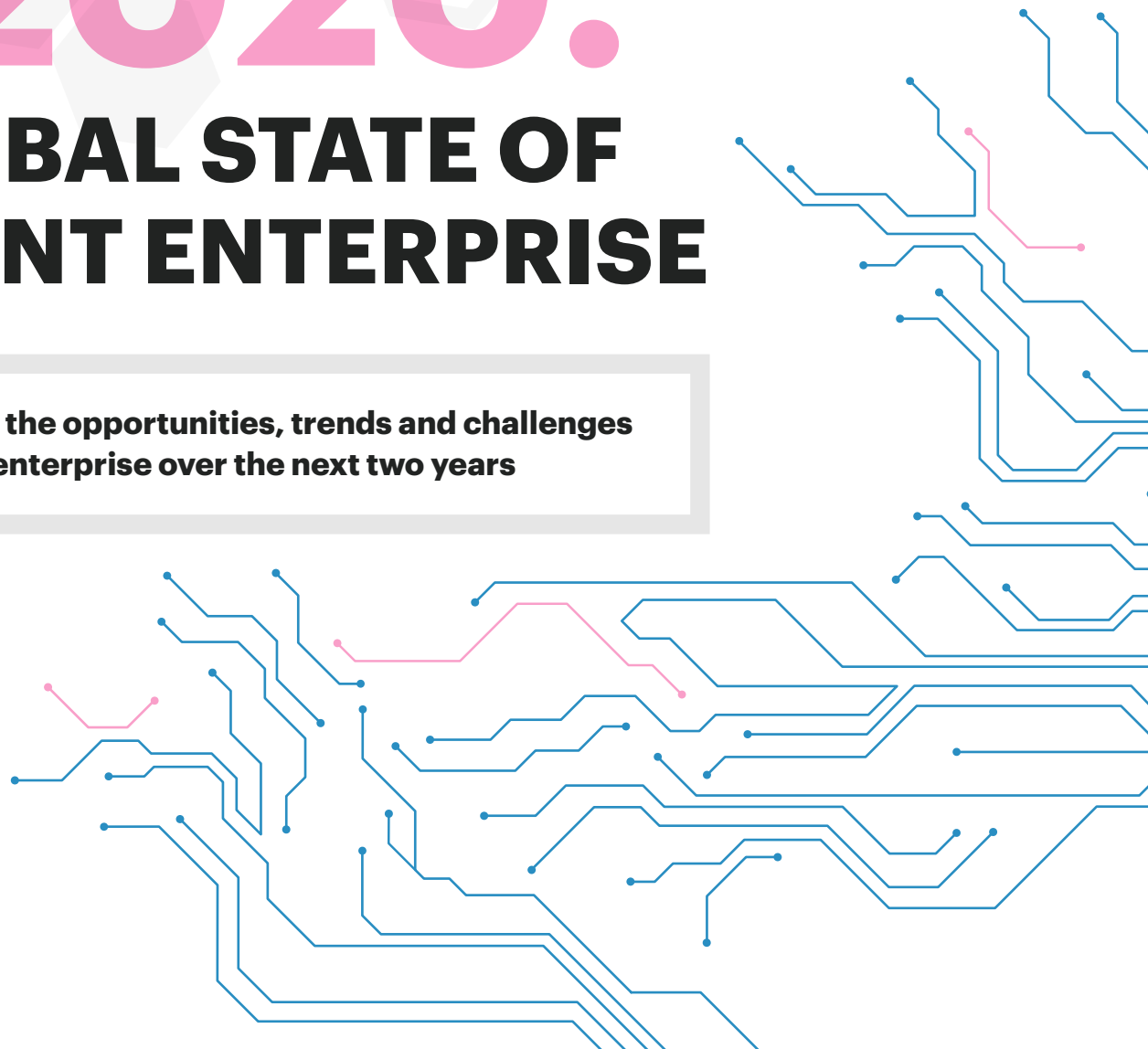
# AI 2020:

# THE GLOBAL STATE OF INTELLIGENT ENTERPRISE

**A cross-industry study of the opportunities, trends and challenges that will reshape enterprise over the next two years**



AI & INTELLIGENT AUTOMATION NETWORK | BUILDING THE INTELLIGENT ENTERPRISE

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# FOREWORD

**What does the intelligent enterprise of the future look like? Which sectors are set to benefit most from artificial intelligence? And why are the perceived challenges so numerous and diverse?**

In the face of the current technology hype cycle, many organizations are grappling with questions like these. Keen to stay on—or ahead of—the curve, organizations are looking to the latest intelligent enterprise (IE) tools to solve business challenges, increase productivity and benefit the bottom line.

Responsive leaders are looking for innovative ways to leverage tools such as intelligent automation, machine learning and predictive analytics, which are fast gaining momentum in the marketplace. The message, for those who've chosen to listen, is loud and clear:

**The intelligence revolution is here - disrupt or be disrupted.**

For organizations, AI promises a world of insights, analytics and business smarts like never before. Sectors like banking and financial services, defense and retail are testament to this, reaping the benefits as early adopters in a tech-pervasive world.

Industries like pharmaceuticals, mining, construction, and telecoms that may have once lagged behind, are now making huge strides to close the IE gap.

Many are now realizing that AI and other IE technologies force us not only to rethink the way we work-but to rethink the way we think.

From a customer perspective, IE technologies offer the opportunity for improved experience and on-demand delivery—putting the onus squarely on brands to deliver what customers want, when they want it.

The near-future challenges for organizations are twofold: first, there is a gap between the perception of how long it takes to successfully implement IE technologies (such as AI and intelligent automation) and the actual time taken to reach maturity (see page 6).

Secondly – and perhaps most notably – there remains a widespread lack of understanding of the potential benefits for AI to solve real-world business problems. The focus to date has been largely on adopting AI as a technology rather than applying AI as a tool to solve existing problems. This report serves to close that gap, drawing on market research, expert analysis and commentary to provide a realistic overview of industry trends and expectations to 2020.

**Megan Wright**
Editor
**Artificial Intelligence & Intelligent Automation Network (AIIA)**

## EDITOR

**Megan is the Editor of the Artificial Intelligence & Intelligent Automation Network (AIIA) - a global community of industry experts, thought leaders and senior business executives focused on building the intelligent enterprise. She is responsible for sharing best practice with IQPC Digital's 1.4 million+ member base and leading the network's AI & Intelligent Automation Advisory Board.**

Megan has extensive experience as a Content Marketer and Technology Journalist with a range of global blue chip technology brands including Telstra, Adobe, Hisense and Xero. In her current editorial role, Megan ensures AIIA's content reflects current tech trends and opportunities to help business leaders continuously drive change and innovation within their organizations.

@megaphonemeg

# ABOUT THE RESEARCH

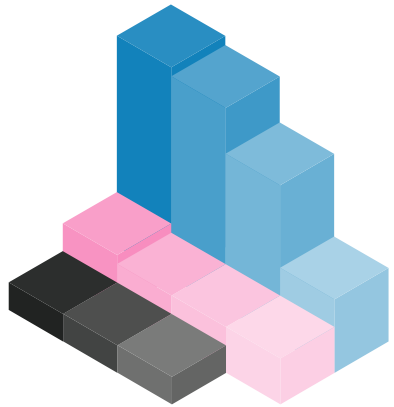
**More than 430 professionals from around the globe took part in our in-depth research into the intelligent enterprise landscape and the impact of AI as the next driver of change across industry sectors including pharmaceuticals, customer experience (CX), defense, and oil & gas.**

## Which title best describes your current role?

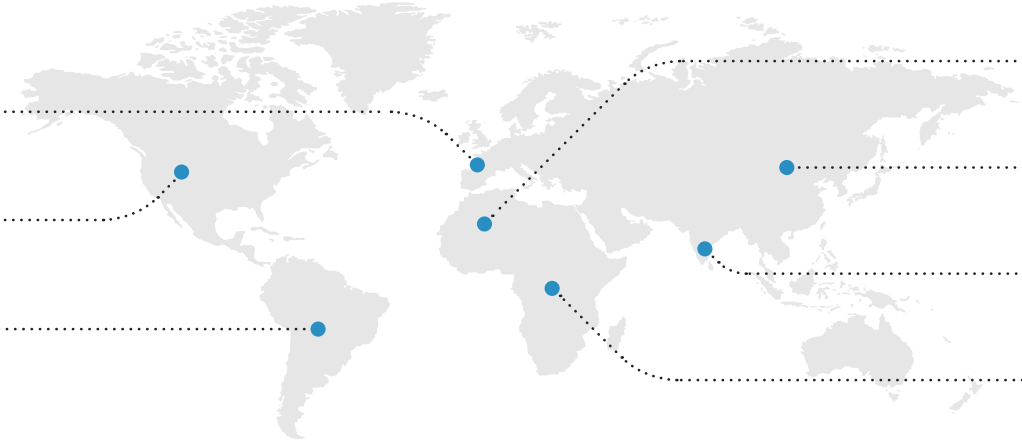
| | |
|---|---|
| Other | 27% |
| Head | 18% |
| Director | 16% |
| C-level | 14% |
| Manager | 12% |
| SVP/VP | 8% |
| IT | 5% |

## In which industry do you operate?

| | |
|---|---|
| Oil & gas | 23% |
| Pharma & healthcare | 22% |
| Defense & security | 17% |
| Other | 8% |
| Financial services | 6% |
| Telecoms | 5% |
| Technology | 5% |
| Manufacturing & construction | 5% |
| Retail & consumer goods | 3% |
| Media & marketing | 3% |
| Education | 3% |



## In which region are you based?



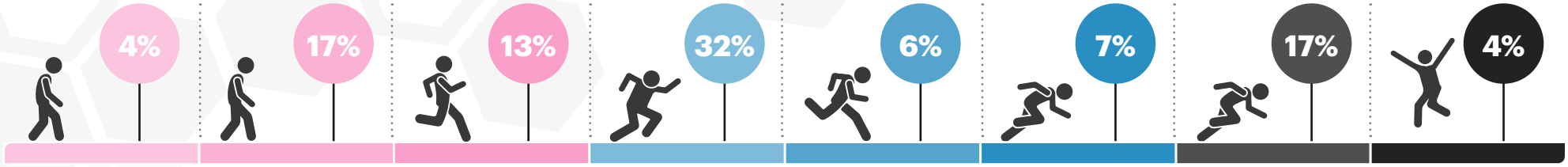
| | |
|---|---|
| Europe | 28% |
| North America | 27% |
| South America | 5% |
| MENA | 5% |
| APAC | 17% |
| Asian subcontinent | 9% |
| Africa | 9% |

# AI 2020: THE JOURNEY

**While the majority of respondents are in the pre- or early implementation stages of their IE journey, an overwhelming majority (54 per cent) predict they will be established within two years. This perception is reflective of the ongoing divide between the hype and reality when it comes to implementing IE technologies like AI and intelligent automation.**

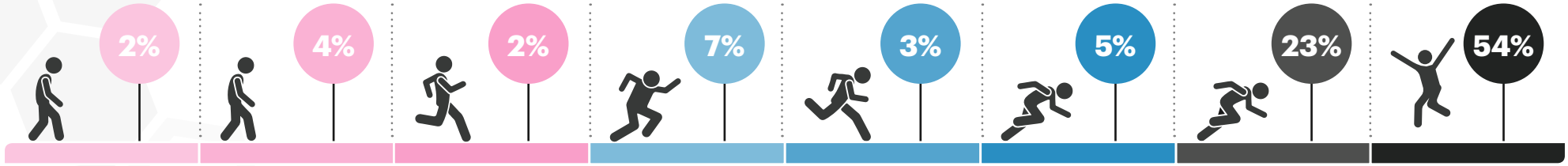
In reality, the path to becoming an established IE is much more nuanced and can be fraught with risks and challenges such as failure to implement governance and regulatory frameworks, a lack of long-term IE strategy, and a lack of in-market case studies for best practice guidance.

**At what stage are you on in your intelligent enterprise journey?**




| We have no plans to start at all | No immediate plans but we are interested in understanding more | We haven't begun | Beginning/ planning phase | Sourcing vendor information | Pre-deployment | Early implementation | Established |
|---|---|---|---|---|---|---|---|

**Where do you hope to be by 2020?**

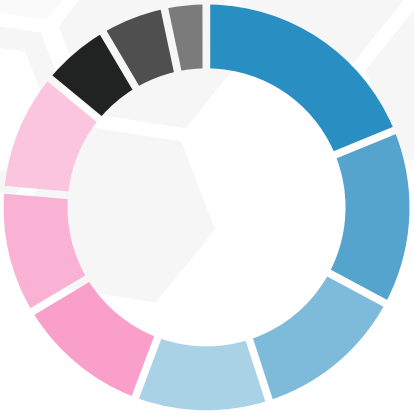



| We have no plans to start at all | No immediate plans but we are interested in understanding more | We haven't begun | Beginning/ planning phase | Sourcing vendor information | Pre-deployment | Early implementation | Established |
|---|---|---|---|---|---|---|---|

# EXAMINING THE IMPACT

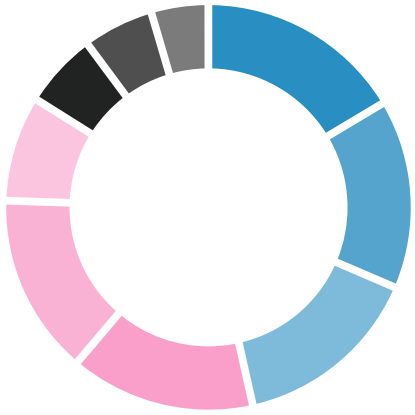
**Which IE technologies do you think will have the most impact on your organization?***

| | |
|---|---|
| Predictive analytics | 51% |
| AI | 38% |
| Intelligent automation | 33% |
| Smart devices | 29% |
| Cognitive analysis/computing | 29% |
| IoT | 27% |
| Machine learning | 26% |
| Text & speech analytics | 15% |
| Chatbots/virtual assistants | 14% |
| RPA | 9% |



**Where do you think AI and IE tools could have the most significant impact on your business?***

| | |
|---|---|
| Staying ahead of competition | 47% |
| Cost-cutting | 43% |
| Streamlining processes | 43% |
| Modernizing business | 42% |
| Time saving | 41% |
| Personalization | 24% |
| De-risking (financial) | 17% |
| Staffing | 16% |
| De-risking (frontline staff) | 13% |



**Respondents could choose up to three options*

Nick Andrews - Executive Chairman, Virtual Operations

There's a real paradox in the hype around RPA headcount reduction because most companies aren't going to get 40 per cent cost reduction from focusing on headcount alone.

On the other hand, the benefits you can get by deploying IE tools holistically (strategic automation) are orders of magnitude greater. Through strategic automation we have delivered significant competitive advantage or improved customer experience—for instance mortgage loans or claims processing, rapid first time order fulfilment and lasting transformation of critical business processes. Inventory levels can be dramatically reduced, container or truck fill levels maximized.

Perhaps the most significant impact that comes to mind is that IE technologies allow the commercial sides of the business to get creative again. This is because, in a highly automated enterprise, they assume that their initiatives can be supported both technically and process-wise, and that is really invaluable to the innovation of enterprise organizations.

# BARRIERS TO INNOVATION

**Surprisingly, 'competing priorities' and 'working with legacy systems' did not top the list of the biggest challenges to implementing an intelligent business strategy. Instead, culture was identified as the single biggest barrier to be overcome by almost half (49 per cent) of all respondents—regardless of industry sector.**

Linking initiatives to ROI was also identified as a key challenge, with the majority (56 per cent) stating that more case studies and industry research would help to overcome such challenges.

**What are the biggest challenges to implementing an intelligent business strategy in your organization?***

| | |
|---|---|
| Culture | **49%** |
| Upgrading/working with legacy systems | **39%** |
| Competing priorities | **35%** |
| Linking initiatives to ROI | **34%** |
| Recruiting the right people | **29%** |
| Rapid changes in technology | **27%** |
| Getting maximum value from investments | **26%** |
| Gaining senior management buy-in | **20%** |
| Assigning internal responsibility | **16%** |
| Lack of suitable vendors | **11%** |

**Respondents could choose up to three options*

**What could help you to overcome these challenges?**

| | |
|---|---|
| Case studies | **30%** |
| Industry research | **26%** |
| Training | **16%** |
| A clearer view of the vendor market | **14%** |
| More budget | **14%** |

Jonathan Hobday - Sales Director, Cortex

**It is disappointing that as an industry cultural resistance is still the biggest enemy of automation, however it manifests itself in some surprising ways. Often the required subject matter experts (SMEs) will appear to be keen to support an automation program, while in reality harboring serious doubts and deep-seated fear for their own survival. We see this resulting in a very high failure rate in delivering against objectives.**

**Working with legacy systems, rapid changing technology and recruiting the right people are all closely related, although it may not be obvious. The right people are actually the people already running the business, the problem is that those people often do not have the technology skills to drive automation.**

**The key takeaways are these:**

**1. A transformation program focusing on the transformation in people's roles is mandatory to ensure success**
**2. The new generation of technologies are required, there is no point in returning to technologies that require specialist skills to install and operate**
**3. Automation should build on what already exists—if the project proposes to replace existing operational systems and automating at the same time it has a high likelihood of failure**

# INDUSTRY IMPACT: REALIZING INTELLIGENT ENTERPRISE

**For those of us in the industry who live and breathe the world of intelligent automation and AI, it would be easy to think that the market was approaching a point at which the majority of organizations had a reasonable appreciation of the potential of the technology—and were planning for deployment, if not already on the journey.**

But the reality is that most of the executives and business leaders we speak with have very little real-world appreciation of just how powerful these technologies can and will be, and just what impact they will have on the world of office-based work.

The good news for a market that has been surrounded by hype and confusing terminology, and severely lacking in mature referenceable case studies, is that recent months have seen a significant increase in those willing to share details of their experiences, and provide empirical data points to demonstrate the value realized. Those early adopters have mostly been larger enterprises, using fairly basic robotic process automation (RPA) to automate high volume, low complexity tasks. And with some operation for five years or more, there are some clear trends emerging.

So, if the "early adopters" have helped to provide learning for those that are now beginning the journey, what should those who form, according to the AI 2020 survey results, the 78% of respondents who believe they will have production deployments in two years' time understand as they continue their journey?

Firstly, there is a clear need to consider intelligent automation as a strategic solution. While it's capable of being a quick fix, the dangers of tactical deployments emerge as organizations approach scale.

What has also become clear to many is the limitations of RPA in isolation, without the force multiplier of artificial intelligence. While a small proportion of most workforces undertake fully structured, rules based work, many more have workloads that could be automated with the addition of machine learning, and other forms of AI.

Finally, in an economy that increasingly consumes 'as-a-service' with flexibility to meet fluctuating demands, historical RPA implementations have been fixed software acquisitions with in-house technology deployments.

The future of a maturing AI market will be for consumption based services, which don't require business functions to become pseudo IT departments. Instead, they will utilize SaaS platforms which combine automation and artificial intelligence to deliver value as a strategic asset across an entire organization, enabling them to continually evolve as the technology landscape matures.

## AUTHOR

**Terry Walby is the founder of and chief executive at Thoughtonomy, an award-winning automation technology company. He has a depth of experience in developing and scaling businesses, delivering innovation and optimization into end-user organizations in both the public and private sectors and to the service provider and outsourcer community who serve them.**

Prior to Thoughtonomy, Terry spent a career in leadership of technology and IT services businesses including senior roles with IBM and GE Capital, as a Director at European outsourcer Computacenter, where he built their consulting and technology businesses, and as Managing Director of automation specialist IPsoft.

**Terry Walby**
Founder and chief executive
**Thoughtonomy**

# AI IN PHARMA: THE FUTURE OF DRUG DISCOVERY

**It's well known that the drug discovery process can typically be protracted, drawn out and expensive - from finding a molecular target and preclinical testing to the various clinical trial phases. It can take as long as 12 years for a drug to travel from the research lab to the patient.**

And with the possibility of success in the pre-clinical stage being less than 0.01 per cent, according to the International Federation of Pharmaceutical Manufacturers, the chances that a drug will fail at any phase of the development process are enormous.

Unsurprisingly, many in the pharmaceutical industry actively welcome ways to de-risk and accelerate the expensive and drawn out path to discovering and developing new medicines.

Intelligent enterprise technologies - such as AI, IoT, RPA, machine learning and data analysis - hold the promise that they might reconfigure the whole drug discovery process.

## Early applications

AI is poised to become "the primary drug discovery tool by 2027," according to AstraZeneca's Global Head of Enterprise.

The roll-out has already begun. For example, IBM's AI supercomputer Watson has been used since 2015 to help develop breast cancer treatments. And a series of AI start-ups including BenevolentAI, Atomwise and Berg have secured contracts that could herald the shape of things to come.

London-based BenevolentAI uses its AI-led system to review millions of scientific research papers and abstracts to make unrecognized connections between 'known facts'.

GlaxoSmithKline, meanwhile, inked a $43m deal with British AI firm Exscientia in July 2017, to harness modern supercomputers and machine learning systems to predict how molecules will behave and how likely they are to make a useful drug.

## Questions around application

Despite the revolutionary promise of AI, it could still take years before pharma firms and patients reap the benefits.

The potential for the application of these technologies in the early stages of drug discovery is immense, however it remains unclear how useful they will be in the expensive, later phases of drug development.

Concerns have also been raised around cybersecurity as the industry moves towards having devices everywhere collecting and transmitting data.

- **94 per cent of pharma professionals expect that intelligent technologies will have a noticeable impact on the pharmaceutical industry over the next two years**
- **Almost one fifth of pharma professionals believe that we are on the cusp of a revolution**
- **Intelligent automation and predictive analytics are expected to have the most significant impact on the industry**
- **A lack of understanding and awareness about the benefits of AI-led technologies remain a hindrance to their implementation**

The rewards to be gained from IE technologies could be enormous—slashing costs and R&D times, and providing huge benefits to patients. But many hurdles need to be surmounted and many questions remain unanswered.

**Chanice Henry**
Editor
**Pharma IQ and Pharma Logistics IQ**

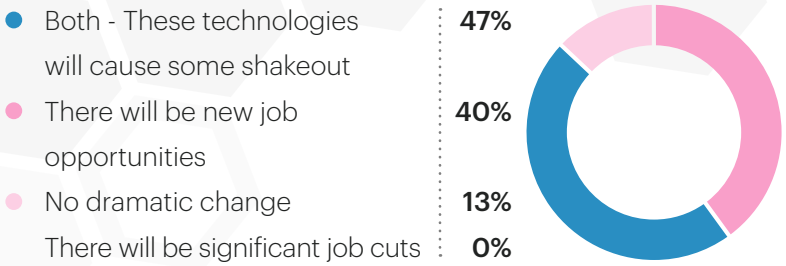
Pharma IQ Pharma Logistics IQ

# AI IN PHARMA: THE FUTURE OF DRUG DISCOVERY

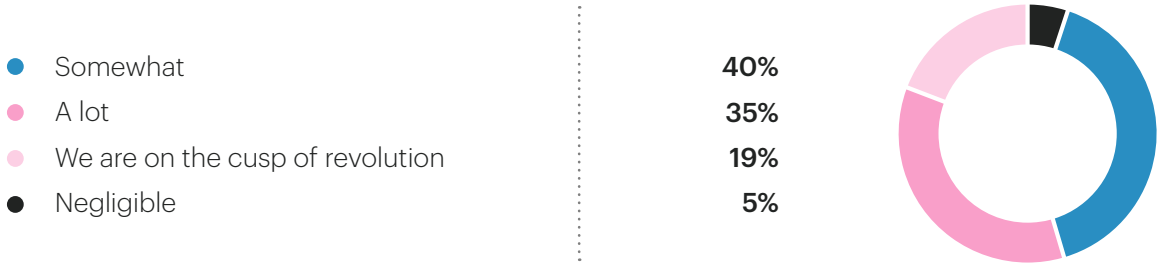
**Respondents show an awareness that the industry will develop in response to the emergence of these technologies. Rather than fighting the shifts needed, pharma firms must progress with the market's evolution. The new skill sets needed to nurture these technologies creates a huge demand for staff re-training, re-organization and cultural change.**

The classic worry felt by many regarding the changes brought by intelligent technologies, is the risk of headcount reduction. Our respondents noted that these technologies are indeed likely to cause significant shakeout. However, no one can foresee a dramatic level of job cuts ahead.

**Headcount disruption: Do you expect IE to significantly cut/create jobs in pharma through 2020?**




**Looking ahead to 2020: How much do you think emerging IE technologies will affect the industry through 2020?**




Rita Hadebe **"There is a strong consensus that there will be new job opportunities, this awareness illustrates that management is open to developing talent in their organization to meet the demands of this new technology and recruit in new skills.**

**"I agree that there will be some form of shakeout, but if the technologies are welcomed by senior leaders in the industry this will simplify the transition."**

Rita Hadebe **"The findings show a definite recognition of the change that the intelligent technologies will bring. When senior management is for a transition this makes change management much simpler. "I am impressed by the forward mentality of top-level management in the pharmaceutical industry here."**

Darryl Davies **"From what I have witnessed in the market, we are definitely on the cusp of a revolution. There is a tipping point happening right now, these technologies are being applied in many different areas.**

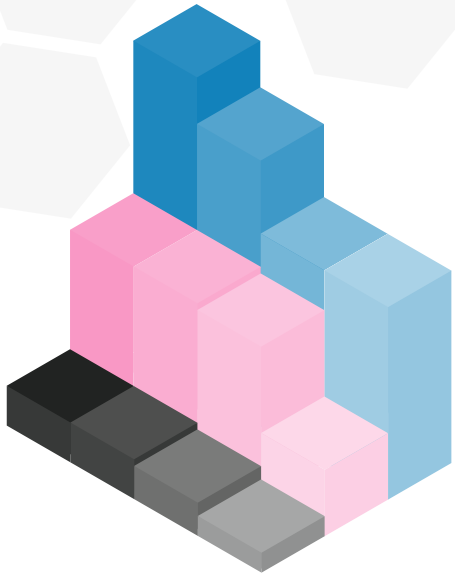
**"The only lagging aspect is senior management being comfortable enough to fully drive the implementation of these technologies. However, I firmly believe that in a very short period of time these technologies are going to be a priority focus for quite a few people."**

# AI IN PHARMA: THE FUTURE OF DRUG DISCOVERY

Predictive analytics, voted as the top intelligent technology of choice, can streamline processes and help pharma firms avoid gaps in productivity. This can provide a competitive edge to firms because this improved efficiency will enable manufacturers to reach approval faster. With risk being such a concern in research and development (R&D), it is a surprise that it received a lower priority ranking here.

**High impact intelligent technologies: Which IE tools do you think could have the most significant impact on your business?***

| | |
|---|---|
| Predictive analytics | 47% |
| Intelligent Automation | 40% |
| AI | 29% |
| IoT | 29% |
| Machine learning | 24% |
| Smart devices | 24% |
| Cognitive analysis/computing | 23% |
| Text/speech analytics | 10% |
| DevOps and API | 6% |
| Other (please specify) | 6% |
| RPA | 5% |
| Chatbots/virtual assistants | 3% |



Dr Andrea Zobel "I have been really impressed by the success stories I've heard where companies used predictive analytics tools on very small data sets to produce a good view into the future and optimize planning, manufacturing and production.

"Regarding the Internet of Things (IoT) only one third of the respondents see it to be of real interest. This is a little surprising because there are so many aspects of IoT in development that are due to influence on drug discovery."

Rita Hadebe "I am happy cost cutting is not the top priority amongst respondents.

"The top response of streamlining process is beneficial across the board. Being a high pressure environment, the advantages of time and enhanced competiveness are attractive to professionals at all levels in drug development."

**Key Benefits: How do you think IE applications could benefit the pharma industry?***

1. Streamlining processes
2. Time-saving
3. Staying ahead of competition
4. Modernizing business
5. Cost-cutting

**Respondents could choose up to three options*

# AI IN PHARMA: THE FUTURE OF DRUG DISCOVERY

**Intelligent technologies are already being applied within the earlier stages of R&D, especially to boost target and compound identification. The prediction of adverse events in patient enrollment for clinical trials can be boosted with analytics. Some are skeptical towards the actual benefits these technologies can bring to the later stages of the drug discovery process.**

**WATCH THIS VIDEO to hear more from Dr Andrea Zobel on IOT in Clinical Trial Supply**

## Pre Clinical: Which parts of the pre-clinical stage in drug discovery will be most affected by intelligent enterprise?

| | |
|---|---|
| Target and compound identification | 1 |
| Managing genomic big data with machine learning | 2 |
| DNA interpretation – using AI to drive personalized medicine discoveries | 3 |
| Speeding up high-throughput screening with AI and machine learning | 4 |
| Enhancing adverse effects and toxicology predictions | 5 |
| Using AI to comb through drug safety data | 6 |
| Locating molecules suitable for drug re-purposing | 7 |
| Enhancing in-silico modelling with AI | 8 |

Darryl Davies **"I can definitely see why people would choose the leading three answers. Simply because there are fully fleshed services in these areas.**

**"Although, in my opinion, speeding up high-throughput screening and the re-positioning of molecules will definitely be affected by these technologies. Also, AI and machine learning is used to assist with drug safety data quite a bit already."**

## Clinical: Which parts of the clinical stage in drug discovery will be most affected by intelligent enterprise?*

| | |
|---|---|
| Using machine learning to examine trial data | 1 |
| The prediction of adverse events or medical conditions in patient enrollment | 2 |
| Improving predictiveness of diagnostic testing with IE technologies | 3 |
| Patient stratification within clinical trials | 4 |
| Improving clinical trial design with AI | 5 |
| Enhancing patient enrollment with AI | 6 |
| Using machine learning to power exclusion criteria | 7 |
| Upgrading trial site selection with AI | 8 |
| Upping patient retention with artificial intelligence | 9 |

Dr Andrea Zobel **"I am surprised that patient involvement was not higher than the expectation that clinical trial data analysis will improve.**

**"These answers will be greatly influenced by the organizations people are associated with. For instance, I am from a clinical research organization, we use these intelligent technologies for site selection and to enhance patient recruitment because it's our main business."**

**Respondents could choose up to three options*

# AI IN CX: THE FUTURE OF CUSTOMER EXPERIENCE

**The age of AI has arrived and it is on the verge of up-ending and re-making virtually every industry. Everyone operating in the customer experience sphere needs a plan for how they are going to adapt-or face getting left behind by their competitors.**

Moreover, the speed of change is rapidly gathering pace. Our deep-dive research into customer experience (CX) found that 36 per cent of businesses are already at the beginning/planning phase of their AI journey. But in just over two years more than half (53 per cent) of organizations anticipate their AI operations will be "established".

Given the overwhelming sense of optimism, it's obvious AI will be a primary focus in the next few years. According to our research, 82 per cent of CX leaders are "excited" about the impact of AI on the industry and, tellingly, only 8 per cent feel "worried" about the impending changes.

Despite the thrum of interest, the majority of practitioners say their AI plans are still in the early stages, and case studies and real-world success stories remain few and far between.

## CX priorities to 2020

It is worth noting that AI falls second on the list of intelligent enterprise technologies predicted to have the biggest in the CX industry by 2020. The clear majority in our research cited predictive analytics as the top trend.

Smart devices came third on the list of priority areas, highlighting the rapid impact that relatively new technologies—such as Amazon Alexa and Google Home—have already had on the industry. The intimate personalized experience these smart devices provide fits with increasing expectations from consumers demanding more tailored experiences.

## Barriers to overcome

Building an accommodating internal culture, competing for attention with other priorities and upgrading/working with legacy systems were identified as the biggest barriers to AI progression.

> **"Integration with existing infrastructure and legacy systems is a barrier to AI investment for more than a third of organizations, compounded by a lack of demonstrable ROI for AI investments."**

- **An overwhelming 82 per cent of CX leaders say they are "excited" about the impact of AI on the industry and only 8 per cent say they feel "worried" about the impending changes**
- **By 2020 a majority (53 per cent) of CX organizations surveyed anticipate their AI operations will be "established"**

To overcome these challenges, practitioners cite the need for more case studies, industry research, training, a clearer view of the vendor market and budget.

These concerns help explain that while 42 per cent of CX practitioners are interested in stepping up AI investment, other priorities still take precedence.

However, with 18 per cent of organizations in the research phase, and 7 per cent actively seeking relevant vendors, the appetite for ramped up investment in IE technologies is certainly there.

**Zarina de Ruiter**
Editor
**CX Network**

cxnetwork.com

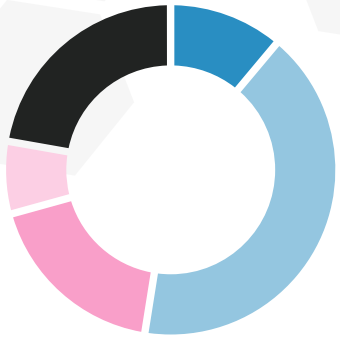
# AI IN CX: THE FUTURE OF CUSTOMER EXPERIENCE

We have looked at the top trends across IE and AI ahead of 2020 as practitioners predict the biggest changes that will impact their organizations and the wider industry. But what is their *actual* business readiness when it comes to staying ahead of their competitors and industry disrupters? And what barriers to investment are hampering their efforts to moving onto the next stage on their journey?

Integration with existing infrastructure and legacy systems is the biggest barrier to investment for a third of organizations.

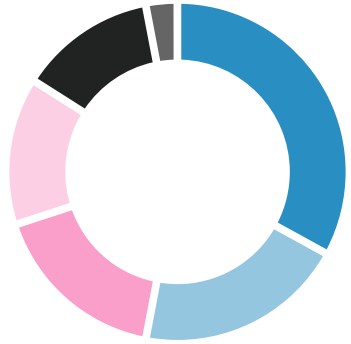
## How would you define your business readiness for investing in AI/IE?

- Not interested at this time — 11%
- Interested but other priorities taking precedence — 42%
- Aware of the main themes and starting to research — 18%
- Aware and actively seeking relevant vendors — 7%
- Already investing and looking to invest further — 22%



## What do you see as the biggest barrier to investment in AI/IE?

- Integration with existing infrastructure/legacy systems — 35%
- How quickly it can demonstrate ROI — 20%
- Lack of understanding of which solution area to focus on — 17%
- Price — 14%
- Stakeholder buy-in — 13%
- Other — 1%



Nigel Willson - Global Strategist, Microsoft

Advice for overcoming the top investment challenges:

1. Integration with existing infrastructure/legacy systems – The true power from AI of any type comes from three factors in combination: big data, cloud computing and powerful algorithms, therefore legacy systems will always be a barrier. However, legacy systems can be as good a source of data to feed an AI solution, or could be fed by information processed in the cloud and fed back to an on premise solution. I would look for solutions that can or could exist outside of legacy systems for a quick win.

2. How quickly it can demonstrate ROI – Most projects are challenged when it comes to demonstrating ROI, and AI projects are no different. Start small, prove the benefit before looking to larger scale deployment. Being cloud-based, AI projects have the advantage of being able to start very small, often initially using some kind of trial or free credit and then scaling up and out (and back down again) as needed.

3. Lack of understanding of which solution area to focus on – Always do your research as to what your competitors are looking at, ask cloud vendors for their ideas and some will invest in hackathons / prototyping, and look at areas that will add value and are proven and available. Don't look at something that looks cool and may not actually yet be achievable.

# HOW THE NORDICS ARE TRANSFORMING CX WITH AI

**What can global organizations learn from the AI-road being paved by Nordea and Nordic Choice Hotels?**

Every now and then, I find myself discussing with acquaintances a phenomenon I usually describe as "The Nordic Innovation Paradox".

Ask anyone in the streets, at the office or at home, what is the first thing that comes to their mind when they think about one of the Nordic countries? The majority will provide answers such as "IKEA, their flat packs and meatballs", "LEGO was my whole childhood" or "I had a Nokia 3310, it used to last forever".

The paradox is that these five countries – Denmark, Finland, Iceland, Norway and Sweden – gave us so many innovations that are now embedded in our lives and yet public opinion tends to only remember three brands.

To name just a few of the most important inventions: we have the Finnish-born heart rate monitor (yes, the feature that allowed you to rationalize buying your fitness tracker or smartwatch), the Norwegian paperclip (yes, they are behind the feeling that you can organize a sprawl of paperwork) and the Swedish seatbelt (something you use every time you hit the road... or so you should).

Fortunately for us, although they don't always get the credit and recognition they deserve, our Nordic friends did not give up on innovating for everyone's benefit.

Artificial intelligence is near the top of everyone's mind at the moment and it isn't surprising that Nordic companies are involved in it. We have two examples of how these unsung heroes could enhance customer experience in the near future.

### Nordea: Putting customers' time first

Stockholm-based Nordic megabank Nordea has been on something of a crusade to fit with customers' schedules; operating around the clock all year round. They have decided to take this a step further by engaging in artificial intelligence.

It started in March, when they announced the introduction of Liv – a virtual colleague that can perform repetitive tasks faster and more efficiently than human colleagues; freeing them up to focus on value-add tasks and therefore providing enhanced experiences to their customers. Liv is not only a fast learner – she is also empowered to make the right decisions through rule-based robotics initiatives.

Then in July, Nordea announced a partnership with a start-up called Feelingstream. The tie-up is intended to improve response times. AI-based text-analytics solution interpret inbound customer communications (reportedly hundreds a second) and intelligently forward them to the right recipients within the business, cutting away the agent-based sorting (or excess of handoffs) that has long frustrated and held up customers around the world.

## Author

**Gustavo Imhof is a CX professional with a background in customer experience measurement and CX strategy design and implementation. He has held customer insight roles at KMPG Nunwood and Carlson Wagonlit Travel, and is currently part of the CX team at consumer delivery specialists Hermes.**

Imhof is passionate about spreading the word about customer experience, making it right by the customer, making customer-led change in businesses and witnessing (and ultimately shaping) what he likes to coin as 'next practice in the making'. You can read his insights on his website CX Ahead.

CX Ahead

# HOW THE NORDICS ARE TRANSFORMING CX WITH AI

The solution is being trialed in Finland now and is expected to provide much shorter wait times before a customer can be put in touch with an agent.

### Nordic Choice Hotels: A digital-first hotel strategy

The hospitality sector can generate extreme emotional responses. One hotel room might contain a blissed-up couple enjoying their honeymoon; next door might be a stressed businessman far away from his family. How the business better understand their individual needs to keep them both happy?

Nordic Choice Hotels – whose hotel brands include Clarion, Comfort and Quality hotels – has invested $29 million in its digital strategy to develop personalized customer service blending physical and digital experiences. The transformation architect making this strategy is Nordic Choice's Chief Digital Officer Lisa Farrar.

In August 2016, the Clarion Hotel Amaranten in Stockholm became the first hotel in the world to offer rooms with a smart assistant. The Amazon Echo devices have been enhanced with additional hospitality functions.

As part of the Nordic Choice's digital strategy, customers will be able to use their phones as room keys (a prototype already available in Starwood and Hilton hotels) and provide a reception-free experience (such as the Hotel Buddy in Germany) and have voice-controlled room environment and room service.

Farrar says the plan is that technology should facilitate an even more personalized experience; with personal pictures in your room and clothes in your size hanging in the wardrobe.

> **"As part of the Nordic Choice's digital strategy, customers will be able to use their phones as room keys and have voice-controlled room environment and room service."**

Such a personalized experience is already made possible through services such as Cachet World (a platform offering, among other features, the ability for guest to personalize their hotel rooms by purchasing add-ons such as designer bedding or beauty essentials) in high-end hotels, but the customer is still required to contribute and tell the hotel what they want.

There is little doubt that the latest AI technologies have the potential to deliver all the above in a smooth and deeply personal way and that is what Nordic Choice is investing in and aiming towards.

- **The Nordic countries – Denmark, Finland, Iceland, Norway and Sweden – have given us many well-known innovations including the paperclip and the seatbelt**
- **Brands like Nordea and Nordic Choice Hotels are leading the way when it comes to a new era of AI-powered customer experience**

Nordic Choice only launched its Farrar-led digital strategy last year but it has the potential to inspire customer experience professionals across a raft of industries.

### The verdict?

Nordic Choice Hotels and Nordea blaze a trail in how AI can be harnessed to facilitate a differentiated and enhanced customer experience. The prototypes the two Nordic companies are trailing could herald important new developments in the science of customer experience and inspire legions of similar services.

# AI IN DEFENSE: THE FUTURE OF GLOBAL SECURITY INTELLIGENCE

**For organizations in the defense industry, survival in the AI-era demands adaptation. Those who embrace AI and begin their plans for adoption can now build an advantage over competitors. Those that do not may be left behind altogether.**

Moreover, pressure is growing for the defense and security sectors to shed traditional 'closed-door' attitudes to outsider companies. Innovation can only take hold by removing these barriers and allowing tech companies to become creatively involved in new equipment solutions.

Operational decision-making is perceived as the area most likely to benefit from AI solutions, and more than half of the defense industry view overcoming conservative internal culture as a key challenge.

## A need for speed

While the majority (71 per cent) of the industry believes intelligent enterprise will play a significant role in defense by 2020, only 3 per cent claim to have established their programs, with two thirds still at the starting line. This suggests a wave of businesses will be left behind the curve over the next two years unless action is taken to speed up adoption.

Notably cost-cutting is not the main driver. Instead, an overall effort to modernize business is the primary goal, with organizations expecting to build a competitive edge by streamlining activities and getting products or services to the market more quickly than ever.

## An opportunity for change

The defense industry boasts some of the most advanced technology in the world—supported by big budget government and military R&D projects. However, it is also notorious for having some of the longest lead-times for delivery to the end-user, with military equipment frequently becoming entangled in competition, bureaucracy, lawsuits and rapidly evolving requirements.

Likewise, traditional defense companies are often resistant to changes in process or partnering with non-conventional defense parties.

All in all, this culture is deemed to be the biggest danger to advancing intelligent enterprise—many businesses will need to re-evaluate how they operate and begin committing to new ways of thinking.

## Looking ahead

Artificial intelligence topped the list of IE technologies expected to have the biggest impact on the defense industry by 2020, closely followed by cognitive analytics.

- **44 per cent of defense businesses are at the beginning/planning phase of their AI journey**
- **71 per cent expect intelligent enterprise technologies will have a "significant" impact on the defense industry by 2020**
- **Operational decision-making is viewed as the area that is most likely to benefit from AI solutions**

Integration with existing infrastructure and legacy systems is the biggest barrier to investment for more than a third of organizations at the present time.

Despite the exciting opportunities ahead, the biggest challenge remains understanding what this change looks like and how AI can and will impact the market on a practical level.

**Richard de Silva**
Managing Editor
**IQPC Digital**

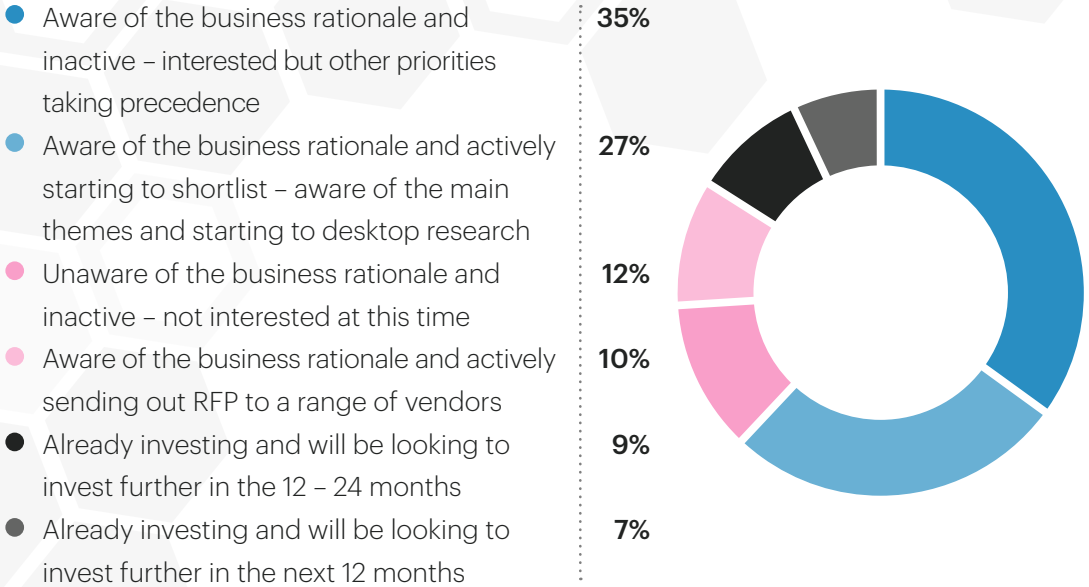
defenceiq.com

# AI IN DEFENSE: THE FUTURE OF GLOBAL SECURITY INTELLIGENCE

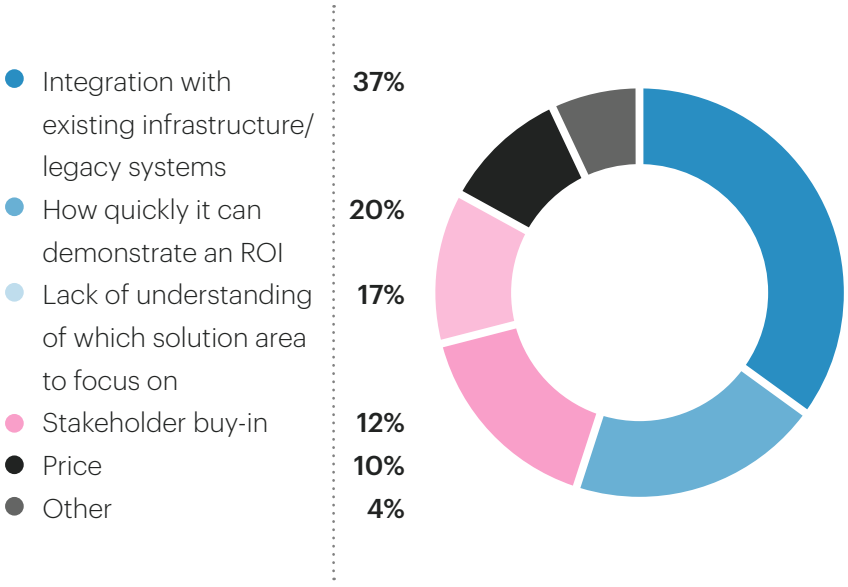
**We have looked at the top trends across IE and AI ahead of 2020 as practitioners predict the biggest changes that will impact their organizations. But what is the level of business readiness when it comes to staying ahead of competitors and industry disrupters? And what barriers to investment are hampering efforts to move on to the next stage in this journey?**

**Integration with existing infrastructure and legacy systems is the biggest barrier to investment for over a third of organizations.**

### How would you define your business readiness for investing in AI/IE?




### What do you see as the biggest barrier to investment in AI/IE?



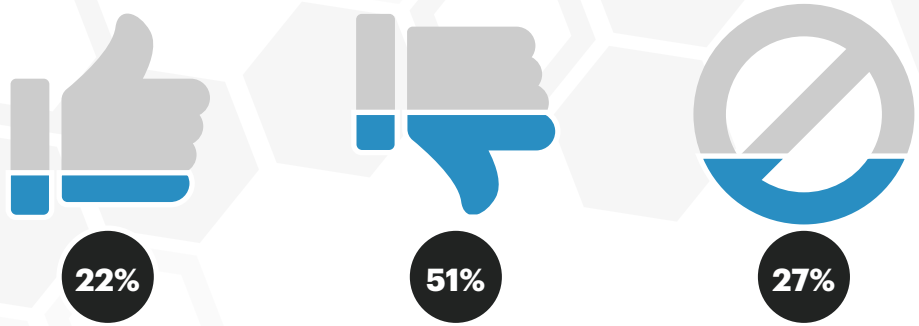

Most of the industry is aware of the business rationale behind IE and AI implementation but only around 16 per cent have begun to actively invest in the technology. Meanwhile, around one third of the industry is now shortlisting options and requesting supplier proposals, while another third have a desire to move forward but are seeing their plans stymied by "other priorities".

Integration with existing infrastructure and legacy systems is the biggest barrier to investment for more than a third of organizations at the present time. Therefore, despite an appetite for advancement, the slow rate of change and adaptation across the industry as a whole may prove to be an even bigger hindrance than cost or ROI analysis in the long-term.

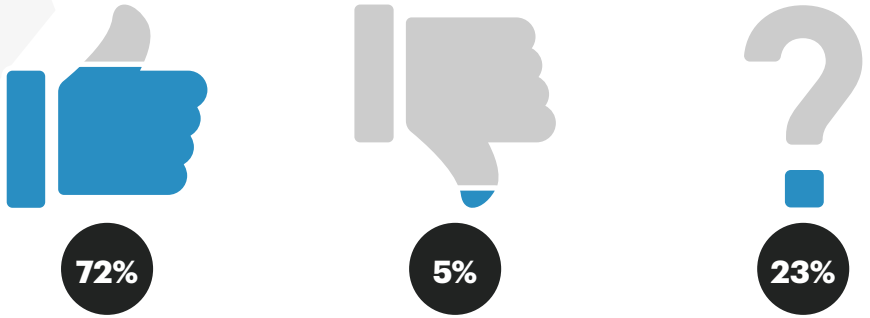
# AI IN DEFENSE: THE FUTURE OF GLOBAL SECURITY INTELLIGENCE

AI is commonly seen as a threat to jobs given the widespread possibilities for automation. However, in opening up new areas of business, the advent of this technology may also create new job opportunities. The defense industry lies more on the optimistic side, while the vast majority are confident IE will save their organizations money over the next five years.

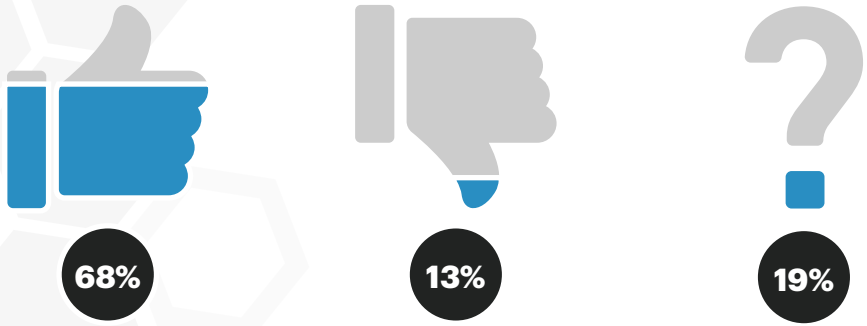
**Do you expect intelligent enterprise to significantly cut jobs in the defense & security industry through 2020?**




**Do you think intelligent enterprise will create more jobs in new areas of this industry by 2020?**

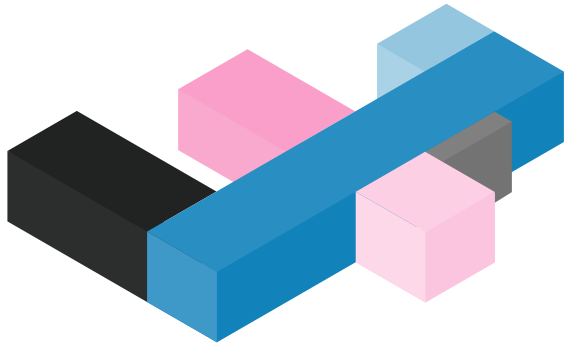



**Can intelligent enterprise applications save your company money in the next five years?**




**...If yes, how much could it save?**

| | |
|---|---|
| Currently unquantifiable | 47% |
| Negligible | 7% |
| 5 - 9% | 15% |
| 10 - 14% | 10% |
| 15 - 20% | 19% |
| More than 20% | 2% |



# AI IN DEFENSE: A EUROPEAN PERSPECTIVE

**The survey results reveal a gap between the rhetoric and reality around the role AI could play in the security and defense sector. Rhetorically, most survey respondents believe that the so-called AI revolution will save them time and money in the future. Industry is also clearly excited about the potential of AI and how it may positively affect the security and defense sector. A majority feel that AI could help reduce costs, streamline business and help with business modernization.**

The real issue to focus on, however, is the reality of how far industry is prepared to capitalize on the AI revolution. Most respondents explain that they are only at the beginning phases of understanding what benefits AI could bring, and, to the extent that they are, the main focus is on using AI as a tool to help with decision making and analysis. I was quite surprised to learn that most respondents did not feel that AI could play a role in manufacturing and logistical processes. My expectation was that businesses would use AI for data and analysis and production, but that does not appear to be the case at present.

What I was not surprised to learn, however, relates to the major inhibitors behind a lack of uptake on AI. The need to change business culture, rapid changes in technology and competing priorities are obvious reasons behind a delayed response to AI. I think that the survey also reveals some interesting concerns about AI. First, industry – much like military planners – is unclear about how AI could be integrated into existing infrastructure and legacy systems. Second, it is still unclear how AI will affect employment in the security and defense sector. Indeed, while respondents feel that AI will create more jobs across the whole of the economy there is less confidence in AI's ability to create jobs in the security and defense sector.

For European industry, therefore, it is clear that the business culture in the security and defense sector needs to take stock of the potential of AI in a more practical rather than general sense. This change in culture will not come about alone. Not only does AI represent a clear need for civilian and military sectors to learn more closely from one another, but dedicated financing of and commitment to research is clearly required. New financial instruments at the European level may well assist firms in looking at the potential of AI, but such instruments mean little without national governments and defense planners also investing time, energy and resources into understanding and investing in the potential afforded by AI. I expect European firms to first start using AI (such big data modelling, robotics, IoTs) to help with production and marketing processes. However, whether AI will be used to improve Europe's military effectiveness is a debate that is still in its infancy.

## Author

**Daniel Fiott joined the European Union Institute for Security Studies (EUISS) in late 2016, where he analyses European defense policy and defense industrial issues. Prior to this, he worked for four years as a researcher at the Institute for European Studies at the Free University of Brussels (VUB) (2012 -2016). At the VUB he analyzed and lectured on various aspects of European security, including defense industrial issues more specifically.**

From 2014-2016 he served as a fellow of the Research Foundation – Flanders (FWO). He was awarded this prestigious scholarship for his research on European defense industrial cooperation. In 2016 he was awarded the IISS' 'Palliser Prize' for his work on EU-NATO cooperation. Daniel was educated at the University of Cambridge and the Free University of Brussels (VUB).

iss.europa.eu

# AI IN ENERGY: THE FUTURE OF OIL & GAS

**After the halving of the price of a barrel of oil since 2014 and the loss of some 350,000 jobs worldwide, a distressed oil and gas industry saw back-to-back years of negative spending in the upstream sector for the first time in the 21st century.**

In the three years of structural streamlining and enforced frugality, a post-slump oil and gas industry has begun to embrace the potential for innovative technologies to enhance performance and profitability in a stabilizing fiscal environment.

Speaking at International Petroleum Week in February 2017, BP's chief executive of upstream, Bernard Looney, declared that: "Big data is revolutionizing big oil" but conceded that the oil and gas industry had been left behind by the speed of the digital onslaught.

**His assertion was that:**

*"We are now making up for lost time—fast."*

## Embracing a new era

Four months after Looney's speech, BP purchased Beyond Limits, an AI and cognitive computing start-up that is adapting Nasa technology designed for deep space exploration to meet the needs of the upstream sector.

Likewise, US-based Chevron has been using graphics processing units to visualize seismic data and create three dimensional, subsurface models to pinpoint the most suitable sites for drilling.

Meanwhile, energy giant Shell has been developing machine learning algorithms to take raw seismic traces and automatically detect and categorize subsurface faults during the exploration phase, both on and offshore.

## Opportunities abound

> **According to the research, the most significant impacts of IE technologies on oil & gas will be cost-cutting, streamlining processes, modernizing business and time-saving.**

Unsurprisingly for a global industry that has just come out of its darkest period in thirty years, two in three respondents believe that the IE will drive cost savings.

- **Four out of five oil and gas professionals are "excited" by the impact of intelligent enterprise applications on the industry**
- **Almost three quarters believe that intelligent enterprise applications can save their company money on capex and opex**
- **One in three respondents say they have either not started, or have no intention of integrating IE technologies into their business models**

Does that mean that oil and gas professionals believe that IE technology and operational excellence are, effectively, synonymous? If so, what implications might that have for the way that the industry seeks to structure itself in the coming years? Only time will tell.

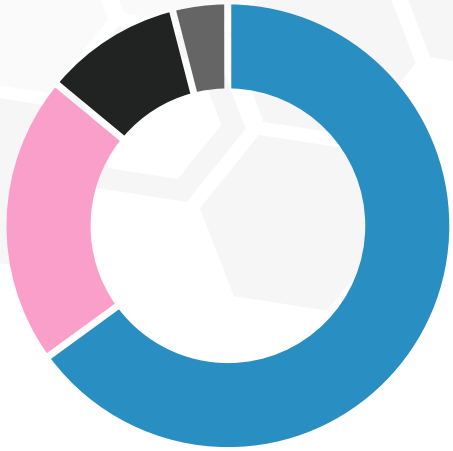
**Jonathan Hollis**
Business Development Manager
**IQPC Digital**

oilandgasiq.com

# AI IN ENERGY: THE FUTURE OF OIL & GAS

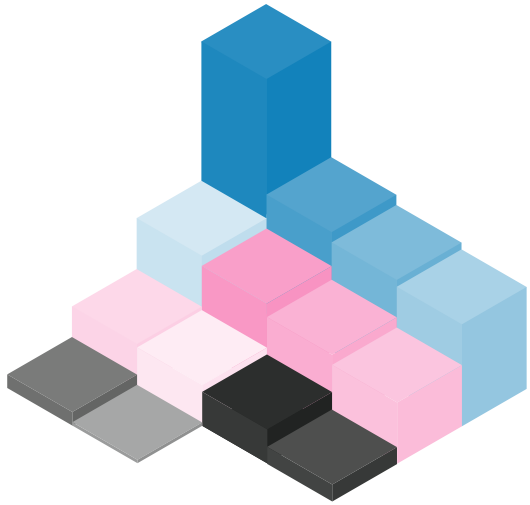
**What part of the industry can be most helped by intelligent enterprise?**

| | |
|---|---|
| All equally | 65% |
| Upstream | 21% |
| Downstream | 10% |
| Midstream | 4% |



**Which parts of the oil and gas value chain will be most affected by intelligent enterprise?***

| | |
|---|---|
| Asset integrity & maintenance | 69% |
| Field development | 35% |
| Geophysical | 32% |
| Pipelines | 30% |
| Drilling | 28% |
| Refining | 25% |
| Power generation | 21% |
| Transportation (tankers & trucks) | 18% |
| Construction | 13% |
| Gas processing | 12% |
| Product marketing | 9% |
| Liquefaction | 5% |
| Other | 4% |
| Storage | 1% |



**Respondents could choose up to three options*

**When looking at the three streams of the oil and gas industry, the most obvious candidate for tangible transformational benefit is the upstream sector, where a raft of techniques have been used in different guises and to differing degrees of complexity for decades.**

It's no surprise that three out of the four top selections chosen by our respondents fall into the upstream vertical, with asset integrity and maintenance – an all-stream discipline – having roughly double the interest of its nearest competitor.

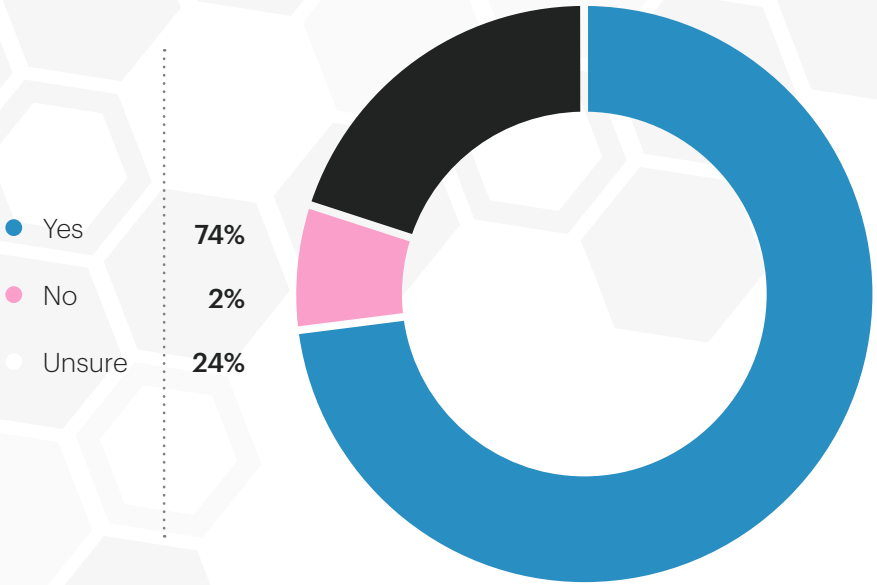
Correlating with statistics observed earlier in this study, asset integrity practices could be greatly influenced and improved with the rolling out of predictive/ cognitive analytics and intelligent automation systems.

Geophysical identification, drilling and field development, stand to benefit from the fuzzy logic applications that are ingrained in IE analyses, down to the sheer volume of data and levels of uncertainty involved in their day-to-day operations.

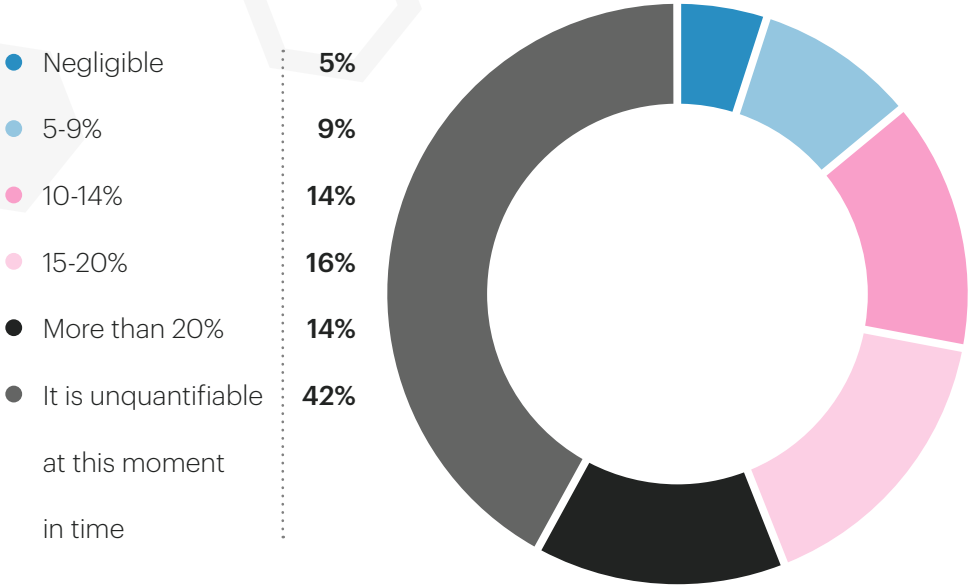
Midstream and downstream areas of the industry – such as pipelines, power generation and refining – also occupy significant percentages of our respondents' opinion, reinforcing the assertion of two thirds of those surveyed that every sector will benefit equally from IE in the fullness of time.

# AI IN ENERGY: THE FUTURE OF OIL & GAS

**Can intelligent enterprise applications save your company money on capex/opex?**




**If yes, how much could it save?**




**With two-thirds of oil and gas professionals believing that cost-cutting will be the primary advantage of IE adoption, a further three out of every four respondents believed that capex and opex efficiencies could come as a direct result of IE system integration.**

Although approximately half of those surveyed believed that the amount that could be shaved off of budgets was undefinable at the present time, 14 per cent were confident enough to opt for "more than 20 per cent".

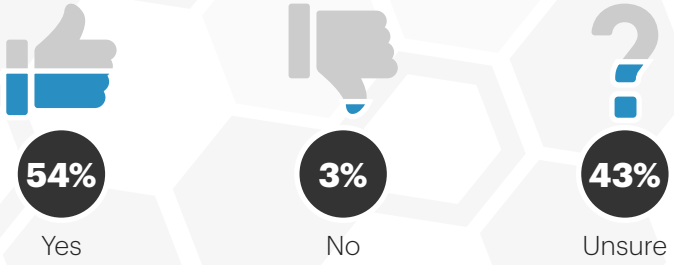
Advances in analytics are enabling integrated driver-based planning, the transparency to link and place individual assets in the context of their industry verticals and within their suite of products, leading to increased accuracy of capex projections.

As IE frameworks are able to fit on top of existing legacy systems to leverage data that is already being generated by extant hardware, capex-intensive businesses like the hydrocarbons industry will see a diminution in their overheads.

In an industry where four out of five industrial megaprojects fail in their objectives this will come as welcome news.

# AI IN ENERGY: THE FUTURE OF OIL & GAS

**Can intelligent enterprise be a solution to the attrition of the great crew change?**




**The oil and gas industry, particularly in the world's mature basins, is facing a demographic disaster: by 2020, half of the industry's experienced engineers and geophysicists will have reached retirement age.**

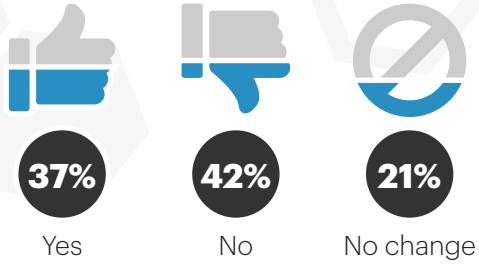
An already critical skills shortage has been compounded by broad-spectrum lay-offs made in the face of plummeting crude prices.

Enshrining the knowledge of millions of man hours of experience in centres of excellence and best-practice digital resources has been the goal of companies in the past decades – technology has always been seen as a crucial part of bridging the skills gap.

More than half of our respondents thought that IE technologies could be the answer to tackle the great crew change head on, yet just less than half were unsure of whether it could be a workable solution.

The replacement of expert humans with expert machines or computer systems has long been seen as a panacea for a dearth of available talent. In the eyes of oil and gas professionals, this trade-off is far from a cure-all.

**Do you expect intelligent enterprise to significantly cut jobs in your industry through 2020?**




**In keeping with the results of the previous question, oil and gas professionals overwhelming believe that IE integration will not mean the phasing out of trained professionals, but will create more jobs across the industry than it will eliminate.**

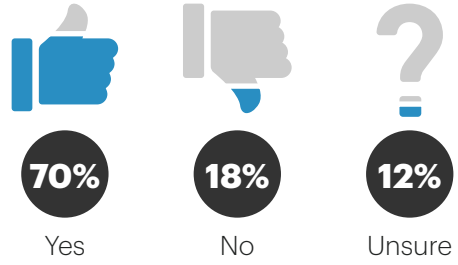
Double the number of respondents believed that IE systems world promote employment growth in the industry through 2020, with one in five believing that there would be no change at all in staffing.

According to a recent report published by global management consultancy, Accenture, the growth of IE applications and their effect on workforce efficacity could boost the productivity of some national economies by as much as 40 per cent by 2035.

In step with the preponderance of novel IT technologies in the business sphere, a raft of roles will be created that will enable humans to direct and support operations in proactive ways.

These emergent job functions have recently been codified into three different fields and are set to supplement, not replace current manpower.

**Do you think intelligent enterprise will create more jobs in new areas by 2020?**



# INDUSTRY IMPACT: AI AND THE SMART MINE

**Predictive analytics and AI are the two intelligent enterprise technologies anticipated to have the biggest impacts on organizations to 2020; but not all industries will benefit from this technology equally—or will they?**

Imagine you work at a mine. Your job takes you to a very remote and isolated open pit truck-and-shovel operation. The ore zone extends 1,829 meters, 244 meters in width and 183 meters in thickness. In a given year you might dig up 136 million tons of material and process 10 million tons of it to produce 1.2 million ounces of gold. How do you leverage AI and predictive analytics in a world like this?

It is a great question and one that is becoming easier to answer thanks to the advancement of drone (unmanned aviation vehicle) technology. Originally drones were consumer toys or military weapons. In recent years, however, drones have entered the workspace as they have become easier to fly, more reliable, and lower cost. The cameras and sensors drones can carry have also advanced, making today's drones capable enough to allow mines to "digitize the dirt" and unlock the advantages of modern technology in this industry.

The first phase of value drones unlock is cloud based visualizations created from the uploaded drone images. Mine workers and executives alike can easily see progress on the mine, measure elevations to centimeter accuracy, track cut and fill progress, see the fragmentation of the rock post a blast, and importantly collaborate with each on the cloud based models from locations all over the mine and all over the world.

But more is possible. Now that the mine is digitized, AI and predictive analytics can be applied to further advance the insights, safety and effectiveness of the mine. For example, adaptive terrain modeling techniques can be used to estimate stockpile boundaries and floors for best-in-class volume estimation. State-of-the-art GIS simulation libraries can also be integrated for water drainage and pooling analysis. And deep learning models trained on terabytes of data can be used for automated centimeter-level segmentation of a site spanning hundreds of acres.

> **Drones are unlocking the potential of modern technology for "physically focused" industries such as mining, construction, energy, utilities, property management and more.**

Historically industries such as mining have been left out of the digitization era; but that will no longer be the case. Drones are unlocking the potential of modern technology for "physically focused" industries such as mining, construction, energy, utilities, property management and more. By 2020 I predict AI and predictive analytics will be key value drivers for all of these industries—and beyond.

## Author

**Yvonne Wassenaar is CEO of Airware: pioneering digital possibilities, empowering the world to thrive. Her current focus is on digitizing the physical world with drones to allow industries such as mining and commercial insurance to benefit from modern day technologies such as cloud, machine learning, and artificial intelligence.**

Previously Yvonne served as CIO of New Relic, a digital intelligence platform company and as a top executive at VMware where she led key initiatives to scale the company. She began her career at Accenture where she joined as a software engineer and held a variety of leadership roles over 17 years. In her current role, Yvonne is championing AI use to drive a safer, more innovative world.

twitter.com/ytechdata

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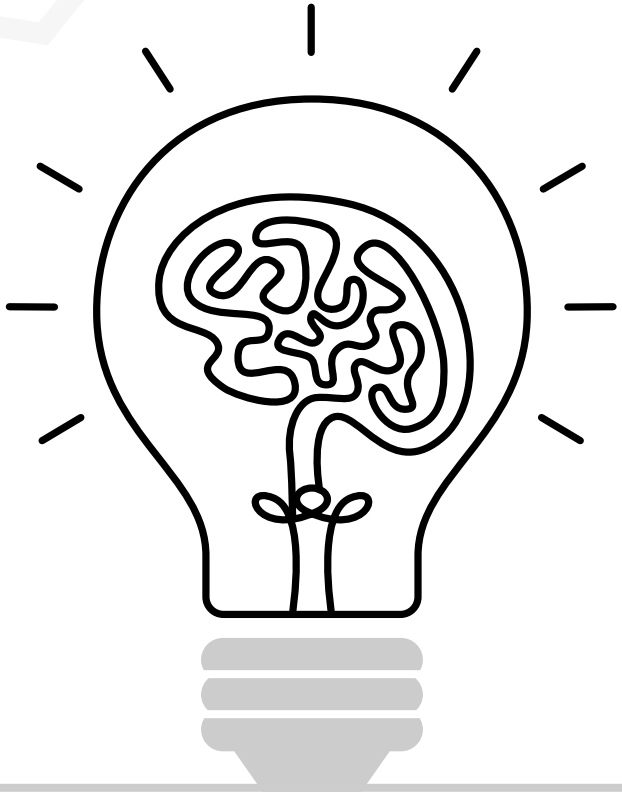

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