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A Larsen & Toubro Group Company

Purpose-built ERP Solutions

The Cornerstone of Industry 4.0

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Optimizing the Value Chain with Smart Factories

Industry 4.0 has transformed the value chain, with technological innovations unleashing a combination of competitive attributes. The connected environment of 'Factories of the Future' leverages automation, agility, productivity, analytics, 24x7 access, and additive manufacturing, among others. Behind every successful innovation, there is technology at work, and Industry 4.0 has bridged industrial assets with multiple applications, in a virtual melting pot. This demands a technology backbone to handle the complexities to simplify the management and operation of Smart Factories. Purpose-built ERP Solutions like JD Edwards, with new functionalities and toolset, provide companies with transformative solutions to innovate in the digital space while offering manufacturers a platform to get the connected ecosystem to work flawlessly.

Transformative Innovation for the Breakaway Enterprise

Innovations are typically incremental, disruptive, or transformative, and Industry 4.0 is more of a combination of the various types of innovations. There are additional changes to existing technologies, there are disruptive changes through the introduction of an entirely new technology/application, and there is transformation achieved through single/multiple technologies at play. Even though the business landscape has moved from the 'winner takes all' monopolies of the past, competition is intense to the point that gaining a toehold may demand remarkable performances. Businesses, or more aptly the breakaway enterprise, achieve this by transforming through digitization, and 'Factories of the Future' usher in the most important dimension—innovations that are transformative in nature.

The difference between companies that succeed and the companies that do not perform as well, is attributed to many factors. However, one striking characteristic worth mentioning is the difference in investment in digital by leading companies.

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A McKinsey study reveals that 49% of leading companies invest in digital, while 90% of companies that do not perform as well invest considerably lesser. There is a clear connection between the strategies of leading companies and performance. A PwC survey indicates that companies expect digitization to help slash costs by as much as 3.6%, while boosting revenues by 2.9%. This clearly shows the connection between digital and performance.

'Digitizing the Core' for Industry 4.0

Integration of Operational Technologies, Information Technology, and the respective backbones is crucial to the successful journey of factories into 'Factories of the Future'. The technology/platform that bridges and creates the cyber-physical assets determine the capabilities and transformation that can be achieved through the convergence. Industry 4.0 demands a backbone that integrates cloud computing, big data, additive manufacturing, mobile and IIoT. '**Factories of the Future'** typically achieve transformation by 'Digitizing the Core', which helps achieve the following.

- Work with sensors, wearables, and mobile devices to capture and process data
- Assess suitability and skills of employees to take up job responsibilities
- Study, analyze, and predict trends in products, apart from predictive maintenance and pre-emptive actions to maintain consistent quality
- Automation of supply chains and processes related to ordering generation and fulfillment. Enhance customer satisfaction levels and meet expectations by monitoring workflows and movement of materials throughout the manufacturing process and the entire supply chain.

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Vertical and horizontal integrations

Various components of 'Factories of the Future' work in tandem to achieve transformation through innovation. For instance, a raft of technologies is at work in Smart Factories—ICS (Intelligent Control Systems), embedded software, IIoT, cloud, servers, robotics, cybersecurity. The whole idea of Smart Factories is to bridge various components in a single platform with vertical and horizontal integrations. This determines the success of the transformation across the value chain. Smart Factories are more of a blend of human input, and various levels of autonomous activities, that work in tandem to create seamless and efficient workflows, processes towards better business outcomes. Data captured from various components turn into valuable knowledge resources and information that help decision making. This demands a platform that captures, visualizes, and applies data from multiple processes, transforming the data in its new form as inputs that semi-autonomously or autonomously drive processes in various workflows.

Purpose-built ERP suites form an integral component in powering the factories of the future. ERP Solutions for Smart Factories create perfect interoperable conditions for different technologies to work together. For instance, the technologies that go into Smart Factories include:

- IIoT
- IT
- OT
- Cybersecurity
- Wearables
- AI
- Cloud
- 3D printing
- Digital twins
- AR, VR
- Rapid application development
- Systems integration
- Autonomous production
- Networking, communication technologies

This list is open-ended and can include new technologies as per the specific domain/products, for instance, Blockchain. A combination of some or all these technologies works to deliver the transformation that Industry 4.0 promises.

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JDE, Purpose-built ERP, facilitate multiple Industry 4.0 benefits

Pivotal to the whole transformation narrative is the need for integration – how all components are technologically stitched together to work seamlessly and in a streamlined manner. ERP Solutions such as JD Edwards with digital roots in application architecture used in various use cases, typically comprise many application modules that handle an extensive range of business processes. This delivers impressive capabilities to the Factory, taking it on the road to transformation. Popular benefits that Smart Factories leverage from purpose-built ERP solutions include:

- ## All-round access to assess the health of the factory from mobile devices

  Key personnel in factories need to be in control of operations and have visibility of the status of equipment. It would be hard to ensure the presence of key personnel on-site all the time. 24/7 access to data that offers complete visibility of inventory, equipment uses, equipment status, and order fulfillment by suppliers, helps plant managers to take the right decisions all the time. Advanced solutions now offer this capability on mobiles, permitting plant managers to get updates at the touch of a screen. Similarly, maintenance managers need updated information on various metrics that include equipment failure, pre-emptive maintenance, scheduled maintenance, availability of specialized crew, and actual performance. This helps to keep the wheels of production turning all the time, smoothly and seamlessly.

- ## Automated production lines

  IIoT and decentralized systems, subsystems work in a grid in Industry 4.0, thereby eliminating errors associated with manual processes. This helps improve productivity, throughput, and overall business outcomes when the connected factories work as a cohesive unit. Stakeholders get to handle the material handing over processes smoothly at staging locations and ensure that work orders are

completed as per schedule. Automated production lines come with automated quality control systems that ensure superior quality and tighter tolerance. The optimized use of materials and labor are a part of the benefits that accrue from automation. Maintenance woes impact routine operations in factories, and automated maintenance helps to track and monitor the status of equipment. This offers maintenance teams the inputs that are necessary to carry out pre-emptive maintenance and part replacements on time to facilitate uninterrupted operations.

Cloud deployment for greater agility

Benefits of the cloud mean many things for different entities. In the case of Smart factories, while all benefits work to the advantage of the factory, the standout advantages include agility, disaster recovery, flexibility, automatic updates, greater collaboration, and remote use. The cloud transforms factories into more productive and agile entities by facilitating the acquisition of additional capabilities, greater IT control, optimized deployment of resources, and seamless integration with Mobile, and IoT platforms. Data exchange and storage in cloud infrastructure and applications deliver multiple benefits to Smart Factories.

Transformation of data into knowledge for decision making

Data is the new oxygen is indispensable to Industry 4.0. The most valuable resource of any organization is not data in its raw form, but the critical thinking ability. Processing data achieve this and transforming the same into a valuable resource for decision-making processes. Data-driven analytics are powerful tools to transform operations in any organization, and it is no different in the case of factories. ERP Solutions facilitate faster and better decision-making ability through crisp data visualizations. Plant managers get to use data visualization to assess various metrics and take the right decisions. For instance, visualizations about the status of equipment, the shortfall in order fulfillment, the expected output, and available capacity in warehouses help managers to take instantaneous decisions that are data-driven. First In-First Out management of inventories, supply, demand, and procurement details are invaluable assets that help managers to manage operations in an error-free manner efficiently. Analytics of supplier history and various other parameters ensure that admin/back end processes and operational requirements are smooth and seamless.

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- **Futuristic additive manufacturing**

  This is one of the most exciting areas in "Factories of the Future," which are essentially a transformed stage of functioning and outcomes. Importantly, additive manufacturing is a shining example of how digital technologies can make a difference in the physical world directly. The absence of any special tooling requirements and the elimination of manpower-intensive, error-prone manufacturing methods is perhaps the biggest advantage of additive printing. ERP Solutions help Smart Factories capture data, transmit the same to 3-D printers, help in simulation, prototyping, and modifying to achieve the highest levels of accuracy and to meet exact requirements.

Convergence hinges on the digital backbone

Customized and personalized production helps achieve experience transformation, which is one of the most important requirements for any industry in a competitively surcharged ecosystem. Industry 4.0 is a multi-dimensional, multi-faceted convergence of technologies and processes which demands the use of an advanced ERP Solution that bridges various components seamlessly through vertical and horizontal integrations. For Industry 4.0 to transform the breakaway enterprise in an incremental, disruptive, or transformative manner, it is essential that purpose-built solutions become the backbone of the convergence.

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Rakesh leads the JD Edwards delivery for LTI. As an Oracle-Certified Implementation Champion, he is aSenior Program Director managing several Global Transformational projects. He has overall 34 years of experience, with 18 years in the IT industry, managing ERP projects and deployments.