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Smart, Digital, and Intelligent Way of Scaling Up and Creating Value in Industry 4.0

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It has often been a journey rife with technology buzzwords, to catch up with the latest trend, but most enterprises have not been able to scale up and create value out of their I4.0 forays. The balance and focus has been difficult to achieve, while on one hand you want to extract the best out of your already existing last-generation CapEx, on the other, trying to optimize the OpEx without investing significantly on making the existing CapEx latest. There is a need for a comprehensive and scalable methodology that can guide enterprises in their Industry 4.0 journey. Wipro's SDI Framework defines a smart, digital, and intelligent way for enterprises to look at Industry 4.0 initiatives across industries, incorporating the latest in technology and processes to create value.

Why are enterprises not getting value out of Industry 4.0?

The Industry 4.0 paradigm is making enterprises rethink on how they respond to stay relevant and competitive. Enterprises are trying to re-invent business models, going from a product-based to an outcome-based or servitization-oriented model while simultaneously trying to optimize cost and efficiency. In the #newnormal, post pandemic, while the need for Industry 4.0 is gaining more steam, the perennial issue of not being able to successfully scale up is slowing the growth.

Scaling is necessary for getting value out of Industry 4.0. Getting a few PoCs right sporadically will not help to create value. It is like managing a small locality or neighborhood versus managing a countrywide program. Challenges and opportunities at scale are different and need to be planned and executed differently for the desired outcome. These are specific challenges enterprises face while scaling up Industry 4.0 programs:

- **Pilot hurdle.** Many enterprises are not able to move beyond a few pilots. Here technology has been the focus of the transformation programs in initial use-cases rather than the financial impact of the pilots. These enterprises took technology as the starting point for the pilots, and often these pilots fall short of the desired financial or business impact.
- **Scale hurdle.** Enterprises are not able to get benefits at scale. It takes an enterprise 5-10 years to realize the full benefits of the transformation program. Not planning for a long-term scale is a recipe for failure.
- **Existing infra or brownfield hurdle.** Many of these transformation approaches work for Greenfield projects. The reality is that more than 80% of facilities are brownfields. The life of some of the brownfield facilities can extend up to 40-50 years. The efficiency needs to be extracted from the existing Capex as well. The transformation should integrate options of managing the brownfield until phase-out and growing the Greenfield scenarios.
- **Technology hurdle** - One single technology implemented in isolation cannot help much in the transformation. The combination of many technologies allows enterprises to move the needle. For example, an enterprise can implement technologies such as process simulation and mixed reality separately but their combination augments the coverage and also helps address improvement in productivity and efficiency at scale. The whole is more than the sum of its parts. In addition, technologies will keep changing and evolving. The transformation should accommodate past, current, and future technologies to deliver the desired outcome.
- **Process hurdle:** Only technology upgrades cannot help transform if functional processes are not changed or realigned with technology changes. For example, if IoT identifies equipment failure in advance but the organization procurement policy takes three months to order and procure, there is no benefit for the enterprise from IoT. Similarly, if enterprises especially in aerospace, O&G, and the

marine industry need to implement additive manufacturing, they need to integrate digital inventory into their inventory and procurement process.

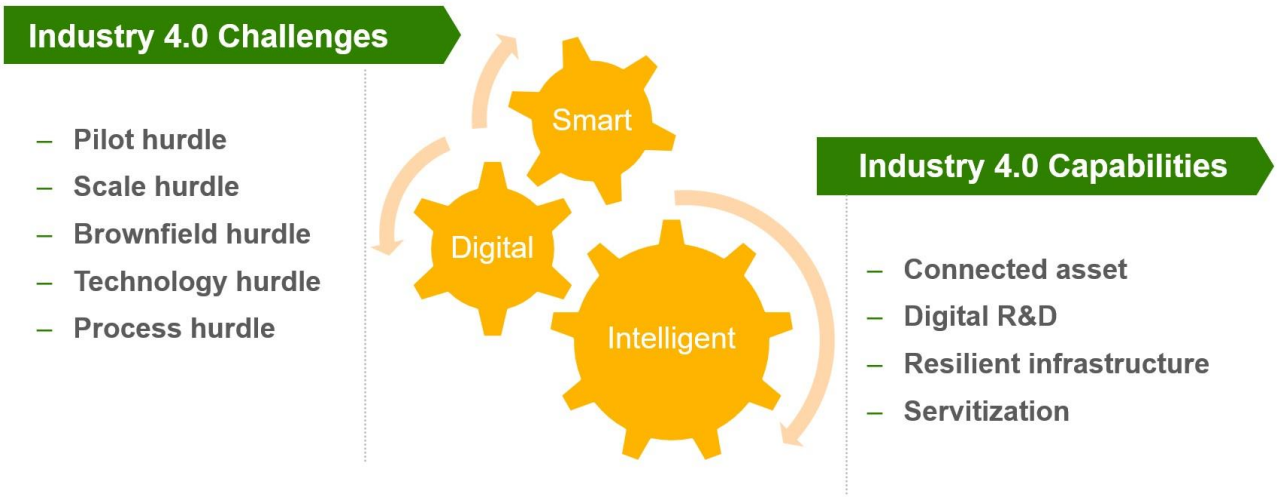
In summary, traditional siloed technology approaches at a limited scale ignoring the challenges of extracting efficiency in brownfield scenarios and integrating with processes is inhibiting value creation in Industry 4.0.

Smart, Digital, Intelligent (SDI) is the way forward to create value in Industry 4.0

Enterprises are finding themselves in a challenging situation where though Industry 4.0 potential looks promising, the current approach and outcomes are not instilling confidence. The boundaries of existing enterprise architecture and a piecemeal approach limit the scaling of Industry 4.0 initiatives. The enterprise architecture needs to be relooked along with the exponential technological advances to make it decision-oriented and market-facing. Apart from leveraging technological advances, enterprises need a scalable way to transform their enterprise architecture and facilitate Industry 4.0 initiatives.

The challenges discussed in scaling Industry 4.0 initiatives can be solved by SDI to create desired capabilities, as shown in exhibit 1.

Exhibit 1: Smart, Digital, Intelligent (SDI) Solving Industry 4.0 Challenges and Creating Positive Outcomes



Source: Wipro, EIIRTrend

- **Smart.** The fundamental principle here is access to information lying in different domains in manufacturing. It is about taking **control** of manufacturing assets and people in a smarter way and making a direct impact. It also involves relooking at the assets, people, and processes for productivity, efficiency, quality, and cost reduction. It may involve minimizing waste, improving energy efficiency, enhancing quality, increasing safety, bridging skill gaps, and driving innovation.
- **Digital.** The main principle here is the access to and use of real-time, free-flowing integrated information synchronized to events across different functions and business units. It is about the indirect impact on manufacturing processes, through **collaboration** with associated functions, both up and downstream. This information enables the reimagination of processes with real-time visibility and data analytics across the value chain. Data and insights become building blocks for process reimagination across the value chain while enabling efficiency and avoiding costly errors.
- **Intelligent.** The key principle here is transforming an enterprise into an insight-driven organization that can mitigate risks in complex and dynamic ecosystems. It is about augmenting decision-making by enabling cognitive enterprise and **optimizing** the economic impact on products, processes, and customers. Business outcomes can be improved with closed-loop intelligent systems. NPI cycles can be reduced, customer usage data and feedback can be incorporated, and product market share can be improved. It is a quicker automated turnaround of insights for critical decision-making on the economics of products and firms.

SDI methodology is about making the entire digital thread from “source to design to build to make to consume” synchronous in addressing the economics of the value chain. Beyond economics, all of these moves are aimed at one another important thing - making the enterprise’s transition from real-time/experiential systems to cognitive-based systems.

SDI methodology can create tangible desired outcomes of efficiency, flexibility, productivity, and quality. For the delivery of any outcome, there must be an augmentation of capabilities. SDI augments the following capabilities:

- **Connected Assets.** The backbone of all Industry 4.0 outcomes is the ability to make assets connected and intelligent. The connected assets can provide data and visibility, and can be controlled digitally and remotely. The related concept is the peaking of asset performance. It often relates to efficiency improvements or utilization of spare capacity as well as alternate ways of efficiently producing the same products.
- **Digital R&D.** The capability to develop customized products and solutions with the help of engineering and R&D. Engineering interventions are required for developing products in smaller lot sizes based on customer personalization requirements. Design for manufacturing is essential for

manufacturing productivity and efficiency. Some COTS Industry 4.0 solutions don't exactly fit customer needs and require engineering intervention to make them suitable to work.

- **Resilient Infrastructure.** Infrastructure needs to be modernized and smart to enable Industry 4.0, be it types of equipment, controllers, sensors, connectivity, or software, depending on requirements and budget. Based on the scale and scope of operations, it can be a smart factory, a smart utility, a smart airport, or a smart city. It is also about the flexibility of operations to change and deliver the desired product mix dynamically and efficiently and even serve customers of lot size one. It could be optimizing operations dynamically to take advantage of peak load and other operating conditions.
- **Servitization.** The servitization involves foraying into new business models, which product-based enterprises typically do not do in their usual scenario. The business model is transformed in making products as a service and selling products on subscription on some usage metrics instead of one-time payment. It includes moving from a produce-and-sell model to the complete lifecycle of produce, sell, install, operate, monitor, and service. The product lifecycle is replaced with a product plus a service lifecycle. This business model shift is enabled by technology and process transformation. It needs technology support and transformation in a heterogeneous, brownfield technology landscape of customers, which might even contain products of competitors.

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Wipro implements SDI with a comprehensive and scalable framework across industries

The biggest piece of the puzzle is how enterprises can implement the smart, digital, and intelligent way for getting value out of Industry 4.0 initiatives. Wipro has developed a comprehensive SDI Framework to help enterprises in their Industry 4.0 journey. Wipro does it flexibly and cost-effectively in a methodical fashion. Industry 4.0 is a long-term journey; a marathon where enterprises can start small but the direction and path to value should be clear.

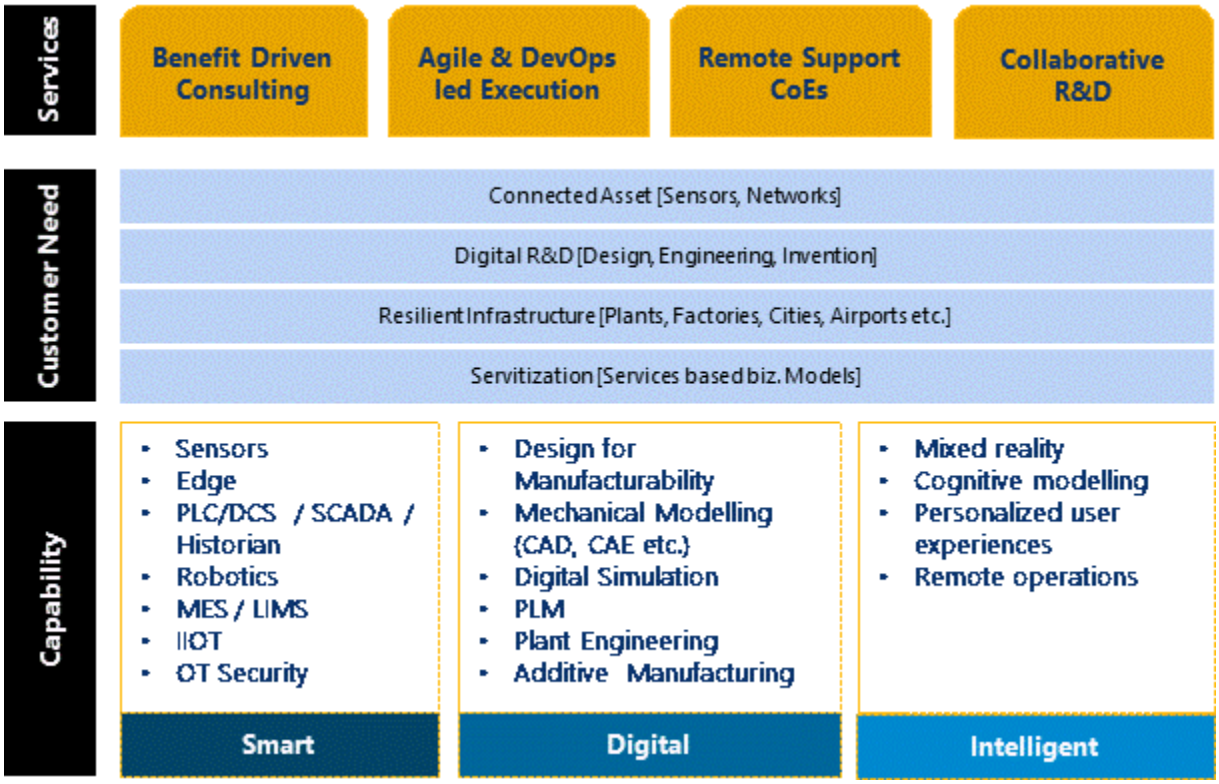
The key components of the SDI Framework are:

- **Benefits driven consulting.** Industry 4.0 initiatives need to be planned with scalability and benefits taken into consideration. The selection and prioritization of use cases are made, and the roadmap for scalability is drawn after factoring in organization constraints of budget, brownfield assets, timelines, etc.
- **Agile DevOps led execution.** Smart execution with cognitive-led automation to deliver benefits. The implementation needs to be agile and include automation wherever feasible. It should enable outcomes faster, better, and in a cost-effective way.

- **Remote support CoEs.** A network of CoEs across geographies to support enterprises. Be it getting the best cost support from offshore centers or customer-centricity from nearshore and onshore centers, Wipro has got you covered. During a pandemic or any other such situation, Wipro can offer entirely virtual and remote support and implementation.
- **Collaborative R&D.** Collaboration with partners is required across the stack to integrate market-ready, best-of-breed solutions while reducing time to market. Also, every company is unique and might need some specific solution or customization. It will require engineering and R&D expertise collaboratively with enterprise and technology partners. Wipro, with scaled R&D expertise and global partnerships, can offer these according to requirements.
- **Comprehensive technology offerings.** Wipro offers 20+ technologies to support Industry 4.0 programs. They could be provided as stand-alone or as part of a more extensive transformation program. The value of transformation is in combining technologies so that the whole becomes greater than the sum of its parts.

The details of the SDI Offering Framework are shown in Exhibit 2.

Exhibit 2: SDI Offering Framework



Source: Wipro

SDI is creating value and helping enterprise transformation in many industries. The common thread across industries is increasing digital acceleration, unlocking and analyzing data, and increasing investment in AI/ ML capabilities. These benefits alone should be a strong reason for enterprises to adopt SDI. Some specific SDI examples across industries are:

- **Manufacturing Discrete.** Manufacturing enterprises are shifting from a product-based model to an outcome-based model. SDI helps manufacturing enterprises accelerate this trend with predictive maintenance, remote asset management, robotic and process automation, and digital twin. Recently, within the lockdown period, for a European major, Wipro undertook a first-of-its-kind virtual commissioning of critical operations technology stack to help in the predictive maintenance journey.
- **Pharma & Medical Devices.** Pharma and medical devices enterprises are investing in leading-edge automation to improve new product development. SDI is helping pharma and medical device enterprises accelerate this trend with personalized healthcare, AI-based diagnostics, digitalization in-patient, process, infrastructure, etc. Wipro is helping leading medical devices enterprises take the journey of remote services platform combining cognitive diagnostics and the necessary infrastructure for digitalization.
- **Energy & Utilities.** Energy and utilities are shifting from maximizing production to monetizing data. SDI is helping energy and utilities become a data-driven enterprise with engineering information management, distributed energy management, digital twin, mixed reality-based training, and safety. Wipro has been at the forefront of adopting OSDU (open subsurface data universe) standards. We help develop a compliant platform, thereby providing timely assistance to companies sitting on difficult-to-access unstructured data or paper-based treasures to think big on operational drivers.
- **CPG & Electronics.** CPG and electronics firms are focusing on customer-centricity. SDI is helping CPG and electronics enterprises accelerate customer-centricity through experience personalization, diversification of supplier portfolio, digital warehouse, inventory management, etc. Wipro is helping the most popular Cereal-manufacturing brand standardize their digital platform across continents.

Bottom Line: Enterprise needs a compass to navigate their Industry 4.0 journey. SDI can guide enterprises for scalability and value creation in Industry 4.0

Every business is aspiring to deliver connected experiences, streamline operations, quickly launch new products and services, and personalize customer service. Industry 4.0 promises to deliver this. But changing

enterprise architecture with Industry 4.0 is a marathon and not a sprint. It requires futuristic planning and relentless execution. SDI can enable an enterprise to start their Industry 4.0 journey today, and help at every step until they scale up and realize value. The ease of scaling is significantly addressed by SDI, where the timeline is reduced by about 50% over conventional methodologies. Benefit-driven consulting ensures that there is stepwise ROI delivered within a conceivable time frame of 3 to 4 quarters and not in the distant future.

SDI is like having a compass on a long, fruitful, and transformational journey that guides enterprises and helps them stay on course. Needless to say, enterprises that develop and follow their Industry 4.0 compass will outpace their peers who don't!

About the Authors

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A seasoned professional with 20+ years of experience, Pareekh has seen the engineering and manufacturing industry from four perspectives: service provider, sourcing advisor, enterprise buyer, and industry analyst. Pareekh's expertise is in providing actionable insights by analyzing market trends.

He is regularly quoted in the media on engineering services, IoT, and outsourcing trends, including Harvard Business Review (HBR), NDTV, Times of India, Economic Times, Business Standard, Hindu, Business Line, Livemint, Financial Express, and Business Insider.

Pareekh is a thought leader, having authored various publications on topics related to engineering, IoT, and Industry 4.0. He received his MBA from the Indian Institute of Management (IIM), Bangalore, and his Bachelor of Technology degree from the Indian Institute of Technology (IIT) Delhi.

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Asish is a Digital Transformation Evangelist in the field of I4.0 with 20+ years of experience. He spent the initial years of his career in the O&G domain, in the areas of pre-commissioning, commissioning, operations & planning functions. Asish has been a Research Associate with IIT Bombay, in the field of Optimization & Simulation, working with leading Process Licensor UOP. He played a pivotal role in shaping and incubating the engineering business of TCS throughout his six-year stint with them. Before joining Wipro, he spent almost 10 years with Invensys / Schneider Electric, heading their Industry Solutions for O&G, Power. He also architected GTM policies for APAC & ME for leading Product portfolio in the Operations, Design & Simulation space.

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