

Straight Talk



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An HCLTech Trends and Insights Publication

Engineering AI for a resilient, sustainable and innovative future

Cover Story

Generative AI:
Reimagining
human-machine
innovation

Feature

Augmented
intelligence in
surgery: The
next frontier in
healthcare

Contents



Cover Story

4 Generative AI: Reimagining human-machine innovation

8 Digital engineering and AI: Building a resilient and sustainable future for enterprises

14 Tomorrow's workforce: The confluence of AI and skill-centric talent management



18

Augmented intelligence in surgery: The next frontier in healthcare



20

Patient-centric care for people living with diabetes



24

Open ecosystems shaping the future of innovation in the semiconductor industry



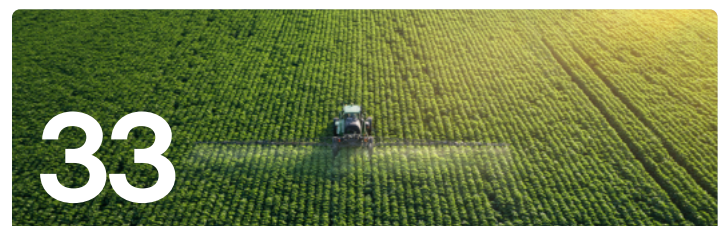
28

A software-defined future: The automotive industry shifts gears



30

Product lifecycle management: The key to longevity and product transformation



33

Sustainability: From compliance to competitive advantage

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Global Head of Brand Journalism: Nicholas Ismail

Contributing Writers: Jordan Smith, Mousume Roy

Creative Director: Rebecca Mikrut

Art Direction: Souma Deb, Muhammad Khalidy

Cover Illustration: Souma Deb, Muhammad Khalidy

Distribution and Leverage: Apoorva Agarwal

Digital and Social: Apoorva Agarwal

Editorial Advisory Board: Jill Kouri, Kalyan Kumar,
Nicole Worthington

Printing: Qualprint

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Vijay Guntur, Hari Sadarahalli, Quinny Lei, Rhoda Dinesen, Anthony Fernando, Colleen Riley, Partha Marella, Rahul Goyal, Razi Abdul Rahim, Michael Neisen, Peter Bilello, Sukant Acharya, Kavitha Srinivasan

Contact us

Apoorva Agarwal

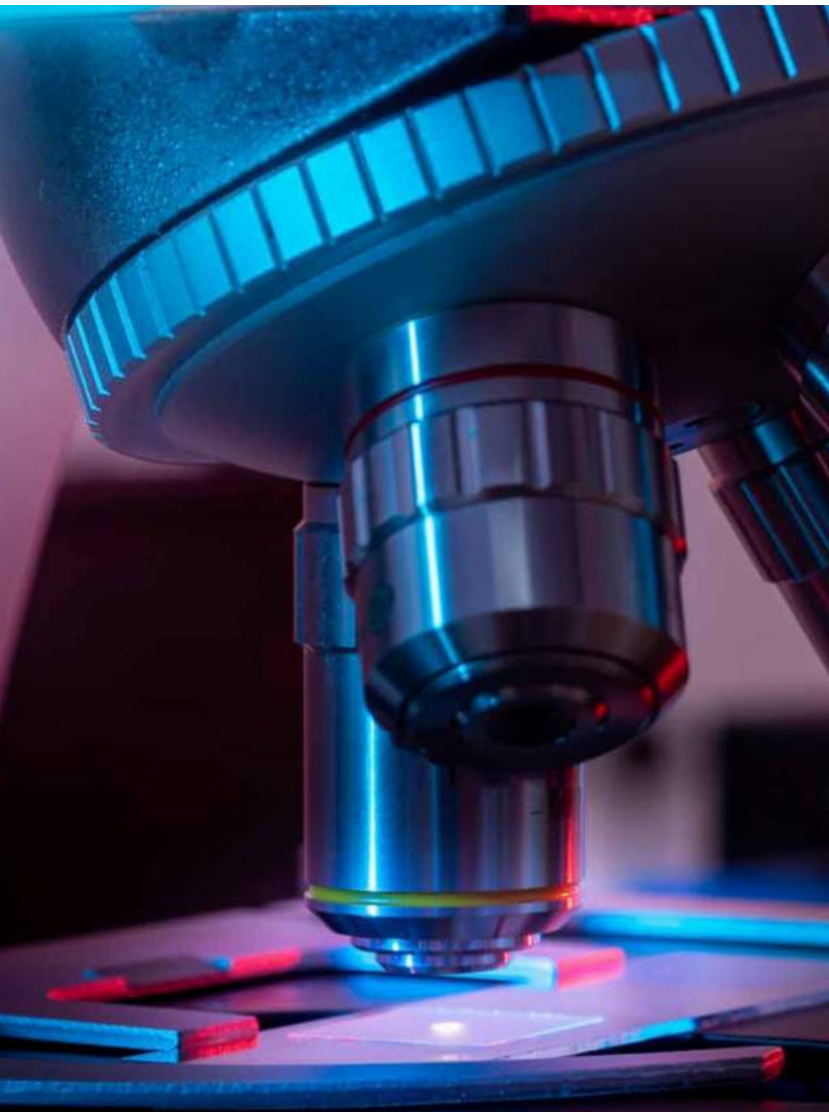
HCLTech,
Tower 5, Sector 126
Noida- 201301,
Uttar Pradesh, India

apoorva.agarwal@hcl.com

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Editor's welcome note

The world is standing on the edge of a precipice. Technology, in good ways and bad, has rapidly come to dominate almost every facet of people's lives. It dictates how we communicate, transact and engage with each other, while at business and government levels, technology is the single most powerful source of innovation, transformation and potentially, destruction.

There's one technology that's on a particularly disruptive path—artificial intelligence (AI) and all its subsets, including Generative AI or GenAI. Some have predicted that AI will replace humans, and while that might sound farfetched, now is the time to consider the implications of AI on the future of humanity. In 100 years, will humans be the smartest 'beings' on the planet? According to a survey from the World Economic Forum, 90% of AI experts believe human-level AI could exist within this timeframe and 50% believe it could come as soon as 2061.

To mitigate the likelihood of a future where humans are no longer the dominant force on the planet, organizations need to engineer AI carefully and build appropriate safety nets via regulation to ensure a resilient, sustainable and innovative future.

In this Straight Talk magazine edition, we explore the potential of GenAI as a force for good and how to build a resilient and sustainable future for enterprises through digital engineering and AI, while covering how technology and innovation is driving change in industries, like healthcare and automotive. The edition also focuses on what tomorrow's workforce will look like, the future of semiconductors, the role of PLM in enhancing digital manufacturing and the importance of technology in achieving sustainability goals.



Nicholas Ismail

Global Head of Brand Journalism



Generative AI: Reimagining human-machine innovation

→ **Vijay Guntur**

President, Engineering and R&D Services, HCLTech

The AI world has undergone a transformative revolution led by Large Language Models (LLMs), a category of deep learning models specifically engineered to analyze and comprehend extensive volumes of natural language data. These sophisticated systems are breaking boundaries, generating human-like content with unmatched accuracy.

With the advent of groundbreaking applications such as ChatGPT and Bard in 2022, LLMs moved away from pattern or rule-based approaches, heralding the era of generative AI (GenAI).

Organizations must embrace GenAI with a holistic approach that combines technology, skilled talent and a deep understanding of industry challenges to build GenAI solutions responsibly. From chips and data centers to LLMs and applications, a mature approach is needed, focusing on impactful, tailored solutions. Enterprises can leverage partnerships across consulting, technology and academia for transformative results. Structured talent-nurturing programs are pivotal to ensure a continuous flow of thought leadership and skilled expertise.

Generative AI industry outlook

The adoption of GenAI is rapidly growing across industries, driven by market demands and emerging trends. According to Gartner, enterprises embracing AI engineering practices are expected to outperform peers by 25% in operationalizing AI models by 2026. Moreover, venture capital firms have invested over \$1.7 billion in GenAI solutions over the last three years, with AI-enabled

drug discovery and AI software coding receiving the most funding.

GenAI's transformative potential is evident in fields like drug discovery, disease prediction, medical diagnostics and many more, fueling automation and growth. The rapid progress of LLMs is driving the demand for high computational power, leading to increased investments in state-of-the-art data centers and cloud innovations.

The other notable trend is the advancements in Generative Adversarial Networks (GANs), which play a significant role in GenAI growth by empowering the development of applications with features such as face aging, photo blending and many more. Breakthrough innovations in silicon is also foundational for GenAI, addressing the ever-growing demand for compute power in handling terabytes of data for better content- and context-aware result generation.

Revolutionizing industries

GenAI has the potential to revolutionize a range of industries and services with cutting-edge capabilities:

Power to programmers

GenAI is augmenting the programming world by assisting developers in generating code snippets, suggesting solutions and automating repetitive tasks like test scripts for various use cases by understanding programming patterns. Through prompt engineering, programmers can maximize GenAI's boundless potential, streamline development processes and accelerate innovation in the field of programming.

Content creation

GenAI also takes content creation to the next level by enabling automated content generation in textual and visual formats. It is also revolutionizing end-user guide generation for technical writers by leveraging extreme automation and using LLMs to extract inputs from product videos and technical, as well as functional specifications. This may result in up to a 60% reduction in lead time for content creation.

Improvements in contracts

It streamlines the analysis and summarization process of lengthy contracts, reducing errors and improving compliance for businesses through Automated Statements of Work (SOW) tagging.

Aiding MedTech

GenAI is revolutionizing medical equipment control through voice technology, enabling touch-free control of equipment and seamless real-time transcription of medical procedures.

Cognitive employee assistance

Another potential use case of GenAI includes developing a cutting-edge natural language interface for policy inquiry, allowing employees to effortlessly interact with the Policy Bot to inquire about company policies and guidelines, transforming employee experiences. This can facilitate up to a 60% improvement in understanding employee needs, thereby enhancing service delivery and deployability.

Improved sales interactions

GenAI is also empowering sales interactions with sales bots. A

cognitive user-friendly engagement bot can help users inquire about offerings within specific domains using natural language. Users can ask detailed questions, prompting the sales bot to generate precise responses customized to their queries. This interface prioritizes flexibility, allowing users to select their preferred output format for structured and visually appealing responses.

Banking assistance

Banks are better equipped today to address challenges like inconsistent responses, low first-call resolution and limited process agility as GenAI is powering the cognitive banking helpdesk. The AI-based chatbot revolutionizes user experience and boosts operational efficiencies by streamlining information retrieval and eliminating manual routing between repositories. GenAI is facilitating seamless customer interactions, delivering swift resolutions anytime, anywhere. AI-powered omni-channel solution can empower service agents with real-time assistance, drawing from a comprehensive knowledge base and past interactions. This ensures prompt and accurate customer support, along with autonomous assessment and upskilling opportunities for agents.

Seamless policy services

GenAI is enhancing insurance operations through seamless customer interactions. From posing predetermined questions to policyholders via voice calls and converting their responses into text data to utilizing a ChatGPT model to extract and validate policyholder records—GenAI can provide tailored user experiences to the customers. Furthermore,

the introduction of autonomous agents can streamline interactions for both agents and customers, fostering a more seamless and responsive insurance service.

Transforming photography

GenAI is empowering photographers and enthusiasts to achieve professional-level results. The collaboration with camera enhancements is shaping a new prosumer market segment driven by consumer and professional aspirations, revolutionizing visual content creation.

Remote monitoring

By leveraging the power of computer vision and NLP, AI techniques can effectively enhance the ability of remote proctoring systems, ensuring exam integrity and fostering a secure testing environment. AI powers continuous monitoring of the elderly by analyzing various audio cues, identifying help keywords and recognizing silence or coughs in voice patterns. A multi-modal system with a low computational footprint, along with custom language, acoustic models and lexicons, can be utilized to address specific requirements. Leveraging a System-on-Chip (SoC) design, packaging and validation capabilities, a high-performance edge inference chip can be developed using in-memory compute architecture.

Enhancing safety

GenAI is also enhancing safety with on-chip telemetry and Remaining Useful Life (RUL) prediction. In safety-critical applications, on-chip

telemetry is crucial for top-notch Silicon Lifecycle Management, ensuring defect-free silicon. ML models can be used for predicting Remaining Useful Life (RUL), enabling chip-level analytics to address aging, latent fault and hardware issues to empower chip design companies and Tier 1 or OEMs with better reliability.

The GenAI-enabled future

GenAI will play a significant role in reimagining the future of human-machine innovation.

By collaborating with humans to combine computational prowess with human creativity and intuition, GenAI will lead to unparalleled innovation and growth through optimizing processes, catalyzing efficiencies, personalizing experiences, fostering agility and creating differentiation with strategic advantage. Its ability to analyze vast amounts of data and learn from patterns complements human creativity, offering new perspectives, augmenting our abilities and inspiring innovative approaches.

LLMs have been instrumental in revolutionizing processes across financial services, healthcare and education while supporting the rise of super apps, accelerating advancements in semi-chip and data-center technologies and facilitating the widespread democratization of AI.

The evolution of AI from its early days to performing complex functionalities today is indeed remarkable, with more to come.





Digital engineering and AI: Building a resilient and sustainable future for enterprises





Globally, enterprises are leveraging digital engineering and AI to build resilience, while achieving sustainability

→ Hari Sadarahalli

Corporate Vice President,
Engineering and R&D Services, HCLTech

In today's dynamic and evolving technology landscape, engineering services are at the forefront, offering a trifecta of competitive advantage, growth potential and social impact.

From manufacturing and energy to transportation, healthcare and agriculture, engineering services are driving innovation, productivity, efficiency and safety, catering to evolving customer and stakeholder expectations.

It serves as the linchpin for sustainable business strategies, guarding against disruption, optimizing costs, fostering loyalty and weaving a positive societal and environmental fabric.

Engineering services are becoming increasingly interdisciplinary, collaborative and integrated, leveraging cutting-edge technologies like AI, IoT, cloud computing, AR/VR/MR and blockchain.

Simultaneously, it has adapted to become more customer-centric

and agile while accelerating time to market, transcending traditional industry boundaries.

The digital engineering spend represents a large chunk of the overall ER&D budget and has been consistently growing. It's estimated to touch \$1.6 trillion by 2026, according to a report from Zinnov. Despite the volatile macro-economic environment, enterprises have been shifting focus to digital technology and innovative engineering initiatives to gain competitive advantage fast and stay relevant.

Today, platformization is an imperative that drives cost-efficiency, innovation and consumer value. The platform market has exhibited remarkable growth, boasting an impressive ~40% YOY expansion from 2020 to 2022, according to a report from Everest Group, with strong indications that this upward trajectory will persist. Enterprises across diverse industries are rapidly adopting platform solutions, with high-tech and BFSI sectors

leading the way, closely followed by professional services, manufacturing and healthcare, all recognizing the value of platform-based approaches for their businesses. Platformization offers a range of benefits, including accelerated innovation and trend adoption. The engineering leadership also benefits from enhanced standardization, compliance, reduced turnaround times and growth potential through disruptive technology.

As this transformation progresses, consumers are the ultimate beneficiaries, enjoying personalized experiences, increased satisfaction and enhanced value. Across the board, platformization's impact is nothing short of transformative.

However, it is not solely about business; it's about addressing the planet's most pressing challenges. The demand for sustainability, net zero emissions and resource scarcity necessitate a holistic approach and collaboration across sectors in designing and implementing solutions that can reduce greenhouse gas emissions, improve energy efficiency, promote a circular economy and enhance social wellbeing.

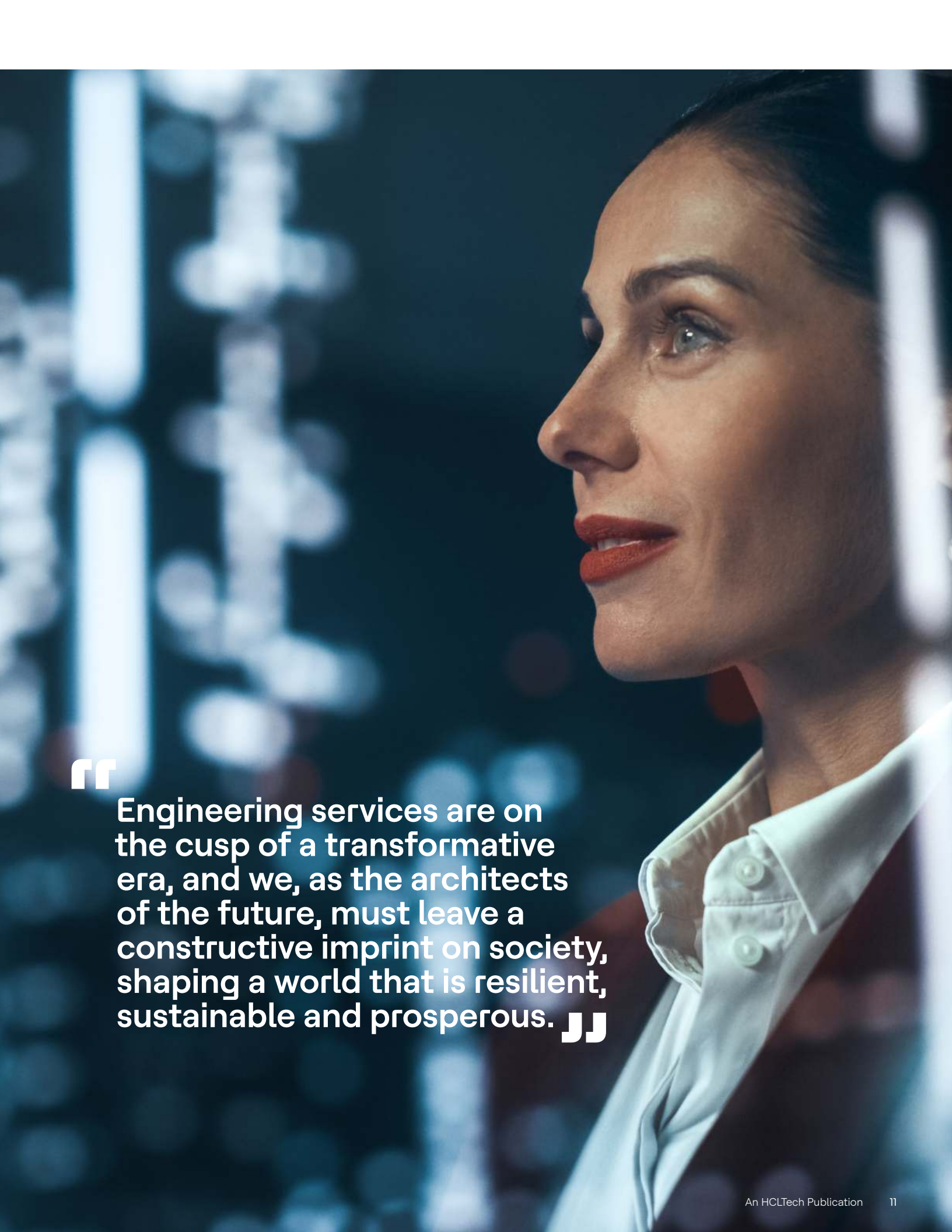
These developments are reshaping engineering's role across industries, enabling personalized customer experiences tailored to changing market dynamics. In an evolving world marked by digitalization, globalization and demographic shifts, engineering remains the compass, guiding businesses and ensuring they not only survive but thrive in this ever-changing landscape.

The evolution of engineering services

Engineering services have transformed from being a cost arbitrage to an innovation ecosystem, seeking to create value for customers, stakeholders and society. As this transformation unfolds, it blurs the line between core and non-core functions, as innovation can emerge from any part of the value chain.

Another key aspect of the engineering evolution is the shift from a self-reliant to an ecosystem-oriented approach. Engineering ecosystems consist of various players, such as customers, suppliers, competitors, partners and regulators. These ecosystems enable businesses to access diverse capabilities, resources and markets, while sharing risks and costs. They also foster innovation by facilitating knowledge exchange, learning and co-creation.

In today's dynamic market situation, distributed R&D is a key aspect of ensuring resilience. Organizations disperse their research and development activities across multiple locations, teams and domains, gaining regional insights while reducing risks. It helps businesses navigate uncertainty, volatility and disruption while leveraging the opportunities of globalization, digitalization and diversification. Distributed R&D enables businesses to adapt to changing conditions, and to build an ecosystem of partners to fuel innovation and broaden their capabilities. This engineering services transformation centers on innovation, collaboration and adaptability, fostering sustainable growth in a dynamic world.



“

Engineering services are on the cusp of a transformative era, and we, as the architects of the future, must leave a constructive imprint on society, shaping a world that is resilient, sustainable and prosperous. ”



The path forward with generative AI

In the evolving realm of engineering services, a convergence of key trends charts its future.

Significant strides have been achieved, yet ample opportunities for innovation and expansion remain, as the market has not fully opened up.

Enterprises across industries are constantly in the quest of leveraging advanced underlying digital technologies to drive future use-cases. Applied AI, distributed infrastructure, metaverse, digital thread and quantum computing are just a few such technologies that present ample opportunities for innovation and growth.

Generative AI (GenAI), though still at a nascent stage, has the potential to revolutionize the future of AI and change the way businesses operate. It holds promise for addressing the prominent challenge of the talent deficit and can bridge the skills gap, bolstering productivity. It amplifies human creativity and intelligence, assisting in designing,

prototyping, testing and optimizing solutions faster and more efficiently.

In industries such as automotive, aerospace, healthcare and telecommunications, GenAI is a game-changer. It pioneers the design of novel materials with precise physical properties, accelerating product development cycles. In software development, it goes beyond conventional code snippets, generating complete functions. Moreover, GenAI enhances healthcare by improving clinical understanding, diagnosis and treatment, ensuring better patient outcomes and operational efficiency.

Telecoms can gain actionable insights, enhance customer experiences, optimize operations through automated chatbots and personalized offers and drive revenue growth. In the banking sector, it refines marketing strategies, supports virtual assistants and enhances machine learning processes for KYC compliance.

GenAI is not just a technological marvel; it's a strategic driver of business value. It accelerates product development, reduces costs,

boosts productivity and efficiently manages risks, ultimately reshaping industries, fostering innovation and pushing progress forward in ways that complement human capabilities.

The landscape today is fiercely competitive, and organizations find themselves in a perpetual race to innovate, differentiate and disrupt traditional norms. Beyond technical proficiency, being current and competitive requires a tireless dedication to pushing the envelope, adopting innovative technology and promoting a culture of continuous improvement. Success in this dynamic environment requires not only meeting existing industry standards but also creating new benchmarks, setting the stage for long-term sustainability and growth. To thrive amid such challenges, engineering firms must foster a culture that thrives on innovation, agility and adaptability.

Engineering services are on the cusp of a transformative era, and we, as the architects of the future, must leave a constructive imprint on society, shaping a world that is resilient, sustainable and prosperous.

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Tomorrow's workforce: The confluence of AI and skill-centric talent management

Quinny Lei, Head of Business IT Solutions at a multinational technology company, explores AI's role in shaping talent management for a skills-driven future

→ [Mousume Roy](#)

Technology is at the heart of every industry's transformation, but the talent management that supports this transformation finds itself at a crossroads. As we step into the future, the integration of AI in the realm of talent management has taken center stage, reshaping traditional paradigms and ushering in a new era of skill-based talent acquisition and development.

To delve into the dynamics of this transformative landscape, Quinny Lei, Head of Business IT Solutions, Grab, shared her insights on the future of skill-based talent and the profound influence of AI on

this journey. Lei is a leader at a multinational technology company that is Southeast Asia's leading super app, offering a suite of services consisting of deliveries, mobility and financial services.

AI's metamorphosis of talent management

Historically, technological advancements have consistently improved work environments. During the Industrial Revolution, integrating new power sources and modern machines made businesses more productive and efficient. The subsequent waves





of automation further expedited workplace effectiveness. Along the way, however, the use of technologies devalued some traditional skills, resulting in job loss and a demand for new expertise.

Currently, the forefront of the technological revolution is based on emerging technologies such as AI, ML, automation and robotics. These innovations are powering capabilities like smart assistants and image recognition, speeding up manufacturing and improving human productivity overall. Within this landscape, the impact of AI on talent management emerges as an undeniable and transformative force.

Lei says: "AI has been a constant force in our history, and it's now at a pivotal phase in its evolution. This current junction marks a significant step forward, as AI's capabilities continue to enrich lives. The meticulous groundwork that once required direct involvement of the workforce is progressively being undertaken by GenAI. With this foundational layer established, an opportunity arises for human resources to upskill, redefine approaches and infuse bespoke creativity."

AI has revolutionized the way organizations identify, assess and nurture talent. Its predictive capabilities help in identifying potential candidates more accurately and efficiently. From personalized job recommendations to analyzing behavioral patterns for cultural fit, AI is driving organizations toward a more streamlined and data-driven recruitment process.

For instance, organizations are shifting from traditional annual performance reviews to continuous

feedback loops powered by AI analytics. This real-time assessment ensures that employees receive timely feedback, fostering skill growth and allowing for agile adjustments to organizational needs.

Redefining education for an AI-driven workforce

As we stand at the crossroads of an AI-driven era, the field of education faces various challenges, including bias, ethical issues, abuses of AI systems and ensuring the pace of learning aligns with the rapid evolution of technology. "The question is: how fast can humans cope with GenAI and align it with education, syllabus and system?" asks Lei. "Our traditional system teaches subjects like math and history but is it preparing us for an AI-driven future?"

"The rapid evolution of AI might outpace traditional education systems. To address this, we need to reshape education, harnessing generative AI's potential to nurture individual talents rather than relying solely on common knowledge."

Quinny Lei

Head of Business IT Solutions, Grab

The upcoming generation might struggle with GenAI potentially taking over many jobs, leaving new graduates with intern-level positions.

Shaping DEI with skill empowerment

The integration of AI is driving remarkable change in terms of diversity, equity and inclusion (DEI). Cultivating DEI is akin to nurturing a rich cultural tapestry.

When considering the role of AI in this context, the question emerges: How can AI and human skills complement each other?

Lei affirms that "AI helps eliminate unconscious bias by focusing on skills and potential rather than relying on conventional markers. This opens the door for underrepresented talent, making the workforce more inclusive and diverse. By capitalizing on AI's strengths, organizations can discern individual potential and craft tailored development paths that unlock untapped abilities."

Skill-based talent management not only mitigates bias but also creates a more level playing field. "Imagine a new recruit uncharted in their career path. Through exploration across departments and insightful AI analysis, an intricate portrait of their capabilities emerges. From

pre-boarding, where AI identifies latent potential, to ongoing personalized development plans for the next 90 days. The cycle doesn't merely follow a predetermined career ladder but revolves around dynamic skill honing," notes Lei.

The narrative shifts from a job role to self-discovery. A programmer might discover an adeptness for project management through continuous development, supported by AI-



Gen Z: Shaping the future of talent management

The entry of Generation Z into the workforce poses unique challenges and opportunities. Lei remarks that “Gen Z is a fully digital generation. They are bold, unafraid to challenge the status quo and seek constant innovation. This dynamism poses challenges in retaining them within traditional roles. Engaging them requires ongoing learning experiences, such as hackathons, gig-like opportunities and transparent growth paths—leveraging GenAI.”

Understanding Gen Z’s behavior and motivations is vital for effective talent management strategies. Customizing engagement approaches based on their preferences enhances recruitment and retention efforts.

The future of talent management is undergoing significant transformation, fueled by the integration of AI and skill-based approaches. The insights shared by Quinny Lei shed light on the potential of AI to reshape traditional HR practices, fostering inclusivity, diversity and agility. As the workforce continues to evolve, embracing these technological advancements is essential to remain competitive and relevant in a rapidly changing employment landscape.

generated insights. Performance evaluations and constant feedback become catalysts for role curation. As employees evolve, the organizations evolve with them, endorsing internal mobility and fluid, agile career progressions.

“In the near future, employee retention will be a major challenge, and organizations that fail to align skills with aspirations may find it difficult to unleash their teams’ potential,” continues Lei.

The shift from job roles to dynamic skillsets

Based on a collaborative whitepaper by HCLTech and Harvard Business Review on the Future of Work, the surge of technology is reshaping the employment ecosystem. Over the past few decades, the manufacturing sector has witnessed a decline in employment, while service-oriented roles have witnessed an increase, as indicated by the Organization for Economic Cooperation and Development (OECD). Consequently, there’s been a surge of 25% in highly skilled positions, yet there remains a deficit of adept professionals to occupy these roles.

The paradigm of talent management is unquestionably shifting from traditional job roles to a skill-based approach. Job roles are confined to specific duties, whereas skill sets transcend those boundaries, encompassing a diverse range of competencies that can be honed over time. Lei reflects: “Possessing a plethora of master’s degrees and PhDs might not necessarily equip an individual with the practical skills required to excel in a job. Skill-based hiring enables individuals with relevant proficiencies, regardless of their formal education, to thrive in roles they are genuinely equipped for.”

Skill-centric talent acquisition will dominate the future job market, and this will accelerate the next generation of learners. A major shift in education is required, with the focus moving away from the rigid syllabus to fostering a culture of practical, hands-on learning. This involves experimental approaches, real-world simulations and assignments designed to nurture individual skills rather than standardized exam-based assessments.

Augmented intelligence in surgery: The next frontier in healthcare

The use of augmented intelligence in surgery is in its infancy, but the potential to transform healthcare is getting the industry excited

→ **Nicholas Ismail**

Compared to other industries, healthcare has been slow to adopt next-generation technologies. In the automotive industry, for example, GPS has been embedded into vehicles for many years and in aviation, planes have the capability to take-off, fly and land automatically.

There are two key reasons for the slower adoption of technology in healthcare. The first is cost. The cost of adopting robotics is high, which has caused penetration to remain low. The second is that the healthcare ecosystem is comparatively conservative. When it comes to healthcare and surgery, the burden of proof is quite high and requires years of testing and approvals from regulators like the US Food and Drug Administration (FDA).

Looking at surgery in particular, the practice has been carried out for hundreds of years. Over time, with better training, a more in-depth knowledge of human physiology and the development of more precise surgical tools, surgeons have become more proficient without the significant aid of technology.

The first use of robotic-assisted surgery took place in 1985. PUMA

560, a surgical robot, was used in a brain biopsy to reduce the impact of hand tremors during the procedure. In more recent times, according to Strategic Market Research, between 2012 and 2022, the percentage of general surgery procedures using robotic surgery rose from 1.8% to 17%. Despite penetration remaining low, there is a clear growth trajectory.

Today, the tide is changing. Reliability has been demonstrated through other industry applications, leading to increased levels of confidence in the healthcare industry and making the adoption of next-generation technology more palatable.

Embracing augmented intelligence and AI in surgery

The healthcare industry is now ready to embrace technologies like augmented intelligence and AI in surgery to improve patient care and reduce risk during procedures.

Essential Surgery, the first volume in the Disease Control Priorities, third edition (DCP3) series, explains the current landscape by highlighting global estimates that suggest at least seven million people suffer complications following surgery each

year, including at least one million deaths. According to the book, as many as 50% of these deaths and complications are preventable.

“These complications are a result of many factors. One is that surgeons are trained differently with different skill levels. There are also some variations in the anatomy of individual patients. Additionally, something that’s difficult to quantify is measuring the physical and cognitive fatigue of surgeons. Given all these considerations, surgical errors are bound to happen,” explains Anthony Fernando, President and CEO of Asensus Surgical—the company digitizing the interface between the surgeon and patient to pioneer a new era of performance-guided surgery.

To overcome these challenges, technology is now viewed as a crucial ally. With augmented intelligence and AI, healthcare organizations can standardize surgical procedures, reducing variability and complications, while increasing efficiency. The focus is now on leveraging these digital technology tools and their capabilities to deliver better

outcomes for patients and reduce the cognitive fatigue of surgeons.

“We’re just at the beginning of this journey,” adds Fernando. “Augmented intelligence tools require a significant amount of data to help normalize surgical procedures and processes. As a result, this radical change in healthcare is going to be a gradual evolution. It will take time to gain a higher level of confidence in the data.

To deliver this transformation, Fernando recommends a phase-based approach, introducing these technologies to surgeons and hospitals on a small scale, collecting

the data and then demonstrating the value delivered. That proof will then cycle back and drive adoption. The key is to help the healthcare industry understand the evolution of these technologies and how they can transform the sector.

An augmented future in healthcare

The proliferation of technology in healthcare and surgery will cause significant changes in the industry.

Perhaps the biggest change will come in how surgeons are trained. Once established, a performance-

guided surgical platform with a trained digital assistant will help surgeons train much faster, augment their skills and deliver exceptional care to their patients.

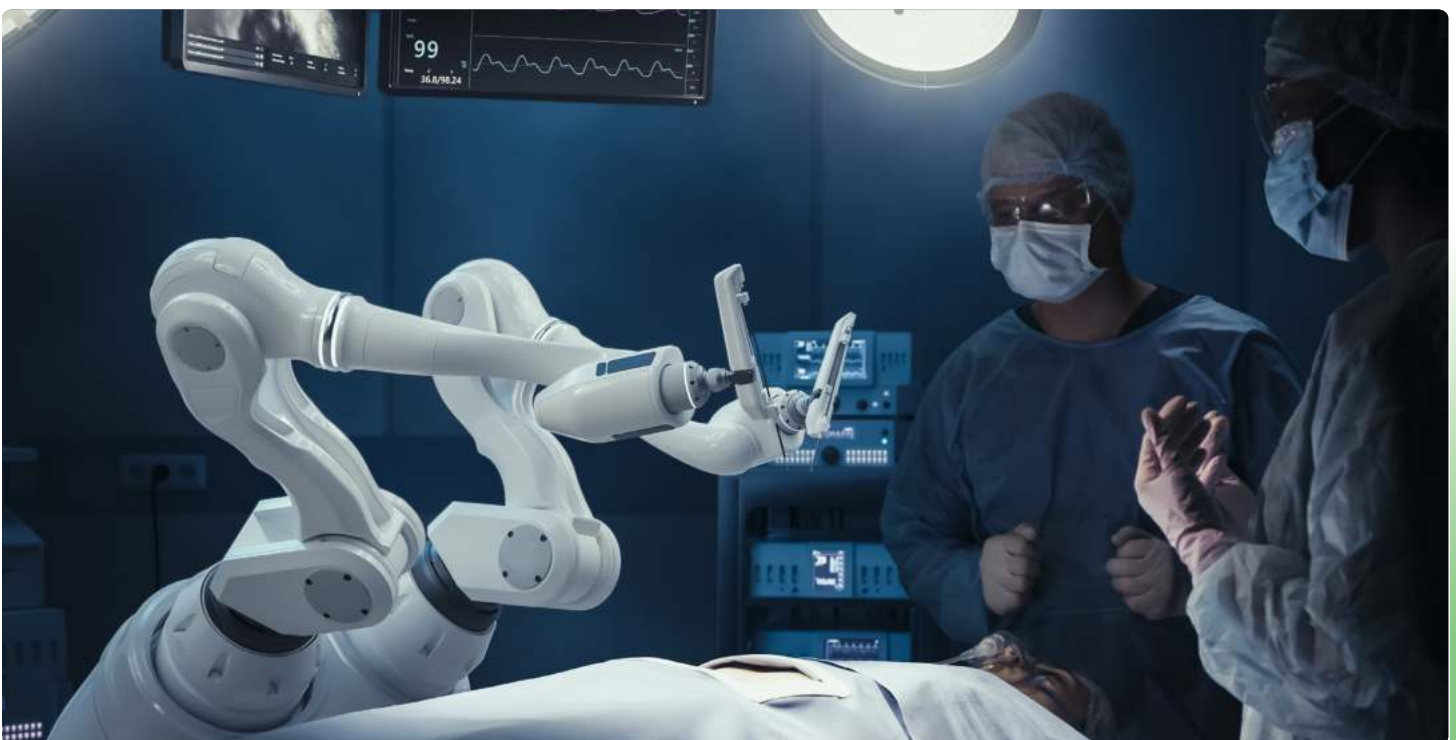
The introduction of technology will represent a paradigm shift in medical training and education.

Looking ahead to a technology-assisted future, Fernando says: “Beyond training, the adoption of augmented intelligence will reduce complications and variability in surgery, while also helping alleviate the impending global surgeon shortage. These tools will contribute to the betterment of patient outcomes and help hospitals become more efficient and cost effective. In addition, and most importantly, technology will help improve the performance of surgeons, because they will experience less cognitive fatigue, enabling them to focus on the most critical task, the patient.”

“The introduction of digital technologies will improve safety standards and help novice surgeons operate at a higher level, while assisting more seasoned practitioners with the most complicated surgeries.”

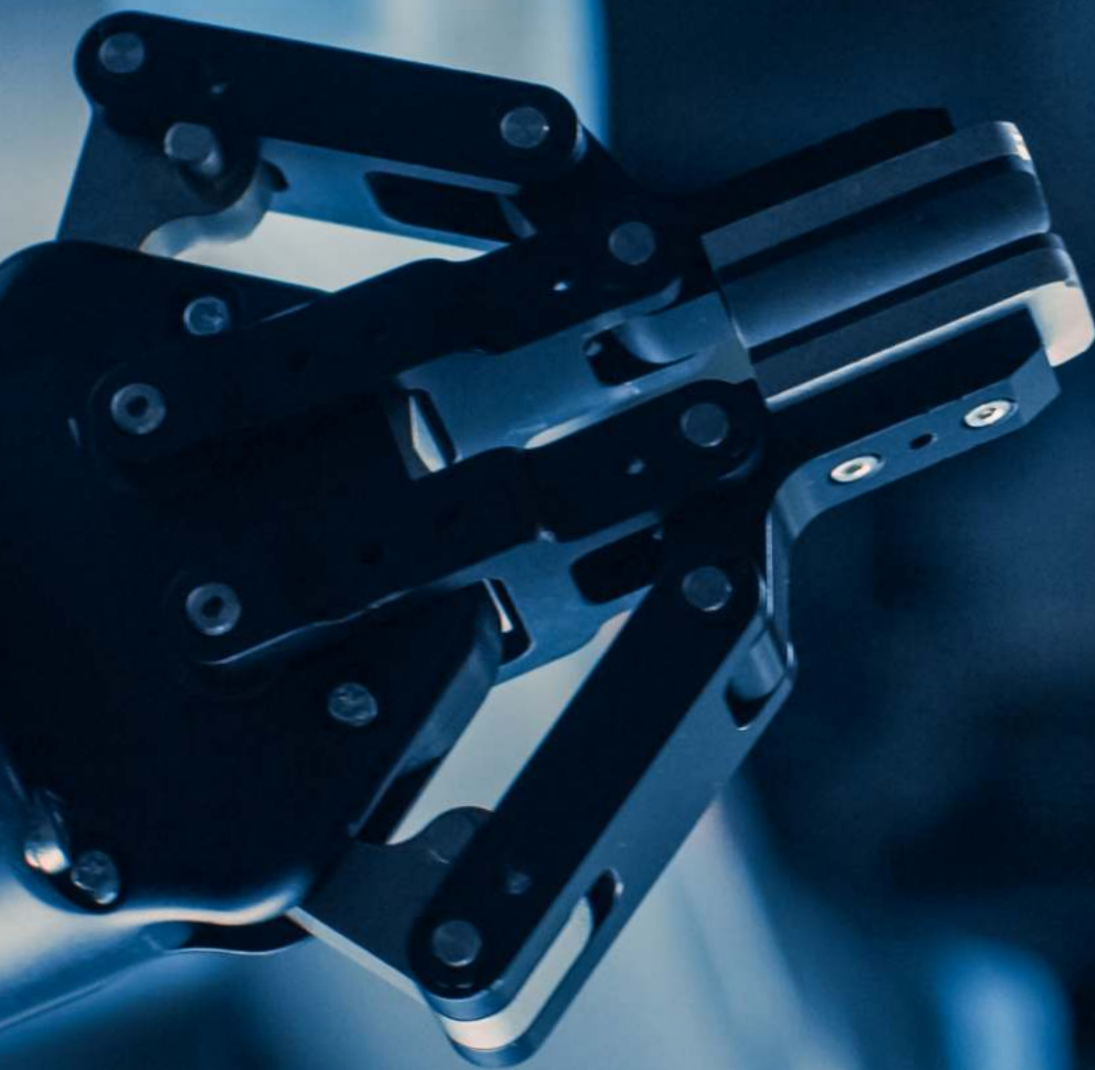
Anthony Fernando

President and CEO, Asensus Surgical



Patient-centric care for people living with diabetes:

Addressing the burden and unmet
needs by transforming the model
of healthcare delivery





The shift of healthcare delivery to a patient-centric model requires active listening, appreciating the burden of the disease and prioritizing patient-driven solutions

→ Nicholas Ismail

The healthcare ecosystem, as it exists today, has made incremental improvements in addressing poor outcomes and reducing harm. Some as simple as electronic prescribing to prevent errors in insulin dosing have been remarkably effective, yet other challenges remain. Certain incremental improvements are specifically designed to be patient-centric, such as the increased use of telemedicine after the initial COVID-19 pandemic.

According to an OECD report, as many as four in 10 patients globally are harmed in primary and outpatient healthcare. The most detrimental errors are related to diagnosis, prescription and the use of medicines, but up to 80% of this harm is preventable.

Another report from OECD found that investments in reducing patient harm (or improving patient care) can lead to better patient outcomes and cost savings. An

example of prevention is engaging patients in both physical and virtual settings, which can reduce the burden of harm by as much as 15%.

The adoption of cloud-based solutions and other technologies for a more collaborative and personalized approach is a priority for healthcare providers looking to improve patient-centric care.

A shifting landscape

The COVID-19 pandemic caused a seismic shift in how patient care was delivered. Treatment plans such as IV infusions needed to be adapted so they could be administered at home. This meant that in some cases, patients had to be empowered to deliver their treatments and monitor their conditions, which required a new patient-centric approach from healthcare providers.

“The healthcare and patient care landscape has changed,” says Colleen Riley, SVP, Chief Technology Officer at embecta, a company that offers innovative products and services for people with diabetes.

She adds: “Many years ago, it was about a one-size-fits-all approach to curing or treating diseases. But today, healthcare is moving to a precision medicine or individualized model where the treatment requires customization that includes not only the medical treatment but how the treatment is administered.”

In the context of diabetes—a progressive metabolic disorder in which glucose levels in the bloodstream rise—treatment plans must consider the degree of progression and the unique needs of the person living with the disease. In some cases of people living

with type 2 diabetes (T2D), weight loss will be sufficient, while others need to inject themselves with insulin multiple times daily. To meet these patient care requirements, embecta is focused on solutions meant to provide people living with diabetes patient-centric solutions that are appropriate for their unique circumstances at every stage of the disease.

“To deliver improved patient care for people with diabetes, we’re trying to consider what people are doing every single day, and what they are telling about the gaps in their care and how to address their unmet needs,” says Riley.

Inclusive of drug delivery, medical device innovation, patient and connected care and lifecycle management, healthcare should be an all-encompassing, patient-centric experience. To achieve this, providers need modularity, adaptability, flexibility, understanding and the ability to incorporate modern technology into various stages of the diagnosis, treatment and care value chain. Additionally, all these solutions should be designed to improve outcomes for patients on a daily basis.

The evolution of technology driving change

Innovations and technological evolutions have helped drive change, with a particular focus on improving patient care.

The evolution in the design of embecta’s syringes and needles is a good example of this. Over time, they have become smaller and finer. Technology and improved processes have enabled embecta to create these less intrusive and painful

medical devices to help with the delivery of medicine like insulin to people living with diabetes.

Recently, embecta has developed and launched a 34-gauge needle in Japan, which is the smallest needle on the market today for insulin delivery.

In addition, embecta’s product development team is developing a fully disposable, easy-to-use patch pump that administers insulin in a customizable way. Ease of use and purpose-built features for people living with T2D are essential design inputs.

“The patch pump will deliver insulin safely based on an algorithm’s recommendation. The function of the pump reflects advancements in hardware and software, and the algorithm’s decision on how much insulin the pump will administer is in part determined by the patient’s food intake, exercise and trends in glucose values,” says Riley. She adds: “The pump will be connected to the cloud, providing patients access to their own data and allowing healthcare providers access to that data to assist in therapeutic decision-making. This will improve virtual care and have the capacity to incorporate data from other sources—such as apps—to create a total, more personalized view of the patient.”

Improving patient-centric care: Designing and building by understanding the unmet needs

Commenting on how to develop a patient-centric product, Riley explains: “Before designing any product, providers should completely understand the

condition and understand how people of different demographics are struggling with different methods of treatment. The aim is then to reduce those challenges through the innovative design and testing of products, based on patient feedback and data analysis. This doesn’t just include ‘did you deliver the right amount of insulin?’, but also ‘how difficult was it to open up the packaging housing the device or medicine?’”

Looking ahead, embecta sees its creation of patient-centric solutions, like the patch pump, to be informed by what the patient expresses is their need and using those as critical design inputs.

Using device connectivity and cloud solutions, the aim is to empower people with diabetes to work collaboratively with their healthcare providers to improve outcomes and self-effectiveness. Doing so will relieve some of the burden of living with a chronic disease.

“To deliver improved patient care for people with diabetes, we’re trying to consider what people are doing every single day, and what they are telling us about the gaps in their care and how to address the unmet needs”

Colleen Riley

SVP, Chief Technology Officer at Embecta

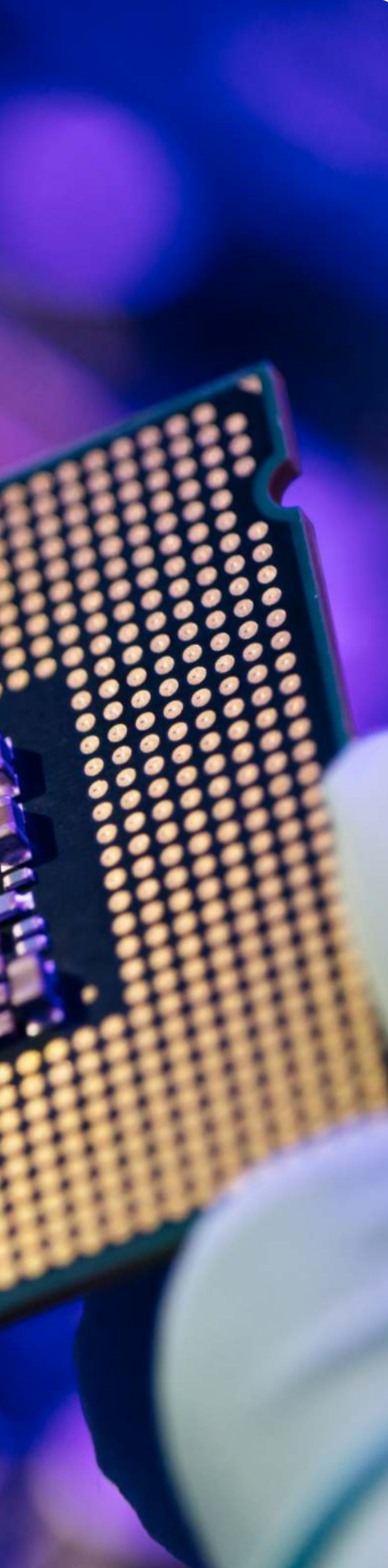


A close-up photograph of a hand holding a semiconductor chip. The chip is illuminated with a bright blue light, highlighting its intricate grid of gold pins and various components. The background is dark and out of focus, emphasizing the chip and the hand holding it.

Open ecosystems shaping the future of innovation in the semiconductor industry

“We see a sustained long-term demand for semiconductors which will require the industry to collectively innovate and bring compelling products and technologies that improve the lives of every person on the planet.”

| **Rahul Goyal**
| Vice President, Intel



Rahul Goyal, Vice President at Intel, explores the evolving semiconductor industry and the role Intel is playing in shaping its future

→ [Nicholas Ismail](#)

If data is the lifeblood of innovation, then the semiconductor industry represents the foundation of modern business, technology and connectivity. The world is built on semiconductors.

According to a report from SIA, from 1995 to 2015, an estimated \$3 trillion in global GDP has been directly attributed to semiconductor innovation, along with an additional \$11 trillion in indirect impact.

And, despite recent struggles around supply chain shortages and the availability of semiconductors, which was caused by myriad macroeconomic and geopolitical factors, McKinsey estimates that the global semiconductor industry is projected to become a trillion-dollar annual revenue industry by 2030.

This projected growth is attributed to factors like the rise of AI experimentation and implementation, the new remote working model and the surge in electric vehicle production.

AI is generating significant demand, with Medium estimating that demand for processing power, largely for AI-related chips, could grow the semiconductor market by \$500 billion in the next 10 years.

Sustainable growth in the Silicomomy

The rise of AI and the convergence of technology, and its semiconductor foundation, has led to what Intel CEO Pat Gelsinger describes as the 'Silicomomy.'

As technology becomes increasingly pervasive in people's lives and in how organizations function, the Silicomomy is a concept that highlights semiconductors as the key enabler of evolving and sustainable modern economies.

Public and private sectors are embracing this silicon-led future. The UK government recently announced a £1 billion investment for design, research and the advancement of chip leadership to secure its digital future. This follows significantly larger investments by the EU, which committed \$49 billion as part of the European Chips Act, and the US, which pledged \$52.7 billion over the next 10 years for semiconductor manufacturing, R&D and workforce development as part of The CHIPS and Science Act 2022.

"As the world goes digital, silicon will be at the center of the next global expansion," says Goyal. "With challenges around the increasing cost of developing advanced technologies and rolling them out at scale, public and private sector partnerships and industry ecosystem collaboration will be critical."

In this Siliconomy, along with innovation, sustainability is a priority and when it comes to making investments to reduce IT-related emissions, energy-efficient hardware is the focus. Among companies investing, 62% invest in energy efficient hardware, 57% invest in renewable energy sources and 54% invest in new “green” technology, according to the Sustainable CTO report from Intel.

“Computing promises greater opportunities and a brighter future if harnessed in the right way,” continues Goyal.

Embracing the opportunities

In pursuit of helping enterprises foster innovation and drive new opportunities with semiconductors, Intel recently announced a significant shake-up.

Originally founded as an Integrated Device Manufacturer (IDM), Intel is known as a semiconductor company that both designs and builds computer chips. IDM 2.0 represents the company’s evolution.

To compete in a highly competitive market, the new IDM model includes manufacturing expansion, plans to become a major provider of foundry capacity in the US and Europe and the intention to expand Intel’s use of external foundries (manufacturers that create chips for other companies) for some of its products.

According to Goyal: “IDM 2.0 will allow us to deliver leading products to our customers by utilizing our partner ecosystem. We will also be able to manufacture chips at scale and maintain the sustained demand for semiconductor chips while

offering our customers increased access to our open foundry services.”

Looking at Intel Foundry Services (IFS), Goyal adds: “IFS is a critical element to restore Intel’s global leadership in the semiconductor industry. IFS will deliver silicon capability, advanced packaging capability and will be an open system foundry. We are building a robust ecosystem with our partners to support customer innovation.”

Open ecosystems

Innovation thrives in an open and democratized environment and enables forward-looking organizations to scale innovation at speed and bring that value to a much larger base.

The idea is to unlock collective potential across multiple companies in a pre-competitive phase. As an example, Goyal points to the Universal Chiplet Interconnect Express (UCIe), an industry consortium made up of Intel, Advanced Semiconductor Engineering (ASE), AMD, Arm, Google Cloud, Meta, Microsoft, Qualcomm, Samsung and Taiwan Semiconductor Manufacturing Company.

This consortium innovates collectively on top of a standard, which allows them to differentiate their own solutions while contributing back to the standard and promoting it over time. In addition to the innovation benefit of an open ecosystem, partnerships can help reduce the challenge of cost in the semiconductor industry. The cost of developing advanced technology is increasing, along with R&D. In 2022, the US semiconductor industry investment in R&D

totaled \$58.8 billion and annual R&D expenditure as a percent of sales has exceeded 15% over the past 20 years, according to SIA.

As a result, it’s become exceedingly difficult for one company to make waves in the semiconductor space without embracing a partner and industry ecosystem mindset.

Shaping a future of responsible innovation

Just as the semiconductor shaped the internet boom with the birth of the microprocessor and personal computer, these same, albeit more advanced, silicon chips will define a future in the cloud and at the edge. They will bring value to almost every touchpoint in a person’s life, from cars to computers and medical devices.

In this digital era that’s reliant on super-fast connectivity, high performance compute will become critical. Consumers and organizations will expect the power of cloud on handheld devices, enabling innovation and collaboration on the go.

The immense possibilities of AI also rely on advanced semiconductor chips. But beyond meeting demand, chip manufacturers and those building large language models (LLMs) need to consider the responsible use of the technology.

“In shaping a silicon-led future, we must make sure that we continue to innovate in a responsible and resilient manner to ensure the trust of our customers,” says Goyal.

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A software defined future:

The automotive industry shifts gears

As technologies evolve and consumer needs shift, the automotive industry is grappling with large-scale transformations altering the industry

→ [Jordan Smith](#)

The DNA of vehicles is changing, challenging the automotive industry to keep pace with evolving technologies and customer desires.

Looking to meet these requirements that include maintaining profitability, while scaling capabilities and innovations, HCLTech recently acquired ASAP Group, a company headquartered in Germany that focuses on the future of automobile technologies.

“We are confident that the combination of HCLTech’s and ASAP’s engineering and technology performance will bring best-in-class advantages

to the automotive industry worldwide,” says Michael Neisen, CEO, ASAP Group. “This acquisition provides us with a window into how the industry is changing, where it is headed and what challenges may arise.”

“We see tremendous transformation potential in the ever-changing automotive industry landscape. In such an environment, we expect HCLTech’s business value stream and cloud-enabled, GenAI infused solutions to be a major factor in defining and sustaining next-gen experiences. ASAP will play key role in enabling those experiences,” adds Ajay Bahl, Chief Growth Officer, HCLTech.

Changes in the automotive industry

The automotive industry is shifting from mechanical products to highly complex, software-driven systems to help meet changing consumer needs. These changes will be supported by building secure, user-experience (UX) intensive, sustainable products that define drivability, experience and in-vehicle cognitive behaviors.

Vehicles today have evolved into driving computers and the in-vehicle software should be developed with value stream aligned platforms that enable functionality over robust infrastructure foundations that integrate with other key software and hardware components.

Modern vehicles are also now able to communicate with other vehicles, infrastructures and

mobile devices to open new possibilities for enhanced safety, navigation and infotainment systems. Vehicles are no longer commute or transport devices but an all-encompassing mobile workplace, business and recreational asset.

In recent years, vehicle electrification has been a huge driver of industry change as a response to stricter regulations and growing environmental awareness. The effort for development and production is considerably lower, and the shift simultaneously represents a disruption in the traditional combustion engine landscape and a decreasing reliance on fossil fuels. The advent of electrification places greater emphasis on sustainability across the business value chain, including safe and eco-friendly battery unit disposal.

Changing consumer behaviors have accelerated in-vehicle commerce imperatives, emphasizing the need for intelligent vehicle operability, advanced safety systems and GenAI-driven behavior functions that ensure human-to-vehicle interaction is productive, secure and highly enriched.

“This necessitates new architectures and integrated, permanent over-the-air updates, which involve significant efforts in development, integration and security,” continues Neisen.

Industry transformation challenges

The enhanced connectivity of vehicles has increased the risk of data privacy breaches and cyberattacks. Implementing stringent security measures to protect consumer data and secure vehicles against these threat actors and potential breaches is critical.

Furthermore, a lack of IT expertise to develop stable and functional software solutions is a significant challenge. New competitors from the IT industry have an advantage in this area.

Additionally, the existing infrastructure, including charging infrastructure and mobile networks, may not be adequately prepared for a successful transformation. These infrastructure deficiencies can hinder the adoption of electric vehicles and seamless connectivity.

This also calls for the IT Industry to develop more robust and agile development, testing, security and compliance checks for software developed in addition to assigning a “sustainability score” for each delivered function.

Technology partnerships: The future of automotive

Future generations of customers will expect a similar service and functionality standard in vehicles as they do from smartphones.

This will increase the demand for digital services and create additional business models, such as mobility-as-a-service. Integrating these innovative services into the vehicle platform will be critical to the future of the industry.

The increasing need for complex solutions will lead to more complete series development projects being outsourced to development service providers.

Electrification, connectivity, intelligent infotainment, aftermarket as a profit center and in-vehicle commerce will significantly alter the structure of the automotive industry. In this environment, service providers will shift focus to infusing GenAI in development and testing practices, building intelligent vehicle platforms and introducing distributed agile and DevSecOps development methodologies to develop those platforms.

Leveraging technology partnerships can help prepare the automotive industry for this software-defined and electric future. HCLTech’s acquisition of ASAP allows the organization to harness innovative technologies and expertise to develop these competitive solutions.

“Overall, the transformation in the automotive industry requires a strategic realignment based on technology partnerships, efficient development processes and a clear focus on essential technology areas,” says Neisen. “Collaboration and the use of modern technologies are the keys to success in this evolving industry.”

Product lifecycle management: The key to longevity and product transformation

Product lifecycle management is an essential element of driving an organization's product transformation

→ Nicholas Ismail





Product lifecycle management (PLM) is ultimately about maximizing a company's return on investment by monitoring, improving and transforming products across their entire end-to-end lifecycle.

It's defined as the handling of a product or service throughout the typical stages of a product's life: from concept, development and growth to its eventual decline and removal from the market.

"It's all about getting the right products to the right market at the right time and for the right cost," explains Peter Bilello, President & CEO, CIMdata. "By doing that, and having an end-to-end view, organizations are going to maximize their return on investment. Without an effective PLM strategy, companies will sub optimize and never get the most of out of their investment in terms of what they're putting into products and what they're bringing to market."

Every business in every industry produces some form of product and/or service. The key drivers behind the rapid transformation of product development are cost optimization and time-to-market to ensure competitive advantage. PLM is core to the successful development, delivery and transformation of these new, more adaptive products and services.

"When thinking about PLM there are three aspects: configuration management capabilities for a clear, concise and valid view of data, end-to-end visibility for lifecycle management and a systems view to optimize the view of the entire lifecycle of a product across the business. Most major PLM solution providers are moving toward

a better enablement of those three aspects," adds Bilello.

Taking PLM to the next level with next-gen tech

Traditionally, when integrating PLM, the challenge for most organizations was that they were structured in a pyramid formation. This meant that only a few people had an entire view of the whole lifecycle. This made it problematic to optimize, improve and transform products and services.

However, people's understanding of the right market lifecycle management has evolved. There's a better knowledge of what's required to achieve an entire lifecycle view of a product or service. At the same time, the proliferation of collaborative or digital technologies is helping break down information siloes across organizations to create a single source of truth for product information and innovation.

The availability of these technologies, such as generative design, advanced analytics and digital twins, can enable a true lifecycle support environment. These technologies can extend the capabilities of individuals looking to maximize the return on investment for products and services across their entire lifecycle.

"The introduction of next-generation technologies, such as generative design and generative engineering, is supporting cross disciplinary and design optimization in the digital space and across different engineering disciplines faster than ever before," says Bilello.

He adds: "Much of this optimization comes from enhanced simulation capabilities, with IoT providing the necessary connectivity

into the field, enabling product design teams to have a better understanding of how a current product in the field is being used.”

Change management is key

Organization-wide change management is also needed to integrate PLM and unlock transformative outcomes.

Bilello explains: “Most organizations aren’t structured in a way that allows optimization across a product’s lifecycle. To change this requires a different method of management and a different set of roles and responsibilities to truly optimize the end-to-end approach that is required.”

He points to the automobile industry as an example: “Automobiles used to have fairly limited warranties. But when they were trying to break into the US market, Hyundai began to offer significantly longer warranties on major components of vehicles. The company invested more in engineering vehicle parts that would last longer than standard warranties in the US market. It cost them more to build the car, but from a lifecycle perspective it was better. Not only did they gain lots of new customers, but they also didn’t have to spend as much on fixing or replacing their vehicle’s components, as their lifecycles were drastically improved. To do this, the organization’s structure and specific product and business strategies had to change. For example, business decisions were made from a lifecycle perspective, rather than a departmental or R&D perspective.”

The digital support system

The digital twin and digital thread or ‘web’ are fundamental in supporting an effective PLM strategy.

The digital twin is the digital replica of a product, enabling engineers to iteratively test, make changes, remediate and improve in a virtual environment.

“Digital twins are a set of information that defines the product, at any given time across its lifecycle. As a product evolves, that information will evolve and provides a holistic view,” explains Bilello.

He adds: “Some companies are using it in the design phase, for simulation-driven systems development, where they’re testing a product or service with heavy degrees of simulation that represent the real world.”

The digital thread is what connects all this information together. It’s a network of decisions and paths that show how an organization has reached any given point in the product’s lifecycle.

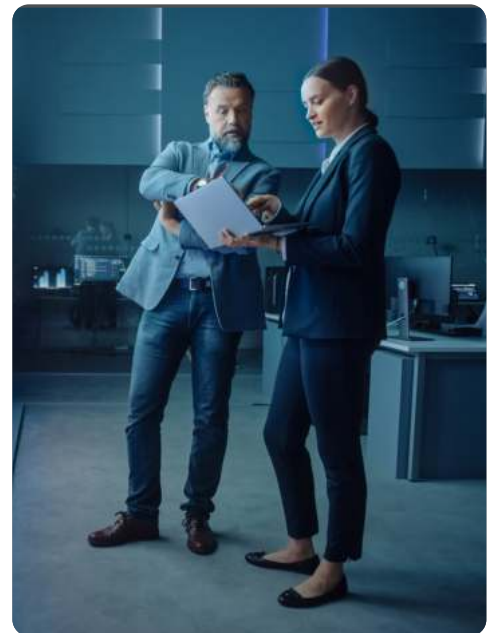
“Without the digital thread the digital twin is an orphan, because without any connection across the lifecycle it’s difficult to know what changes to make. It removes the guesswork of the past,” says Bilello.

Technologies like the digital twin and digital thread, under the umbrella of PLM, are becoming more important as organizations continue to realize that their products have a lifecycle that must be embedded and optimized in the market at the right time.

Ultimately, PLM provides a holistic view of a product’s lifecycle, leading to continuous transformation. It enables the connectivity that supports end-to-end optimization and increased product complexity, allowing organizations to bring impactful products to market with a speed and agility like never before.

“Much of this optimization comes from enhanced simulation capabilities, with IoT providing the necessary connectivity into the field, enabling product design teams to have a better understanding of how a current product in the field is being used.”

Peter Bilello
President & CEO, CIMdata



Sustainability: From compliance to competitive advantage

How can organizations embrace technology to achieve a compliant and sustainable competitive advantage?



Sukant Acharya,
Global Business
Head, Industry
NeXT, IoT and
Sustainability at
HCLTech, explores
how businesses
can achieve
compliance
and sustainable
competitive
advantage

In today's rapidly evolving global landscape, sustainability stands as the cornerstone of a responsible business ecosystem. Recently, we have witnessed a substantial reinforcement of regulatory frameworks and compliance directives, underscoring the growing significance of this paradigm shift. Notably, the introduction of the Corporate Sustainability Reporting Directive (CSRD) in Europe, which mandates over 49,000 entities to report on sustainability, vividly lays out the importance of adhering to European Sustainability Reporting Standards (ESRS) and embracing the principle of double materiality—a term that considers the impact of a company's activities on the environment and society as well as its financial performance. This evolution highlights the imperative for businesses to lead the way in sustainable practices.

California's New Climate Law (SB253) has broadened its reporting requirements to include 'Scope 3' emissions, emphasizing the need for a comprehensive strategy for environmental accountability. Similarly, the UK's adoption of the Strategic Disclosure Standards (SDS), rooted in International Financial Reporting Standards (IFRS) principles, sets a higher benchmark for transparency, fostering a resilient and accountable ecosystem.

Amidst these shifting landscapes and pressure to comply with regulatory mandates, organizations are grappling with the dual challenge of staying competitive and meeting regulatory mandates on sustainability. These demands often entail substantial costs and organizational shifts. Technology innovations offer a remarkable opportunity to align sustainability with shareholder values,

creating a foundation for competitive advantage. A technology-driven strategic approach not only offers capabilities to achieve net-zero goals but also provides seamless visibility into operations, dynamic control of systems, prevention of wastage and a reduction in per-unit energy costs. Moreover, rapid differentiation through the development of sustainable products and services can positively impact the market.

Despite well-developed regulatory frameworks, compliance directives and technology-driven sustainability initiatives, organizations still face specific challenges that persist in their pursuit of sustainability. Let's explore how these challenges hinder their efforts to attain their sustainability goals.

Complexity in integrating the ecosystem: Achieving sustainability goals requires seamlessly integrating sustainability practices across the entire value chain. This integration poses a unique set of challenges, demanding a deep understanding of the organization's internal operations and those of its suppliers, partners and customers. Consider a B2C company serving millions of customers through diverse systems and interaction models across the globe. Without a holistic ecosystem perspective, managing end-of-life for circularity can be daunting. Similarly, a B2B manufacturer faces increasing complexities with unique sustainability demands from each customer and a globally dispersed supplier base. Ecosystem integration involves aligning sustainability objectives, sharing information and fostering collaboration among ecosystem stakeholders. Implementing sustainability practices at this level, supported by the right

technological solutions, is paramount to driving substantial change.

Challenges with data management: Data complexity is a significant challenge for businesses with extensive operations spanning diverse products and service lines across multiple locations. Managing this data efficiently entails cleaning, structuring, integrating and aligning it with various regulatory requirements while extracting valuable insights. This requires considerable effort and technology plays a pivotal role in automating tasks like collection, storage, integration, mapping and reporting processes, ensuring compliance with region-specific frameworks and standards. Leveraging digital twin technology for data intelligence yields precision, traceability and verification, providing assurance for audit processes. Furthermore, technology facilitates data analysis, enabling the identification of existing inefficiencies and the provision of recommendations for operational enhancements.

Broken chain in circularity: Embracing sustainability demands a focus on sustainable products and a circular economy. Annually, according to the Ellen MacArthur Foundation, over 120 billion metric tons of goods circulate within the economy, but consumers discard an estimated 99% of these products within just six months of use. Also, a report from the US Environmental Protection Agency found that less than 5% of plastic waste in America is recycled, with limited innovations to support the avoid-reduce-reuse-recycle model. The biggest hurdle in circularity is the blind spots in the production-consumption-end-of-life chain. Introducing technology

to establish a digital thread in the product value chain coupled with design stage interventions to enhance product lifecycle and enhanced recyclability helps fast-track circularity initiatives.

Technology innovation: Driving sustainability initiatives as a source of competitive advantage

Leveraging cutting-edge tech solutions is the key to achieving net-zero emissions and sustainable practices while making operations more efficient. From AI-driven supply chain transparency to digital twin-driven sustainable operations, these innovations empower businesses to reduce their carbon footprints and embrace a greener, more sustainable future.

Net-zero transformation and sustainable operations: Achieving sustainability through net-zero transformation is paramount. Across all industries, the reduction of greenhouse gas (GHG) emissions requires leveraging technologies, such as digital twin, AI, IoT and predictive maintenance. Adhering to the principle that "what gets measured, gets managed," the strategic implementation of emission measurement technologies, trend analysis and benchmarking enables optimization and emissions reduction. Digital twin-based tools offer real-time insights, allowing organizations to measure, monitor, normalize, compare, contrast, predict and alert on the source of issues and opportunities in near real-time. AI and machine learning-driven dynamic threshold control, KPP builders and a comprehensive organizational view streamline the path to net-zero transformation and cost reduction.

Monitoring energy consumption can proactively prevent failures and downtime, minimizing poor-quality product production and waste in rework and scrap.

Sustainable products: Sustainable products are a vital element of the circular economy. They significantly reduce emissions, carbon footprints, energy consumption and material usage, driving circularity. These products undergo rigorous simulations and testing to minimize their environmental footprint, demonstrating a commitment to sustainability and innovation in product development. Utilizing mapping and what-if tools for Product Carbon Footprint and Lifecycle Assessment aids in enabling Design for Sustainability by measuring and mitigating the environmental impact of a product or future product throughout its entire lifecycle. Data-driven insights and an ecosystem-driven knowledge base for material substitution change of design principles aid faster decisions toward a more sustainable product. Cloud-enabled ecosystem collaboration and extensive usage of simulated data and environment help reduce R&D costs and accelerate time to market. Moreover, sustainable products extend the product lifecycle, increasing organizational value and simplifying end-of-life management. This comprehensive approach fosters sustainability from inception to disposal.

Sustainable IT: Sustainable IT commands urgent attention. While fast-proliferating volumes of data have become the source of energy to feed the expansive business ecosystem, it has necessitated

energy-guzzling algorithms and infrastructure to process the same. In addition, the convergence of IT-OT and ET is creating a complex digital workplace that needs to be available 24/7, consuming energy and leaving a significant carbon footprint.

Server virtualization is a prime example of an effective approach, consolidating applications to reduce power consumption and optimize space and cooling. Nevertheless, certain power-intensive applications still exist, emphasizing the need to identify and optimize these specific processes. By embracing energy-efficient coding (green coding) practices, we can effectively reduce power consumption associated with such applications. Similarly, employing desktop virtualization techniques helps reduce the number of power-consuming devices, ensuring a more sustainable IT infrastructure. Leveraging advanced analytics for network analysis and dynamic load balancing can help reduce energy consumption in network assets. Moreover, implementing technology-enabled interventions, such as green IT procurement and automated power-saving measures, saves cost and helps achieve net-zero goals.

Sustainable finance: Sustainable finance ensures downstream project compliance, supporting a greener ecosystem. Technology serves as a cornerstone in driving sustainable finance by empowering businesses to navigate the complexities of environmental impact assessment and mitigation effectively. Through the implementation of Partnership for Carbon Accounting Financials-aligned emission quantification methodologies for financing, investing and insurance-related



activities, technology facilitates precise target setting in accordance with standards like the Science Based Targets Initiative, Net-Zero Banking Alliance and Net-Zero Insurance Alliance. It further enhances client and investor engagement solutions, fostering a marketplace-driven approach to promote sustainable finance and living. Through the establishment of robust platforms for taxonomy management and standardized reporting, technology streamlines the classification of green financing frameworks and EU taxonomy, ensuring comprehensive and transparent disclosures. Additionally, technology supports the seamless implementation and management of corporate ESG strategies, which facilitates the integration of tailored dashboards for efficient ESG data management and reporting. This will ultimately drive sustainable finance practices to new heights and reduce risks for organizations.

In a nutshell, technology will play a crucial role in helping businesses attain sustainability. It empowers organizations to reduce environmental impact and meet the ever-growing demands of responsible business practices. Simultaneously, technology is instrumental in guiding organizations toward harnessing sustainability as a source of competitive advantage. Technology offers a wide range of solutions to drive sustainability as a value enabler moving forward, from energy transition to supply chain transparency, remote work capabilities and near real-time operations optimization.

At HCLTech, we are committed to advancing sustainability through our comprehensive suite of sustainability-focused solutions, including Design for Sustainability SF 360, among others. Our flagship, award-winning Net-Zero Intelligent Operations solution designed for Scope 1, 2, 3 tracking and reporting leverages digital twin, IoT and AI technologies to streamline energy consumption and mitigate GHG emissions with real-time insights. It provides actionable insights to reduce costs, prevent failures and enhance operational efficiency. Our efforts are complemented by our commitment to driving rapid and meaningful long-term sustainable growth while adopting a responsible and mindful approach for our customers.

This fusion of technology and sustainability pushes the boundaries, offering exciting possibilities for CXOs to succeed and establish a sustainable competitive advantage.

“Leveraging cutting-edge tech solutions is the key to achieving net-zero emissions and sustainable practices while making operations more efficient.”

Sukant Acharya

Global Business Head, Industry NeXT,
IoT and Sustainability, HCLTech





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