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JAN 2023 – JAN 2024
INDIA

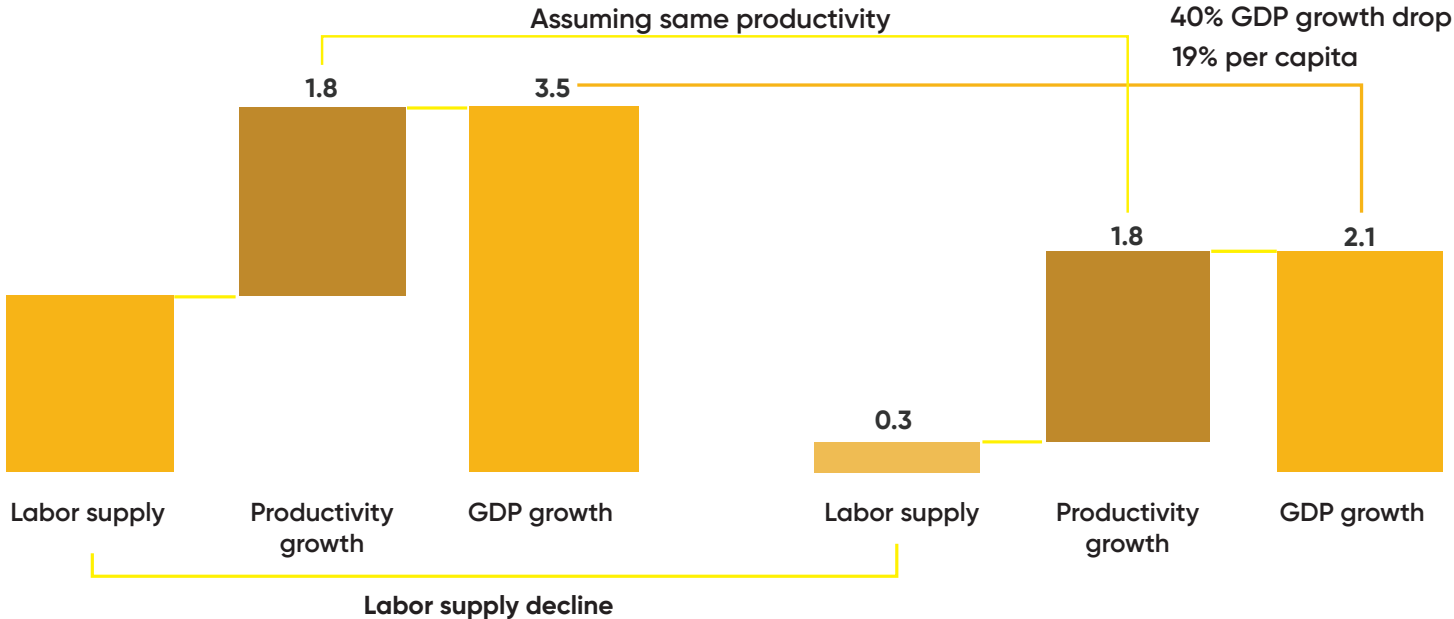# Focus on Productivity, Personalization & Sustainability

When the Industry 5.0 buzzword first appeared on the industrial horizon half-a-decade ago, the world was busy with Industry 4.0 where digital transformation initiatives defined progress and enterprises sought to make operations more agile and connected. Technology keywords that characterized this era of innovation such as artificial intelligence, automation, big data analytics, machine learning and internet of things, are actively driving transformation. More importantly, these are the very pillars around which Industry 5.0 would drive the next phase of change - where people and machines work together to create enterprises that are more human centric, focused more on sustainability and are stronger and resilient.

So, in more ways than one, the future of innovation that drives industrial revolution would be an extension of what we are going through now, with the emphasis shifting from technology itself towards how automation and artificial intelligence can power humans, conserve resources and prioritize value creation for stakeholders - from business owners to consumers. In many ways, this phase is enhancing productivity while retaining all that is important for the future generations - good health and a good environment driven by sustainable goals. And the reasons are quite obvious, as this study by McKinsey indicates.

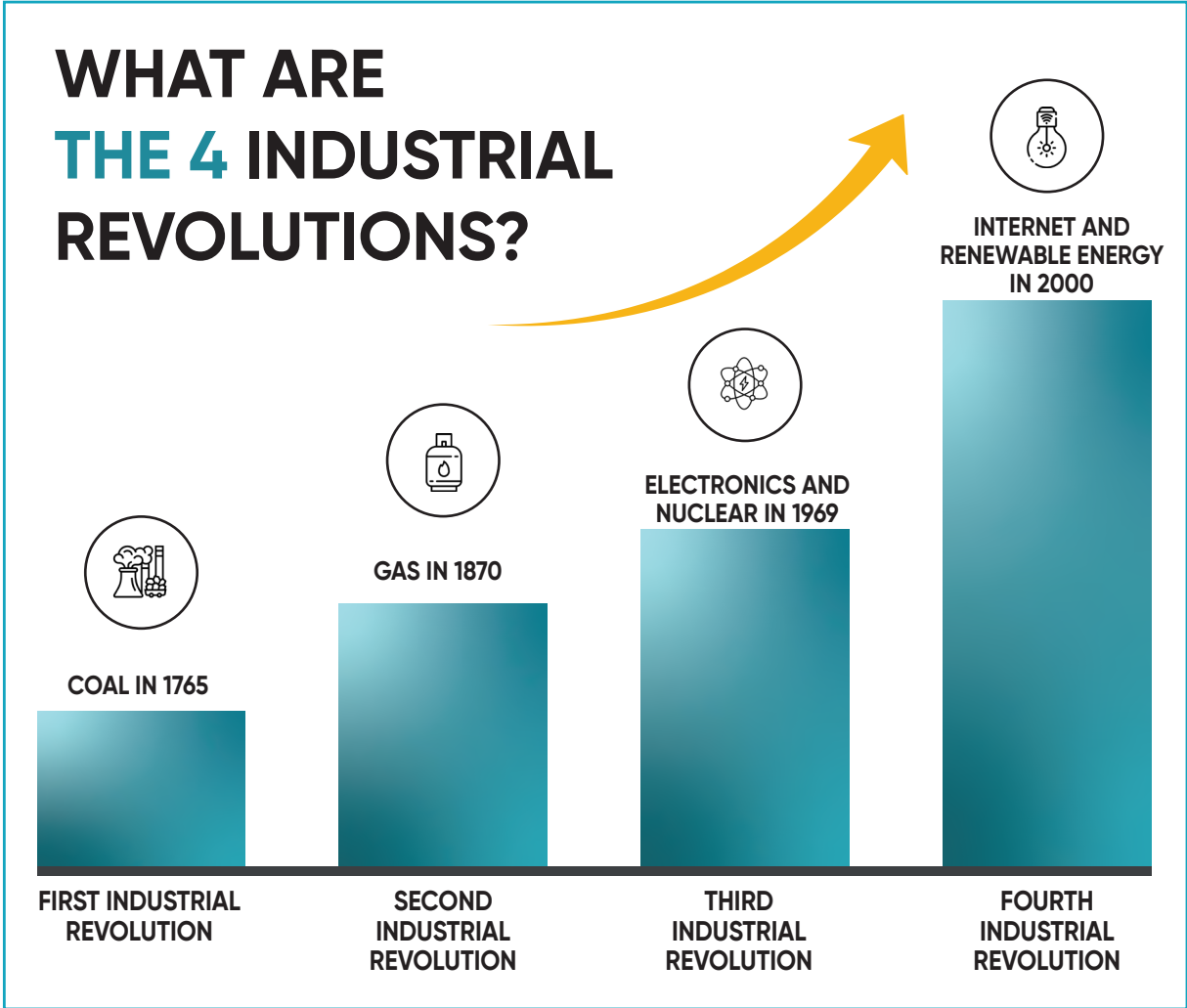# Productivity matters...and will matter more

Last 50 years of growth
1964 -2014 CAGR for G19+Nigeria %

Next 50 years of growth
CAGR for G19+Nigeria, %

Assuming same productivity

40% GDP growth drop
19% per capita

1.8   3.5

1.8   2.1

0.3

| Labor supply | Productivity growth | GDP growth | Labor supply | Productivity growth | GDP growth |

Labor supply decline

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If productivity would be the buzzword that drives Industry 5.0, customization would be another that gets carried forward from Industry 4.0 where digital transformation continues to be seen as a means to drive customer-centricity in the service business. This, in essence, is the vision where smart facilities create greater freedom for workers, less stress on the environment through a collaborative approach between humans and machines.

WHAT ARE THE 4 INDUSTRIAL REVOLUTIONS?

INTERNET AND RENEWABLE ENERGY IN 2000

ELECTRONICS AND NUCLEAR IN 1969

GAS IN 1870

COAL IN 1765

| FIRST INDUSTRIAL REVOLUTION | SECOND INDUSTRIAL REVOLUTION | THIRD INDUSTRIAL REVOLUTION | FOURTH INDUSTRIAL REVOLUTION |

To get a better handle on the industrialization journey, we must hark back to the very beginning when the industrial revolution began in England more than two centuries ago. Mechanization through the use of water and steam power of the textile industry is how this concept was depicted with experts debating the period when the first phase of modern innovation occurred. The second revolution came in the late 19th century and lasted till World War-1 that saw electric power being used to mass produce products at the cost of human effort. Henry Ford has often been credited with mastering the assembly line that led to urbanization at scale.
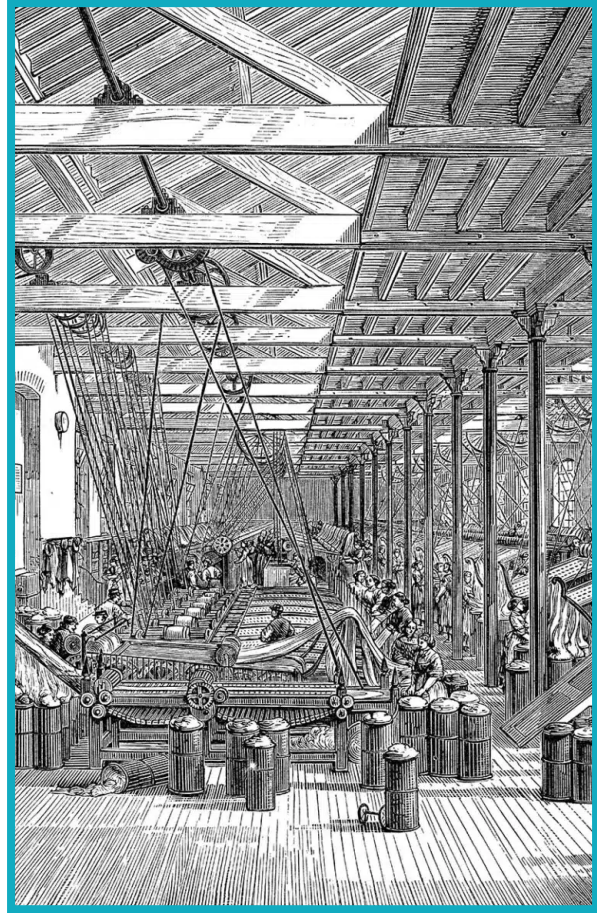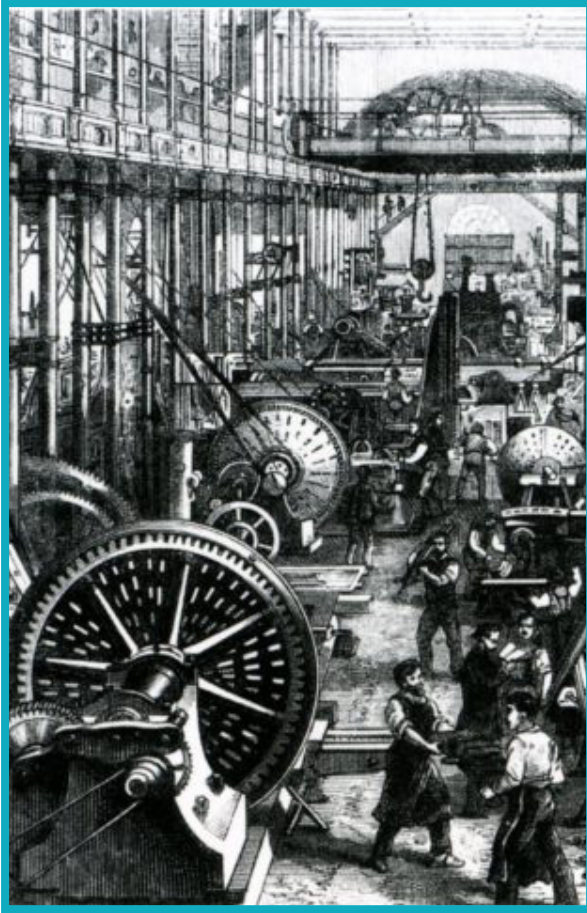
The Third Industrial Revolution began in the '70s in the 20th century through partial automation using memory-programmable controls and computers. Since the introduction of these technologies, we are now able to automate an entire production process - without human assistance. Known examples of this are robots that perform programmed sequences without human intervention.

However, the next two phases of the industrial revolution virtually dovetailed into each other with automation and computerization driving them. What began in the 1970s with partial automation driven by memory-programmable controls, took wings in the 1990s when manufacturing went digital. We had smart software, innovative materials and dextrous machines capable of handling new processes that came together with a whole range of web-based services to make the factories of the past look antiquated. To the point where Ford's idea that car-buyers could choose any color as long as it was black became laughable. Early in the millennium smart factories, with support from digital technology and communication, began producing smaller batches of a wider variety of products - each tailored to customer whims and preferences.

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Which now brings us to the factories of the future - one where the focus shifts to mass customization and may well resemble the weavers' cottages from 1750 than the Ford Motors assembly line of the 1920s. Industry 5.0 represents the shift of yet another gear - where automation technologies such as IoT and smart factories are further leveraged by the unique creative potential of the human mind to create solutions that are sustainable and customized.

The next best thing is an extension of Industry 4.0

Given the intertwined nature of the third and fourth industrial revolution, it comes as no surprise that for many companies the journey from 3.0 to 4.0 continues to be the "next thing" as they transform into the world defined by automation, big data analytics, smart systems, virtualization, AI, ML and IoT. Since all these concepts would continue to be the cornerstones of 5.0, there is no pressing need for enterprises to panic or make hasty decisions. The foundations are already in place or should be so by way of automation of the manufacturing process so that use of AI and other technologies can create a more human-centric and sustainable process environment.

01
REDUCED COST
DUE TO RESOURCE
EFFICIENCY

02
EMPOWERED
WORKERS
REMAINING IN
CONTROL

03
COMPETITVE
INDUSTRY BY
ATTRACTING
BEST TALENT

04
ADAPTED
TRAINING
FOR EVOLVING
SKILLS

05
COMPETITVE
EDGE IN NEW
MARKETS

06
IMPROVED
SAFETY AND
WELL-BEING

Why industry 5.0?

INDUSTRY 5.0 IS A SOLUTION PROVIDER FOR PEOPLE AND OUR PLANET

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Given that a key goal of Industry 5.0 is to create more flexible and adaptable manufacturing that can respond to business needs at the blink of an eye, the focus should continue on data collection and real-time analytics with an eye on enhancing efficiencies and quality. Once these goals are clearly set, the processes could shift focus on sustainable manufacturing through reducing wastage of raw material, energy and people, while empowering a human-centric approach to collaboration to deliver higher productivity, enhanced quality and reduced costs.

The research and innovation arm of the European Commission had noted that Industry 5.0 could become a reality only through active collaborations between government and industry with the sole focus of finding solutions to societal challenges. The Industry of the Future approach brings benefits for industry, for workers and for society by (a) empowering workers while also addressing the evolving skills and training needs of employees and (b) increasing industry competitiveness to attract the best talents through the use of circular production models that use natural resources more efficiently and revising value chains and energy consumption patterns in order to make industry more resilient against external shocks such as the Covid-19 crisis.

Some immediate benefits and use-cases

A recent post by Emerson, an American multinational and Fortune-500 company that makes engineering products and services for industrial, commercial and consumer markets, notes that Industry 5.0 will mark increased empowerment, safety and well-being of the workers as companies automate rote, dangerous or cumbersome tasks leaving humans to focus on strategic initiatives. Claudio Fayad, VP of technology at Emerson believes automation will evolve to support people to do their work in different, more efficient ways, that require upskilling and a change in mindset. Here are some early use cases being propagated:

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**"YOU NEED THE INDUSTRY 4.0 UNDERPINNING TO ACHIEVE THE GOALS OF INDUSTRY 5.0"**

- Robotic arms have been around for some time now, performing monotonous, dangerous and physically exhausting work in plants. The next phase of this evolution could witness them working in close collaboration with humans

- Wireless sensors and drones could perform remote operations and inspections while shielding workers from hazardous situations. With real-time data feeds enabling instant decisions, the human element can considerably elevate the grunt work of machines

- Breweries use up to ten times more water than they need for producing beer, thanks to inefficient flow and measurement technologies. Today companies like Emerson are installing meters over wireless networks whereby a brewer in India brought down water usage, benefitting the ecology and the bottom lines.

- Another use case could be healthcare in remote areas where a collaborative approach between humans and machines could be tailored for an individual by monitoring their body parameters, tracking their lifestyle and even delivering medicines

- There's already talk of a new generation of 'Cobots' that can work safely alongside people to create on-the-fly product innovations and personalizations to the next level. These could extend to electronics, automobiles and many more sectors in the future.

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# The future of manufacturing comes with its challenges

Before envisioning the challenges facing the rollout of Industry 5.0 at scale and speed, there is a growing need to recognize that the concept is still gaining ground, especially since enterprises are heavily engaged in the digital transformation initiatives defined by Industry 4.0. Into this mix, the sustainability stories are just getting woven in with trade blocs such as the European Union pushing the envelope. The focus on societal value and wellbeing is slowly nudging growth and profits to make space with the 5.0 framework now getting defined on three pillars, viz., of human centricity, resilience and sustainability.

Resilient	Human centric	Sustainable
	INDUSTRY 5.0	
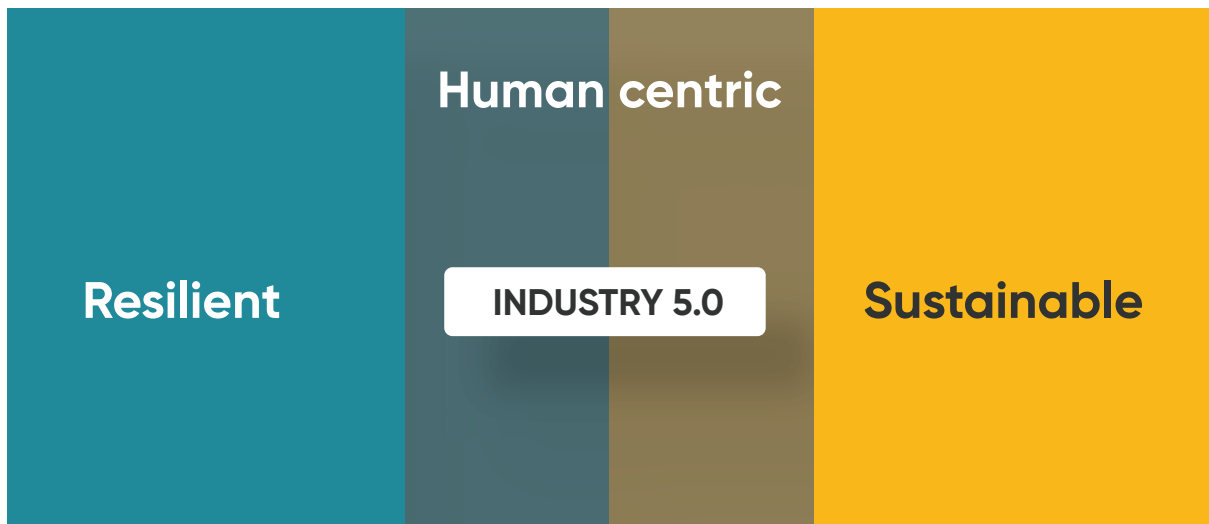
A lion's share of how this new paradigm pans out would depend on how manufacturing embraces its key principles - be it retraining and upskilling, reducing carbon emissions through better fuel efficiencies and enhancing raw material usage through waste reduction. Of course, there is the all important issue of cybersecurity and managing regulatory frameworks that could play a crucial role in ensuring the success of Industry 5.0.

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Some of the critical challenges may include, though it is fair to say that more could crop in the years to come:

Training

Cybersecurity

Cost-prohibitive

Regulation
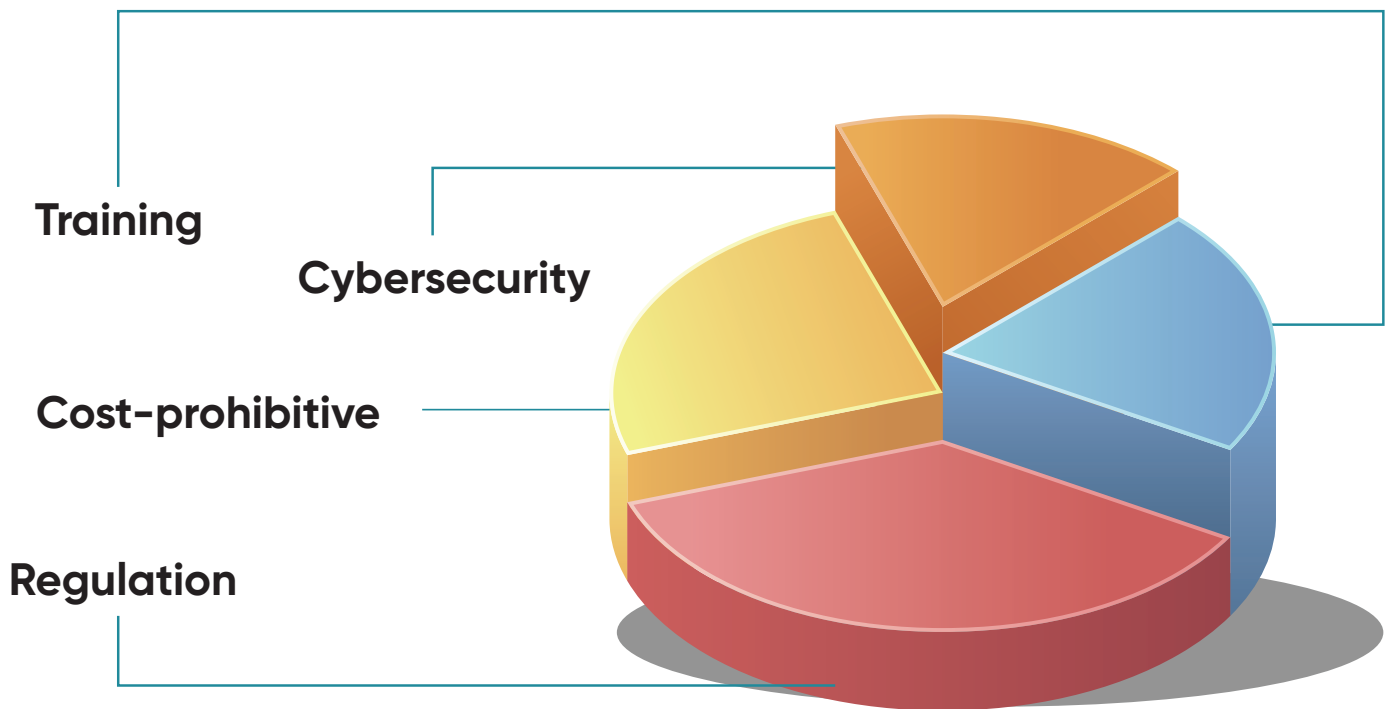
Addressing the challenges posed by the cyber landscape is not easy because risks are evolving faster than companies can react. Threat actors are well resourced–they no longer use "'smash and grab" ' tactics but focus on maintaining their presence for years to cut through the security measures used by an organization. They employ innovative techniques to evade classic controls such as firewalls, antivirus systems and IDS/IPS.

Training

As discussed earlier, the integration of machines and human creativity would require specialized training for employees, which is both expensive and time-consuming. When consumers expect a human touch to production, the first requirement is to assist workers to go beyond grunt work and step into the wide world of innovation for which training would emerge as a prerequisite

Cybersecurity

The second challenge is not new as we've already witnessed digital transformation initiatives requiring pinpoint focus on guarding against cyber attacks. Every digital technology initiative brings with it data in their terabytes and along comes the threat of actors who would like to steal it. This means both state and non-state actors need to be kept at bay and we know this costs money.

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⊘ Cost-prohibitive

Just the above two aspects could result in several smaller enterprises putting off their Industry 5.0 plans as fresh investments could be scarce. Of course, cloud-based digital solutions could be round the corner but for these to scale up, the businesses would need to appreciate the value that 5.0 is no more a desirable change but a vital one - that is if the planet is to be preserved for future generations.

⚖ Regulation

Last but not the least, use of technology always raised questions around unbridled use and its impact on social equality. There's already moves and counters floating around the generative AI, which governments may need to come together and resolve through global regulation. Industry 5.0 is another story that may require a similar intervention at the political and economic level.

In fact, the European Commission has already set in place a body that aims to bring together several stakeholders to share the best practices, co-create actions to implement Industry 5.0 and generally contribute to the New European Innovation Agenda (NEIA) implementation. Called the Community of Practice (CoP 5.0), this club is currently exclusive to Europe with membership being granted by an ad-hoc selection committee. Having said so, there could be a proliferation of further such groupings across the world that could help create value for stakeholders at the local, regional and national levels by facilitating a sharing of ideas, fostering synergies and even providing funds at some stage to foster change.

The journey from Industry 4.0 to Industry 5.0

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While the industry itself appears to be convinced that delivering solutions for society to preserve resources, ensure social stability and address climate change are noble, the challenge is how soon can this journey from 4.0 to 5.0 commence. Experts argue that it has already commenced in fits and spurts, but bringing digital innovation to power the next phase of the industrial revolution requires organizational leaders to step up and make things happen. Where productivity and profit can also enhance the lives of employees and meet sustainability goals.

Over the next decade, technology innovations would create efficient and sustainable smart factories that combine with the best of human intelligence to create customized solutions for users, thus completing the Industry 5.0 cycle. The impact would be significant as it would enable enterprises to adopt a flexible and agile approach to production while fostering a collaborative and human-centered work environment. Technologies such as AI, robotics and IoT would help manufacturers optimize operations, reduce waste and improve overall quality and productivity. This change would follow one another in quick succession over the next decade and beyond, at a pace faster than what the first three industrial revolutions took.

What may not matter is how rapidly enterprises implement Industry 4.0 ideas, because there is now clear data that shows the impact of these innovations at enhancing productivity. According to a research paper by McKinsey, Industry 4.0 has helped companies make strides across KPIs that drive growth that include lead-time reduction, enhanced speed-to-market, customization, better factory output and sustainability. Since Industry 5.0 is a continuation of these ideas, it could well be the right moment to consider a Chief Robotics Officer - one who can drive change on the factory floor and bring close collaboration between human creativity and robots while also driving innovation through R&D efforts to move from 4.0 to 5.0.