UK INDIA
BUSINESS COUNCIL

LTIMindtree

WHITEPAPER

TOWARDS NET ZERO:

Utilising Digital Technologies
for a Sustainable Future:
Opportunities and Challenges for UK and Indian Industries

SUPPORTING BUSINESS SUCCESS

Contents

The UK India Business Council is a strategic advisory and policy advocacy organisation with a mission to support businesses with the insights, networks, policy advocacy, services, and facilities needed to succeed in the UK and India. We believe passionately that the UK-India partnership creates jobs and growth in both countries, and that UK and Indian businesses have ideas, technology, services, and products that can succeed in India and the UK, respectively. www.ukibc.com

LTIMindtree is a global technology consulting and digital solutions company that enables enterprises across industries to reimagine business models, accelerate innovation, and maximize growth by harnessing digital technologies. As a digital transformation partner to more than 700 clients, LTIMindtree brings extensive domain and technology expertise to help drive superior competitive differentiation, customer experiences, and business outcomes in a converging world. Powered by nearly 90,000 talented and entrepreneurial professionals across more than 30 countries, LTIMindtree — a Larsen & Toubro Group company — combines the industry-acclaimed strengths of erstwhile Larsen and Toubro Infotech and Mindtree in solving the most complex business challenges and delivering transformation at scale. For more information, please visit www.ltimindtree.com

Introduction

As the fifth and sixth largest economies in the world, India and the UK play key roles in the world's fight against climate change. Both have set Net Zero targets, meaning equivalence between the amount of greenhouse gas produced and removed from the atmosphere, and are investing finance and resources towards energy transition, green mobility, and related infrastructure, accordingly.

According to Intergovernmental Panel on Climate Change (IPCC) research , "limiting warming to around 1.5°C (2.7°F) requires global greenhouse gas emissions to peak before 2025 at the latest, and be reduced by 43% by 2030". Most major countries have announced that they aim to achieve Net Zero by various points in time, ranging from 2045 to 2070.

The UK government aims to reach Net Zero by 2050 , with a transitional target of 78% emissions reduction by 2035 compared to 1990 levels. The Government of India has set a Net Zero target of 2070 , with a significant goal along the way to achieve 50% of its energy from renewable resources by 2030.

Digital innovation and technology will play a key role in the green transition and cutting greenhouse gas emissions through the innovative products, processes and services that will become an integral part of the green industrial revolution.

Technology is already contributing positively, from enabling greater energy efficiency to the propagation of feedback loops and data analysis for more effective and efficient processes.

It is through the Fourth Industrial Revolution – particularly the synergy and interactions between novel technologies such as 5G, the Internet of Things (IoT), artificial intelligence (AI), Robotics, Blockchain etc. – deployed throughout the entirety of an organisation and its ecosystem that can truly generate a step change in the sector's greener future. For instance, through sensors in factories, smart cities, and even in our homes, 5G and AI have the potential to make our societies and economies radically more efficient and sustainable.

This thought paper analyses the role of digital innovation and technology as an enabler for the journey towards decarbonisation. It does this with a focus on the solutions and opportunities in the UK and India. First, the paper discusses the importance and challenges to achieving net zero. It then highlights the solutions that digital innovation and technology can bring to the market. It ends with a series of related call to actions.

Digital innovation and technology are essential, they're interconnected, they're intricate, and they'll be at the forefront of the green transition going forward.

The Importance of Net Zero

Countries around the world face varying challenges as a result of climate change, from extreme weather like flooding and droughts, to more frequent natural disasters, to the food shortages and humanitarian catastrophes that these conditions create. Facing the effects of climate change first hand, consumers and customers are becoming increasingly aware of these facts, the effects, and their responsibilities as global citizens, and are now demanding more sustainable products and services.

To meet the changing consumer demands, businesses have to accelerate their sustainability efforts in all facets of their business. This represents an important opportunity to reimagine company philosophies, operations and environmental footprints, beyond mere compliance reporting and consider the entire ecosystem of stakeholders as depicted in the diagram below.

Figure 1: End-to-end Regenerative, Self-Sustaining, Decentralised, and Digitised Value Loop

Net Zero can be achieved through various interventions such as making business processes more efficient, using alternative, clean fuels, afforestation, and green investments. Such is the scale of the climate challenge that all these solutions are necessities in the world's arsenal. Even if we electrify our cars and decarbonise our energy grids, it will not be enough for us to reach our targets.

Global production sectors alone are responsible for one-fifth of carbon emissions and consume 54% of the world's energy sources (as per the World Economic Forum); accordingly, there is increasing pressure on business leaders and governments to reorient value chains and move towards sustainable, circular models.

Organisations need to rethink their operations, purpose and envisaged future, especially considering that consumer demands will only continue to increase and meeting them needs to be sustainable. As India's energy use grows with its fast-paced development, with young technical minds and resources at its disposal the country is well placed to adopt green growth from the outset.

The rise of India's solar power as an important source in the country's energy mix is a case in point. India is a global leader in renewable energy, particularly solar power, leading the International Solar Alliance , an alliance of more than 120 countries.

At the same time, the UK is leading the way to the achievement of net zero, becoming the first country to enshrine net zero into legislation in 2019. Businesses are required to submit thorough public plans in 2023 outlining how they will transition to a low-carbon future in line with the UK's 2050 net-zero target. As a result, there is increasing pressure on UK businesses to bring sustainability to the forefront of their operations.

Thus, businesses have a double incentive to go green - with market forces being one and compliance being the other. The 2023 roadmap towards mandatory TCFD-aligned disclosures (Task Force on Climate-related Financial Disclosures) and application of SFDR regulations and Taxonomies (Sustainable Finance Roadmap Disclosure) in the UK are some of the key regulation and policy pathways to achieve net zero ambitions.

Challenges to overcome in Transitioning to Net Zero

While the UK and India are taking strides individually to further their sustainability initiatives, a lot more can be achieved by both parties working together. To cut emissions on a global scale it will be essential for already industrialised countries such as the UK to support developing countries.

The UK, as a leader in green technology and innovation, has the capability and commitment to support India's climate goals. The UK has long been a global hub of science, technology, and engineering excellence, with a strong ecosystem of world-leading businesses, start-up ecosystem and universities. India is fast becoming one too, supported by the consistent stream of world class, technically adept and socially conscious minds, and growing technologies, both of which are supported by expansion of the sector under the 'Make in India' initiative.

It is well accepted that acting in environmentally sustainable ways has widespread benefits for society. At the same time, to truly solve our climate crisis, we need to address the burden that green practices can impose on businesses driving that positive change, particularly the small and medium enterprises (SMEs).

Compliance with regulation can be time consuming and technical and SMEs often have trouble accessing ample finance too. Implementing environmentally sustainable measures also requires certain managerial skills and technological understanding, which may not be a top priority for an SME looking to hire skills for its basic survival and growth first. However, the silver lining is that while this is certainly true to an extent, the perception around the costs and technicalities of environmentally sustainable solutions is often exacerbated and are falling.

Infrastructural investment that seeks to address the environmental challenge brings two-fold benefits. In the short-term, it generates economic growth through its ability to create jobs and stimulate economic activity. In the longer-term, wider growth is created by improving connectivity and sustainability of practices throughout the economy.
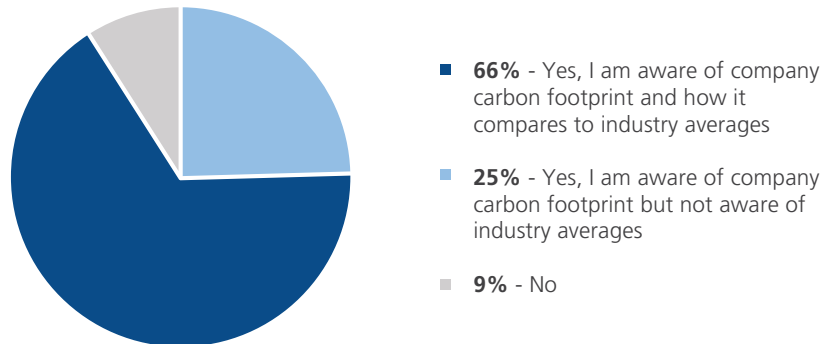
With this in mind, it is important to understand what challenges are most off-putting to businesses, which of the benefits outlined above are most appreciated and make businesses more aware of the potential solutions. With this knowledge, governments and businesses are better able to support the Net Zero ambition - through knowledge-sharing, enhanced financial support, improved market access, and other policy interventions.

In light of this, we undertook a survey of 77 Indian SMEs to find out what they are currently doing to offset their impact on the environment and gather their views on environmental issues and available solutions, to see where the greatest challenges lie, and, importantly, where they most need support and in what form.

The SMEs interviewed predominantly operate in three sectors: advanced manufacturing and engineering; ICT; and financial and professional services. These three sectors were selected to provide a range of manufacturing and services sectors in order to explore and compare the challenges that SMEs face as a whole and on a sector level of varying energy and industrial requirements.

We found that nearly all companies surveyed (91 percent) were aware of their carbon footprint, with 27 percent of them further aware of how it compares to their industry average. Greater awareness will help incentivise action, compelling companies performing worse than industry average to learn from their peers. For those performing better than industry average, it represents a chance to be at the forefront of industry change and a positive contribution to society.

Are you aware of your company's carbon footprint, and furthermore, how it compares to the average footprint of similar companies in terms of size and sector?

■ **66%** - Yes, I am aware of company carbon footprint and how it compares to industry averages

■ **25%** - Yes, I am aware of company carbon footprint but not aware of industry averages

■ **9%** - No

Sample size = 77 businesses

Figure 2: Employees' general awareness of their organisation's carbon footprint

It is well accepted that the world is not doing enough to mitigate and adapt to climate change. Similarly, we examined the obstacles that small and medium-sized enterprises (SMEs) encounter in their efforts to become more environmentally sustainable, and explored the most effective methods for surmounting these challenges.

For businesses in the manufacturing sector, the most significant factor is the cost of environmental technologies, commonly known as the "green premium", which demands higher costs in the short term while the benefits are realised over a longer term, hindering its adoption. For financial services and ICT sectors, this translates to forgoing short term gains associated with dealing with low-carbon businesses instead of carbon intensive businesses offering better immediate returns.

For aviation, which is currently responsible for over two percent of the global carbon dioxide emissions, the main challenge lies in trying to find an alternate fuel source that is cheaper, easily available and environmentally sustainable, the greenhouse effect of the industry needs to be controlled, especially as it grows to meet increasing demands. As organisations get conscious of their Scope 3 emissions, in order for the aviation industry to thrive, the carbon footprint per passenger per journey needs to drastically reduce. The UK is setting an example of the ambition needed to tackle climate change, and the Jet Zero strategy provides a clear path to building a greener aviation sector for generations to come . Government policies, ecosystem partnerships and advanced technology adoption are helping drive the shift to contribute to the economic and ecosystem prosperity in the UK.

We also found that a perceived lack of demand from consumers was another key reason for companies not taking steps towards being environmentally sustainable; it is ultimately the demand of consumers that drive business decisions. For as long as customers are willing to buy a company's products and services, there is less incentive for them to mend their ways and spend resources on going green in the present term.

Rank the following factors based on the level of difficulty they pose to your company's endeavours towards becoming more environmentally sustainable/reducing its carbon footprint, using a scale of 1 (least significant) to 5 (most significant)

Lack of consumer demand
Adhering to regulations
Availability of resources
Lack of knowledge of solutions available
Lack of staff knowledge
Cost/funding

0   0.5   1   1.5   2   2.5   3   3.5   4
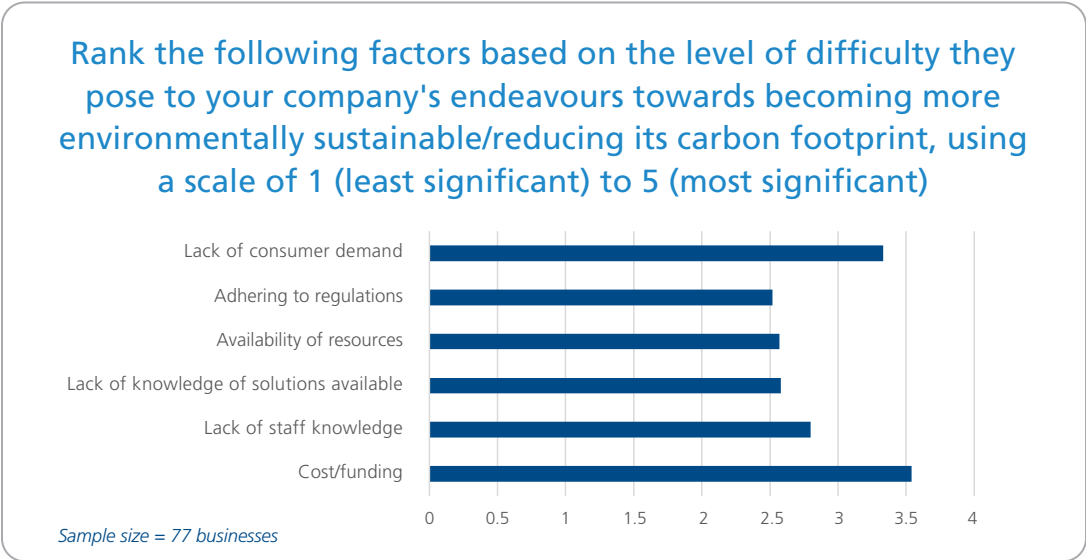
Sample size = 77 businesses

Figure 3: Factors obstructing adoption of sustainable practices

While these viewpoints may be logical now from a purely business standpoint, there are numerous studies that show that consumer behaviour is changing in favour of environmental sustainability and that it will be financially beneficial to adopt sustainable practices now.

If companies are to be prepared and ultimately sustainable in the face of climate change, changing practices now is likely to be more effective and financially-sound.

For example, acquiring solar panels now will save a firm money in the long-term through cheaper energy costs once the initial expenditure is cancelled. Support to acquire such cost-saving products in the first instance will be important.

Two other challenges related to knowledge and awareness – 1) staff knowledge of the significance of environmental degradation as a driving force to spur change, and 2) lack of awareness of the solutions that are available to make that change easier, cheaper and quicker, are further opportunities to develop.

For those businesses that are taking action to be more environmentally sustainable, or at least considering it, cost is the number one consideration when determining what action to take, whether it is a certain product or service, even more so than efficacy.

When considering products or services that can help your business to be more environmentally sustainable/reduce carbon footprint, rank the following factors on a scale of 1 (Less important) to 5 (Most important) when determining if you would use/be

Familiarity with the product/service
Simplicity
Efficacy
Cost.

3.65 3.7 3.75 3.8 3.85 3.9 3.95 4 4.05
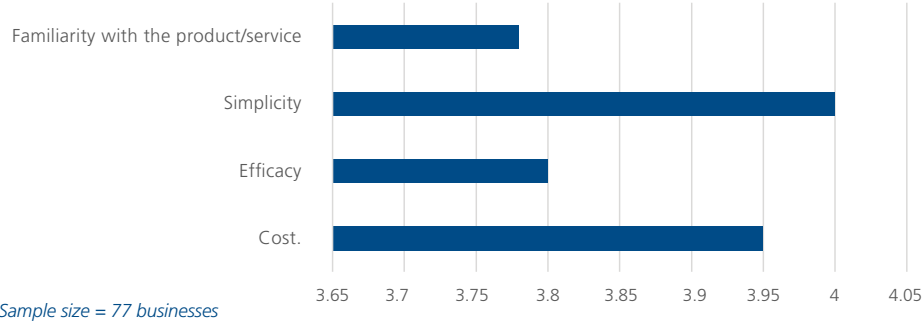
Sample size = 77 businesses

Figure 4: Factors influencing adoption of sustainable practices

Compare this with the benefits that businesses associate with being sustainable, and related decisions are largely based on economic concerns and outcomes, as the economic benefits and the ability to attract customers are the most widely accepted benefits of being more environmentally sustainable.

What do you understand to be the benefits of being more environmentally sustainable from a company perspective?

Other
Better employee engagement and satisfaction
Receive tax incentives / government subsidies
Legal and regulatory preparedness
Enhance brand recognition and image
Attract environmentally-conscious customer
Economic benefits

0% 10% 20% 30% 40% 50% 60% 70% 80%
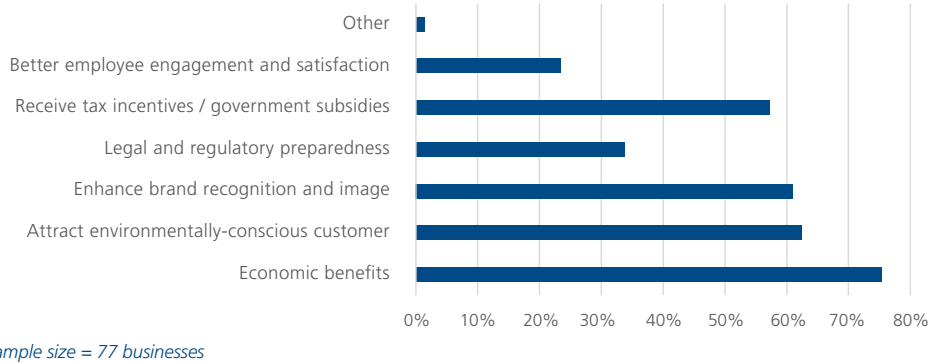
Sample size = 77 businesses

Figure 5: Perceived benefits of sustainable practices to organisations according to employees

While concerns around inflation and the global recession are forcing consumers to veer toward the lower priced items, many are trying to simultaneously balance their personal impact on climate change. People want to be more environmentally sustainability generally, but do not always have enough discretionary spend available to go the extra mile.

We see a similar trend among businesses, with only a lowly 16% of the businesses we surveyed having taken measures to reduce carbon emissions, including use of renewable energy and electric vehicles, showing that good will is too rarely translated into positive action.
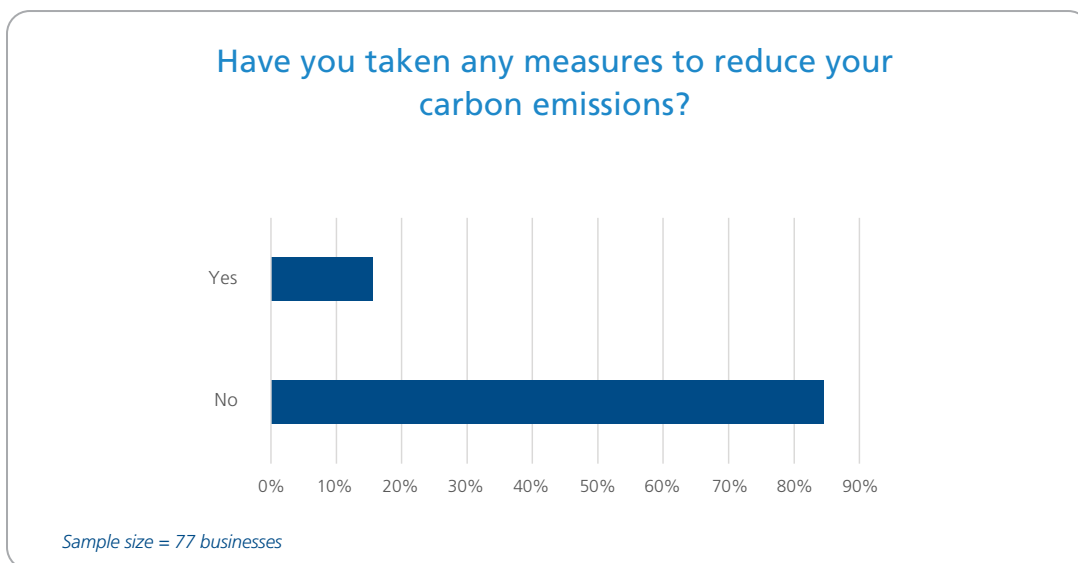

Figure 6: Percentage of businesses taking measures to reduce carbon emissions

According to the press information bureau of India, the Union Cabinet has approved India's updated Nationally Determined Contribution (NDC) to be communicated to the United Nations Framework Convention on Climate Change (UNFCCC). The updated NDC (though non-binding to any sector specific mitigation obligation or action) seeks to enhance India's contributions to the strengthening of the global goal towards Net Zero.

This will require businesses to reaffirm their commitment to work towards a low carbon emission pathway and take necessary actions to measure scope 1 (direct emissions), scope 2 (owned indirect emissions), scope 3 (indirect emission within a wider value chain) carbon emissions.

The views of the firms surveyed are in line with the wider thinking on the issue of climate change adaptation by industry leaders and experts. Challenges around lack of visibility into current carbon footprints, and hence no view of how to scientifically reduce it, lack of proven technologies at scale, difficulties with innovation and behavioural change, lack of carbon KPI integration in entire value chain process, and lack of skills and understanding of ways of working with clean energy are the top challenges. While there are technologies with the capabilities to meet growing demands, as on-ground practitioners, we see the other major challenge being the long and intense transformation journey to invest in and replace low-carbon ready assets.

The role of Digital Technology in Planet Conscious Solutions

Technology is already driving significant climate action, through renewable energy technologies for instance and electric vehicles, but to take a quantum leap in the fight against climate change, industry 4.0 can be a true gamechanger .

Many manufacturers have been exploring the adoption of emerging digital technologies in the Industry 4.0 era, such as Internet of Things (IoT), big data, AI, and 3D printing, for improving sustainability. Such digital technologies are widely acknowledged as a means to improve labour productivity, but their potential to improve environmental performance of manufacturing and supply chains has been underappreciated, and indeed underutilised.

> "
> Achieving net zero ambitions requires the ecosystem partnership coupled with technology and services to come together to guide enterprises in their journey towards building a promising future."
> – Monish Mishra, Head of UK&I Business, LTIMindtree.

LTIMindtree recently built a Digital Command and Control Solution leveraging industry 4.0 technologies to provide visibility into the operations of a Green Hydrogen Plant in India. The solution enabled remote monitoring and control of all services at the plant which helped optimise energy and operational costs and drive effective utilisation of resources such as solar energy and battery energy storage systems. The solution was equipped with tools to help reduce the plant's carbon footprint and improve operational agility, thereby aiding quicker adoption of new clean energy and improving environmental monitoring and reporting.

Ten years ago, a major fast moving consumer goods company launched a plan to become the world's most sustainable business and improve living for 8 billion people. To achieve this, LTIMindtree introduced an innovative solution called 'EcoDesign' to embed sustainability in product design. This online tool analyses and reduces the environmental and social impact of new products in real-time, and helps leaders make sustainable innovation decisions. The result was an increase in more sustainable products and a boost in sustainable business performance.

The Indira Gandhi International Airport in Delhi, built by LTIMindtree's parent company, made history in 2022 as India's first airport to be completely powered by captive solar plants and hydropower. In the UK, both Heathrow and Gatwick airports have been recognised for their commitment to reduce their carbon footprint, and going forward, have set tough yet achievable goals for themselves, such as ensuring all on-airport vehicles meet zero or ultra-low emission standards as in the case of Gatwick. The test flight of a low-cost, rugged and practical "electric sky jeep" was also completed successfully, giving wings to the vision of a sustainable future for the aviation industry [1].

Greater data collection, transparency, collaboration, control, analysis, and informed decision making will be hugely beneficial to reduce emissions and uphold reliable, energy efficient systems. Data can, for example, pinpoint exactly where emissions are produced in a system, and supply chain, thus help to identify the most tactical strategy to reduce emissions. Analytics can also be benchmarked for sharing with others, enhancing the ability to coordinate collective efforts. Technological advancements in AI and machine learning can maximise impact, increasing the scope, accuracy, and usability of data.

For a British multinational consumer goods firm, LTIMindtree built an innovative and path breaking digital solution to embed sustainability in their product design. This intuitive tool computes and analyses environment footprint (greenhouse gases, waste, and water) and social impact (nutrition, health & hygiene, and sustainable sourcing) of new product innovations in real-time, along with ways of reducing impacts. The scenario modelling capabilities allow R&D scientists to enhance packaging designs and formulate ingredients that are more sustainable and innovative, thus influencing the whole life cycle of products. The application not only facilitates optimising packaging, formulation, and consumer-use, but also enables the senior business leaders in their decision-making during sustainability innovation review. The outcome was a surge in product designs and innovations that were more sustainable than the products currently sold in the market, helping drive the company's strategy for a sustainable business that drives superior performance with waste impact per consumer use reduced by +32%.

> "Among other benefits, digital technologies can provide the data and tools to optimise energy efficiency of operations. They can track and promote transparent reporting across supply chains, and therefore help to make better informed decisions, and design and operate energy systems with reduced carbon footprints."
>
> – Kealan Finnegan, Senior Manager, UK India Business Council.

> "To compute for Net Zero, we need to put sustainability at the core of digital strategy and make carbon data pervasive by activating carbon KPI's across the entire value chain right up to the C-suite. If handprint and footprint feedback loops cannot be measured with accurate and timely data, it cannot be improved, then there is no sure way to get to where we need to go. Connectivity is key; Ecosystem Digitalisation and Open Innovation is key."
>
> – Anand Rao, General Manager and Managing Principal LTIMindtree Consulting.

A core focus of the Fourth Industrial Revolution has been to develop the tools, technologies and skills required to build a smart, connected, and autonomous ecosystem. As we reach a stage of maturity in that journey, the next focus is on developed and developing tools combined with human-creativity to build a sustainable, inclusive ecosystem, and creating a curated, personal experience for every user. Figure 7 illustrates LTIMindtree's Industry X.0 Framework that highlights the considerations to account for in an organisation's journey towards technology driven sustainability.

Key Tenets

| Improved Customer Relationship | Increased Productivity | Superior Design | Autonomous Production | Digital Control Tower | Sustainable Production |

Outcomes

Core Pivots

Strategy & Operations — *Connectivity* — *Technology & Operations*

| **Connected Customer** | **Digital Operations** | **Autonomous Production** |
| Leverage Digital CXM along with AI to provide real time progress visibility | Connectivity, Digital Twin and AI powered automation to reduce cycle times and improve quality | Self controlled, Self managed manufacturing to optimise material flows and production powered by AI and Robotics |

Foundational Themes

Data
Data Storage & Security

Communicate
Protocols, Connectivity & Data Transport

Edge
Sensors, Devices & Telemetry

Mind, Machine & Materials

Analytics
Edge/Cloud Analytics, Big Dta, AI/ML

Insights
Insights & Actionable Intelligence

Edge
Interfaces & Industrial Metaverse Applications
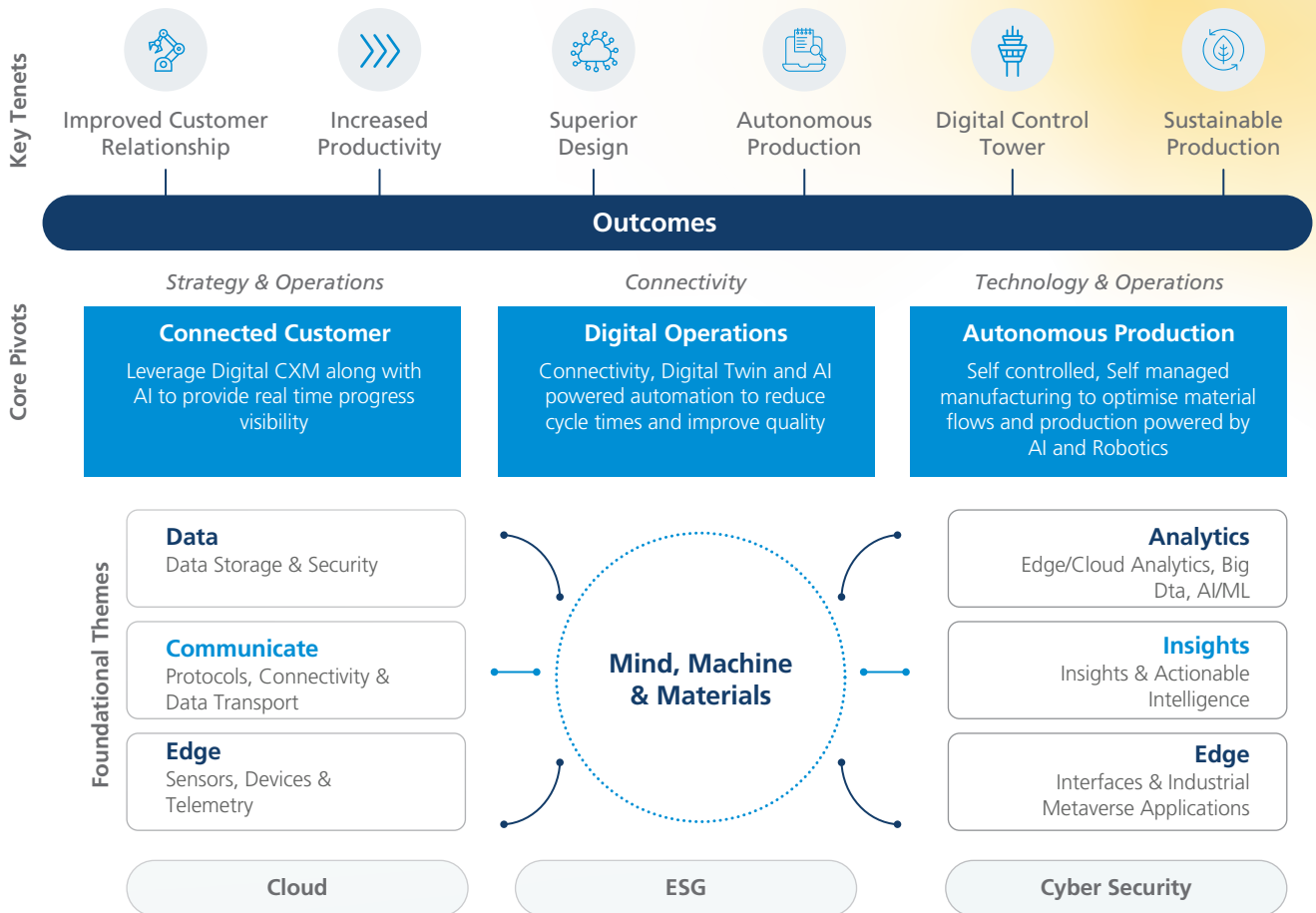
| Cloud | ESG | Cyber Security |

Figure 7: LTIMindtree's Industry X.0 framework

The achievement of net zero will also require businesses and wider society going back to the basics with a Reduce, Reuse, Recycle approach, aided by learnings from digital technologies. Regenerative, circular economy principles are key ingredients for this.

Reduce, Reuse, Recycle

Simple as it sounds, reducing consumption of resources and wastage in business and production processes is vital to achieving net zero. It is not enough to adopt renewable energy. There needs to be a simultaneous reduction in the consumption of non-sustainable resources, replaced by sustainable ones.

Carbon offsetting, which has long been seen as a solution to sustainability, is becoming increasingly expensive, and its effectiveness is facing scrutiny. Experts predict that the voluntary carbon market will have to expand substantially – 15-fold by 2030 and 100-fold by 2050 – for us to achieve net zero. The latest amendment to Article 6 of the Paris Agreement at the COP27 – the introduction of "mitigation contribution" as a new type of carbon credit - disallows companies that purchase it from claiming the emission reduction they represent offsets their pollution. This prevents the same emission reduction from being counted by two countries, propelling honest climate accounting and fewer loopholes for potential greenwashing. This makes it even more crucial for organisations to reduce, reuse, and recycle more, using a circular economy approach for long-term success.

LTIMindtree is supporting businesses of various sectors and sizes to deploy such models.

As a digital partner to a ~£100 billion global fast-moving consumer goods firm, LTIMindtree assessed the product supply value chain and developed a seamless, secure one-stop automated insights platform with abilities to evolve foresight indicators with AI and regenerative metrics as their business model evolves. The solution has helped business to identify products / stock keeping units in improving the overall recyclability scores in their journey to reduce the consumption of virgin plastic to 50% of their 2019 actuals by 2025, achieve 100% recyclability for all plastic consumed by 2025 and use at least 25% PCR (plastic made from recycled plastic which can be widely recycled) in their plastic consumption by 2025.

Recently, LTIMindtree developed an ESG analytics platform by leveraging conventional and alternative ESG data sources to assist a UK-based asset management company in aligning with ESG regulations (EU SFDR Level 1, TCFD, SASB). We analysed the company's ESG data (carbon footprint and greenhouse gas emissions) modelling in the enterprise data lake and developed a comprehensive ESG investment platform strategy for over 400 users. This resulted in a 50% reduction in time for data ingestion and report generation, as well as automation of ESG reports.

> " Developing Net Zero solutions is everyone's problem. These relationships with businesses and their ecosystem of partners, require co-creation and must be built on clarity, confidence and constant dialogue which enables translating ambitious commitments to action and together change the way the world does business.
>
> – Rachana Singh, Industry Associate, LTIMindtree

Considering the magnitude of the crisis we are facing today and the staggered pace of technological advancements to mitigate it due to the lack of resource investment in the right pools, we have no choice but to take a hard look at the gaps that need to be plugged and the best way to fill them. At the core of it, the problem is not in the lack of motivation to make digital advancements, but in the lack of proper incentivisation. The role of digital innovation and technology in solving our climate crisis is clear.

Governments set the policy agenda to enable a global move towards renewable energy and businesses need to incentivise employees to learn more about and practice sustainability.

Call to Action

It should come as no surprise that many organisations today are looking for realistic and effective ways to reduce their carbon footprints by aligning themselves with the principles laid out in this paper. However, this is an extremely challenging problem and is further complicated by the fact that each organisation and country's policies have its own idiosyncratic infrastructure and systems.

Many businesses are struggling to articulate meaningful climate-neutral strategies for their operations and are confronted with some level of "analysis paralysis" when it comes to defining, managing, and executing digital transformation programmes.

While companies are optimistic about their ability to decarbonise, there are several crucial factors which businesses should consider in order to develop and implement effective Net Zero strategies with digital innovation and technology.

The following list of recommendations sets out 10 key areas and objectives that businesses should incorporate into forward-looking strategies:

- **Recommendation 1: Build a purpose-driven organisation**
  A goal without a plan is just a dream. Ambitious yet achievable goals need to be set and metrics closely monitored to guarantee success. The business needs to invest in the upskilling of its workforce, enabling them to be better equipped to handle alternate technologies

- **Recommendation 2: Incorporate carbon into business decisions**
  Developing incremental strategies based on personas' decision-making objectives – user needs, end-to-end journeys, motivations, and goals, and requiring Carbon key performance indicators (KPIs) to be integrated in the end-to-end process.

- **Recommendation 3: Making carbon data pervasive**
  Reliable, integrated data regarding current carbon footprint across partners, applications, systems, and marketplaces, makes it possible to track, trace and reduce it. If a KPI cannot be measured, it cannot be improved.

- **Recommendation 4: Ensuring usability and alignment of Taxonomy data**
  Solving EU taxonomy, UK related-frameworks and providing them in the form of semantic data assets and graph models – ontologies, schematics, domain models, catalogues, reference and master data etc.

- **Recommendation 5: Onboarding the organisation for adoption**
  Difficulties with innovation and behavioural change to adopt a whole supply chain perspective, which requires the entire organisation to be activated, right up to the C-suite.

- **Recommendation 6: Computing for Net Zero**
  Exploration and adoption of technologies that have been proven to work on large scales and understanding of how clean energy can be harnessed and required to transform the core systems to support the organisation's digital agenda.

- Recommendation 7: **Building a culture of rapid prototyping and learning**
  Incrementally build the skills and resources to implement a full-scale programme and guide rapid testing and implementation of new processes and business models which needs to be compounded with speed of digitalisation leveraging advancements in the fields of Metaverse and Quantum computing.

- Recommendation 8: **Prioritising of technology spending**
  Develop digital strategies to outline investment cycles to replace the existing digital, physical, and emotional infrastructures within the firm. It is no longer a question of when these infrastructure changes, but how to assess their value returns.

- Recommendation 9: **Principles and ethics of human-machine collaboration**
  As data becomes more pervasive, it also becomes more susceptible to being abused. It is therefore important for policy makers to invest in technical experts and implement laws around data protection and ethical usage and it is for businesses to invest in a robust cyber security ecosystem.

- Recommendation 10: **Fostering ecosystem innovation and collaboration**
  For Net Zero to be achieved, the movement towards it needs to be a global phenomenon. Customers, Suppliers, Product Developers, Innovators and Policy Makers need to influence their respective organisations to create, collaborate and communicate with a sustainability-first mindset.

Such capabilities and competencies can accelerate companies' impact journeys towards Net Zero goals, preparing them for any unexpected regulatory changes, and in the process, benefit due to improved efficiencies and futureproofing business models and processes.

Recommendations for policy makers

Although businesses have the power to influence society, they cannot incentivise other businesses to do so in the way that Governments, as policy makers, can. Governments across the world need to provide clear pathways and a consistent taxonomy for sustainability policy and regulation across markets.

Enabling greater trade, investment, collaboration, and partnerships among industry will support the proliferation of technologies and infrastructure required to bring cleaner energy sources and sustainable products and process to the majority. Below, we set out five recommendations specific to the UK-India relationship to better enable the bilateral partnership to support both country's energy and sustainability agendas and be a positive force for global good.

- Recommendation 1: Widen access to finance and other support for the development of small-scale projects. Sustainability projects may have large capital requirements and a long break-even cycle, so require the support of bank financing at affordable rates. SMEs struggle with the financial costs of investing in environmentally sustainable solutions. Improving access to loans and grants will be needed in the short and long term. Recent financial investments announced at the UK-India Economic and Financial Dialogue are making progress in this area.

- **Recommendation 2:** Establish stable regulatory frameworks that encourage and incentivise sustainable investment and practices. Given the long-term nature of energy innovation, energy investment and energy infrastructure, stable policy and regulatory frameworks are essential to promote short- and medium-term behaviours. Policies should be designed to: ensure long-term energy security; make energy more efficient and affordable; and promote sustainable energy delivery and consumption.

- **Recommendation 3:** Foster collaboration between business, government, and academia. There is an urgent need for collaborative research projects on energy technologies that could deliver the step-changes in performance for sustainable global energy usage. Business will continue to play a significant role in finding solutions, within its sphere of responsibility and in collaboration with other stakeholders, but governments, business and civil society should also partner to leverage resources.

- **Recommendation 4:** Openness to free and fair trade. For example, to be a manufacturing hub, India will need to be part of international supply chains, which will mean importing as well as exporting. If tariffs make manufacturing in India too expensive, investors will go elsewhere. If India does choose to use tariffs, it should do so by signalling how tariffs will increase over a period of years. This would give investors the incentive to create an Indian supply chain and the time to do it. Likewise, the UK should continue to be welcoming of international investment and collaboration.

- **Recommendation 5:** Put sustainability at the heart of trade and investment strategy. If shaped properly, trading arrangements can help support the poor and protect the environment. Countries and trade blocs are cognisant of this fact and as such are increasingly integrating sustainability and human rights into their trade agreements and strategies. Environmental sustainability should be accounted for in the products and services that are traded and invested in. Finally, as well as fostering its own sustainable trade and investment strategy, India could use its global leadership role to encourage its international partners to do the same.

Conclusion

It will be vastly more expensive to mitigate the ill effects of climate change than to act now. Covid-19 has been a most recent case that allowed us to see the value of timely action, followed by cost-of-living crisis, and inflation, all of which require governments and business leaders to step up their climate commitments and increase the implementation of low-carbon solutions as a pathway to Net Zero commitments.

With industries contributing a great deal of the world's emissions, it will be vital that businesses play their part. Our research found that the top challenges among businesses to green practices is a lack of awareness, both on the negative impacts of climate change and related investor and consumer behaviour, and therefore the urgent need to be greener. For those businesses that understand this need, a lack of knowledge as to how to evolve. Other limiting factors include finances, particularly in the cases of SMEs.

In India, these problems are further exacerbated by limited regulatory pressures, opening the opportunity for a greater role of environmental regulations in India to push businesses to go green. On the other hand, the UK's Climate Change Act commits the UK government by law to reducing greenhouse gas emissions by at least 100% of 1990 levels (net zero) by 2050. The UK Government is shaping industry responsibilities accordingly, including requirements to disclose climate-related financial information. Our countries can share these learnings as policies and regulations develop.

In both countries, digital innovation and technology will be key to the transition through innovative products, processes and services. From enabling greater energy efficiency to the propagation of feedback loops and data analysis for more effective and efficient processes, technology is already contributing to climate action and green transition of industry.

The Fourth Industrial Revolution – the synergy and interactions between novel technologies such as 5G, the Internet of Things (IoT), artificial intelligence (AI), Robotics, Blockchain etc. – can take the transition to the next level. We highlighted examples where businesses are transitioning to greener processes and practices with LTIMindtree support.

India and other developing nations – often the most affected countries by climate disasters - need support from developed nations such as the UK to transition to cleaner energy sources and to strengthen the growing energy requirements that their growing economies demand, and indeed propagate sustainable practices more widely.

It is the sharing of such lessons and co-development of technologies that make the UK-India relationship so valuable. Our governments can work together to share knowledge and experiences on climate-related policies and regulations. Businesses and universities can work together to research and innovate and develop and roll-out climate-mitigating technologies. As the UK-India relationship grows and trade barriers fall, more businesses will be able to partner and collaborate across the bilateral corridor to these ends.

Authors

Monish Mishra is Vice President and part of Executive Leadership at LTIMindtree, driving growth of Service Lines and Strategic Engagements enabling a cross section of clients to drive digital transformation, Monish is passionate about driving revenue acceleration, improving cost efficiencies, capability creation and delivering to enterprises' ESG agenda. Monish is passionate about enabling an Innovation ecosystem transcending organizations fostering collaboration, and driving societies, businesses and governments to a cleaner, greener planet.

Anand Rao is a Consulting Practice Partner within LTIMindtree, where he leads an inspiring team of experience design, sustainability tech. and advanced analytics practitioners in reimagining, ideating and accelerating the execution of digital transformation initiatives aimed at enabling an economic and planet-viable ecosystem. Anand excels at successfully tying purpose-driven strategic thinking that imbibes 'Value at Scale' with practical execution that enhances the end user experience and meets the desired business goals.

Rachana Singh works with LTIMindtree's strategic clients in Retail &CPG. She has a strong foundation in Industry 4.0 technologies which she leverages to help her clients navigate short term challenges to deliver on long term opportunities. She is passionate about harnessing the power of technology to (a) help organizations embrace and progress in making sustainability an integral part their strategic decision making and business process and (b) help organisations re-engineer their business processes to address the looming climate emergency.

Kealan Finnegan is responsible for Policy and Advocacy and research at UK India Business Council, include conducting comprehensive research, writing informative reports and whitepapers, and managing advocacy campaigns. Kealan recently completed a Master's in International Development at the LSE and has an avid interest in sustainable development, including the green transition and environmental justice.

Appendix

Abbreviations

Term	Description
COP26	26th meeting of Conference of the Parties
COP27	27th meeting of Conference of the Parties
GHG	Green House Gases
IPCC	International Panel on Climate Control
NDC	Nationally Determined Contribution
ONS	Office of National Statistics
SDG	Sustainable Development Goals

Term	Description
SFDR	Sustainable Finance Disclosure Regulation
SME	Subject Matter Expert
TCFD	Task Force on Climate-related Financial Disclosures
UNFCCC	United Nations Framework Convention on Climate Change
WEF	World Economic Forum

Definition

Term	Description
Carbon Neutral	Any carbon dioxide released into the atmosphere from a company's activities is balanced by an equivalent amount being removed through offsetting and the purchase of carbon credits.
Circularity	The circular economy, or circularity, is an economic model that follows the three Rs: Reduce, Reuse and Recycle. It aims to retain the lifespan of products through repair and maintenance, reusing, remanufacturing, or upcycling.
Climate Neutral	Reducing all greenhouse gas emissions to the point of zero while eliminating all other negative environmental impacts that an organisation may cause.
Footprint	Footprints are the environmental and social impacts of the processes that sustain the ecosystem, either directly or indirectly through the supply of every good and service purchased or experienced by the customer or consumer.
Green Investment	Investment activities that focus on companies or projects committed to the conservation of natural resources, and aligned with environmentally friendly business practices
Green Premium	The additional cost of choosing a clean technology over one that emits a greater amount of greenhouse gases. Simply put, for example, the difference in cost between a product made with fossil fuels and it's sustainable alternative.
Green Transition	Refers to the period between now, when our way of life is unsustainable in the long term, and the time when our activity will not endanger the health of the planet.
Handprint	If Footprints are the negative consequences of all that it takes to sustain a business —the total planetary "cost" of its presence, then Handprints are the the positive changes that you bring into the world.
Net Zero	According to netzeroclimate.org, Net Zero refers to a state in which the greenhouse gases going into the atmosphere are balanced by removal out of the atmosphere.

References

I.   **IPCC, 2022: Climate Change 2022:** Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, B. Rama (eds.)]. Cambridge University Press. In Press.

II. **Climate Change Committee.** "Independent Assessment: The UK's Net Zero Strategy", https://www.theccc.org.uk/publication/independent-assessment-the-uks-net-zero-strategy/.

III. **PIB Delhi.** India's Nationally Determined Contribution (NDC), https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1847812.

IV. **World Economic Forum.** "Reducing the carbon footprint of the manufacturing industry through data sharing", https://www.weforum.org/impact/carbon-footprint-manufacturing-industry/.

V.   **Observer Research Foundation.** "India's international solar leadership; Walking the talk?", https://www.orfonline.org/expert-speak/indias-international-solar-leadership-walking-the-talk/.

VI. **LTIMindtree.** "Are You Ready to Embark on the Industry 4.0 Journey", Surbhit Arora, https://www.LTIMindtree.com/insights/blog/are-you-ready-embark-industry-4.0-journey.

VII. Delhi airport becomes India's first to run entirely on hydro and solar energy. https://www.hindustantimes.com/business/delhi-airport-becomes-india-s-first-to-run-entirely-on-hydro-and-solar-energies-101655883952841.html

VIII. Was COP27 the beginning of the end for corporate offsetting? https://carbonmarketwatch.org/2022/12/07/was-cop27-the-beginning-of-the-end-for-corporate-offsetting/