

## Manufacturing Strategy

Message from the CMO

**We are committed to shortening all manufacturing lead times to respond swiftly to change.**



**Hiroshi Yasuda**  
Executive Vice President, CMO

### Responding to Accelerating Environmental Changes

With growing geopolitical risks in various countries and regions, the strengthening of laws and regulations related to safety standards and carbon neutrality, and accelerating changes such as a shrinking workforce, it has become necessary to respond comprehensively, not only within our Company but also throughout the supply chain. For example, the development of HEVs requires a multi-pathway approach to continue the production of fuel system components, as the adoption of HEVs varies by region depending on national policies and the progress of charging infrastructure development.

In addition, in the key region of the Americas, where automobile demand is expected to remain strong and local production is projected to expand in response to tariff policies, there is a growing need for short production preparation times and labor-saving initiatives.

Furthermore, in India, strengthened safety regulations for protecting vehicle occupants are leading to rapid demand for airbags, and there is increasing need for rapid production startups that place the highest priority on quality. Addressing these challenges and meeting customer demand while continuing to strengthen competitiveness at the same time requires a timely response to changes.

### The Shortest Possible Lead Times

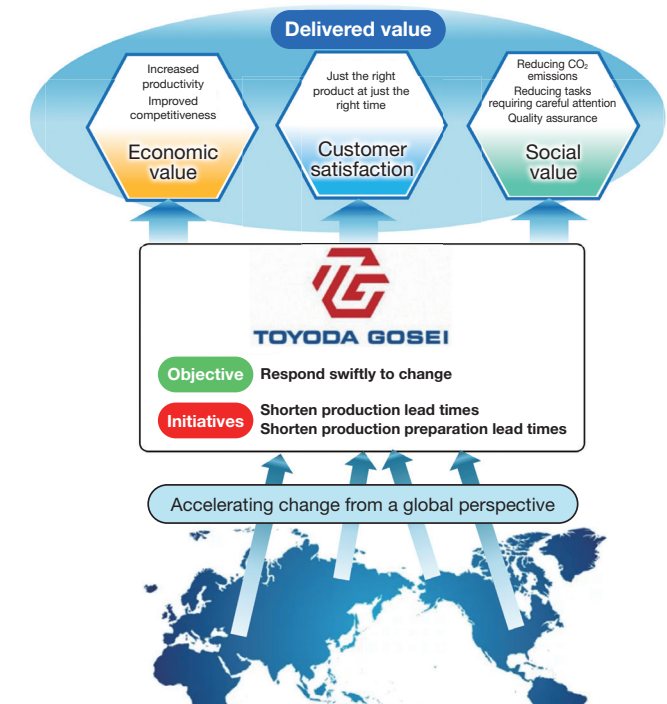
To achieve this, and to deliver high-quality products to all customers when needed and in the required quantities without being affected by environmental changes, we must remain committed to shortening both production lead times and production preparation periods, and rapidly launch highly agile production processes.

For example, in the Americas, by digitally implementing highly precise process and equipment design, robot simulations, and other measures in advance, we can reduce losses during actual process installation and achieve high-quality production readiness quickly with a small number of engineers.

We will realize this by thoroughly eliminating waste based on the Toyota Production System (TPS) philosophy, which we have cultivated over the years, and through groundbreaking new value creation and productivity improvements via innovations in production technology, as well as smart factories that combine the latest technologies for IoT and automation. In India, by utilizing IoT technology and traceability systems that produce and ship products to meet customer needs, we will realize a production system that can quickly respond to fluctuations while ensuring quality. This requires shortening lead times throughout the supply chain including suppliers and delivery destinations and building a connection between goods and information.

### Addressing Social Challenges

The benefits of our efforts to shorten lead times extend beyond improving productivity and strengthening competitiveness. Simple and streamlined processes that can instantly respond to changes create new value and help address social challenges, such as reducing the burden on technicians, minimizing energy consumption, and ensuring quality through data utilization. By realizing the TG Advanced Factory Concept, proposed last year, we aim to provide stakeholders with enhanced corporate value.



## Manufacturing Strategy

## Priority Efforts to Shorten Lead Times Using Production Technology Innovation

### Using In-mold Painting to Shorten Production Lead Times

By utilizing plastic injection molding—one of our core technical competencies—we have developed in-mold painting technology that significantly shortens lead times in our conventional process from molding to painting, realizes smooth decorative surfaces that cannot be achieved with paint, and reduces CO<sub>2</sub> emissions during parts manufacturing. Integrating molding and painting within a single mold eliminates conventional steps such as separate painting and drying, halving the number of processes, reducing the lead time by 80%, cutting CO<sub>2</sub> emissions by approximately 60%, and significantly improving the working environment for technicians.

In terms of quality, we realized a highly glossy decorative surface that is integrated with glass or other surfaces. In addition, by leveraging our proprietary mold design and equipment control technology, along with material development in collaboration with a paint manufacturer, we are able to apply this even to large, highly complex products. This technology not only shortens lead times but also contributes to carbon

#### In-mold Painting Product: Luggage Panel

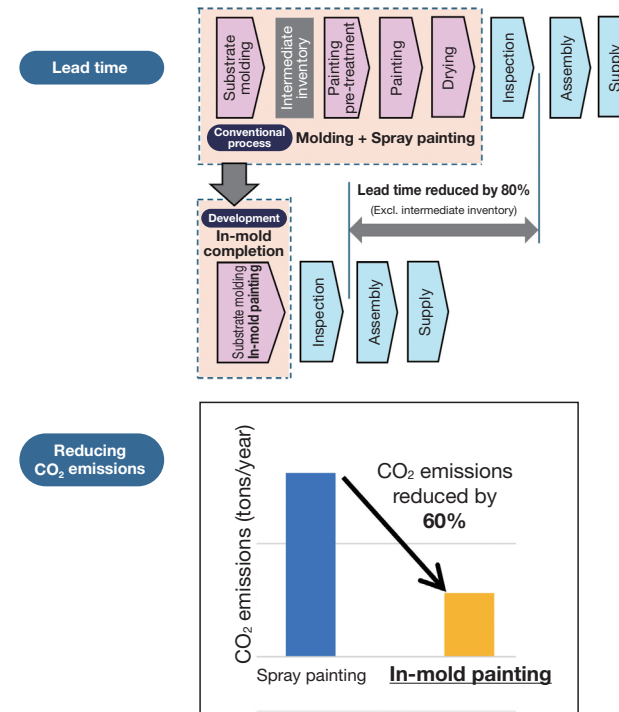


#### Vehicle installation location



neutrality, addressing a key social challenge while responding to the needs of all stakeholders.

#### Effects



### DX Technology Transforming Operational Processes

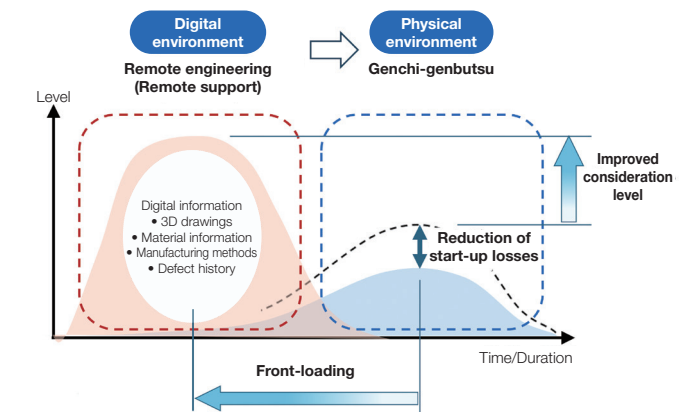
#### (Shortening Production Preparation Lead Times)

To achieve short, high-quality production preparation and continually improve competitiveness, it is key to conduct highly accurate validation from the early stages of development by utilizing digitized data and front loading in which confirmation and adjusting work are implemented ahead of schedule. This enables us to reduce startup losses such as adjustments and rework in the real environment while further enhancing verification accuracy using the resources gained.

In addition, by using 3D point cloud data of the entire plant to simulate process layouts and robot operations in a digital twin environment, we can verify work paths and cycles in advance and build agile processes.

These digital initiatives enable remote support for production preparation regardless of location or time difference, thereby shortening the production preparation period. Furthermore, by centrally managing manufacturing information on a common platform, production locations around the world can always make swift decisions based on the latest information. We will incorporate these activities into all processes, from parts procurement to mold and equipment development, manufacturing, and shipping, and promote the transformation of production preparation processes utilizing digital technology.

#### Transformation of the Production Preparation Process



## Manufacturing Strategy

## Building Advanced Plants with IoT and Automation Technologies

### Realizing TG Smart Factories

To produce and deliver a wide variety components in line with customer demand, it is essential to have plants that combine the latest IoT and automation technologies to enhance process agility, as well as plants that enable data-driven, preemptive decision-making and can swiftly respond to change. Since starting up a model smart plant at Miyagi Ohira Plant in 2022, we have introduced technology to our existing Seto Plant in 2024, and have been gradually expanding the expertise we have cultivated in Japan to address challenges facing global regions and production bases.

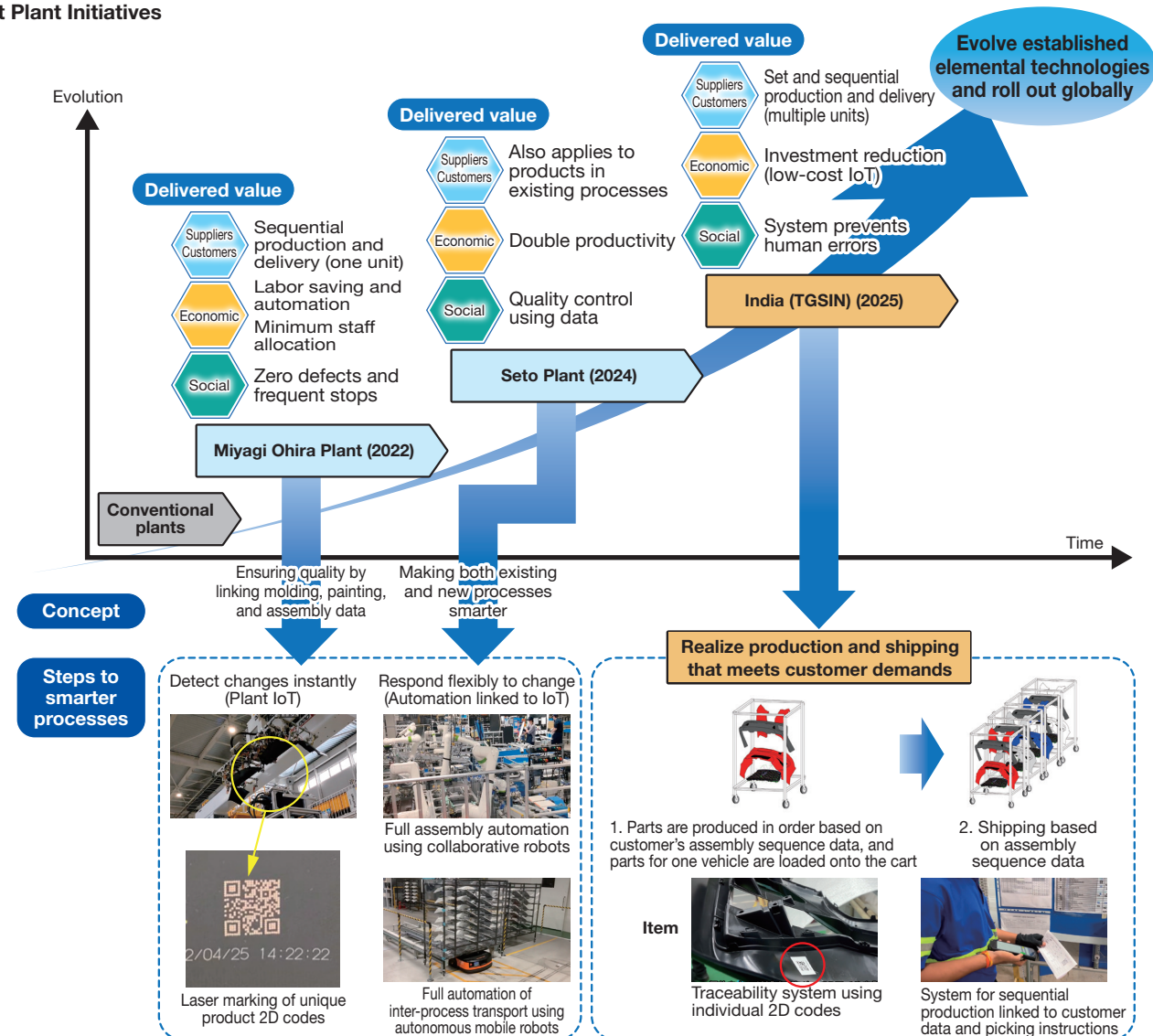
### Smart Plant That Contributes to Resolving Customer Challenges at Toyota Gosei South India (TGSIN)

When customers continuously produce vehicles with varying specifications, the exterior components produced and supplied by TGSIN, our subsidiary in the south of India, are large, and keeping all component types in stock would lead to wasted inventory space and inefficient transportation for both customers and TGSIN.

To address this challenge, we have developed an individual 2D codes traceability system that uses IoT technology to prevent color mismatches as well as a sequential production and picking instruction system using IoT technology, thereby realizing sequential production and delivery according to the customer assembly sequence. Through efficient production tailored to orders, we have minimized in-plant inventory for both customers and TGSIN, enhancing space efficiency. As a result, we achieved shorter total lead time and prevented human errors.

In addition, we reduced CO<sub>2</sub> emissions by lowering transport frequency, thereby contributing to solving social challenges.

### Smart Plant Initiatives





## Manufacturing Strategy

## Shortening Lead Times Across the Supply Chain

To respond swiftly to fluctuations in order volume and changes to specifications from our customers around the globe, it is essential that we shorten lead times across the supply chain, from procurement and transportation to assembly and delivery. To that end, we are coordinating with domestic and overseas suppliers to enable more flexible manufacturing to meet the delivery formats and timings demanded by our customers, while also reducing excess inventory and redundant work.

In addition, it is important to optimize the flow of information in line with the flow of goods. Digitizing information in the supply chain and sharing that globally in real-time enables everyone to make swift decisions based on up-to-date information.

In this way, we can optimize both the flow of goods and the flow of information, and establish a framework that enables our global production locations to work together as if they were a single plant, allowing us to respond quickly to customer needs anywhere, anytime.

Furthermore, through these initiatives, we will improve our production technology and realize higher quality and more efficient manufacturing, thereby delivering the benefit of shorter lead times to our customers.

### Manufacturing That Adapts to Change

