

## DX (TRX)



## Vision

## Accelerating value creation through DX connecting people and technology

### Refining TPS with DX ~Digital Business Transformation Through Data Utilization~

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in charge of DX



In advancing DX, our company takes a return to the fundamentals of the Toyota Production System (TPS) as our starting point. We aim to obtain necessary information at the appropriate time, determine what is normal and abnormal, swiftly investigate causes when abnormalities occur, and drive the improvement cycle. This applies not only to manufacturing sites but to all workplaces involved in development, production, and logistics, striving to enhance operational efficiency and enable high-quality work. We are committed to advancing the entire manufacturing process—not merely improving operational efficiency, but also ensuring product reliability through enhanced design quality precision, strengthening competitiveness by embedding cost control, shortening lead times from development to mass production through streamlined production preparation, and implementing leaner (waste-free and efficient) production planning and execution.

Based on this philosophy, we have established the following perspectives as the core pillars of our initiatives.

**1 Re-evaluate and radically overhaul business workflows**  
Re-examine and transform the flow of tasks and information: Does each task generate value in subsequent processes? What information is needed where?

**2 Build and enhance the data use infrastructure**

Strengthen master data management and data integration systems to ensure necessary data is available when needed.

**3 Streamline through standardization and automation**

Standardize repetitive tasks by formalizing tacit knowledge into explicit knowledge and automating them (automation incorporating human wisdom). This enables members to take on more creative tasks.

**4 Improve quickly and have flexibility**

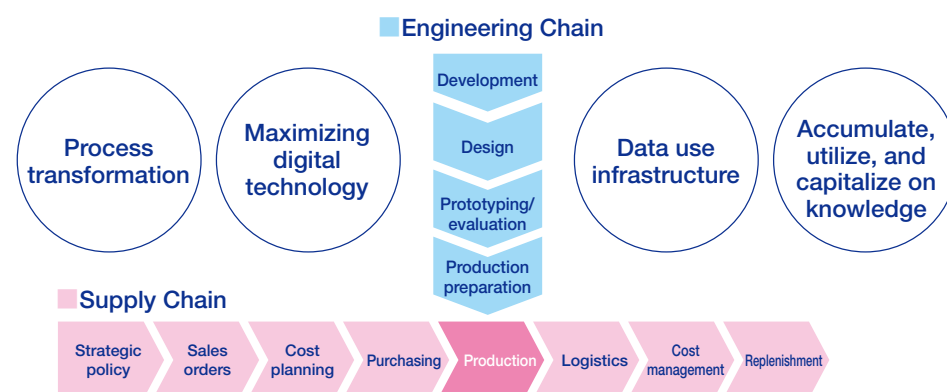
Test in small steps and accelerate the improvement cycle. Evolve beyond merely “visualizing” data to a form that is genuinely and effectively utilized on the front lines.

Citizen development using low-code tools has become more accessible, and generative AI continues to evolve at an astonishing pace year after year. It is crucial to properly benchmark and leverage these technologies. To that end, we will also enhance education on IT literacy and the effective use of generative AI.

Through these initiatives, we will vigorously drive forward the enhancement of corporate value and sustainable growth for the future, with everyone participating.

## Key Initiatives

### Company-wide DX Achieved Through the Integration of Engineering and Supply Chains



We are undertaking activities to fundamentally reexamine our manufacturing flow by integrating two chains and aiming for company-wide optimization through the renewal of business processes. By formalizing knowledge across the entire product lifecycle—from development to production and logistics—and establishing mechanisms for sharing and utilizing this knowledge throughout the organization, we strive to achieve both higher quality and faster speed in our operations. As a result, we aim for further improvement in QCD (quality, cost, delivery).

Within the engineering chain, building in “quality” as the source of competitiveness is paramount. By leveraging 3D technology between design and production engineering, and using digital technology to harness on-site wisdom and expertise, we produce superior product functionality and highly efficient, stable production processes. In the supply chain, we intelligently manage and improve “cost” by linking cost planning to cost control based on information from the engineering chain. We also enhance “delivery” precision by rapidly completing production preparations and executing efficient, waste-free production plans during mass production. Furthermore, we build a system capable of flexibly devising region-specific strategies based on data such as market trends and global production strategies.

## Four Foundations Supporting DX Advancement

To create a sustainable future, we position the following four elements as the foundations supporting DX advancement. At the core of these initiatives lies the concept of human capital management. We prioritize the growth and value creation of each individual employee to realize “value creation through the collaboration of people and technology.”

### DX and IT Talent Development

Enhance IT literacy and cultivate talent capable of independently planning and driving business transformation through low-code tools and data utilization.

### AI Utilization Platform

Build a foundation that continuously incorporates AI advancements to support operational efficiency and deployment across products and production processes.

### Data Use Infrastructure

- Establish an infrastructure for integrated data management that ensures quality and security
- Enhance decision-making through timely information provision

### Organizational Culture Transformation

Foster a culture that values transformation, cultivating talent and organizations that embrace a mindset of challenge and proactively drive improvement.

## Human Capital Management

## Example of DX Use

## Reducing production setup lead time

During the production preparation stage for parts, we utilize 3D/3DA\* data to achieve automated dimensional measurement and automated report generation. We standardize and automate tasks prone to variation, accumulate high-precision data, and analyze it using AI. By feeding this back into the next model's design, we improve the precision of the first-time molds and move away from the traditional trial-and-error process. This contributes not only to stabilizing quality but also to shortening development time.

While envisioning the future ideal of automated mold design, we are currently making steady progress.

\*3DA: abbreviation for “3D annotated”; refers to 3D data with added manufacturing information such as dimensions and annotations

## Digitization of Production Performance Data

The task of compiling production results based on paper forms had become a burden on the workload at the production site.

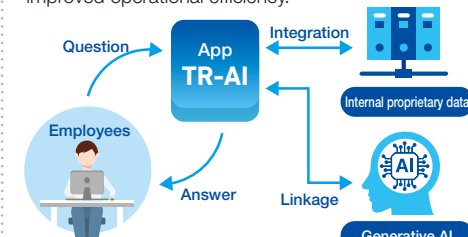
We have now established a system that enables real-time digital acquisition and sharing of actual data, allowing managers to focus on improving quality and productivity. Through these efforts to connect the production site and management with data, we are expanding the scope of data utilization.



## AI Utilization in the Technical Department

We have begun implementing a system where generative AI learns from accumulated in-house design requirements documents, design know-how, and case studies of past failure. This enables the AI to instantly provide expertise addressing technical challenges faced by designers.

This eliminates the need for designers to manually search through vast amounts of documentation. It has established a process where designers first organize their own concepts before consulting their supervisors, leading to faster decision-making and improved operational efficiency.



## Design Process Reform

## The Challenge of Passing Down Technology and Driving Developmental Innovation

**Toshiki Nogami**

Corporate Officer  
In charge of Design  
Process Reformation

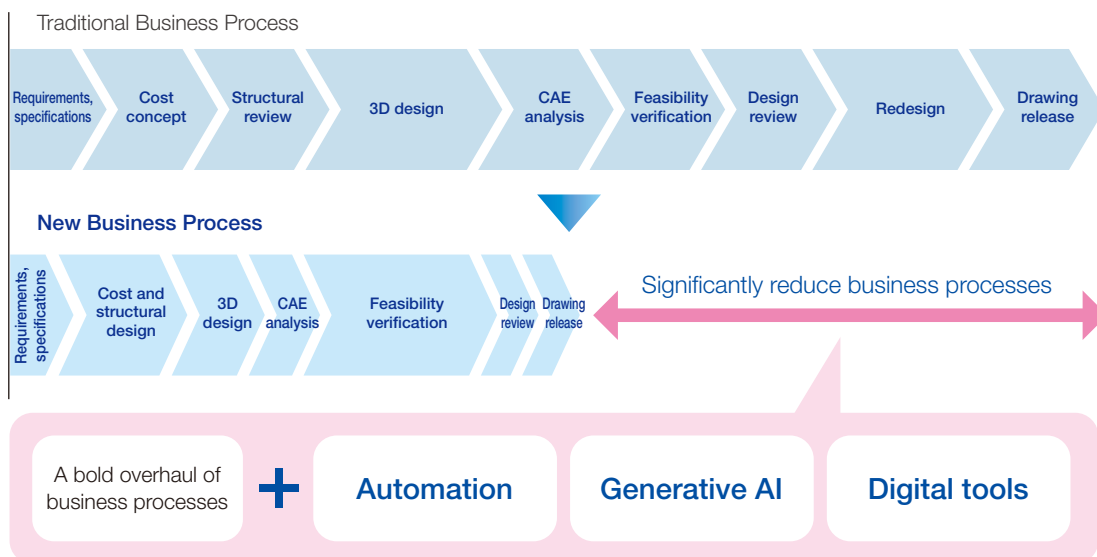


Our development is entering a major transition period marked by increasing product complexity, accelerated development speeds, and generational shifts in our workforce. In this environment, formally documenting the expertise held by veteran engineers and integrating it with digital technology is a critical key to strengthening our future competitiveness.

Current design sites reveal numerous challenges stemming from inadequate knowledge transfer mechanisms. These include time-consuming searches for design documents; design reviews that are overly dependent on individual expertise, making it difficult to incorporate company-wide insights; and inexperienced designers unfamiliar with manufacturing processes repeatedly making mistakes, leading to persistent rework.

Therefore, based on the principles of the Toyota Production System (TPS), we are reorganizing the flow of physical items and information. We are boldly reexamining business processes that have become entrenched as sacred cows through long-standing habits, thereby establishing the foundational infrastructure necessary for digital adoption. By integrating digital technology onto this foundation, we are building an environment where design information can be reflected in downstream processes in real time. We are also advancing the creation of mechanisms that leverage generative AI to support junior designers, enabling the immediate incorporation of past knowledge. We will start by conducting trials on a small scale, aiming to evolve away from the traditional development style involving design changes and toward a development culture that builds mass-production quality without rework.

### Resolving business process challenges through digital transformation initiatives



We are promoting “automation” that starts with a bold reexamination of business processes, thoroughly entrusting machines with tasks that do not require human intervention. By digitizing design requirements, manufacturing requirements, applicable regulations, past failure cases, and the wisdom of veteran engineers, and actively utilizing generative AI, we support high-precision design. This enables product design that balances quality and cost, reduces development man-hours by minimizing losses from redesign, and simultaneously achieves both quality and cost objectives. Simultaneously, we provide designers with hands-on experience in manufacturing environments to instill a production-side perspective. By redirecting limited development resources toward higher-value creative processes, we aim to enhance overall development productivity and competitiveness.