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Novus ex Machina: Realise your organisation's creative potential with AI

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Novus ex Machina

Realise Your Organisation's Creative Potential with AI

Innovation managers must learn how to harness AI's transformative potential.

by Adam Tatarynowicz and Utz Claassen

Elekta, the global Swedish medtech giant with over 3,000 engineers and scientists on its payroll, has long been a pioneer of innovation in radiation therapy and radiosurgery-powered brain disorder treatment. In early 2018, the company harnessed the power of Artificial Intelligence (AI) to sift through vast clinical trials and patient datasets, unveiling patterns and correlations that remained elusive to many competitors. The result was Elekta Unity, a groundbreaking mixed reality (MR) linear accelerator ('linac') platform used for external beam radiotherapy, the most common form of cancer radiation treatment in which radiation is targeted at the cancer site with minimal effects to surrounding tissue.

Elekta Unity's visualisation capabilities help clinicians track elusive soft tissue changes during radiation therapy, so that they can adjust the radiation doses in real time based on the patient's unique anatomy. This transformative change is testament to the power of AI in healthcare,[1] and Elekta has since relied on AI-powered innovation that has resulted in the automation of its imaging and treatment delivery systems, ensuring unparalleled accuracy and speed. In the rapidly evolving landscape of medical technology, where continuous innovation is becoming the norm, Elekta's AI-driven approach has not only solidified its position as an industry leader, but also showcased the boundless potential of AI in addressing some of the most pressing challenges in healthcare today.

AI, of course, is revolutionising industrial and business operations far beyond healthcare. Understanding and harnessing its power is thus essential for driving continuous innovation and maintaining a competitive edge. Yet, the journey to seamlessly integrate AI technology into an organisation's innovation practices is filled with challenges. It demands not only a strategic approach and a deep understanding of AI's capabilities, but also an organisational culture that champions innovation, adaptability, and continuous learning. This article aims to guide innovation managers through this intricate terrain, offering insights and strategies to effectively leverage AI's immense potential.

DEMYSTIFYING AI'S CREATIVE POTENTIAL

AI's ability to analyse large amounts of data ('big data') and identify patterns that might otherwise go unnoticed, and in the process generate creative ideas, can be a gamechanger for businesses across a vast number of industries. Entertainment giant Netflix, famed for its recommendation engine, has been leveraging AI since 2010 to fuel its content suggestions. It has invested in understanding user behaviour, and developing a personalised streaming experience for each user that translates to screens that are "designed in real time" by an AI algorithm.[2] Many boundaries and parameters are specified by human designers at the outset of the process, but the decisions about which movies to show, how to display them, which pictures to represent them with, and many other design decisions are made by algorithms embedded in the so-called *AI problem-solving loops*.[3] Moreover, Netflix uses unsupervised learning to discover related groups of customers and even to decide which content to create in the first place. Its application of predictive analytics, for instance, was instrumental in evaluating the potential of the hit TV series *House of Cards* back in 2013.

In fact, the adoption of AI in innovation management is increasingly compelling managers to shift from a traditional *artifact-centric* model of innovation, as seen in the Netflix example, to a more holistic *system-centric* model. In the traditional artifact-centric model, the emphasis is on the creation of tangible products or services, which are the end result that customers can see, touch, or experience. But with the advent of AI, the system-centric view of innovation has emerged. Here, the focus is not just on the end product but also on the entire ecosystem that supports it. It is about creating a dynamic organisational framework that continuously learns, adapts, and improves.

This is where AI shines. With its ability to process big data, recognise patterns, and make predictions, AI can automate many *problem-solving* tasks that were traditionally the domain of humans. This does not necessarily mean that humans become obsolete. On the contrary, it frees them to concentrate on *problem-finding*. By identifying and defining the right problems to solve, and using those inputs to train AI algorithms, humans are still needed to guide AI systems to come up with more meaningful and impactful innovations.

In essence, the shift to system-centric innovation is about seeing the bigger picture. It is about understanding that in today's fast-paced, AI-driven world, innovation means thinking beyond the product to build an adaptable, responsive organisation that can keep up with changing customer needs, market dynamics, and technological trends. It means seeing a future where AI and humans work in tandem, each amplifying the other's creative potential.

STRATEGISING AI ADOPTION IN INNOVATION MANAGEMENT

The successful integration of AI into the fabric of your organisation is a strategic initiative that demands a meticulous and thoughtful approach. This journey encompasses several key steps, including identifying suitable AI use cases, assessing organisational readiness for AI adoption, and crafting a holistic roadmap that charts the course for seamless implementation of AI within your firm.

The first step is identifying where to dig, or in this context, determining the range of suitable AI use cases where technology can unearth value. Using small or inexpensive tools, address a specific challenge and learn from it, and then progressively deploy bigger tools as your confidence and understanding of the terrain grow.

Once that is done, you must assess the readiness for AI adoption by evaluating your organisation's human, tangible, and intangible assets.[4] First, the human: is there enough technical expertise to not just adopt but also adapt to AI's continuously evolving nature? The presence of such technical acumen is a crucial prerequisite to not only implement but also steward AI initiatives. Next, the tangible: does your company have the robust data infrastructure that AI demands? A robust data infrastructure is the bedrock upon which AI systems thrive, and ensuring its technical adequacy is paramount. And finally, the intangible: the cultural milieu. An organisation's culture should be malleable: ready to mould itself around the innovations AI brings, and foster a spirit of continuous learning and adaptability. A culture that champions innovation, cherishes a growth mindset, and is receptive to change is indispensable for the fruitful adoption of AI.

The role of the 'design strategist'

In the evolving narrative of AI adoption, one strategy stands out, which is the changing role of the human designer. In the AI-driven world, designers are no longer just people who create new products. They are evolving into 'design strategists'–adept professionals equipped with the knowledge and know-how to navigate the complex maze of AI technologies and the problems they entail.[5] These design strategists possess the capability to discern the opportunities and constraints of AI, wielding them as potent tools to trigger continuous innovation. Their role is multi-faceted. They are tasked with identifying meaningful innovation challenges, framing the innovation narrative, and setting up the algorithms and data infrastructure to tackle these problems. It is a holistic approach that goes beyond mere product or service design.

This paradigm shift also underscores the importance of pivoting towards a *system-centric* innovation approach, ensuring a continuous cycle of innovation and refinement. As an illustration, consider VFlowTech, a Singapore-based maker of long-duration energy storage solutions based on low-cost, modular batteries. Traditionally, the designers in this business-to-business (B2B) sector would focus on the technical aspects and functionality of the product. However, at VFlowTech, designers have transcended this role, morphing into strategists who harness the power of AI to craft innovative energy storage solutions tailored to the specific needs of their customers.

The company's groundbreaking work on the Vanadium Redox Flow Batteries (VRFBs) is an example of this approach.[6] Instead of merely focusing on the battery design, VFlowTech's design strategists employ sophisticated AI algorithms to delve deep into various operational parameters, such as temperature dynamics, pressure variations, and flow rates. By doing so, they can fine-tune the battery's performance, and enhance its efficiency and longevity. This meticulous approach not only amplifies the product's operational prowess but also curtails maintenance and support expenses, delivering significant value to the end users.

But VFlowTech's AI-driven innovation strategy does not stop there. By leveraging AI's predictive capabilities to anticipate energy consumption patterns, the company draws from both historical data and real-time grid inputs. This approach enables the energy storage systems to adjust energy output in real time, ensuring peak performance and high energy efficiency.[7] The design strategists at VFlowTech are no longer confined to the traditional realms of design. They are visionaries, pioneering different ways to harness AI to drive innovation by sculpting technological solutions that resonate with the dynamic demands of the energy sector. This case underscores a crucial shift in the design landscape, where the emphasis is not just on crafting products but also creating holistic solutions that leverage AI's transformative power.

CATALYSING CREATIVITY AND INNOVATION WITH AI

To harness AI's creative potential, you must understand the nuances of its application throughout the innovation journey. The traditional innovation management model, also known as the Funnel Model, is linear, where managers progressively gather, process, and analyse data to make informed product decisions. A large number of ideas and opportunities is gradually narrowed down and refined to select the most promising ones for implementation. The funnel shape represents the decreasing amount of data as it progresses through the four stages from the initial opportunity identification to the actual launch (refer to Figure 1).

THE FUNNEL MODEL

Opportunity Identification   Opportunity Selection   Development & Testing   Production & Launch
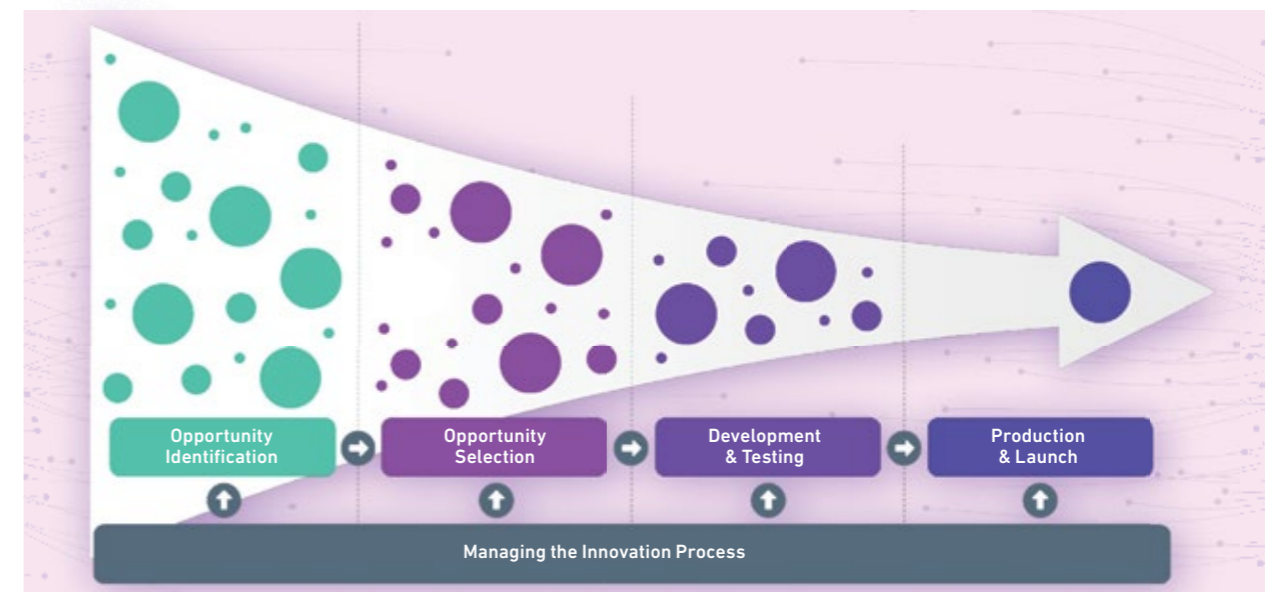
Managing the Innovation Process

FIGURE 1

However, with AI and its vast data processing capabilities entering the fray, this model is likely to undergo a major shift as its scale and scope limitations become evident. AI can be a gamechanger in managing the innovation process in several ways. First, AI can significantly amplify the ideation stage. By sifting through vast datasets, it can identify patterns and trends that might be invisible to the human eye. These insights can serve as a catalyst, sparking new solutions and fuelling organisational creativity. For instance, AI can suggest product features or service enhancements based on ongoing customer feedback and market trends. Second, AI can improve decision-making by providing real-time data analytics. Innovation managers can receive more accurate and timely information, which can guide their strategic decisions, reducing risks and ensuring that innovations are in line with market needs. And third, AI can accelerate product development and streamline the product or service development and refinement stage. For instance, by analysing customer preferences, AI can suggest features that can make a product much more appealing to the target audience.

From funnels to factories: The IDEA process for AI-powered innovation

Rather than using the conventional linear model, which will yield less and less data as we go along, we propose adopting an unconstrained, cyclical approach instead. Our Factory Model of Innovation embraces a continuous data-driven innovation cycle, underscoring AI's game-changing effect on the ability of the organisation to process information at every step. This model represents a dynamic, continuous approach

to innovation management, integrating AI at every stage of the innovation journey. By emphasising iterative learning and refinement, it underscores the pivotal role of AI in unleashing system-centric innovation (refer to Figure 2).

Our IDEA model comprises four stages and embodies the symbiotic relationship between AI and innovation. Consider it a strategic roadmap that will guide your organisation through the complexities of system-centric design.

Invent & Learn: This foundational stage is all about the genesis of innovation. AI plays a pivotal role in recognising areas ripe for innovation in your industry, discovering untapped opportunities, and generating groundbreaking ideas. It is not just about brainstorming; it is about using the power of AI to sift through vast datasets, identify patterns, and use intricate predictive models to bring forth innovative solutions that might otherwise remain hidden.

Develop & Refine: Once ideas are on the table, they need to be moulded, shaped, and perfected. This stage leverages powerful AI analytics to transform the data on these fresh ideas into tangible offerings–whether they are products, services, or processes. It is about taking the raw potential of an idea and refining it to the point where it is almost ready for the real world.

Evaluate & Select: Not all ideas, no matter how groundbreaking, align with your business strategy and resources. At this stage, AI comes into play to evaluate the data on product feasibility and potential impact. By analysing various parameters, AI helps in cherry-picking the most promising solutions, ensuring that only the best ones move forward.

FACTORY MODEL OF INNOVATION

INVENT & LEARN
This stage involves using AI to continuously identify new ideas and opportunities from the market for innovation.

AI-CENTRED
In this stage, the new ideas and opportunities that have been identified are further developed and refined using AI-centred data analytics and pattern recognition.

ATTRACT & SELL
In this stage, AI is used to leverage customer feedback to evaluate and improve current product performance, and generate new data flows to predict future market needs.

EVALUATE & SELECT
This stage uses AI to evaluate and select the most viable solutions from the pool of generated options.
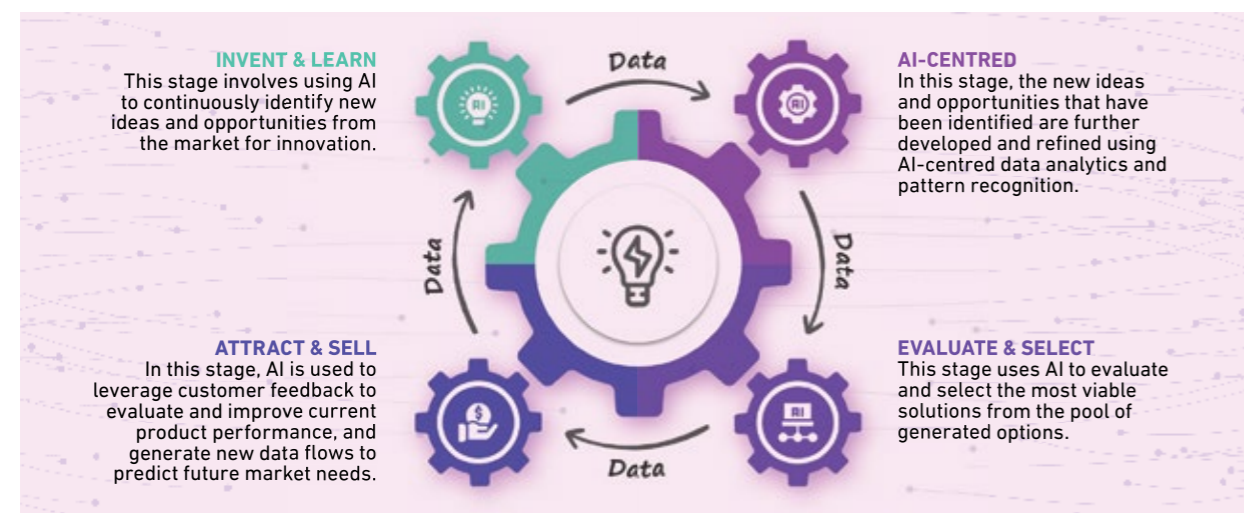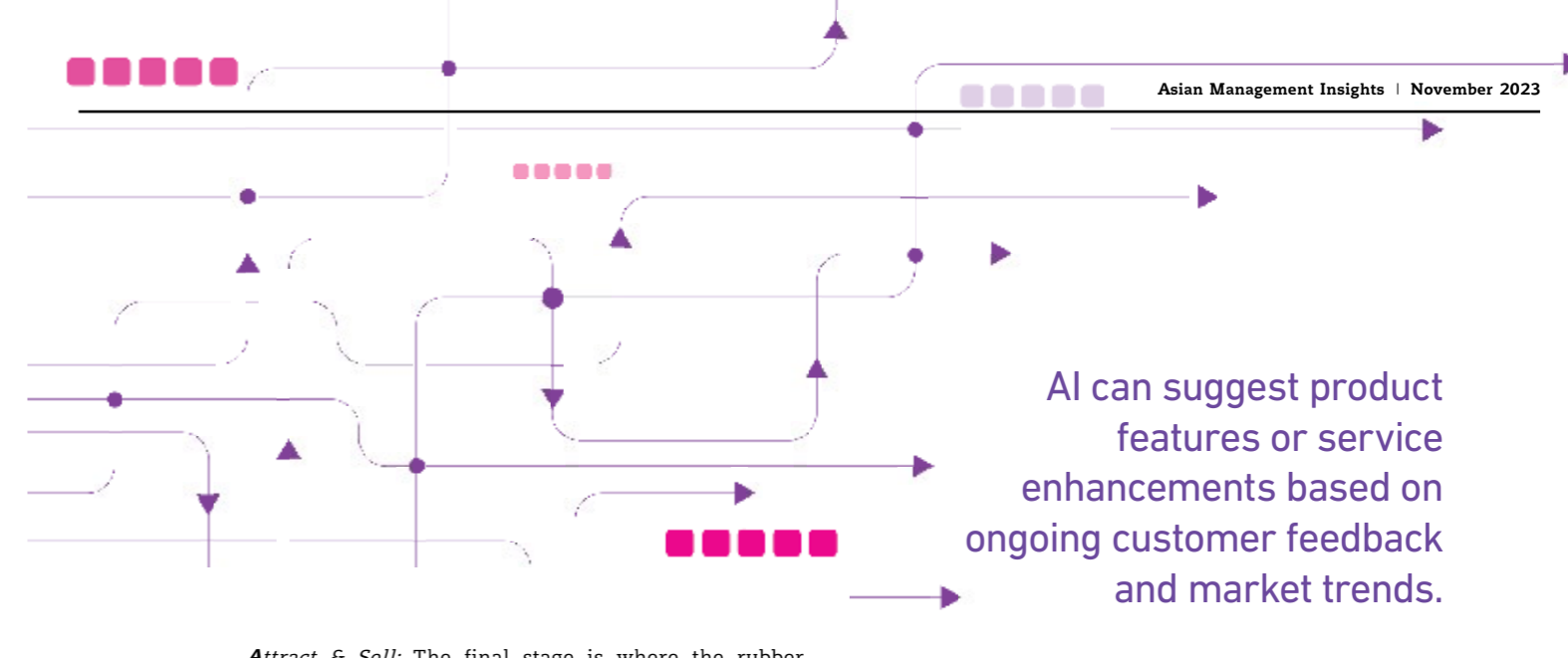
FIGURE 2

Attract & Sell: The final stage is where the rubber meets the road. After rigorous testing and validation, the product is unveiled to the world. But the role of AI does not end here. Using real-time data from customers and stakeholders, the relentless AI analytics help to refine the offering, ensuring that it remains relevant and effective in the long run.

While the Funnel Model has been a powerhouse for innovation, particularly in fields that blend science and intuition like materials science, the Factory Model brings a new level of systematic, interconnected thinking to the table. This is not just about tech or natural sciences; it opens new frontiers in diverse fields from linguistics to law. The real magic happens when these domains intersect, creating fertile ground for disruptive innovations in complex interdisciplinary areas like biomedicine and bioelectronics.

Take Syntellix, a bio medtech innovator with roots in both Germany and Singapore. This start-up has created a groundbreaking magnesium-based implant technology that eliminates the need for implant removal surgeries, benefiting millions globally. This success was achieved by marrying the ingenuity of traditional pioneering innovation with the systematic, data-driven approach of the IDEA model. It enabled the firm to secure product registrations in over 70 countries within just 15 years, all while operating with a lean, highly specialised team of global scientists and engineers. But what makes Syntellix's story even more compelling is its culturally diverse core team with its unique blend of perspectives and backgrounds. This creates a fertile *cultural milieu* for continuous patient-centred innovation, turning a goldmine of material opportunities into the new gold standard of cutting-edge implant technology.[8] It is a vivid illustration of how the IDEA framework serves as a universal blueprint for AI-powered innovation management, which is adaptable and effective across diverse cultural and business landscapes.

> AI can suggest product features or service enhancements based on ongoing customer feedback and market trends.

NAVIGATING CHALLENGES AND RISKS

As organisations venture deeper into the AI realm, they must grapple with multifaceted challenges ranging from data security to ethical dilemmas and workforce readiness.[9] Navigating these complexities while ensuring that the AI integration strategy is both responsible and effective will be critical.

One key concern surrounding AI adoption is data privacy and security. In an era where data breaches can tarnish reputations overnight, organisations must prioritise robust data protection mechanisms. This goes beyond mere compliance with evolving data privacy regulations, and entails a holistic approach that addresses secure data storage, transmission protocols, regular security assessments, and more. Additionally, fostering a culture where employees are well-versed in data privacy norms and best practices is crucial. Regular training sessions, workshops, and awareness campaigns can fortify this first line of defence against potential breaches.[10]

Yet, as AI systems become ubiquitous, the challenge is not just about safeguarding data but also equipping the workforce for this new era. Upskilling becomes essential. The AI-driven future demands a workforce fluent in AI's programming language and its myriad libraries. Organisations should invest in comprehensive training programmes, workshops, and hands-on sessions, ensuring employees are both familiar with AI and adept at leveraging its extensive capabilities. Cultivating an environment of perpetual learning and innovation is key, where curiosity is rewarded and experimentation with novel technologies is the norm.

However, beyond these tangible challenges lies the more nuanced realm of ethical AI. As AI systems increasingly influence decision-making, ensuring they are transparent, reliable, and fair becomes paramount. This triad—transparency, reliability, and fairness—offers a robust framework for innovation managers. It is a compass guiding them through the intricate maze of AI adoption, ensuring their journey is both responsible and impactful (refer to box story). These ethical dimensions, while technical in nature, have profound organisational and managerial implications, and demand a blend of technical oversight, corporate social responsibility consideration, and stakeholder engagement.

> The AI-driven future demands a workforce fluent in AI's programming language and its myriad libraries.

THE AI TRIAD

Transparency: This signifies that the operations and decision-making processes of systems are not just efficient, but also clear and interpretable to their users and stakeholders.[11] For innovation managers, this means venturing beyond viewing AI as a mere 'black box' that churns out results. Instead, they must actively collaborate with their technical teams to grasp and subsequently explain the underlying algorithms and models that drive these outcomes. Comprehensive documentation becomes essential—detailing the AI's design, its programming language, data sources, the algorithms at play, etc. This documentation, while technical, should be offered in a manner that is accessible to a diverse range of stakeholders, ensuring that they can place their trust in the system's output.[12] To further foster trust, innovation managers can take the initiative to engage with those stakeholders, perhaps through regular workshops or training sessions, so as to demystify the often complex assembly of different functions and their abstraction levels that underpin AI.

Reliability: This refers to AI's ability to perform dependably across various scenarios and over extended periods of time. For innovation managers, this translates into a commitment to rigorous testing. AI systems should be subjected to a battery of tests, from stress scenarios to real-world simulations, thus ensuring their robustness.[13] Managers should also champion the implementation of feedback mechanisms, allowing users to report any inconsistencies or system errors. This continuous feedback loop ensures that the AI system remains on its toes, constantly learning, refining, and improving. Furthermore, just like software, AI models are dynamic and might require updates. Innovation managers must ensure a seamless system for rolling out these updates, one that ensures uninterrupted operations and maintains a clear logbook of changes for future reference and accountability.

Fairness: This ensures that AI's operations are devoid of biases, thus eliminating discrimination against certain groups.[14] For innovation managers, ensuring fairness implies a proactive approach. Regular bias audits, conducted in collaboration with data scientists, are therefore essential. These audits delve deep into the system's outputs, checking for any unintended biases that might disadvantage particular groups (such as certain segments of end users based on their ethnicity and gender). Fairness starts at the source, which is the data. Managers must ensure that the datasets used to train AI systems are not just vast but also diverse, representing a broad spectrum of user groups. This emphasis on diversity and inclusivity in data collection and curation ensures that the outcomes of AI models are equitable. To anchor these efforts, innovation managers should champion the creation of and adherence to a set of ethical guidelines for AI deployment and operation. These guidelines, while serving as a technical roadmap, should also act as a moral compass, prioritising fairness at every stage of the process.

CONCLUSION

We stand on the brink of a new AI-driven era. In this rapidly changing landscape, embracing AI is no longer a choice—it is a necessity for organisations aspiring to lead in innovation and digital transformation. By harnessing AI's creative potential, meticulously crafting new strategies—like the IDEA process model we have introduced here—and adeptly navigating the risks of AI adoption, you can put your organisation at the forefront of this metamorphic change.

Throughout this article, we have underscored that AI is not just another tool in the shed. It is a seismic force, reshaping the very bedrock of organisational innovation. Yet, to truly harness its game-changing impact, organisations must not only understand AI's vast capabilities but also seamlessly integrate it into their strategic agendas. This will also require agility to recalibrate traditional roles, processes, systems, and structures.

The journey towards AI mastery may be difficult, but the rewards—innovative products, market leadership, and unparalleled growth—are alluring. As AI paves the way for new pioneering innovations, businesses have a clear choice: ride on this AI-driven wave and harness its potential to redefine the rules of the game, or risk being left in its wake. [AMI]

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