



Mitsubishi Heavy Industries Constructs Digital Transformation with Looker

It is no exaggeration to say that Mitsubishi Heavy Industries, Ltd is a company that built the history of Japan's manufacturing industry. The company is constructed of three main business domains: the "Power" division that manufactures nuclear and thermal power generators, the "Aviation/Defense/Space" division that manufactures aircrafts and rockets, and the "Industry & Social Infrastructure" division that manufactures machinery from shipbuilding to chemical plants and beyond. The group's consolidated net sales exceed 4 trillion yen (\$37 billion USD).

The rapid global digitalization era that organizations are navigating today poses huge challenges for a heavyweight manufacturing business. The Digitalization Promotion Group at Mitsubishi Heavy Industries has taken on the task of designing how the company can overcome these challenges through digital transformation. Until March 2020, this group was under the management of the Business Strategy Team within the domains of Industry & Social Infrastructure. From April, it reports directly to the CEO as the Development Promotion Team, and works to promote digitalization of all companies. We asked Mr. Kentaro Kawaguchi from this group about digital experience (DX) in the manufacturing industry and the role Looker has in it.

Improving customer lifetime value

At Mitsubishi Heavy Industries, one of the long-term business goals is to create a comparable balance between assets, sales, and market value. Within this scope, Mr. Kawaguchi had been given the project to improve business development and profit stability by digitalization.

In the past 10 years, Mitsubishi Heavy Industries has worked on splitting up the company structure to a

group of around 20 companies, all controlled by the head office. Digitalization of each company is managed by Kawaguchi's Digitalization Promotion Group at the head office. Many industry resources such as the main product machinery have a relatively long product life of 20 - 30 years. As emphasis was put on profits at time of sale, the main issue in regards to improving customer lifetime value lay in the sub-par quality of services beyond that point.

"For example, it was common for us to take one week to respond to a customer inquiry or a parts order for machinery," explains Kawaguchi. "If digitalization can resolve these issues, we felt that we could improve customer lifetime values in aftercare services."

The nature of IoT is in SoE, not SoR

An important business resource in industry material business comes from IoT that obtains and utilizes data from active machinery.

Every company that manufactures and sells machinery has a general roadmap to achieve digitalization, however, they are still at the trial and error stages when it comes to a detailed plan as how to incorporate it into its business. This is where Mr. Kawaguchi's team receives inquiries on "how to proceed with IoT."

The biggest challenge with IoT in a manufacturing business is that many people often misunderstand IoT for SoR (System of Record); that IoT is about accurately recording machinery data. It needs to be emphasized that there is no successful business without the SoE (System of Engagement) concept, which not only focuses on obtaining data, but also orchestrating the entire customer experience until the obtained data reaches the user.

One example of this is Mitsubishi Heavy Industries' industrial machinery dashboard. Built with Looker, this is a product that collects data obtained from various sensors installed on machinery to PLC (Programmable Logic Controller), uploads it to the database via edge device, then processes and visualizes it. The dashboard indicates information such as production quantity and speed, operation rate, and errors.

To offer a system with a SoE approach, there needs to be an infrastructure that is more than a dashboard, but with a dedicated customer portal that acts as the communication tool with customers, CRM, data management of delivered products, user authorization, and a data collaboration platform.

Currently, Mitsubishi Heavy Industries has an initiative for Sol (System of Insight) under way that attempts to further analyze data to gain insight. A platform to visualize and study the analyzed database is currently under development, and Looker will be incorporated in this process as well.

"It is also our job to redesign such business strategies. By researching customer pain points, identifying which pain points could be resolved to improve the business, and planning a resolution, we are then able to implement these factors in digitalization," shares Kawaguchi. "Our basic approach is to use SaaS, PaaS, and IaaS as much as possible. This allows us to use resources for development rather than in maintenance operation, and to be self-sufficient in development. The high compatibility with Looker offered in SaaS is a great advantage."

The objective of digital utilization is not in building an IoT system. The true objective is to create new value by using data to understand the operational status of the machinery used by a customer.

Before IoT, the only source for this information was communication between the sales representative and

the customer. However, with IoT inspection based on data is now possible, helping to automate and streamline this process. Mr. Kawaguchi's team carries out exploratory analyses on how data should be utilized, and presents insights while supporting business divisions with various experiences and cultures.

An organizational design that promotes DX

Mr. Kawaguchi's group is responsible for both the architectural aspect of designing the entire DX structure, as well as the engineering aspect for its implementation.

It can be imagined that conventional methods, thought processes, and the business culture of a machinery manufacturer would be different to those derived from an IT business. To fill the gap of such cultural differences, what approach is taken in organizational design?

What stands out is that Kawaguchi's digital team is not part of the data system department. This allows the digital team to take the lead in their projects. An important weapon here is the Digital Promotion Group's in-house engineering team.

To offer a valuable customer experience, there needs to be a quick turnaround of the PDCA process, where a product is manufactured, customer feedback is obtained, and modifications are made promptly. In-house engineering is essential in this process.

"Our team is unique in how we do PoC; we take care of everything and test the result," shares Kawaguchi. Our system and approach are non-conventional, so we need to change the cultures of individuals involved. We strive to move things forward using these four steps: 'learn' (Learning Style), 'try' (Engagement Style), 'lead' (Leadership Style), and 'show' (Communication Style)."

Instead of outsourcing to a vendor, Kawaguchi's team creates a data platform in-house, visualizes data with Looker, and presents detailed case studies. This strategy gradually permeates the understanding within each company.

Using Looker to share visualized data with everyone

An important key in building a corporate culture is the system of "sharing". Even with visual operational status of industrial machinery data from IoT and its exploratory analyses, there must be a dashboard that displays such data to business divisions and customers.

"Originally, the intention was to display data to customers also by using a BI tool, but there were critical issues regarding speed and display restrictions. Multiple BI tools were tested, but from the viewpoint of exploratory analyses tool features, data governance controls, and the ease of Slack collaboration, we decided to use Looker," Kawaguchi elaborates. "In addition, we use not only BigQuery but also Amazon Redshift, so we needed multi-cloud compatibility. We anticipate using various SaaS in the future, so it was important that there were no limits in data coordination."

Finding pain points for both the business division and customers

Mr. Kawaguchi states that in order to promote DX, a diligent task of understanding the frontline is crucial; therefore data platform maintenance is important. For instance, if a customer's pain point is "a slow response," the company's pain point may be "a lack of time due to paperwork."

In order to visualize the problem area, Mr. Kawaguchi's team currently also incorporates NPS (Net Promoter Score), a client loyalty evaluation index. By digitalization of various items related to business tasks, DX can be promoted even for a manufacturing industry giant.

"Behind every customer pain point, there must be a business pain point. Areas of improvement will surface by finding the appropriate data. For this process, a data platform must be maintained. We believe data platform maintenance is the utmost priority in DX. There is no DX promotion without this investment. Data visualization by Looker, as well as reference and business redesign will prove to be most powerful in this very aspect."

Kentaro Kawaguchi, Mitsubishi Heavy Industries