Wipro's Smart, Digital, Intelligent Strategy

Transforming Industry while Addressing Global Sustainability

CIMdata Commentary

Key takeaways:

- *The industry 4.0 approach is gaining traction across industries. What started as a concept is becoming industrialized, as successful pilots transition to production.*
- *Pilot successes have been slow to evolve to operate at scale because true transformation requires people, process, technology, data, and profitability dimensions to be addressed across the extended enterprise.*
- *Wipro's **S**mart, **D**igital, **I**ntelligent (SDI) framework helps businesses get the full benefits of Industry 4.0 by bringing together the right business process, organizational change, and technology services and identify what to control (Smart), how to collaborate (Digital), and why to optimize (Intelligent) to ensure projects don't get stuck in perpetual pilots.*
- *Sustainability and greenhouse gas emissions are growing concerns worldwide. Wipro has applied the SDI framework to help customers address these global challenges by monitoring, controlling, and minimizing emissions as part of the digital transformation program.*

Introduction

Industry 4.0 began in 2006 in Germany and has grown over the years to become a global initiative. It is an industrial strategy often tailored to the needs of different countries that describes how connected manufacturing and commerce will function. It defines cyber-physical systems (CPS) that leverage the bidirectional connectivity of the Internet of Things to minimize waste while maximizing return on investment and organizational effectiveness.[1]

At the strategic level, Industry 4.0 makes sense and is compelling, but most industrial companies struggle to get beyond pilot projects. There are many reasons for such lack of progress and most fall into the categories of people, process, and technology. Changing established processes is hard, people resist change, and the technology is complex.

To achieve maximum benefits, Industry 4.0 must operate at enterprise-wide scale. If not, functional silos will continue to exist, return on investments won't meet expectations, and many processes will grow more complex when supported with limited automation and legacy approaches.

Wipro's SDI Framework

Wipro, a leading system integrator (SI), has created a framework known as Smart, Digital, Intelligent (shown in Figure 1) to support customers' digital transformation initiatives, including Industry 4.0.

[1] Research for this commentary was supported by Wipro.

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Figure 1—Wipro's SDI framework
(Courtesy of Wipro)

The "Smart" aspect focuses on transforming legacy equipment and devices into intelligent devices thus establishing control. By creating connected equipment, control and digital data exchange are established enabling automation. The devices, such as equipment and work cell controllers and robots, receive digital instructions and return data to provide status and support decision making. Edge computers can process data to derive insights to support autonomous decisions and offload data for deeper processing in the cloud. In the most forward-thinking companies these capabilities support closed loops among manufacturing, service, and product development, enabling improved productivity, quality, and enhancing designs.

The "Digital" aspect is focused on virtual product and process models, represented by digital twins. A wide variety of tools are used to model virtual products and processes, including mechanical, electrical, electronic, and software tools as well as recipe management solutions within food & beverage and many other process industries. Plant and process modeling tools are used to predict process and plant performance in discrete and process manufacturing. To be competitive, these modeling tools need to be managed and integrated. Configuration management, a core PLM capability, is critical to ensuring product and production definitions are accurate, complete, and synchronized to ensure everything works as planned and traceability is captured. Traceability, required for regulated industries, also helps minimize waste and uncertainty in all industries by ensuring data is properly managed and easy to find.

The "Intelligent" aspect of the framework leverages the inherent intelligence associated with "Smart" and "Digital" to provide context based on the embedded process. Wipro then applies advanced technology, including artificial intelligence and machine learning (AI/ML) to support cognitive modeling and augmented and virtual reality (AR/VR) to improve operations. The use of AI/ML to support cognitive modeling is just one of many areas where Wipro is applying advanced technology to support real-world business issues. Beyond technology, a critical aspect Wipro brings to an engagement is helping their customers develop strategies to meet business objectives and ensure their organizations can meet stated objectives. CIMdata sees Wipro's SI background as a critical capability to making a framework like SDI succeed.

Bringing SDI to Market

During CIMdata's discussions with Wipro, Wipro reviewed their approach to delivering SDI to market. Digital transformation has an enormous scope that can lead to "boiling the ocean", both within industrial companies and systems integrators, if projects are not well planned and executed.

While Wipro has the expertise and scope to provide support across most industries with solutions based on technology from all the leading independent software vendors (ISV), they

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have chosen to launch SDI, focusing on key industries and a small number of ISVs. Wipro could apply SDI and all the technology they support across all their supported industries but are currently focused on automotive and industrial discrete manufacturing and oil & gas operations and chemicals within the process industry markets.

Within these markets, the core strategies supported include connected assets, digital research and development (R&D), resilient infrastructure, and servitization.[2] These strategies complement each other and combine to dramatically restructure how businesses operate. Digital engineering creates the models needed to support digital twins. Using modern tools and solutions such as CAD, simulation, Model-Based Systems Engineering (MBSE), and PLM to develop and test models of products and processes, engineering becomes digitalized. Leveraging infrastructure including IoT, modern networking, the cloud, and the Internet ensures resiliency and enables operational data to be connected to digital twins, validating simulations, enabling condition-based and predictive maintenance, and supporting closed-loop digital engineering.

Connecting digital twins with physical assets enables new business models based on servitization. As asset performance is modeled, manufacturers can take on more responsibility for the asset including offering their product as a service. This allows customers to focus on the most critical aspects of their business (what they deliver to their customers) while having the in-use equipment operated by experts with a pay-for-performance model, thus improving efficiency. With this model, the equipment producer expands their revenue while optimizing equipment usage for total lifecycle cost rather than upfront market pricing, creating a win-win solution for their customers.

Making Industry 4.0 and advanced strategies such as servitization effective is not an out-of-the-box process. There are many variables beyond digital models and IoT that need to be understood and optimized. CIMdata has followed Wipro for many years and has observed their acquisitions, capabilities, and successes across industries applying diverse technologies and domain expertise. Making technology work at scale is critical to achieving acceptable returns on investment. To stay competitive and grow, companies need to address all the domains of the Smart, Digital, and Intelligent paradigm to enable a complete solution that is continuously improving as learning happens and market conditions evolve.

Applying SDI to Sustainability

Enterprises no longer have a choice about sustainability. Funding, market access, and even customer adoption are now influenced by an enterprise's commitment to delivering an ecosystem sustainable for current and future generations. There is growing evidence that climate policy is increasingly interwoven in trade policy. Businesses must transform to meet regulatory and market requirements fast enough to remain sustainable. With the post-pandemic new normal, where digital-first strategies are becoming more evident, sustainability goals must help define the targets for digital transformation. The adoption of digital technologies often lacked clear business linkages, and the ROIs were tough to justify. Still, sustainability policies, especially around greenhouse gas (GHG) emissions, are an excellent way to justify a digital transformation and track progress. It is therefore imperative that every aspect of the business, including digital transformation and engineering, be interwoven with sustainability initiatives.

[2] Servitization is the conversion of a product to an as-a-service business model

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Part of the criteria Wipro used to choose the initial focus of SDI was the sustainability aspect. Table 1 shows how Wipro categorized GHG emissions by industry. The Smart capabilities help organizations control operations and maintenance functions, while Digital capabilities enable collaboration throughout the organization and value chain. The Intelligent capabilities, meanwhile, help companies drive results through optimization.

Emission Category	World CO_2 Emissions 2020
Power	40%
Industry	23%
Transport	23%
Buildings	10%
Other	5%

Table 1—Worldwide CO_2 Emissions by industry
(Source: International Energy Agency[3])

The table above shows that industrial, transportation, and power production account for 86% of CO_2 emissions illustrating why Wipro chose those industries for the SDI launch. Factories are used across these industries, making them a perfect target for an Industry 4.0 approach. Wipro further detailed its SDI framework for sustainability to focus on

- Design, engineering, and construction
- Operations and maintenance
- Decommissioning, refurbishment, and reuse

For design, engineering, and construction, Wipro enables real-time visibility into the effects of changes on processes, equipment, and systems, improving efficiency by automating data exchange and avoiding mistakes caused by insufficient or inaccurate data. By aligning sustainability goals with the typical focus on efficiency improvement and waste reduction within operations and maintenance—a strategy that aligns well with lean approaches prevalent in modern manufacturing facilities—companies can leverage digital transformation to realize sustainability gains. CIMdata is impressed with how Wipro has applied SDI to the critical problem of GHG emissions and is looking forward to updates on their progress.

Conclusion

Industry 4.0 is rolling out across industries with mixed results. While the vision is clear, putting it into practice at scale continues to challenge enterprises. Companies often believe Industry 4.0 is about technology, but it requires much more. People, processes, technology, and data all need to be incorporated into the solution to succeed.

Wipro's Smart, Digital, Intelligent (SDI) framework leverages its skills in technology, process reengineering, and organizational change to help industrial companies achieve their vision of operating at scale with an Industry 4.0 strategy. Wipro has also applied SDI to sustainability, an area where CIMdata has ongoing research and a long-term interest. CIMdata believes a comprehensive solution such as SDI can have a real impact on digital transformation in the discrete and process manufacturing industries and is looking forward to hearing more about its application to sustainability issues. Wipro's SDI framework, size and global experience make

[3] https://www.iea.org/data-and-statistics/charts/global-energy-related-co2-emissions-by-sector

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them a prime contender for any company looking for digital transformation assistance, especially those who want to adopt an Industry 4.0 strategy.

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