The human element of AI integration

Part of our Series “AI in the manufacturing industry”

Episode 4

pwc

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The series

Welcome to our series on the impact of artificial intelligence (AI) on the manufacturing landscape in Flanders and North Brabant, a joint project by PwC and the Open Manufacturing Campus (OMC). Our goal's to provide you with a comprehensive understanding of how AI's reshaping manufacturing and how it helps manufacturing companies improve their performance, innovation and sustainability, based on real-world use cases from different sectors and regions. We also share our insights and experiences on how to implement AI solutions successfully, addressing the technical, organisational and ethical challenges involved. Each whitepaper delves into a specific aspect of AI, to help you gain valuable knowledge and actionable takeaways. Throughout the series, our "AI in a nutshell" reference sheet provides the reader with an explanation on terminology and some fast facts.

This episode

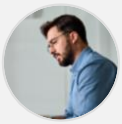
AI isn't just about technology; it's about people. This whitepaper delves into how introducing AI impacts your workforce. Here, we identify different personas and how AI affects each one.

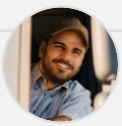
We discuss strategies for engaging and upskilling your workforce which are applicable for both specific use cases and the broader transformation of creating a culture that embraces innovation and continuous learning. Considering these elements, we look at the possible success factors and pitfalls.

How AI impacts different personas

AI's reshaping the manufacturing industry and affecting employees and stakeholders in various ways. Depending on the role and function a person or team serves within the organisation, the impact on their way of working will differ. For example, leadership roles experience AI's influence during strategic decision making, while operators encounter more operational changes focused on automation or efficiency. A good understanding of these nuances is crucial to tailor the change approach and increase adoption from all impacted stakeholders. To facilitate this, we've grouped similarly impacted roles into personas, each with specific ways of interacting with AI.

Personas, how they're likely to interact with AI and their hopes and fears.

Persona	Example profiles	Key impact of AI*	Hopes	Fears
 **Blue-collar worker**	Operators, technicians	• **Scale:** Automation of more complex activities by AI-driven robots • **Enrich:** Gen-AI enabled bots to guide operators through procedures, work instructions, asset documentation, etc.	• Automation of "dirty, dull and dangerous" tasks • Easily accessible asset information and procedures	• Job replacement • Loss of control over production
 **Analyst**	Reliability engineer, data scientist, demand planner	• **Scale:** Automation of repetitive analyses and reporting, allowing engineers to focus on key insights • **Scale:** Preparation (draft) of work instructions • **Enrich:** Prediction models for asset conditions and inventory levels, leveraging additional sensor and external data	• Automation of repetitive work and administration • Pre-filtering and selection of relevant influence factors (data) for prediction models • Increased accuracy of data analyses (i.e. forecast errors)	• Job replacement • Loss of control on analysis outcomes (black box) resulting in over-reliance on AI for critical decisions (i.e. inventory built up) • Increased demand for reporting due to additional insights by certain factors
 **Creative worker**	Marketeer, designer, product designer, R&D	• **Enrich:** GenAI-assisted product design for agile iterations and explorations of directions • **Reinvent:** Uplift customer interaction by GenAI applications in marketing	• Reduced effort to grasp customer requirements and interaction • Increased accessibility for ideation and brainstorming	• Less creative freedom • High dependency on AI for creative tasks • Increased expectations on go-to-market lead times

Persona	Example profiles	Key impact of AI*	Hopes	Fears
 **Support staff member**	HR, finance, procurement, Legal	• **Scale**: Virtual assistants to rapidly screen documents (i.e. OCR apps) and prepare reporting or documentation • **Scale:** Chatbots for internal and external helpdesks (i.e. recruiting, finance questions) • **Enrich:** Analysis of complex policies and cross-departmental questions	• Increased efficiency in administration tasks • More focus and time on strategic and high value-adding activities	• Job replacement • Decreased human interactions, being a large motivating factor for supporting profiles • Decreasing customer service due to AI shortcomings in ramp-up phases (i.e. HR branding) • Potential algorithm bias in the recruiting process and unfair hiring practices.
 **Leadership**	Plant management, operations directors, executive management	• **Enrich:** AI-enhanced digital twins for simulating operations and external impacts • **Enrich*:** Enhancement of reporting agility and connectivity, leveraging company-wide insights • **Reinvent:** GenAI inspiration and first level analysis of new business and operations concepts	• Additional data insights across units or departments • Reduced effort for reporting and administration, allowing more time for insight discussions and action decisions	• Cyber threats with high impact on business continuity • Increased tension amongst labour and unions with regards to job efficiencies • Over-reliance on data models for basic business continuity capabilities • High implementation cost and complexity
 **Customers**	Customer purchaser, End consumer	• **Scale and enrich:** 24/7 customer interaction platforms in all languages, with enriched insights across data systems (i.e. lead time deviations through supply issues) • **Reinvent:** GenAI applications to quickly customise and personalise products	• Increased customer satisfaction and visibility on delivery • Increased capabilities and agility to customise products without repetitive interactions or physical presence	• Decreased accessibility to human contact and problem-solving skills in case of complex problem • Privacy concern on data sharing
 **Suppliers**	Customer Service agent at supplier side, Truckers	• **Scale and enrich:** Supply chain optimisation due to forecasting models (i.e. TMS on slots) • **Scale:** 24/7 accessibility to transport platforms for unloading activities	• Increased visibility and streamlining of supply chain operations • Reduced delays and logistic expenses	• Potential disruptions due to AI system failures • Decreased accessibility to human contact for operational decisions

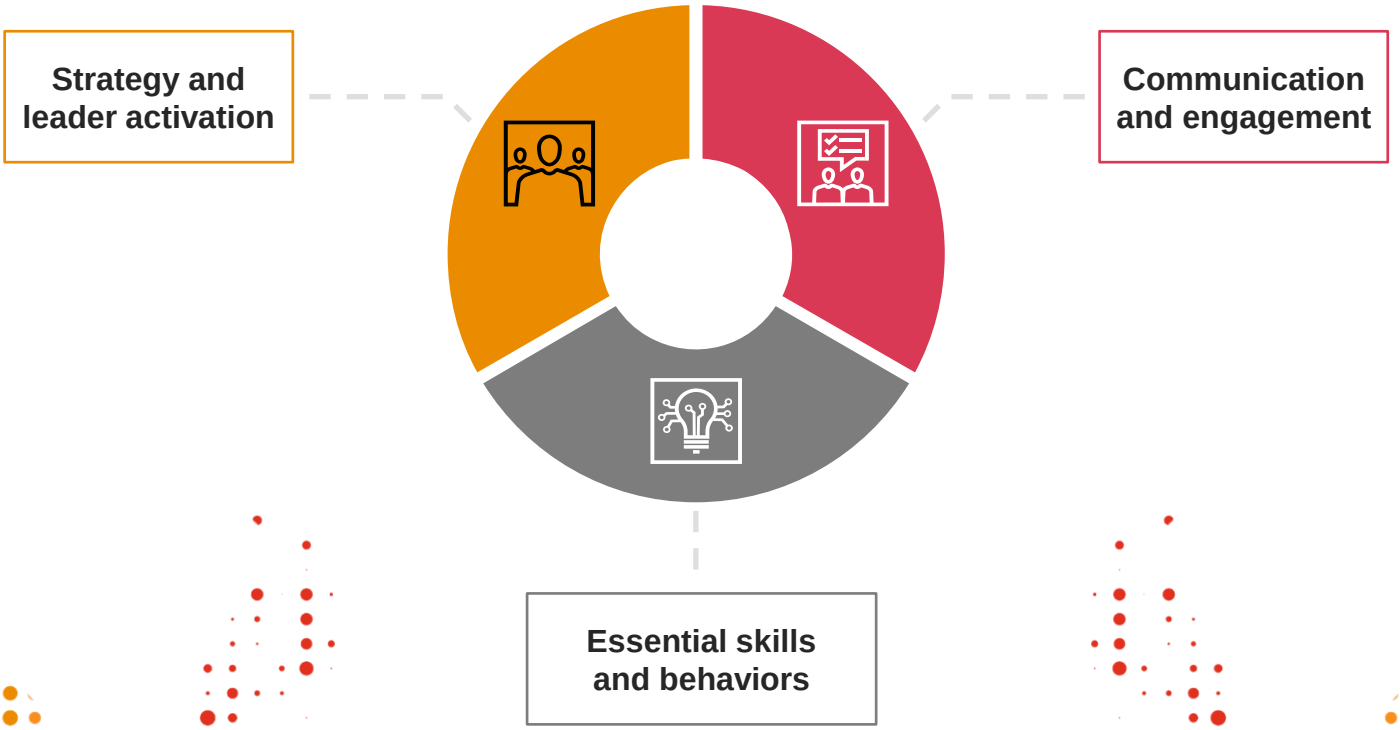
*refers to the impact categories scale, enrich and reinvent from Whitepaper 2.

When evaluating or integrating AI solutions, take time to identify which personas you're impacting and what the impact will be. This will help you tailor solutions and adapt approaches to the unique needs of each, boosting the speed of adoption and making the change more sustainable.

Inspiring employees and increasing adoption

As AI continues to transform manufacturing, the biggest challenge is to engage your workforce and other key stakeholders and incorporate AI into the way you work. Adoption of AI doesn't come from one-shot transformation and training programmes. It needs to be a continuous flow of small changes across the whole organisation (and beyond). AI isn't simply a tool for automation and isn't the sole responsibility of the technology department. AI tools may automate tasks and consolidate information, but critical thinking skills are needed to move towards an AI-enhanced manufacturing environment. To secure the successful adoption of AI, companies must invest in effective change management strategies that address the needs of all impacted stakeholders, starting from the overview of personas (see above).

When defining a clear plan to embed AI into your organisation, it's important to focus on a dynamic and iterative approach that can be applied to specific AI use cases and projects, as well as on the broader need to create a culture that embraces innovation and continuous learning.



Strategy and leader activation

Starting with a **clear strategic framework for implementing AI** is essential to ensure alignment with business objectives and the effective use of resources. A clear strategy enables organisations to prioritise projects based on factors such as feasibility, impact and urgency. For each project, your strategy can then be clearly translated into a case for change based on expected benefits, scope and how it'll affect employees: Why do we need it? What will we use it for? Who'll use it? Do we have to redesign our process? What are the risks?

Developing this overall AI strategy and case for change is important, but aligning your formal and informal leaders on this common vision and creating clear leadership buy-in is even more so. Actively involving leaders from different areas in discussions about objectives, challenges and approaches allows them to take ownership of the initiative and feel more invested. Leaders who actively promote AI initiatives are more likely to keep teams engaged and motivated throughout the transition. It also helps cultivate a culture that embraces innovation and technological advancement.

Communication and engagement

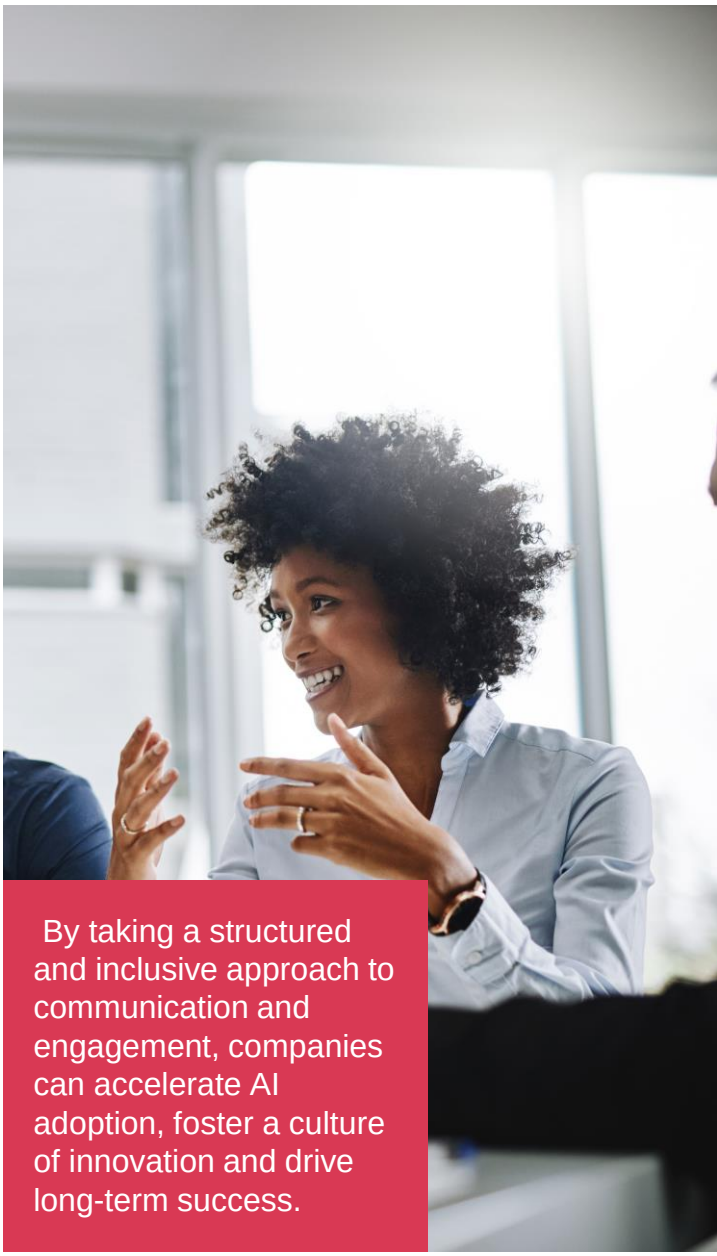
Leadership buy-in is crucial for the success of AI transformation, but **effective communication** is also a key success factor when integrating AI into processes and your way of working. A clear, well-structured communication strategy ensures alignment, fosters engagement and helps mitigate resistance.

Organisations must translate their change vision into a detailed **communication plan** that outlines specific activities for each stakeholder group. This plan should include a compelling storyline with core messaging, key themes, relatable characters and clear benefits. Establishing a strong narrative makes AI adoption more tangible and relevant to employees at all levels.

Engaging key stakeholders early in the process by seeking their input and addressing their concerns can transform perceptions from uncertainty to enthusiasm. Open dialogue and active involvement create a sense of ownership over the transformation, helping reduce resistance. To further embed AI into the organisation's culture, companies can share testimonials that highlight positive experiences and tangible outcomes, reinforcing the value AI brings to both individuals and the business.

To boost the adoption of AI, organisations can establish a **change champion network** that comprises identified influential employees who advocate for AI adoption. These champions can support their peers, address concerns and serve as a bridge between leadership and employees. Empowering early adopters is key. Companies can formalise this approach by appointing AI ambassadors across departments and establishing dedicated teams to explore and share AI use cases.

To launch AI transformation effectively, companies can best combine **virtual and physical engagement strategies**, such as multimedia storytelling, internal marketing campaigns, interactive experiences and company-wide events. Providing tangible elements like branded materials, leadership-led discussions and opportunities for employees to ask questions fosters a deeper connection to the change. Recognising key milestones and celebrating success stories also helps sustain momentum. Sustaining engagement requires continuous **communication channels** where employees can voice concerns, ask questions and contribute feedback. Establishing forums, workshops and other interactive spaces helps make sure that leadership remains responsive to real-time insights from the workforce, allowing AI strategies to evolve accordingly.



By taking a structured and inclusive approach to communication and engagement, companies can accelerate AI adoption, foster a culture of innovation and drive long-term success.

Skills and behaviours

Implementing AI and building a future-proof, AI-driven workforce not only requires organisations to develop **new technical and analytical skills, but also to re-assess current roles and responsibilities and define new functions and behaviours.**

The intuitive, natural language interface of generative AI (GenAI) reduces the need for extensive technical user tool training; but, organisations can still enhance engagement through dedicated training and development programmes. A **comprehensive workforce strategy** helps make sure that both baseline knowledge and specialist expertise are developed across the organisation. Upskilling and reskilling are about more than just providing access to training. Companies should not only provide learning opportunities, but also identify the specific knowledge and skills required to drive future success.

Starting with this sort of **skills gap analysis** provides insight into the capabilities needed for AI integration, helping you design targeted upskilling and reskilling initiatives. Selecting key roles that are highly impacted by AI and tailoring reskilling efforts to these groups is critical. To ensure long-term adaptability, your upskilling and reskilling strategy should be integrated into existing learning and development (L&D) frameworks. Moving beyond traditional technical training, organisations should embed AI-related learning into everyday workflows. By integrating capability development into daily operations, companies can upskill and reskill their workforce at scale, fostering a culture of continuous growth.

As mentioned above, early buy-in from leadership is essential to the success of these initiatives, reinforcing the importance of training programmes such as mandatory "GenAI & Me" sessions, AI prompting workshops, digital fairs and internal webinars. Leadership and managerial training is important to foster a top-down understanding of AI's strategic value. Sessions focused on responsible AI use, such as interactive "Show & Tell" demonstrations and hands-on experimentation with real-world AI use cases, empower employees to explore AI's potential confidently.

A next important step when moving towards an organisation with a culture that nurtures learning, innovation and a digital mindset is understanding your current culture and identifying a set of critical behaviours to be aspired to. **Below are some examples of key cultural components:**

- A culture that embraces experimentation can lead to successful AI initiatives. Offering employees the psychological safety to test, iterate and innovate fosters an environment where new ideas can thrive and failures are viewed as learning opportunities.

- AI implementation often requires significant changes in processes and workflows. A culture that promotes adaptability and openness to change facilitates a smoother transition and higher engagement from employees.

- AI can enhance teamwork, but a collaborative culture is essential for harnessing its full potential. Encouraging cross-functional collaboration can lead to more innovative uses of AI and better problem solving.

- Continuous feedback allows you to adapt your AI tools and ways of working in real time based on user experiences and outcomes. Regular feedback helps identify problems or unintended consequences of AI implementations at an early stage. By promoting a culture where employees feel comfortable sharing their observations and concerns, organisations can address issues related to accuracy, bias or functionality before they escalate.

A mindset that values feedback, is open for change and encourages collaboration helps build trust between employees and technology. When team members see that their feedback is taken seriously and leads to tangible improvements, it fosters a culture of trust in AI systems, making them more likely to embrace and use AI technologies effectively.

As AI adoption accelerates, taking a moment to look at ethical implementations is essential. Accountability must be at the core, particularly when AI systems make real-time decisions in areas such as production monitoring, predictive maintenance and safety. Clear protocols should define responsibility in cases of AI malfunctions or harm, with human oversight remaining critical in safety-sensitive environments.

Regular audits and refinements are necessary to minimise biases and maintain reliable AI performance. Transparency in AI-driven decision making, particularly in supply chain management and resource optimisation, helps prevent unintended consequences. Beyond operational efficiency, companies must also consider AI's environmental and social impact, making sure that its use aligns with sustainability goals and avoids issues such as excessive waste or energy consumption. As automation shifts job requirements, organisations have a responsibility to support their workforce. Providing reskilling programmes can help employees transition into new roles, helping make sure that AI adoption benefits both business growth and employee development. Responsible AI practices not only mitigate risks, but also enhance long-term success by balancing innovation with corporate and societal values.

By prioritising workforce engagement and continuous skill development, you can create a resilient, agile and motivated workforce ready to embrace AI-driven transformation. Culture doesn't change overnight, it requires long-term effort.

Success factors and pitfalls

Success in implementing AI hinges on several key factors, with a strong focus on workforce involvement and ethical considerations.

First, having high-quality data is essential for AI to function effectively. AI systems need clean, accurate and timely data to make informed decisions. However, the workforce plays a critical role here – helping make sure data is properly collected, validated and interpreted. Employees, especially those in data-related roles, must be equipped with the skills to maintain data integrity, as unreliable data can undermine AI's effectiveness, particularly when it comes to predicting failures and optimising processes.

Seamless integration of AI with existing systems is another crucial factor. Companies face challenges when trying to incorporate AI into legacy technologies and the workforce must be prepared to manage this transition. Skilled engineers, operators and IT professionals must make sure that AI systems work cohesively with existing infrastructure. This requires training staff to not only use new technologies, but to oversee their integration so that AI enhances current systems rather than disrupting them.

Equally important is having a workforce capable of working alongside AI systems. While AI can automate many tasks, human expertise remains indispensable. A skilled workforce, including data scientists, engineers and operators, must be ready to leverage AI tools effectively. This means investing in continuous training and reskilling to enable employees to adapt to new roles and maximise AI's potential. Emphasising the complementary relationship between AI and human workers, rather than viewing AI as a replacement, fosters an environment where both can thrive.

A critical ethical consideration is the use of AI for specific business objectives. AI shouldn't be adopted without a clear understanding of its impact on both the organisation and its workforce. Whether improving production efficiency or enhancing safety, it's important to consider how AI deployment may affect employees, job roles and ethical implications. Businesses should establish clear use cases that prioritise ethical outcomes, such as minimising job displacement and promoting transparency in decision making.

Finally, continuous monitoring and improvement are vital to maintaining AI's long-term success. AI systems must evolve with changing business needs, technological advances and ethical standards. Employees must be involved in this iterative process, providing feedback to make sure that AI systems remain aligned with both business objectives and ethical considerations. Regular audits and adjustments help to identify and address potential biases, to help make AI solutions fair, transparent and ethically sound.

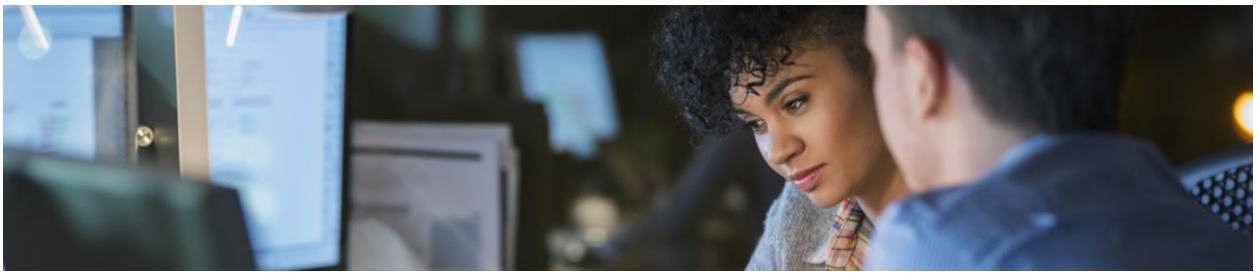
By focusing on workforce engagement and ethical practices, organisations can achieve successful AI deployment, whereby technology benefits both the business and its employees and aligns with broader societal values.

The case of Reynaers Aluminium (below) is a prime example of the importance of a case for change and securing the engagement of all stakeholders. The case of PwC's bespoke Capture the AI Flag game demonstrates how participating in such an activity can help organisations understand the immediate impact AI could have on their daily operations.

Cases - Reynaers Aluminium

Forecasting **Pattern recognition**

AI FOR DEMAND FORECASTING



CONTEXT.

Reynaers Aluminium, part of Reynaers group, is a leading specialist in the development and marketing of innovative, sustainable aluminium solutions for windows, doors and façades. With a catalogue of over 3,000 different profiles, inventory management is crucial to reliably satisfy customer demand without relying on excessive inventory levels

CHALLENGE

Reynaers Aluminium didn't have a forecasting module/system to feed its existing inventory solution, leading to stock outs of some profiles and overstocking of others. The team realised the need for better demand forecasting, but knew that building up this capability would require a considerable amount of time and resources.

AI SOLUTION

Demand forecasting typically relies on the analysis of historical data, enriched with insights on market trends and more contextual elements (e.g. large projects at key clients). To speed up the development of the demand forecasting capability, the team decided to leverage AI for a first prediction based on historical data. Starting from this AI prediction, humans then enriched the forecast with contextual information. This hybrid approach automated the data analysis and forecast model selection, which enabled human resources to focus on the last mile: Incorporating contextual information and aligning across multiple stakeholders for validation of the forecast. Interesting here is that the required skills of the demand forecaster shifted from an emphasis on data analysis to strong interpersonal skills.

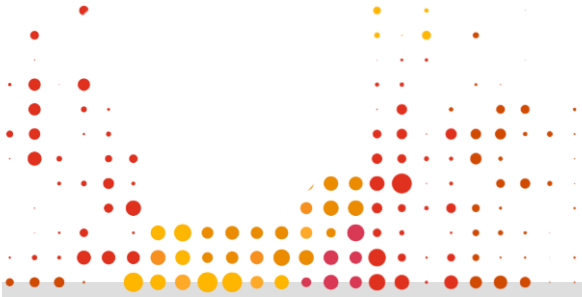
IMPLEMENTATION APPROACH

- **Tool selection:** With demand forecasting being a common challenge across industries and with Reynaers Aluminium having no extensive customisation needs, many off-the-shelf solutions met the firm's business requirements. The team selected a local scale-up to be its provider from the abundance of start-ups that have already entered the AI solutions market.
- **Pilot and roll-out:** The supply chain team selected one of the demand markets to test the tool, which was up and running within two to three months and provided good forecasts. Within a year, the tool was further rolled out to the remaining large demand markets.

Cases - Reynaers Aluminium demand forecasting

RESULTS AND IMPACT.

Thanks to the implementation of the forecasting engine, Reynaers Aluminium was able to build a demand forecasting capability for a cost equivalent to one FTE. Without the tool, three to five additional FTEs would have been required to cover all markets with sufficient attention. In addition to FTE avoidance, Reynaers Aluminium recorded the speed of capability build up and its scalability as important outcomes of the project. However, the supply chain organisation noted that enhanced visibility on demand didn't have the full expected impact as it wasn't fully leveraged in the entire sales and operations process, as this requires full adoption by all functions, e.g. sales, finance and supply chain, which can't be tackled by the AI solution itself.



LESSONS LEARNED

Change management to drive business adoption:

The enthusiasm for the AI solution was so great that the effort required to drive business adoption and focus on specific business impact was somewhat underestimated. When implementing any new capability or process, defining a strong case for change is crucial for success. Why do we need it? What will we use it for? Who'll use it? Do we have to redesign our processes? What are the risks?

Experiment and learn:

Reynaers Aluminium moved fast but faced several blocking points along the road. By tackling these step by step, it gathered valuable lessons on how to leverage AI. If it would have stayed in the drawing room, discussing everything in great detail, it would've been far from achieving any impact.

CONCLUSION

The Reynaers Aluminium demand forecasting project highlights the potential of AI in enhancing inventory management and demand prediction. By leveraging a hybrid approach that combines AI-driven data analysis with human contextual insights, Reynaers Aluminium successfully built a robust demand forecasting capability. However, the project also shows that while AI tools can significantly enhance operational efficiency, their true value is realised when there's a clear case for change, when they're integrated with effective processes and when the benefits are clearly communicated to all stakeholders.

Cases - PwC Belgium: Capture the AI Flag

Chatbots & Virtual assistants **Text Generation & Summarization**

PWC BELGIUM DEMONSTRATES PEOPLE OF ALL MATURITY LEVELS THE IMMENSE VALUE AI CAN BRING

CONTEXT.

PwC Belgium has a strong track record in helping companies navigate their AI journey. PwC helps clients develop AI strategies aligned with business goals and provides robust support for effective AI implementation.

CHALLENGE

Many companies struggle to understand the immediate impact AI could have on their daily operations. Despite growing interest, there's a significant gap in practical knowledge and hands-on experience. To address this, PwC Belgium's Experience Centre developed a bespoke Capture the AI Flag game that offers an engaging and educational experience to help demystify (Gen)AI and demonstrate its tangible benefits.

AI SOLUTION

Capture the AI Flag is an action-packed, Gen AI-based game in which players need to help their AI buddy, Flaggi, solve a series of challenges. The game immerses participants in real-world AI scenarios, providing practical insights into AI technologies and their applications in daily operations.

IMPLEMENTATION APPROACH

Capture the AI Flag is a 60–90-minute game where participants can work in teams or individually to solve challenges presented by Flaggi. The game features a simple screen with an AI toolbox containing today's most commonly used AI applications. Players face 25-30 challenges that can be solved using any of these applications, allowing them to gain knowledge about AI, regardless of their maturity level.
The game is designed to cater to different levels of AI maturity by offering varying levels of assistance. Those with more AI knowledge require less help, while facilitators are available to assist those who need it. This helps make sure that the game is challenging and fun for everyone. Additionally, collaboration and teamwork are key to solving the challenges, making it a great teambuilding experience.

Cases - PwC Belgium: Capture the AI Flag

RESULTS AND IMPACT.

Capture the AI Flag has, to date, been played by more than 800 players, both within PwC and across the firm's client base in various industries. The game has received extremely positive feedback:

- Participants say they gained a deeper understanding of AI concepts and practical applications as well as increased awareness of the risks of AI
- Participants are appreciative of the hands-on experience and the opportunity to apply AI techniques in a controlled environment

LESSONS LEARNED

PwC Belgium identified several key lessons from the initial iterations of Capture the AI Flag:

- Advancing along with AI: As AI has advanced and the capabilities of AI applications have grown, some initially difficult challenges have become easier. The team is constantly looking at how to make sure the game remains challenging and fun as the technology advances.
- Player engagement: The interactive and competitive nature of the game keeps participants engaged and motivated.
- Tailoring real-world scenarios: The game presents various real-world scenarios, but not all are equally engaging for every company. By tailoring the game to suit different contexts (e.g. car manufacturer vs. food industry), participants can better relate AI concepts to their own operations, making the learning experience more impactful.

CONCLUSION

Capture the AI Flag successfully addresses the challenge of helping PwC Belgium's clients and its own people understand the instant impact of AI on their daily operations, via a hands-on, interactive learning experience.

Closing

The human element of AI integrations involves recognising how AI impacts various personas within an organisation. It's crucial to tailor solutions and adapt approaches to the unique needs of each persona to secure successful adoption. In this paper, we've discussed how a clear strategy, effective communication, engagement, upskilling and reskilling are key strategies for increasing workforce adoption of AI. In our next paper, we'll explore the future of AI, both in general and in relation to individual companies. What are the emerging trends? And how can you get started in the most practical way? Stay tuned to find out.

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