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WHAT NLP CAN DO FOR YOU, AND HOW YOU CAN CAPITALISE ON IT

WHITEPAPER

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WHAT NLP CAN DO FOR YOU, AND HOW YOU CAN CAPITALISE ON IT

Introduction

A Computing survey reveals that Natural Language Processing (NLP) has come on a long way in the past couple of years, not only thanks to breakthroughs in how algorithms ingest data prior to processing, but also the development of a broad spectrum of practical applications.

Over 80 percent of organisations are now using it, not just for familiar applications such as speech recognition, but also for sentiment analysis, semantic search, machine translation, and more. Our survey found IT leaders believe that NLP can also help automate tasks and improve business efficiency.

One reason for its growing popularity is that the use of cloud-based machine learning and neural networks has rapidly improved the performance of NLP while also reducing its costs and adoption barriers.

As a result, it has evolved from a bleeding-edge technology to a valuable means of interacting with almost any digital interface – with leading use cases across customer-facing applications, cyber security, business strategy, and more. Organisations find they can use NLP to get closer to customers, users, and employees and better understand their likes and needs: the Holy Grail for most in a data- and customer-led economy.

This is why your business can benefit from it too: investing in NLP is an investment in your customers and employees.

In this Computing white paper, which features our dedicated research findings, we assess the enterprise appetite for exploring these emerging use cases and how they might deliver real business advantage.

But first, we determine the extent to which NLP solutions are already in the enterprise and what they are being used for. We also reveal how NLP is adding value to digital initiatives, the challenges that organisations have faced with their deployments, and how businesses expect their use of NLP to develop in the future.

Who is using NLP – and why?

The advent of advanced algorithms, cloud platforms, artificial intelligence (AI) and machine learning (ML) tools has created real opportunities for NLP to spell success for the enterprise. IT leaders increasingly have an eye for AI.

If you can understand what people are saying about the enterprise, then you can engage with them, build a relationship with them, and learn their wants, needs and preferences across every type of device and platform. NLP can help you do that.

In other words, NLP can be a powerful tool for customer relations. But it has countless applications in internal business support and decision-making too, as this white paper will explain: if it can help your customers navigate your products and services then it can help your employees do that too. The question is, how many IT leaders understand the technology's growing potential and affordability across different areas of the business?

Our survey of 140 senior IT decision-makers in medium to large enterprises in every major sector of the UK economy found that NLP is more widely adopted than some might have realised (given the relatively low hype around it compared with other technologies). 81 percent of respondents report deploying at least one solution that includes NLP.

Fig. 1 : Have you deployed a solution that employs Natural Language Processing (NLP) at your organisation?

While roughly half of IT leaders already using NLP have just one such solution in place, nearly one-third of respondents (30 percent) have two, while 12 percent have deployed five or more. Clearly, NLP is gaining a significant foothold in many types of business.

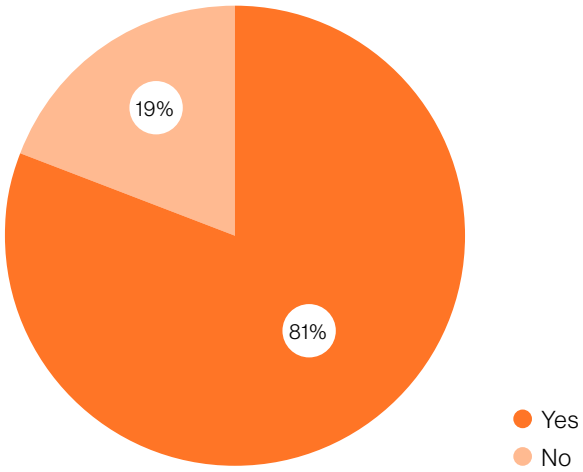
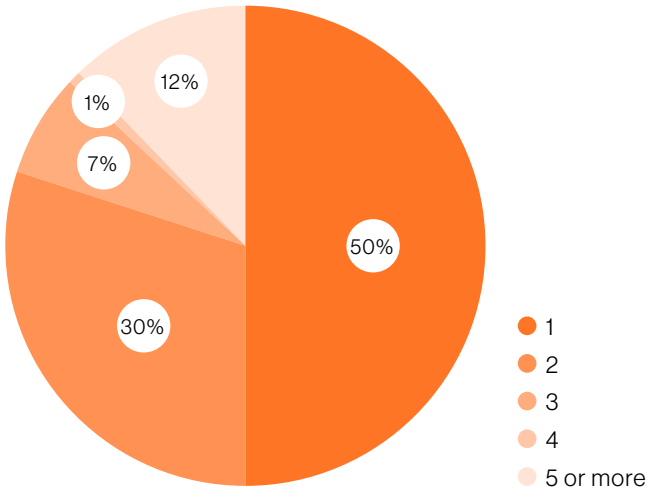
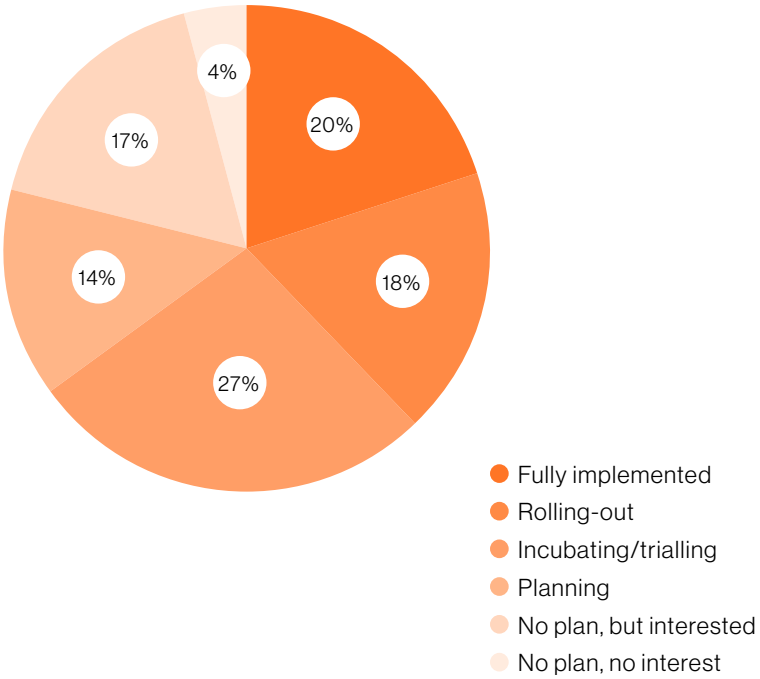


Fig. 2 : *[Those who have deployed at least one]*
How many NLP-based solutions do you use?



That said, many deployments remain works in progress: just 20 percent are fully implemented, 18 percent are being rolled out, while the largest bloc – a little over 27 percent – is still being trialled. Just under 14 percent of respondents say that their implementations are on the drawing board, with a further 17 percent expressing a strong interest in the technology, but with no active plans to implement it yet. Nonetheless, it's clear that NLP is fostering near-universal interest and has something to offer almost all organisations.

Fig. 3 : What stage are you at in deploying an NLP-based solution?

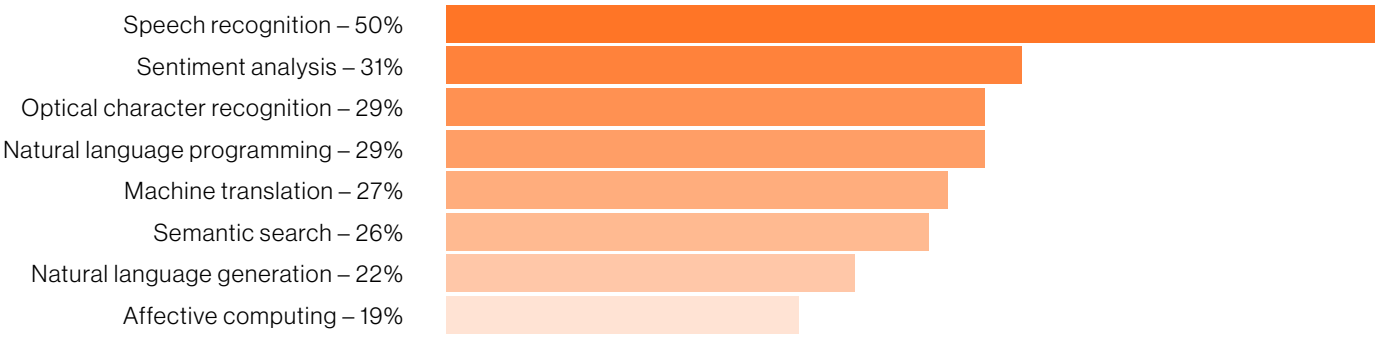


But NLP is not a single point technology: it embraces different forms, functions, and applications. These include speech recognition (which makes up 50 percent of deployments) and sentiment analysis (31 percent), with the latter invaluable for understanding the mood of customers' communications across different platforms, including web, mobile, and social.

Others include natural language programming (the use of human languages, such as English, as the basis for a computer programme, 29 percent); optical character recognition (one of the oldest applications, 29 percent); machine translation (increasingly used by cloud-based AI transcription and translation services, 27 percent); semantic search (26 percent); and more.

Fig. 4 : What types of NLP solutions does your organisation currently use?

Decision-makers report that these and other technologies are split across cloud-based, on-premises, and hybrid deployments, with cloud-native solutions making up nearly half of enterprise implementations at present. NLP is increasingly a cloud service, accessible to your organisation from anywhere at any time – including outside normal office hours.



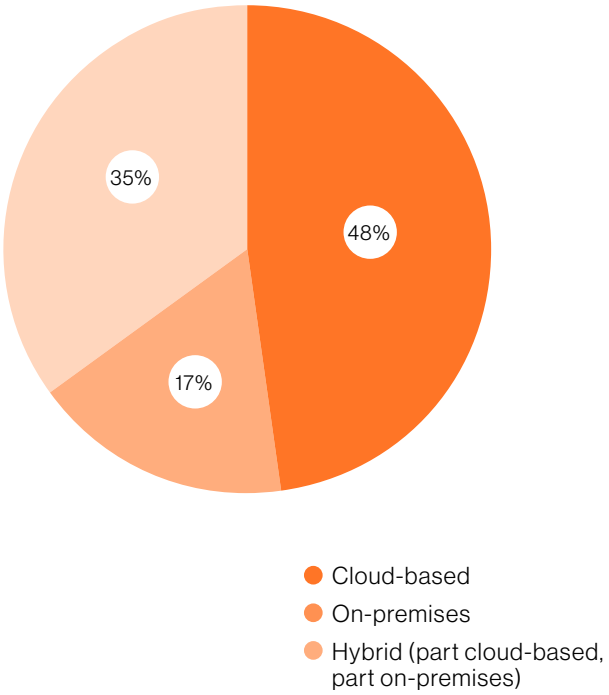


Fig. 5 : Generally, which of the following NLP solution approaches do you prefer?

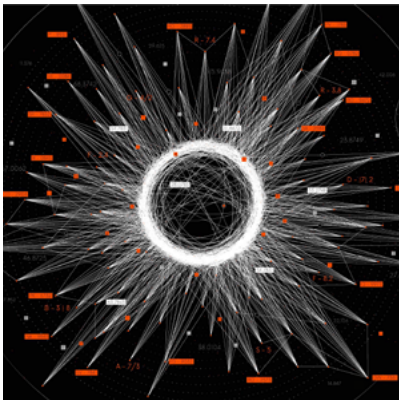
One conclusion from all this is that NLP isn't just about computers understanding the spoken or written word, though that remains a critical purpose of the technology; it is also about understanding unstructured data and data from natural language interactions or content, such as chat or text.

As we have seen, applications like these can be invaluable in helping enterprises understand what customers are saying or feeling about their encounters with the organisation - either directly (through chat) or indirectly (via interactions on social platforms). But as we will explore, that is just the tip of the iceberg of business utility.

Yet to do that successfully, NLP systems need to understand a range of complex factors, including context and sentiment. Artificial intelligence is an increasingly important element in that process: NLP needs to be smart and be able to identify patterns in both structured and unstructured text or speech, which is a core strength that AI brings to NLP.

Where NLP use is growing

But in which areas, departments, and/or lines of business are NLP-based or -enhanced solutions finding favour? Our survey found that while the customer remains the key focus for implementations, either in terms of Customer Services tools (cited by 44 percent of respondents), customer-facing applications (one-third of respondents), and Marketing (15 percent), NLP is being adopted across the board in internal support functions too.



Among the many innovative use cases, a restaurant company has used NLP to analyse customer reviews to highlight recurring problems that needed addressing, thus providing actionable insight from unstructured data. They were able to identify sentiments towards particular dishes and disregard star ratings that contradicted the content of the review itself. These deep findings would have been missed had the company solely relied on customers' star ratings and the overall sentiment from those.

A more common example is that chatbots can not only help customers with queries and support, but can also help employees in the same way – in internal functions, such as IT, HR, procurement, and payroll. And as the organisation gathers data from the chatbot about common queries, problems, and bottlenecks it can become smarter and more efficient.

In both of these cases, NLP-powered applications are using AI and ML to become smarter and provide ever-deeper levels of insight from ongoing interactions.

In this way, they can empower both your customers and your employees – when they need it to, 24x7. Just as important, they can help organisations improve their products or services over time, and really listen to what people are saying about them.

Our survey found that nearly 30 percent of IT leaders cited data analytics and business intelligence (BI) as key NLP uses; collaboration and productivity applications – vital during the pandemic – were mentioned by 22 percent; and cyber-security by over 20 percent. Finance, accounting, human resources/human capital management (HR/HCM), recruitment, enterprise resource planning (ERP), and supply chain management are among other functions that now include NLP elements.

Fig. 6 : In which of the following business areas has your organisation implemented NLP as part of a digital initiative?

In terms of the kinds of tasks being carried out by NLP-powered processes, these range from chatbots and contact centre support (both cited by roughly one-third of IT leaders), to automated transcription, customer sentiment analysis, market intelligence, machine translation, security authentication, text mining, the auto-generation of reports, and even facilitating recruitment.

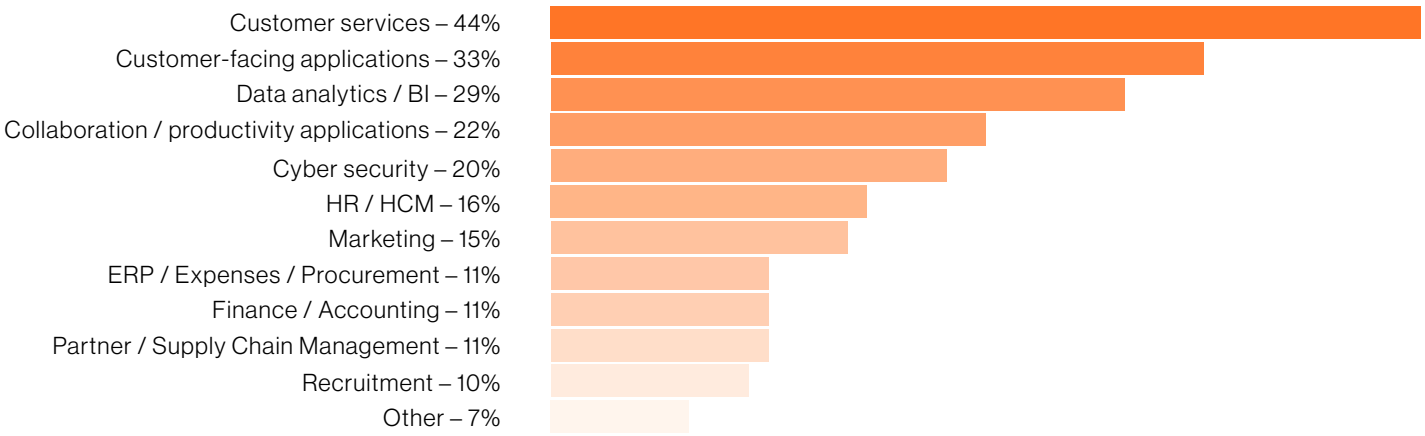
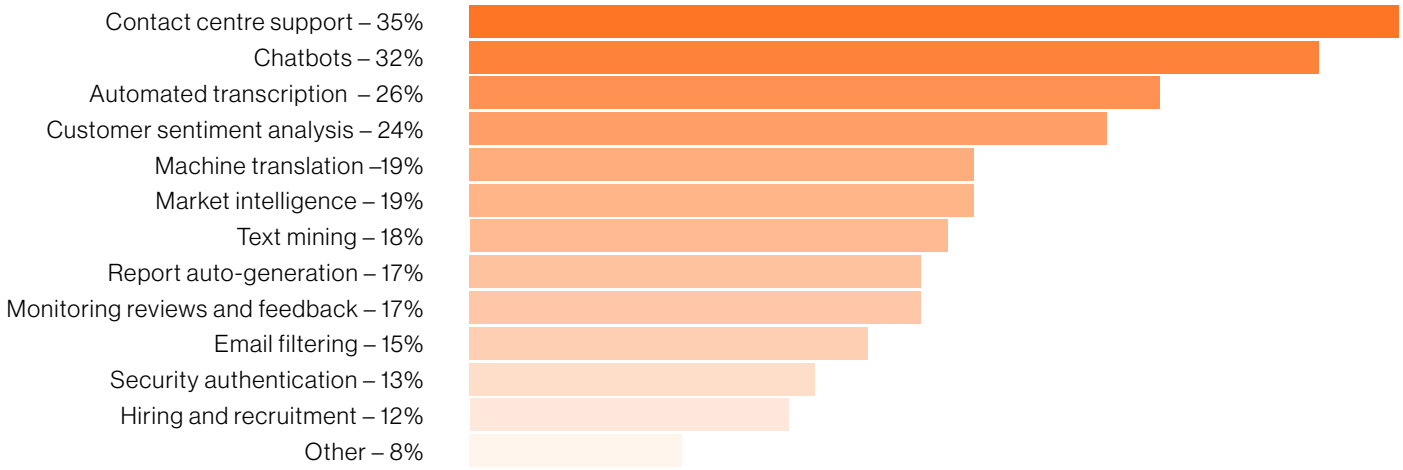


Fig. 7 : Which of the following use cases do you currently use NLP for?

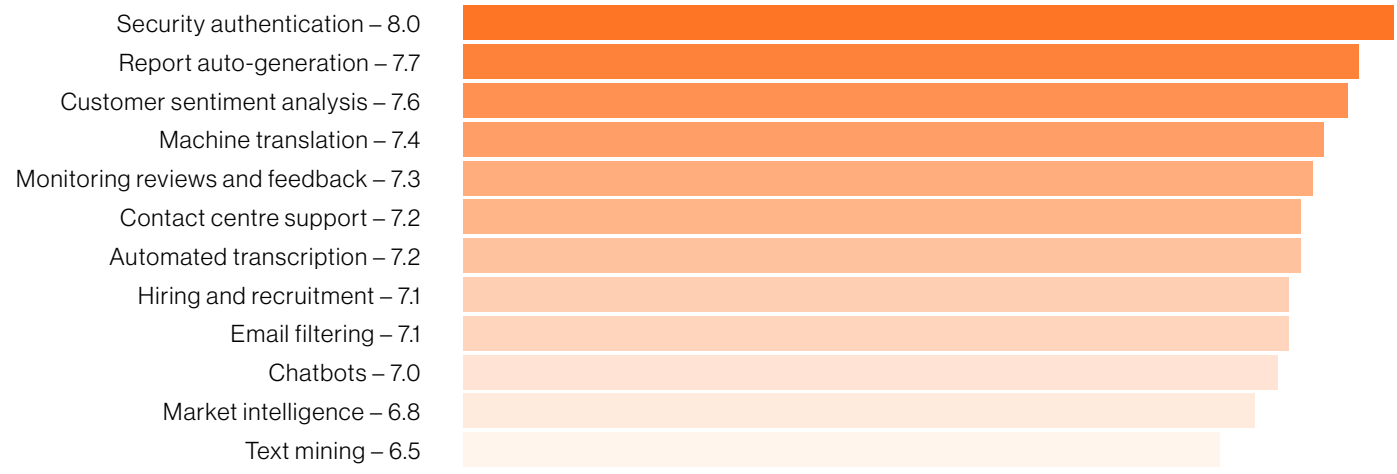


Are users happy with NLP so far?

But how satisfied are IT leaders in each of these use cases – what are their sentiments towards NLP? While Computing found generally favourable scores for the value that NLP adds to the enterprise, the highest (an average of 8 out of 10) was awarded to its use within security authentication – an encouraging thumbs-up after nearly two years of enforced remote working for many people.

Customer-facing or support deployments, plus automated reports and transcriptions, also received generally high scores.

Fig. 8 : Please rate the use cases chosen in the previous question based on how much value they add to your organisation
(1 = Does not add value, 10 = Adds significant value).



Improving the NLP experience

But with room for greater excellence in many cases, it is clearly important to get NLP deployments right. A positive interaction with the enterprise can make your customers/users feel well served, understood, and valued, while a negative one might add to their frustrations or provide false insights. The same goes for internal processes: NLP should enable, not obstruct, their smooth operation.

Good management is critical, therefore, which may mean bringing in external expertise, developers, and consultancy. Key questions for IT leaders to ask include: are actionable insights genuinely achievable with the data you have? And if so, do you have the data science and analytics expertise in house to capitalise on that data?

So how have IT leaders been deploying NLP so far: independently or with external help? And are they using off-the-shelf components or developing bespoke solutions that are focused on business needs?

Responses reveal that most IT leaders (nearly 56 percent) are deploying off-the-shelf tools in the cloud, with a further 26 percent going off the shelf on-premises – together making up nearly 82 percent of respondents. However, with IT leaders able to select more than one option in our survey, nearly one-third are building bespoke solutions in the cloud, while 22 percent are designing their own on-premises. Roughly one-third of IT leaders have brought in third-party expertise.

Fig. 9 : Which of the following approaches has your organisation used to deploy NLP solutions?

Computing found that although fewer business leaders are opting for bespoke, third-party solutions, either on-premises or in the cloud, they generally report higher success rates with these implementations than with off-the-shelf or self-built alternatives. On a scale of 1 to 10, with 1 equalling “failure” and 10 “very successful”, respondents awarded a score of roughly 7.4 for third-party bespoke solutions, versus 6.8 or 6.9 for other options – favourable, but with room for excellence.

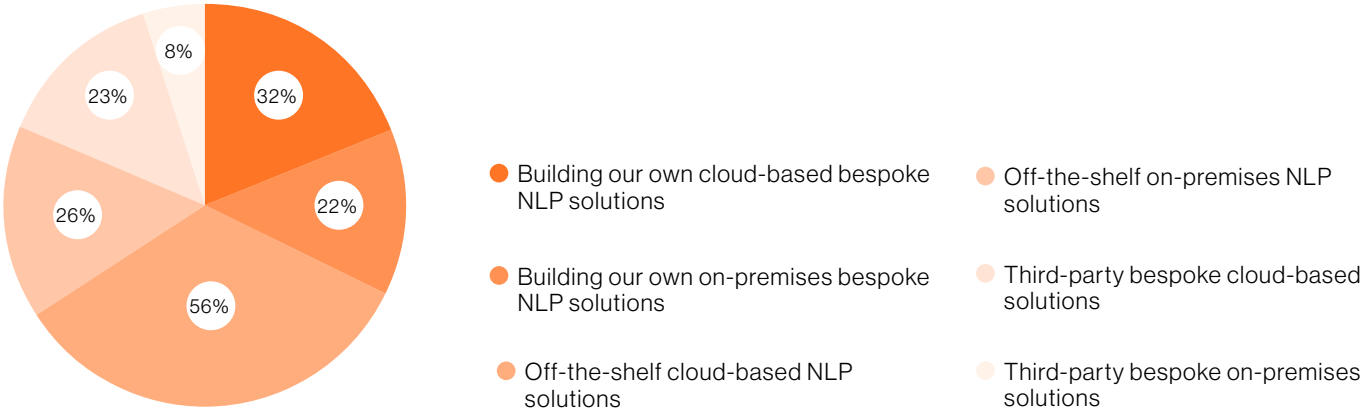
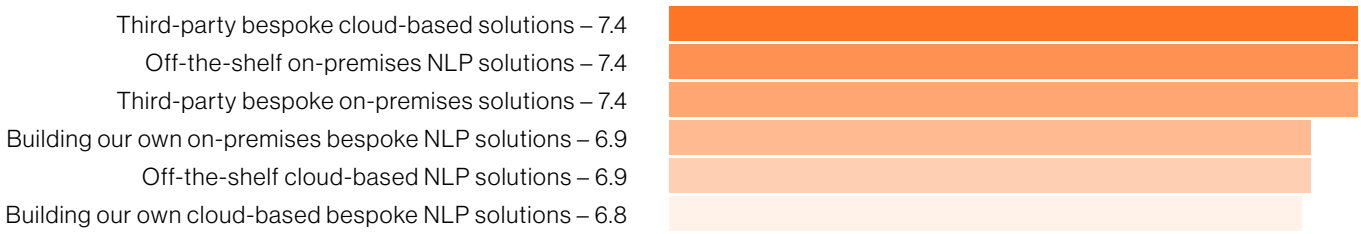


Fig. 10 : On a scale of 1 (not at all successful) to 10 (extremely successful), how successful have your approaches to implementing NLP been?



The many benefits of NLP

So, taking a step back from the granular aspects of deployment to look at the big picture, what do IT decision-makers believe are the main benefits of deployment overall?

How does NLP translate into business advantage and help speak the language of success?

By far the biggest survey response was "improving process efficiency", something that is becoming increasingly important as productivity and output remain low in many sectors, while costs are rising and Covid or Brexit uncertainty remains.

Many IT leaders see NLP in the growing contexts of task automation, cost-cutting, and minimising headcount – alongside AI, software robots/digital employees, and other technologies that help remove the drudgery from repetitive, yet essential, tasks.

In terms of making the business smarter, others see more effective data analysis and sourcing actionable business intelligence as key benefits, alongside turning unstructured data into structured information. As we have seen, even a chatbot can help you do that.

While managing customer relationships and gaining insights into customers, users, sentiment, and brand reputation were all mentioned by respondents, these benefits were further down the list – despite most NLP deployments still being focused on the customer, as we have seen.

This suggests that even when NLP initiatives are targeted at customer relationships, many business and IT leaders see the ROI coming from efficiency and lower costs, rather than from greater insights. Those leaders would be well advised to see NLP as offering deeper insights, rather than easy cost reductions – particularly when internal challenges might impede ROI.

Fig. 11 : What are the main benefits of NLP adoption? *[3 maximum]*

Looking at the flipside of these issues, what do IT leaders believe are the main barriers to NLP's successful adoption? As we have seen, many believe it offers a route towards a more efficient, more automated, lower-cost business, so what is stopping them getting there?

Answers to this question were spread across a range of different challenges. The greatest of these was issues with data quality and completeness. Also vying for decision-makers' attention were cost, difficulties in generating value, lack of technical expertise and employee buy-in, problems integrating NLP with legacy systems, and concerns over security and compliance.

Lack of C-suite buy-in was another issue, but only in 10 percent of cases. The emphasis here is on the importance of partnering with NLP experts who can help you identify use cases, create solutions that are right for your unique needs, and guide you through integrating solutions successfully.

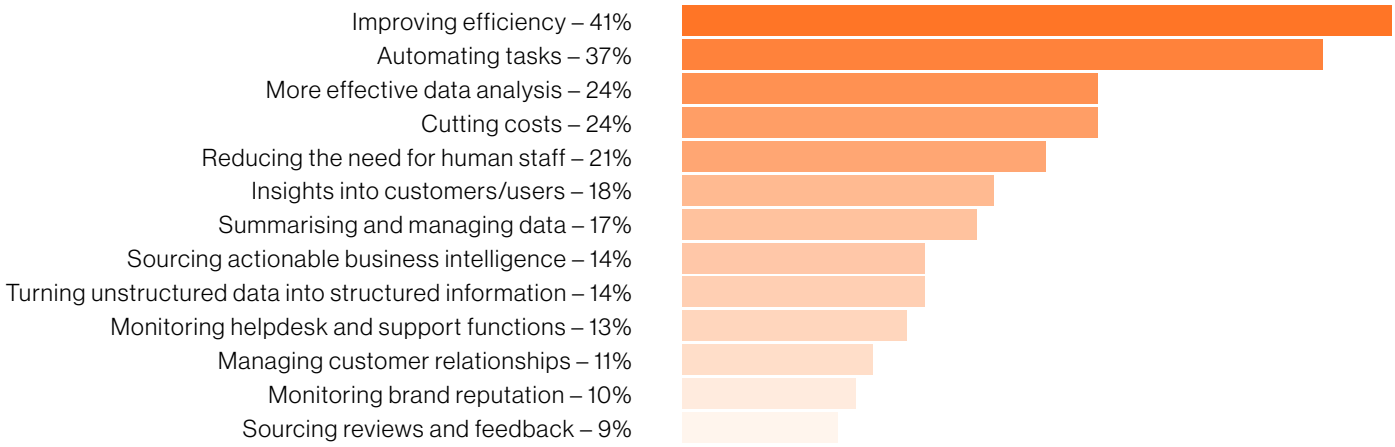
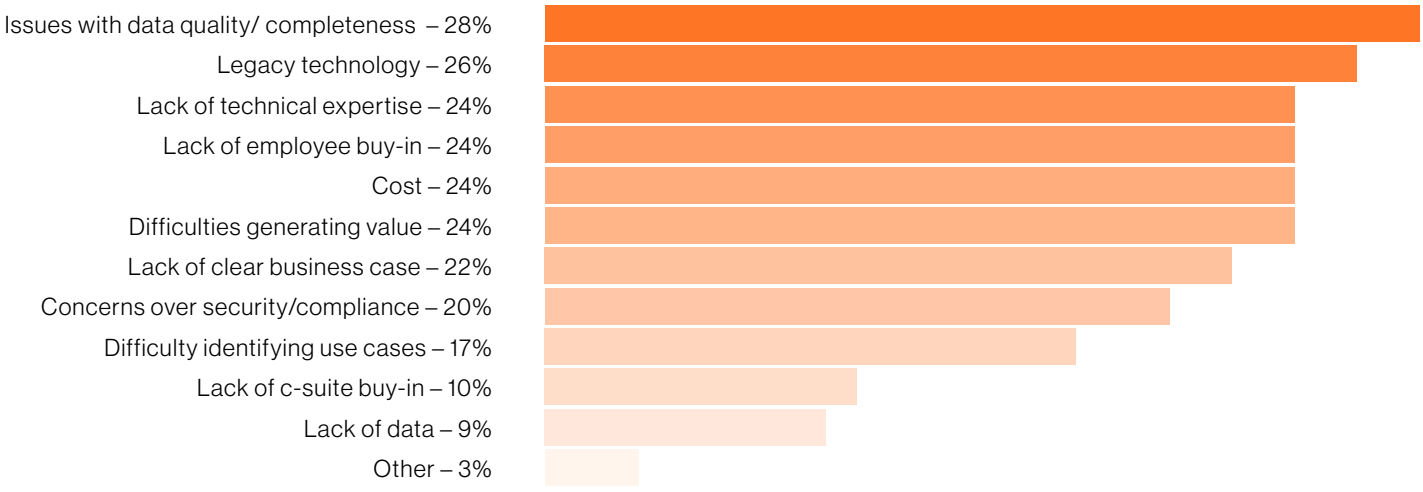


Fig. 12 : What are the main barriers to NLP adoption? *[3 maximum]*



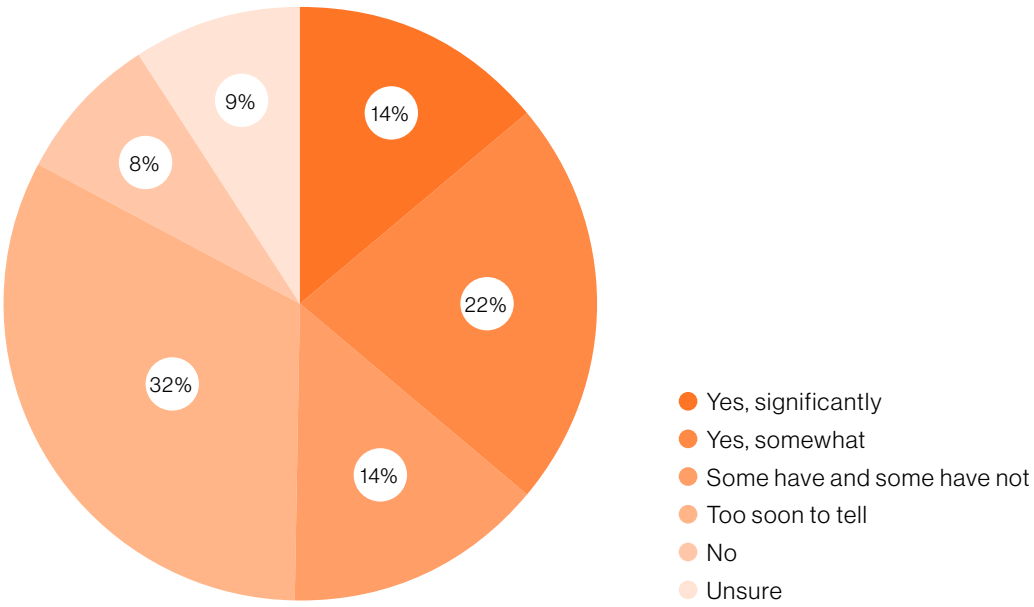
What is the ROI?

So, are NLP initiatives generating a measurable ROI for IT leaders? The good news is the answer is a clear yes in nearly 37 percent of cases, and a definite no in less than eight percent. In other words, roughly five times more IT leaders are seeing a measurable payback from NLP than are not.

At present, many enterprises (32 percent) say it is too early to say. But remember, our survey also found that only 20 percent of NLP schemes have been fully implemented to date; most are either being rolled out or still at the planning stage.

Looked at in this light, clear evidence of ROI forms the largest bloc of IT leaders' responses, and this may be why almost as many IT leaders say NLP projects have helped change significant aspects of the business. In short, most respondents with live, fully realised NLP programmes are seeing a measurable payback.

Fig. 13 : Have the NLP projects implemented at your organisation generated a return on investment?



Conclusion: NLP helps you welcome the future

It's clear that the future holds great promise for NLP, as more projects mature and begin to demonstrate their potential to improve both internal and customer-facing processes.

So, how do IT leaders see their future with the technology? Given free rein to answer, responses revealed that many IT leaders forecast a rolling or ratcheting programme of implementation, experimentation, measurement, and further rollouts. "Experiment with more ways that NLP might add value" said one CIO about the future. Another said, "use more of it to understand the customer intent of callers and direct them to the most appropriate customer journey".

IT leaders' free-text comments included plans to:

Experiment with more ways in which NLP might add value, especially in capturing people's knowledge and gaining insights from the analysis of this.

Use more of it in order to understand the customer intent of callers and direct them to the most appropriate customer journey.

Increase use and integrate with AI.

We expect to take on several full-time tech staff in 2022 to specialise in NLP.

We will learn from other industries and adapt to our own.

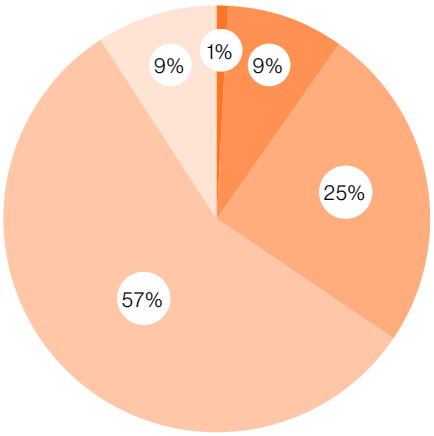
Increased automated customer support response.

Likely to increase investment, should the budget allow.

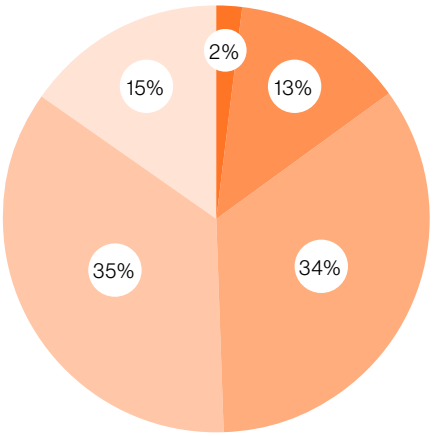
Expansion into more use cases.

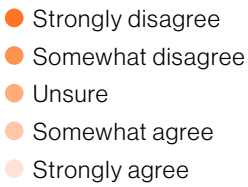
Fig. 14 : To what extent do you agree with the following statements?

"Natural language processing has evolved from a bleeding edge technology to a valuable means of interacting with almost any digital interface."

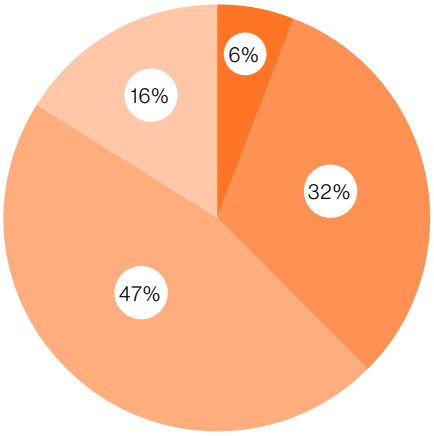


"NLP has generated value at my organisation."

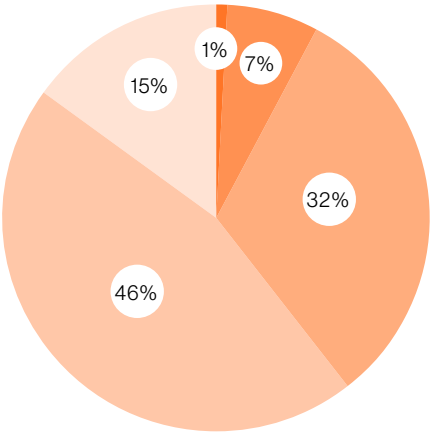




"My organisation would like to use NLP in more ways than it is currently."



"NLP will play an increasingly important role at my organisation over the next 3 years."



Others see more of an internal focus for the technology, expanding into new use cases, with greater automation and scalability emerging within the business. However, some acknowledged the need for better, or more tightly integrated, data.

In conclusion then, if you have an eye for AI and want to speak the language of business success, then NLP can certainly help – when implemented strategically to make the business smarter and more efficient. Your need to out your house in order on data quality and integration with legacy systems too.

Regardless, it's clear that most organisations have at least already dipped their toe into the NLP waters. Failure to at least start experimenting already puts you at risk of being outmanoeuvred by your competitors. There are simply too many benefits to be had.

Expert Insight: PGS Software

Many companies want to start their own Data, AI, and NLP projects. However, they often don't know how to best approach these areas. One of the biggest challenges is measuring their business value.

This struggle is no surprise. Working with innovative technologies can be tricky. Finding the optimal verification methods is key to success. Yet, it's immensely difficult.

For example, writing assistants (like Grammarly) are helpful but not ideal. Using them can save you a lot of time – even if you can't absolutely "trust" in their infallibility. And considering more unique solutions, finding the right quality threshold and validation methods requires a unique approach.

From this perspective, it's no surprise that Innovation-as-a-Service's (IaaS) popularity is growing. At PGS Software, we started our own IaaS initiative – the Innovation Lab – before it became a market standard. And we're happy to say that this approach is not only successful, but also fast. Since it embraces the succeed fast, fail fast strategy, 6 weeks are usually more than enough to test and validate new ideas.

Andrzej Rygol

Head of Innovation Lab, PGS Software

About PGS Software

PGS Software delivers custom-made IT solutions to clients around the world. As part of the global Xebia Group, we offer our clients full-stack digital transformation services and solutions.

Every project is tailored to your specific needs – whether you want to extend your team or have us manage the delivery of an entire project. Our service includes Software Development, Business Analysis and Quality Assurance, ensuring your project's success on all fronts, and if your idea is more progressive, our PGS Innovation Lab is sure to help you embrace state-of-the-art technologies. Among the companies we've already helped are Yell, Interflon, Sage and Schmitz Cargobull.

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