or after the applicable Par ...</li> <li>On or after the applicable Par ...</li> </ul>	S-12Table of Contents "Par Call D...
<ul style="list-style-type: none"> <li>March 1, 2029</li> <li>March 1, 2029</li> </ul>	Optional Redemption Prior to Dec...	Answer not found	On or after December 1, 2028 (thr...	" Remaining Scheduled Payments...
November 15, 2047	<ul style="list-style-type: none"> <li>Optional Redemption We may ...</li> <li>If a series of the preferred stoc...</li> </ul>	20 basis points	In addition, we may redeem all or ...	Answer not found
September 24, 2049	Optional Redemption We may red...	10 basis points	We may also redeem, at our optio...	We may also redeem, at our optio...
<ul style="list-style-type: none"> <li>October 11, 2028</li> <li>October 11, 2028</li> </ul>	A " business day" for these purpo...	15 basis points	NO ANSWER	Answer not found
<ul style="list-style-type: none"> <li>September 15, 2022</li> <li>September 15, 2027</li> <li>September 15, 2047</li> </ul>	Optional Redemption Prior to (i) w...	<ul style="list-style-type: none"> <li>10.0 basis points</li> <li>12.5 basis points</li> <li>15.0 basis points</li> </ul>	Each series of notes will be redee...	<ul style="list-style-type: none"> <li>100% of the principal amount of ...</li> </ul>
<ul style="list-style-type: none"> <li>July 8, 2026</li> <li>July 8, 2029</li> <li>July 8, 2029</li> </ul>	Optional Redemption We may red...	<ul style="list-style-type: none"> <li>10 basis points</li> <li>10 basis points</li> <li>12.5 basis points</li> </ul>	<ul style="list-style-type: none"> <li>5 Table of Contents S-3 In addi...</li> <li>We may also redeem, at our o...</li> </ul>	Optional Redemption We may, at ...

Figure 3: Example results table showing answers retrieved by the platform

Using Eigen’s Document AI platform, 3,000 documents were analyzed during the initial implementation project, and the assessment of those eligible under MA rules was successfully automated. Additional data was compiled and exported for calculation and compliance purposes. Because the platform flagged instances when it was uncertain if it had found the right answer and those data points were reviewed, checked and corrected by an actuary the quality of the results were far higher than those typically achieved through manual review. The results were not only more accurate, but countless hours were saved in actuarial time required to complete the assessment. The end client, the insurer, is now able to claim

capital relief. And the asset manager has leveraged the consultant’s expert knowledge and captured that within the platform in a way that can be reused for other projects and clients in the future.

The beauty of Document AI is its flexibility and scalability. There are almost a limitless number of processes, workflows and manual tasks involving document review and data compilation that the technology can automate or support. Is your team spending time manually reviewing documents? Or are you employing lawyers, consultants, analysts or temps to tell you what’s in your contracts? If so, it’s time to consider using Document AI.



## 5. Who to Trust:

How to choose a Document AI provider that's right for your business?

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With so many Document AI, data extraction and contract analytics platforms available – and new ones emerging all the time – the landscape can be confusing. Many companies looking for a better way to access and analyze large amounts of data from documents are unsure how to choose a solution.

In this section, we'll guide you through the questions to ask potential vendors and give you some tips on where to steer the conversation to help you determine which solution best meets your needs.

Vendor Question 1:

### **What can you tell me about the data accuracy that you deliver?**

Understandably, this is usually one of the first questions we get asked by prospective clients. After all, improving speed and accuracy are the main reasons, along with cost reduction, that companies turn to us for their data automation needs. First, be wary of anyone claiming 100% data accuracy out of the box. Unless your documents are completely standardized, and you only need to extract quantitative data from them, 100% accuracy from the outset is unrealistic. And if your data is sufficiently structured and organized to allow for instant precision, you probably don't need a Document AI solution in the first place.

To optimize for accuracy, a machine learning model needs to be trained based on your specific use case, documents and data requirements. So, the answer to your data accuracy question will differ by use case and be dependent on factors such as variation in documents and the complexity and granularity of data required. The provider should be able to share with you the accuracy levels they've achieved for clients with the same or similar needs as yours. The accuracy rate should come with some caveats on the volume of training documents and the length of time typically required to achieve that level of performance.

At Eigen, we deliver market-leading accuracy rates typically of more than 80-90% because we apply the best elements of the three approaches to machine learning to drive the best outcomes. In the diagram below, you can see our three-pronged approach to machine learning. Our platform also guides users to review low confidence answers providing a feedback loop that ensures the model is continuously learning on the job.

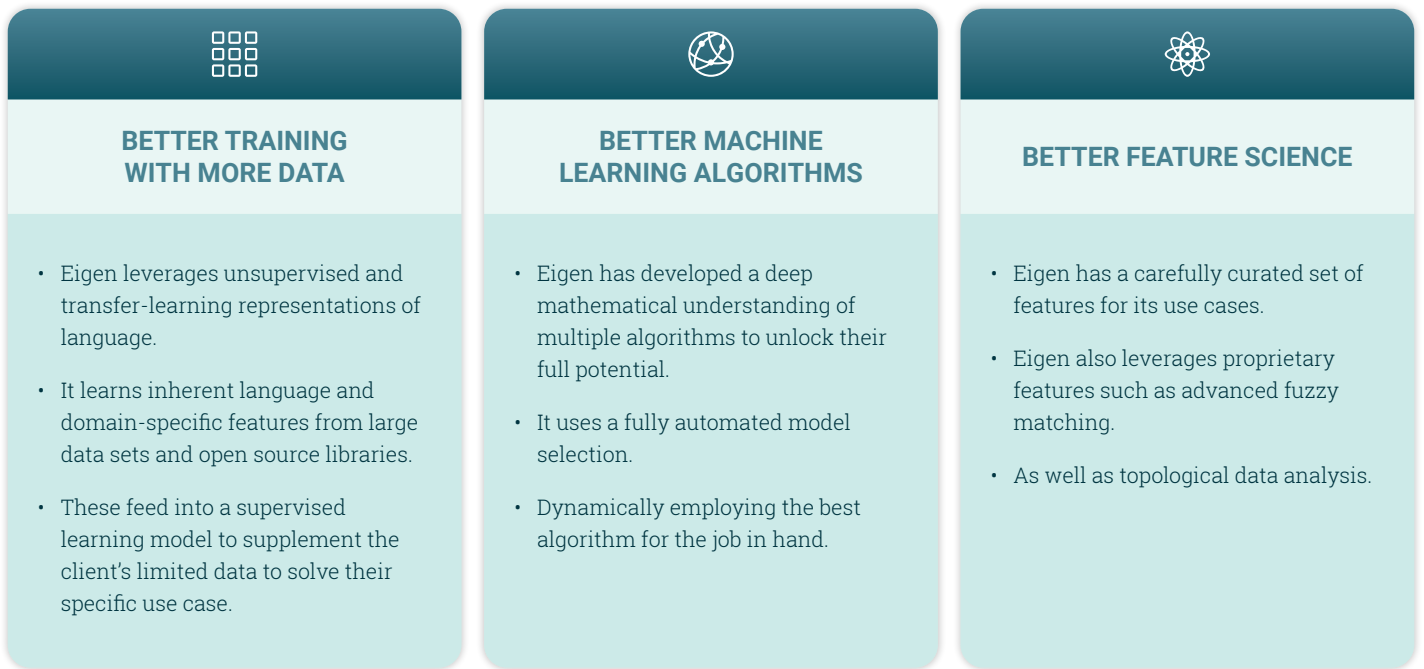


Figure 4: Eigen's three-pronged approach to machine learning

Vendor Question 2:

### How can your Document AI solution meet my exact needs?

When sourcing any new technology, your starting point is identifying the problem that you need to solve as well as the people, processes and systems that are impacted by those changes. A provider can't address your needs if they don't understand them so share with them as much information as possible about your specific use case (with an NDA in place if required). But no matter how thorough you are in gathering and prioritizing your Document AI requirements, one thing is inevitable; they will change.

- *Ask any potential provider what their process is for handling change requests.*
- *Ask them how often they launch new platform features and functionality and how these are prioritized and rolled out to clients.*
- *Ask them how they work with internal teams, third parties and integration partners.*
- *Ask them how easy it is for clients to scale their platform usage up or down.*

If you're in the market for a Document AI platform, you probably want to create efficiencies, drive down costs, automate and accelerate processes or analyze previously inaccessible data. To achieve these goals, you need a solution that can be finely tuned to your exact needs but is also highly adaptable and able to cope with evolving change. If you need the platform to work with other systems and repositories, make sure you choose a provider who has a proven track record in integrations and can offer APIs, plugins or other options.

Eigen has successfully delivered customized solutions and developed integrations for clients across a diverse set of use cases ranging from one-off regulatory exercises to full-scale digital transformation projects. Eigen's models are purpose-built to order to ensure they meet the exact needs of each client. This bespoke approach makes it easier for the client to manage and tweak the model as they are familiar with its set-up and its data output.

Vendor Question 3:

## How do you ensure my documents and data are secure within your environment?

Another common concern for clients is the security of their data. And rightly so given the sensitivity of their information, their customers' expectations and the risks and regulations surrounding data handling. If you're entrusting a third-party with your documents and data, you need to ensure they are taking that responsibility as seriously as you do.

When you ask the question 'how do you ensure my documents and data are secure within your environment?' the response should cover a broad spectrum of measures. These should include platform access and security, data transmission and storage procedures, ongoing monitoring, reporting, testing, and staff training. Ask them if they hold industry-standard certifications and undergo independent security audits. And don't be afraid to ask the vendor to provide details of their information security credentials (e.g., ISO certifications) and related policy documents (e.g., data protection, disaster recovery and business disruption) to substantiate their claims.

Vendor Question 4:

## What support and training will you provide?

Implementing any new technology or system takes time, effort and money and can be a daunting prospect. In the case of AI, it's also disruptive by design. You're not just replacing a legacy system you're automating processes and changing workflows that have been developed over time. Don't underestimate the effort involved in implementing Document AI successfully in ways that maximize your ROI. That said the platform itself should be intuitive and straightforward to use once you've received training.

The exact services and support you require from a vendor will be dependent on the scope and scale of the implementation project. The complexity of integrations with other systems and your hosting requirements will also have a bearing on the workload. The vendor should provide you with a delivery plan alongside their proposal that sets out the requirements and responsibilities on both sides with an indicative timeline to production. Be sure to

Don't let the vendor blind you with science or baffle you with jargon. Information security is as much about processes and people as it is about authentication, encryption and data replication. You want to work with a provider who is clear, and upfront about their solution and their working practises. If the vendor is offering a cloud-hosted solution, find out who manages that service and which party is responsible for security.

Eigen holds three ISO certifications to a gold standard, and we are subject to frequent independent audits to ensure we meet the necessary standards of information security management and business security possible to retain these certifications.

clarify what's required of your internal teams and the vendor to achieve the results and accuracy rate you've previously discussed.

However intuitive and easy to use the platform appears you should be offered training, so your team understands how to develop the model for your specific use case. Beware of vendors who provide a self-service solution without any support - you won't achieve the best outcomes without training. Ideally, you should be provided with a dedicated account manager, around-the-clock technical support and training materials.

Eigen offers its clients a range of additional technical and professional services including APIs, plugins and model development to ensure they get the most out of their Document AI platform while only paying for what they need. All Eigen's clients have a dedicated Customer Success Manager, receive regular platform upgrades and ongoing maintenance and support.

Vendor Question 5:

## How long will it take to get up and running with the platform?

There's no simple answer to this question as the timeframe will vary depending on several factors including the variation in documents, the number of data points and answers required, the complexity of integrations with downstream and upstream systems, the desired data accuracy etc. But this is not a trick question. A provider should be able to give you a relatively accurate estimation based on their knowledge of your use case and experience of implementing similar-sized projects for other clients.

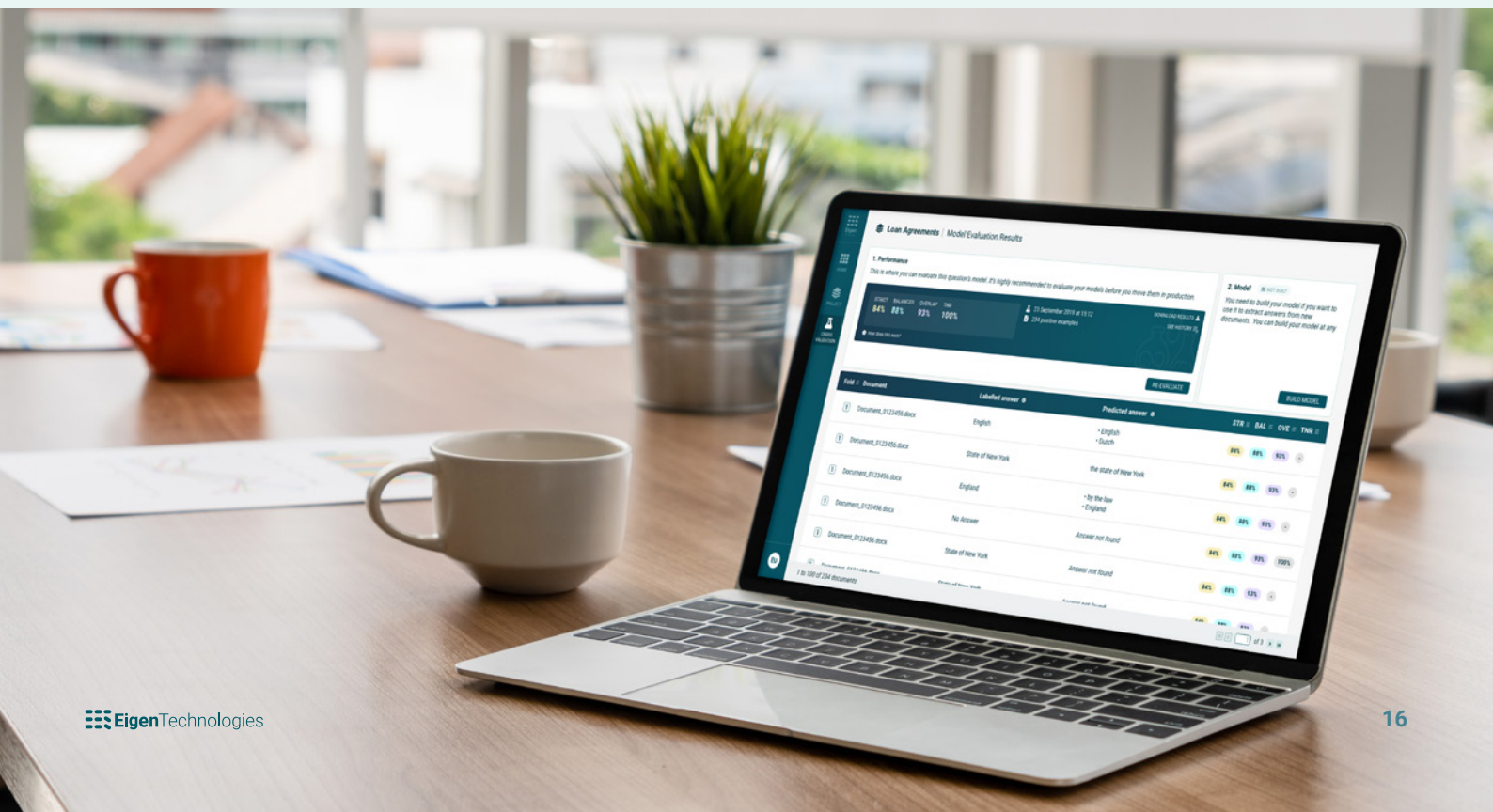
The pre-production implementation phase can run from a few weeks to a few months but should be phased, and project managed, so you know where you are in the rollout process at any given time. Many providers, including Eigen, have developed warmed-

up models for specific use cases to give clients a head start. These models are built based on the typical document structure and data requirements for a use case and can significantly reduce the time needed to train a model from scratch. However, the warmed-up model will need additional training to deliver a client's specific requirements and should not be considered a substitute for developing their own model.

Eigen's Document AI platform can be trained using very few documents. It can take as few as 2 to 100 documents to successfully train the platform while our competitors often require hundreds or thousands. We've developed cutting-edge machine learning techniques that help us to reduce the time to value for our clients.

## Always request a demo

When you're evaluating potential vendors asking the right questions is only part of the process. Always request a custom demo using samples of your own documents or those of a similar length and format. Be as specific as you can be about the data points, sections and answers you want extracted from the documents so the demo can include these and give you a better sense of the work required to get you the results you need.





## 6. Straight-through processing:

Integrating Document AI for maximum efficiency

For use cases such as compliance or regulatory reporting that require total precision, Document AI can achieve up to 100% accuracy when machine learning techniques are combined with human review. But, for use cases where a small number of errors can be tolerated, or stringent quality control and model risk management protocols are built-in, human review can be reduced or even eliminated to complete the task even faster and cheaper. This is known as straight-through processing (STP).

### The origin of straight-through processing

STP methodologies were initially developed to automate electronic payment transfers, reducing the need for manual intervention and making them virtually instantaneous. Before STP, sending money involved multiple departments, both on the initiation and receiving end of the transfer, and took days to complete. The old process required data to be rekeyed and rechecked, which was time-consuming, prone to error and made transactions more susceptible to fraud. With the advent of STP, the entire process was automated, eliminating duplication of effort, reducing the risk of errors and fraud, accelerating the turnaround time and lowering the processing costs.

STP development started in the early 1970s when the banking industry first began integrating computers and computer programming into their daily operations, enabling banking payment transfers to be upgraded from a much slower, less secure

telegraphic system. Beyond payments, STP has revolutionized securities trading by automating and digitizing previously complex and cumbersome manual trade settlement processes. Before STP, to settle a trade, phone calls, emails and paperwork needed to be exchanged between the buy and sell-side. The information would be re-entered and cross-checked, and the trade wasn't complete until receipt of the certificate and payment were confirmed by both parties. Following the old manual process, it would take up to 10 days to settle a trade whereas STP reduced the average to just 2-3 days.

STP has many uses and can be applied to any transaction, settlement process or financial product to eliminate the bottlenecks and costs inherent in human-led processing. Many banks and financial service providers use STP across multiple processes and functions to achieve paperless offices.

### The role of Document AI in straight-through processing

At the heart of STP is the near real-time transferral of information between systems and parties, using technology as the enabler. STP is now the norm for payments, but it's also been applied more broadly to repetitive processes that are transactional and can be automated to drive efficiencies. For example, Document AI can remove the need to manually review new loan agreements and extract the salient information required to complete the deal and feed

internal systems to help manage the loan over its entire lifetime. This eliminates inefficient manual processes and the risk of human error.

STP is beneficial for automating steps in long processes where information would otherwise be rekeyed between systems to be used by multiple teams. Document AI can meet different functional teams' information requirements and gather insights

and transform data to eliminate steps in various processes. Wherever you have sets of documents that are subject to periodic review, require some form of follow-up processing or where events can trigger the need to dive into individual contracts, Document AI can help. Using a technique called point extraction, the technology pinpoints and extracts the exact word, number, phrase or sentence that each user or team in the process might need in the future. This technique outputs precise results that can be used as-is or can form the basis for further analysis that the platform can be trained to perform automatically. By applying logic, Document AI can interpret the extracted data

and provide actionable insights and answers to complex questions.

Analyzing documents manually is time-consuming and expensive, especially for organizations with large volumes of documents to review regularly. Ultimately, the goal of STP is to make end-to-end operations less dependent on human intervention and speed up processing times. Document AI can play an integral role in the straight-through processing of documents. By extracting and compiling the necessary data and sending it to other systems, the human effort required in processing your documents is minimal.

### The benefits of straight-through processing your documents

Document AI makes it possible to automate document analysis with rapid and precise results, so your people don't have to scour them repeatedly. The Eigen platform can extract dozens of key terms from hundreds or thousands of documents creating significant efficiency and reducing processing time and costs. It can automate processes to smooth the transfer of data associated with document analysis, data entry, cross-checking and eliminate the need for multiple approval steps. As a result, clients report a range of benefits including closing deals faster to bring in revenue sooner, saving on outsourcing costs, enabling teams to focus on higher-value work and the ability to make better more timely decisions and action requests faster.

systems and processes. Once you've identified all the touchpoints, you can gather requirements from all impacted parties and factor their needs into the data flow to ensure you achieve the highest possible level of automation. Where data formats are inconsistent across systems and information would usually be rekeyed, we've developed customized plugins to transform it before it's sent to other systems via APIs. For example, date formats can be located and automatically reconfigured for international transactions (e.g., changing the date format from the US to UK standard).

The diagram below illustrates how Document AI integrates with other systems within an organization.

To achieve maximum efficiency, you should identify every touchpoint over the document's lifespan, including all upstream and downstream users,

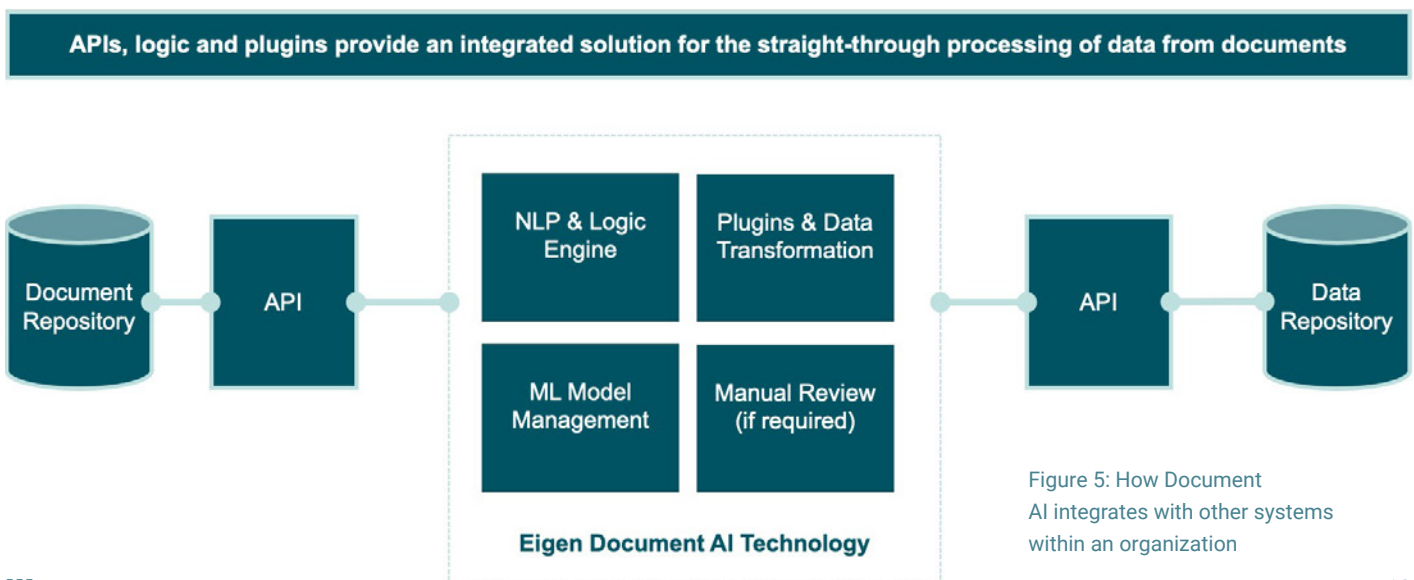


Figure 5: How Document AI integrates with other systems within an organization

## Little-to-no human intervention

Thanks to STP methodologies and Document AI, entire processes can be automated, and the extracted data can be integrated seamlessly with internal systems. This enables documents to be processed with little-to-no human intervention. In addition, clients that use Eigen for STP purposes have full visibility of the documents being processed and the data being extracted so they can review and audit the results at any time. They remain in total control even when the machine is doing all the work.

Gathering, analyzing and manually rekeying data to process documents is both ineffective and expensive. Using Document AI, you can empower your team to spend more time on tactical, revenue-generating tasks and less time on time-consuming manual review procedures. STP holds the key to achieving maximum efficiency, and you can harness its power through Document AI for your information management needs.



## 7. How to scale:

### Leveraging Document AI technology across your enterprise

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While companies are always facing external challenges, the past year has been especially formidable. The global coronavirus pandemic has changed how many of us work and has increased the number of economic risks for many businesses. External pressures can quickly change business priorities, and one way to manage these more effectively is with technology. Financial services firms have faced many challenges, including falling interest rates, the COVID crisis and Brexit. These issues have triggered a renewed focus on digital transformation.

Like so many businesses, financial services firms are trying to cut costs, and these cost-saving measures often result in reduced productivity. But the savviest firms are embracing technology to help them through these difficult times. Whether they need to mitigate credit risk, manage regulatory compliance, or meet other requirements, firms must find ways to do more with less to remain competitive.

### External pressures create huge administrative burdens

The administrative burden for financial services firms is enormous. For example, banks and lenders now have a considerable challenge in reviewing their back books. They may have thousands of loans, and each agreement may need to be reviewed in relation to recent events and regulatory changes. This puts additional time-sensitive demands on organizations to analyze their documents. Data needs to be located and compiled from each contract, so the impact and business risk of changing market conditions and reforms can be accurately assessed.

The burden is compounded when you consider that potentially thousands of documents need to be examined at a level of granularity previously unrequired. A single loan agreement could be subject to a review of LIBOR-related language, including maturity date and fallback provisions, terms relevant to restrictions due to Brexit and pandemic-related clauses. The logistics of such exercises are

complicated and require project management and tracking to ensure they are carried out effectively and deliver the necessary results within the required timeframes. And while external factors are fluctuating and evolving, so are your data needs. You need to do a thorough job of compiling information, so you have the salient data to hand but do it quickly so it can be acted upon before the situation changes or worsens.

In an environment where you lack resources and budget but need to act fast, manually reviewing documents is no longer an option. Fortunately, Document AI can help alleviate the burdens associated with reviewing, evaluating and gathering insights from thousands of documents. And once you've successfully implemented Document AI for one use case, it's quick and easy to apply it to other documents, data needs and processes.



## Advancing your digital transformation efforts with Document AI

By using technology rather than people to do the cumbersome work of sifting through documents, firms are saving a substantial amount of time and money. Some of Eigen's clients report a cost saving of 80% or higher compared to the cost of outsourcing manual document review. And time savings of up to 75% have also been reported. Once clients have seen the value they get from one application of the technology, they feel confident that it can handle other functional areas, use cases and address more internal process pain points. In fact, starting with one use case and expanding into others has become the norm for our clients.

Financial service firms are awash with contracts, agreements, prospectuses and paperwork in general. With so many documents, the opportunity to solve for multiple business challenges are plentiful. And those choosing to use AI to automate their in-house document review capabilities for one problem area, have taken a giant leap forward with their digital transformation efforts. For example, a global bank wanted to automate how they identified and managed contracts impacted by regulatory change. They had thousands of loan documents to review, and each

one was taking a highly skilled specialist approx. 70 minutes per agreement to review manually. It would have been a prolonged and expensive exercise to complete manually. Instead, the bank used Eigen's Document AI technology to extract answers from all their loan documents. The platform successfully extracted over 7,500 data points with the exercise completed in 75% less time at a fully loaded cost saving of 60%.

After this initial project's success, the bank used Eigen to automate its loan fulfillment processes to drive further efficiency gains and cost savings. Eigen's technology is now being rolled out across other functions and use cases, delivering automation of repetitive, costly and human-error prone tasks. Document AI sits at the heart of the bank's digital transformation program powering its information management, data quality, document processing and analysis automation efforts. Using APIs and plugins, data is seamlessly extracted, interpreted, transformed and delivered to systems across the bank. And with the easy-to-use platform, new data fields or questions can be added and trained quickly as external pressures and business needs change.

## Scaling Document AI beyond short term challenges

At Eigen, we work with innovation, digital transformation and data management teams to help them solve the document-related aspects of their digitization programs and scale data extraction and analysis across their organizations. We can help identify and assess which use cases, document types and processes are good targets for Document AI and meet with your engineers and functional leads to determine requirements and dependencies. We work with clients to prioritize use cases and plan the implementation effort to ensure that the time to value is minimized and that benefits are quickly realized. If required, we also have a network of delivery partners and consultancy firms to call upon for subject matter expertise.

During the setup and training phase as well as ongoing post-implementation, we provide support and advice to make sure requirements are met, and the correct data is delivered. The platform guides non-

technical users through the model training process, which can be handled in-house or by Eigen's Legal Product Consultants if resources are unavailable. It's easy to gauge the model's performance with an in-built model evaluation tool showing you the accuracy levels attained for each field or question. A screenshot of the model evaluation tool is shown below. Using the tool to evaluate the performance enables clients to retrain and tweak the results until the desired accuracy is achieved before moving into full production. Clients have complete control over the data output so they can handle future changes as necessary.

ISDA - QFC - Product... | Questions List

Name	Performance	Status										
<input type="checkbox"/> <b>P</b> A3.7 Governing Law ID: 270 POINT EXTRACTION 83 labelled documents in total (83 positive and 0 negative)	<b>1. Performance</b> This is where you can evaluate this question's model. It's highly recommended to evaluate your models before you move them in production. ⚠ Evaluations on fewer than 100 positive labelled documents will not return generalisable insights on your model's performances. <table border="1"> <thead> <tr> <th>GTI</th> <th>TEXT-BASED F1</th> <th>OVERLAP</th> <th>TNR</th> <th></th> </tr> </thead> <tbody> <tr> <td>92%</td> <td>95%</td> <td>95%</td> <td>-</td> <td>           7/30/2020 at 01:36 PM            eigenuser            83 labelled documents         </td> </tr> </tbody> </table> ⓘ What do these numbers mean? RE-EVALUATE VIEW RESULTS >	GTI	TEXT-BASED F1	OVERLAP	TNR		92%	95%	95%	-	7/30/2020 at 01:36 PM eigenuser 83 labelled documents	<input checked="" type="checkbox"/> EVALUATED <input checked="" type="checkbox"/> BUILT
GTI	TEXT-BASED F1	OVERLAP	TNR									
92%	95%	95%	-	7/30/2020 at 01:36 PM eigenuser 83 labelled documents								
	<b>2. Model</b> <input checked="" type="checkbox"/> BUILT You need to build your model if you want to use it to extract answers from new documents. You can build your model at any time, but it's recommended to do this after having evaluated it first and having reached the desired estimated accuracy. BUILD MODEL											

Figure 6: Model evaluation enables users to quickly assess the performance of their models

The platform's flexibility and simplicity and the transparency of results make leveraging the technology across multiple use cases easy. New models can be trained to handle more document types, and existing models can be updated as data needs change. The platform can be used to scale operations, automate processes and drive cross-functional efficiencies. Companies handling large volumes of documents have an almost endless list of possibilities and functional areas across their enterprise can benefit from streamlined or automated processes. Document AI is increasingly becoming part of many firms' digital transformation tech stack, enabling them to eradicate their teams' need to review documents or manually locate information buried in contracts. As a result, these firms are reaping the cost and time-saving benefits of automation of everyday tasks.

## 8. Conclusion

The Document AI future is here. According to the market research firm IDC, worldwide spending on AI and cognitive systems will reach \$57.6 billion in 2021. IDC also predicts that worldwide revenues will surpass \$300 billion by 2024, illustrating how AI technologies are being used to solve problems across the business spectrum.

The events of 2020 have reinforced the fact that regulations, market conditions and business priorities can change quickly and that companies must be increasingly agile to overcome the next inevitable challenge. Whether firms need to efficiently process large volumes of documents, extract critical information, feed data into other applications or automate cumbersome processes, there is a renewed need and appetite for using AI to cut costs and save time.

Document AI not only helps enterprises achieve cost savings but also improves workforce productivity. Repetitive, manual document processing by experts is expensive and inefficient. People are the most important resource for any business. They should be focused on the highest-value work: making informed decisions rather than analyzing pages of documents. Automating the answering of questions to assess risk and opportunities and power processes is the most cost-effective and efficient way to free up peoples' time.

As enterprises seek to improve compliance, meet regulatory changes and reduce the cost of processing vast volumes of information, Eigen expects Document AI adoption to accelerate in the next couple of years. There is incredible potential to reshape the way companies do business in the not-too-distant future.

**Are you ready to discover how Document AI can help your organization gain a competitive edge?**

[Request a demo](#) of our platform to find out how we can help you.



## ABOUT EIGEN TECHNOLOGIES

Eigen is a Document AI company that enables its clients to quickly and precisely extract answers from their documents, so they can better manage risk, scale operations, automate processes and navigate dynamic regulatory environments.

Eigen's customizable natural language processing platform uses machine learning to automate the extraction of answers from documents and can be applied to a wide variety of use cases. It understands context and delivers better accuracy on far fewer training documents, while protecting the security of clients' data.

Our clients include some of the most well-known and respected names in finance, law and professional services, including Goldman Sachs, ING, BlackRock and Allen & Overy. One-third of all G-SIBs use Eigen to overcome their document or data challenges. To date, Eigen has raised over \$60m across two funding rounds from Goldman Sachs, Temasek, Lakestar, Dawn Capital and ING Ventures.



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