

# Innovative Manufacturing: Building Resilience through Intelligence



## 1. Smart Manufacturing: Navigating the Digital Age



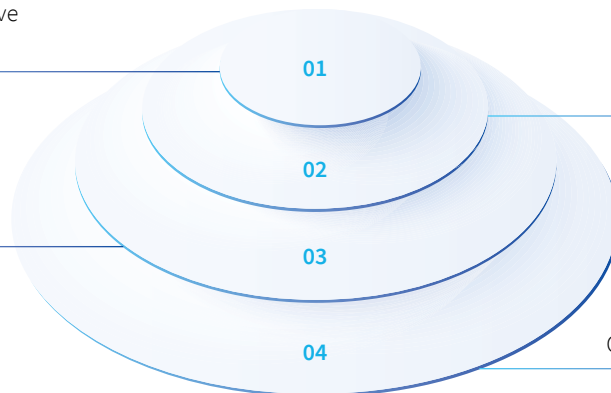
Interconnected, Data-intensive and Agile Environment



Seamless Data Integration



Cultivating a Culture of Innovation



Building an Agile and Customer-Centric Environment

At Deepak Group, we are undergoing a radical shift from conventional manufacturing to a highly interconnected, data-intensive and agile environment. This transformation is driven by digital technology growth, evolving customer demands and the need for heightened efficiency and resilience.

## Seamless Data Integration

Through smart sensor integration, we capture and communicate real-time data, ensuring a smooth flow of information across the organisation. This enhances visibility and fosters supply chain integration. As a part of continuous technology upgradation, the Company is participating in Industry 4.0, process of digitalisation in supply chain, demand forecast and pricing strategy.

## Cultivating a Culture of Innovation

Smart manufacturing at Deepak Group extends beyond technology adoption. We foster a culture of continuous learning,

innovation and cross-functional collaboration. Our employees are equipped with the skills and tools needed to excel in this new manufacturing landscape.

## Building an Agile and Customer-Centric Environment

Our vision for smart manufacturing goes beyond efficiency and productivity. We aim to create an agile, resilient and customer-centric environment. This transformative journey will significantly bolster our competitiveness, drive sustainable growth and position Deepak Group as a leader in the chemical manufacturing industry during the digital era.

## 2. Visibility and Integration: The Core of Our Strategy

At Deepak Group, we embrace visibility and integration as fundamental pillars of our smart manufacturing approach. These principles permeate every aspect of our operations, empowering us to achieve superior process efficiency, agility and resilience.

### Unleashing the Power of Visibility

Our unwavering commitment to visibility delivers numerous advantages. It allows us to quickly identify and address issues, minimising downtime and maximising operational efficiency. Furthermore, it provides valuable insights to our decision-makers, empowering them to optimise processes and drive continuous improvement.

### Creating a Synergistic Integration Environment

Integration is not just about connecting systems; it is about fostering a synergistic environment where information flows

seamlessly and operations are harmonised. At Deepak Group, our integration strategy encompasses both forward and backward integration, ensuring a coordinated ecosystem that supports our smart manufacturing goals.

### 2.1 Forward Integration

Our forward integration strategy encompasses a comprehensive approach to ensure the smooth and efficient delivery of our products from production to the market. Our primary goals within this strategy are to prioritise customer satisfaction, foster strong partnerships with customers and distributors and maintain a paramount focus on safety in product distribution.

Collaborating closely with logistics partners, we establish stringent safety protocols and utilise real-time tracking and GPS technologies to monitor the safety of product shipments and personnel during the delivery process.

### 2.1A Customer Relationship Management (CRM): Strengthening Forward Integration Strategy

Automated customer tasks,  
Enhanced engagement,  
Personalised service,  
Proactive communication

Integration of CRM  
with ERP system (Links  
customers order to the  
manufacturing activities)

Sending price quotes,  
Real-time about the status of  
their orders, despatch details  
and expected delivery times

Our forward integration strategy relies on a robust CRM system that serves as a central repository for customer data, preferences and purchase history. This integration allows for automated customer tasks, enhanced engagement and personalised service.

We have integrated our CRM with ERP systems which establishes a direct link between manufacturing activities and our customer requirements. When an order is placed, relevant details are

seamlessly relayed to the concerned department, enabling a swift response to market demand.

Our CRM system facilitates proactive communication with customers, providing real-time updates on order status, despatch details and expected delivery times. This transparency fosters trust and strengthens customer relationships.

### 2.1B Distributor Partnerships

Our distributors play a crucial role in our forward integration strategy. By fostering strong relationships with our distributors, we ensure an efficient route to market for our products.

Our integrated systems, offers real-time order management capabilities and relevant marketing materials. This not only enables our distributors to provide better service to the end customers but also allows us to manage our inventory more efficiently.

**Our forward integration strategy aims to streamline operations, prioritise customer and distributor satisfaction and enhance our competitiveness in the chemical manufacturing industry. Through leveraging CRM and fostering strong distributor relationships, we align production with market needs, improving efficiency and overall performance.**



### 2.2 Backward Integration

Deepak Group Company's backward integration strategy encompasses more than securing a consistent supply of high-quality raw materials – it enhances operational efficiency, safety and transparency in our chemical manufacturing processes.

To improve delivery times, we have implemented GPS tracking for raw material shipments. This real-time tracking system provides accurate location data, enabling us to monitor progress at every

stage of the journey. Such visibility empowers us to proactively manage logistical challenges, make necessary adjustments and avoid delays. It also enables us to provide our production teams with proper estimates of material arrival times, facilitating efficient planning and reducing the risk of production stoppages.

### Ensuring Safety at Every Step

Safety is paramount when dealing with hazardous raw materials. Our backward integration strategy includes comprehensive safety measures for secure transportation, storage and handling. Technology, such as sensors in transportation units, continuously monitors factors like speed, night-driving, sudden-braking etc. to ensure safe conditions. Moreover, safety protocols are integrated into quality testing and procurement procedures which protect personnel and prevent mishaps during the testing process in our quality labs.

We collaborate closely with suppliers, ensuring adherence to our safety standards through regular audits.

### 2.3 Driving Operational Excellence

#### 2.3A Auto Filling: Maximising Efficiency and Quality

At Deepak Nitrite, technology plays a pivotal role in enhancing operational efficiency, reducing costs and improving overall productivity through process optimisation and automation. Through the utilisation of digital tools and software solutions, we analyse, optimise and streamline our processes.

One of our successful implementations is ABB Auto filling, an advanced system that automates the loading of tankers with minimum human intervention, while strictly adhering to safety regulations. Seamlessly integrated with our ERP system, it ensures an automated process from billing to load management.

Auto filling is a key component of our optimisation process, streamlining material filling operations. By eliminating manual errors and minimising waste, it maximises throughput, leading to improved operational efficiency and cost savings.

To ensure precision and accuracy, the software incorporates intelligent sensors and measurement devices for material filling. This level of precision eliminates variations in fill levels and ensures consistency.

Safety is a top priority and the software adheres to industry regulations while implementing comprehensive safety protocols. By minimising manual handling and material spillage, the ABB Auto filling software creates a safer work environment for employees, maintaining compliance with strict safety standards.



### 2.3B Laboratory Automation

At Deepak Group, our Laboratory Information Management System (LIMS) plays a pivotal role in laboratory operations by enabling us to optimise our laboratory workflows, enhance data integrity, compliance and drive operational excellence.

This transformative solution revolutionises laboratory operations, data management and collaboration and empowers us to achieve greater efficiency and productivity. With the integration of LIMS, we successfully optimise processes, reduce manual errors and ensure high quality products delivered to the customers.

### 2.3C Supply Chain and Logistics Automation

In the dynamic world of supply chain and logistics, we utilise tEG as a transformative solution to address the challenges of managing complex networks, optimising operations and meeting customer demands. tEG Logistics planning and optimisation engines, powered by Cloud Computing, AI, ML & IoT, connect all stakeholders in a single platform with a multi-dimensional workflow. This enables the execution and optimisation of logistics flow, including services procurement, resource planning, allocation, despatch, in-transit monitoring, delivery confirmation and vendor payments.

tEG is tightly integrated with our ERP systems, generating alerts for exceptional incidents. Deepak Group leverages advanced supply chain and logistics software to streamline operations, optimise efficiency and deliver exceptional products to customers.

Our focus on efficient supply chain management, streamlined logistics operations, enhanced visibility and collaboration ensures we remain a leader in the chemical manufacturing industry. We continuously strive for excellence, providing superior value and service to our customers while maintaining a strong competitive edge.

### 2.3D Production Allocation and Hydrocarbon Accounting

We understand the significance of Production Allocation and Hydrocarbon Accounting in optimising resource management, ensuring accuracy and complying with industry regulations. By leveraging advanced software solutions, we streamline these processes, enhance operational efficiency and facilitate accurate reporting and decision-making.

Our PAR system seamlessly integrates with the ERP, collecting data through sensors. By integrating data from sensors, flow meters and production systems, our Production Allocation software calculates production volumes and allocates them to the appropriate assets, leases, or partners. This data-driven approach optimises resource management, facilitates decision-making and enables efficient utilisation of assets.

Deepak Group leverages Production Allocation and Hydrocarbon Accounting software to enhance operational efficiency and optimisation. This information aids data-driven decisions, process optimisation and loss minimisation.

Our software systems provide visibility into key performance indicators, such as production rates, downtime and hydrocarbon inventories. This visibility allows us to monitor and evaluate operations, identify areas for improvement and implement strategies to enhance efficiency, productivity and the direct push of production data to the ERP system.

Comprehensive reports on production volumes, revenue allocations and key performance indicators are generated by our systems. These reports offer valuable insights into operational performance, cost analysis and revenue distribution, facilitating effective decision-making at various levels of the organisation.

With a commitment to excellence and adherence to industry best practices, Deepak Group remains at the forefront of efficient production allocation and hydrocarbon accounting, driving value creation and operational excellence in the chemical industry.



### 2.3E Integrated Project Management System

We understand the importance of streamlined project management processes for project success and team collaboration. Through the Integrated Project Management System (IPMS), Deepak Group effectively collaborates with vendors & engineering partners to finalise technical specification, tracking project milestones and resources deployment.

IPMS implementation has helped the timely project delivery, adherence to budgets and stakeholder satisfaction. Through continuous process improvement and technology-driven solutions, Deepak Group maintains its position as a leader in efficient and successful project management and driving excellence.

### 2.3F Advance Process Control (APC)

We value Advanced Process Control (APC) for its ability to enhance efficiency, stability and performance of industrial processes. APC optimises operations, reduces costs and maximises productivity across manufacturing activities. By accounting for

process nonlinearities, dynamics and constraints. Deepak Group is implementing APC in the plant. The system is based on the AI and Utilising mathematical models and historical data, APC predicts process behaviour and adjusts control parameters in real-time, ensuring stability and preventing disruptions.

Real-time monitoring of critical variables enables APC to optimise performance and make timely decisions.

Deepak Group's commitment to leveraging advanced technologies for continuous improvement is reflected in the integration and implementation of APC.

## 3. Analytics

We embrace the significant benefits derived from analytics in driving organisational success. By leveraging analytics, we gain valuable insights from extensive data volumes, enabling informed decision-making, optimising operations and attaining a competitive edge in the market. Our commitment to innovation ensures the delivery of high-quality products and the achievement of operational excellence. Through effective data utilisation, we achieve increased productivity, cost savings and enhanced customer satisfaction, setting new benchmarks for success in the dynamic realm of smart manufacturing.

In the context of smart manufacturing, analytics plays a crucial role in capturing, integrating and analysing data from diverse sources, including sensors, machines and production systems. To facilitate this process, we have implemented IP21, enabling the efficient capture and analysis of our production data. This allows us to harness the power of analytics to drive continuous improvement and optimise our manufacturing processes.

Furthermore, IP21 stores historical operational data, allowing us to conduct retrospective analysis and generate comprehensive reports. This feature enables us to compare performance over time, track trends and perform root cause analysis for any operational issues that may have occurred.

### Predictive Analytics

Emerson's vibration monitoring system plays a vital role in Deepak Group's operations by providing regular health monitoring of single line equipment and other critical rotary machinery. We use condition-based predictive analysis and performing vibration analysis, Oil Analysis, Thermography, Motor current Signature analysis, corrosion monitoring and thickness Surveys.

With early detection and timely maintenance interventions enabled by predictive analytics, Deepak Group can ensure the optimal health and performance of its equipment, minimise downtime and maximise operational efficiency.