

Customer Experience Transformation through Issue-driven Co-design: Σ SynX CX

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After-sales services (spare parts sales, maintenance work, handling inquiries, etc.) support the stable operation of machinery products and are directly connected to customer value. These services still involve a significant amount of conventional communication with the customer via telephone, email, etc., but due to their labor-intensive nature, balancing quality and efficiency has been an issue. By adopting an approach that starts with identifying the issues faced by both customers and business departments of Mitsubishi Heavy Industries, Ltd. (MHI), envisions a future after those issues are resolved, and co-designs solutions, MHI has developed the digital product Σ SynX CX for customer contact points and has expanded it into multiple businesses including overseas markets. This report describes the design philosophy, product concept, and achievements gained through the deployment of this product, and demonstrates that issue-driven digital product development creates value for both the customer's business and MHI's business.

1. Introduction

The after-sales service domain of Mitsubishi Heavy Industries, Ltd. (hereinafter referred to as MHI) encompasses numerous operations that ensure the stable operation of machinery products, such as spare parts sales, maintenance work, and handling of inquiries. However, these services still involve a significant amount of conventional communication with the customer via telephone, email, etc., demonstrating their strong labor-intensive nature. There is significant potential to enhance the value provided to customers by digitalizing these operations to improve their quality and efficiency. On the other hand, when such digitization is promoted, the introduction of technologies and tools tends to take precedence, while the connection to the purpose of the initiative and to customer value remains unclear. As a result, cases are not uncommon in which systems are introduced but do not lead to behavioral change among stakeholders or to the results originally expected. In other words, a solution-driven development approach carries the structural risk that digitalization stops at the mere introduction of tools, without reaching the fundamental issues faced by customers and business departments.

To address issues related to customer contact points in the after-sales service domain, MHI established an in-house digital development organization that works closely with business departments. Rather than asking "what can be done with this solution," this organization first asked "what does a state look like in which the issues faced by our customers and by the business departments have been resolved?" Product development has proceeded with an emphasis on experience design, and digital solutions are chosen only after envisioning that resolved state. Specifically, this approach combines design thinking based on business issues with hypothesis-testing agile development, creating solutions that deliver tangible results through co-design with business departments. Furthermore, by abstracting and standardizing successful solution examples and accumulated practical knowledge, MHI has constructed the digital product Σ SynX CX with a

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certain level of versatility across multiple business departments. This report describes the process, achievements, and future deployment of this development.

2. Philosophy and methodology of the issue-driven co-design approach

2.1 Limitations of the solution-driven approach

Issues (problems) at customer contact points in the after-sales service domain exist simultaneously on both the customer side and the MHI employee side, forming a structure in which the two mutually influence each other. On the customer side, challenges arise such as difficulty identifying replacement parts required for machinery maintenance, time-consuming processes for obtaining estimates and placing orders, lack of support during the night or in an emergency, and difficulty quickly finding scattered information necessary for maintenance. As a means to resolve these issues, customers make inquiries to MHI representatives via telephone, email, and other means. Consequently, inquiries become concentrated on individual representatives, leading to an uneven distribution of workload, reliance on individual skills, and response delays. As the workload of representatives increases, response slows and quality becomes inconsistent, which in turn feeds back to the customer as a further deterioration of the customer experience. The mutually reinforcing vicious cycle between customer experience (CX) and employee experience (EX) is shown in **Figure 1**.

In this structure, a solution-driven approach that introduces technologies and tools by focusing on a specific operation cannot extend to the overall structure, even if part of the loop is modified. As a result, systems are introduced but do not necessarily lead to changes in behavior among stakeholders, leaving customer experience virtually unchanged. To achieve fundamental improvement, an approach is required that treats CX and EX as an integrated whole, envisions the resolved state starting from the fundamental issues of customers and business departments, and only then selects the digital solution.

2.2 Co-design approach based on design thinking

MHI adopts a co-design approach — a design process carried out jointly with customers and business departments — based on design thinking as a methodology to integrate the deep business understanding held by business departments with the digital technology and development expertise of the in-house digital development organization. Specifically, MHI applies the 6C model proposed by Design School Kolding in Denmark: business issues are "collected" and "comprehended," the desired future state is "conceptualized," and the solution is "created" — all carried out together with relevant parties ("collaborate") — while "communicating" the resulting concepts and achievements to stakeholders to gain more supporters. An overview of the 6C model adopted by MHI is shown in **Figure 2**.

The starting point of co-design is primary on-site information obtained through interviews and observations with the customer and business department representatives. Based on the information obtained, the disconnects and fundamental issues in the current experience are structured together with relevant parties, and a "state in which the issues have been resolved" is envisioned as the future vision. Driven by this vision, the minimum viable product required to seamlessly connect the customer's experiences is identified, and the product is evolved in an agile manner through small-scale verification. Insights gained during the co-design process are shared among relevant parties, and serve as a driving force to increase supporters for new initiatives.

2.3 Experience design aiming for improvements in both CX and EX

This approach aims not only to improve customer experience (CX) but also to simultaneously explore improvements in the employee experience (EX) connected to it. Based on the mutually reinforcing vicious cycle described in the previous section, CX and EX are not independent but are targets that should be designed as an integrated experience. Providing an experience in which customers can resolve issues on their own, for example, alleviates the concentration of inquiries on MHI representatives, allowing them to focus on higher-value-added work. Conversely, a mechanism that makes it easier for MHI representatives to provide accumulated knowledge to the customer also increases the degree of customer self-resolution. The objective of this approach is to accumulate improvements in CX and EX cyclically.

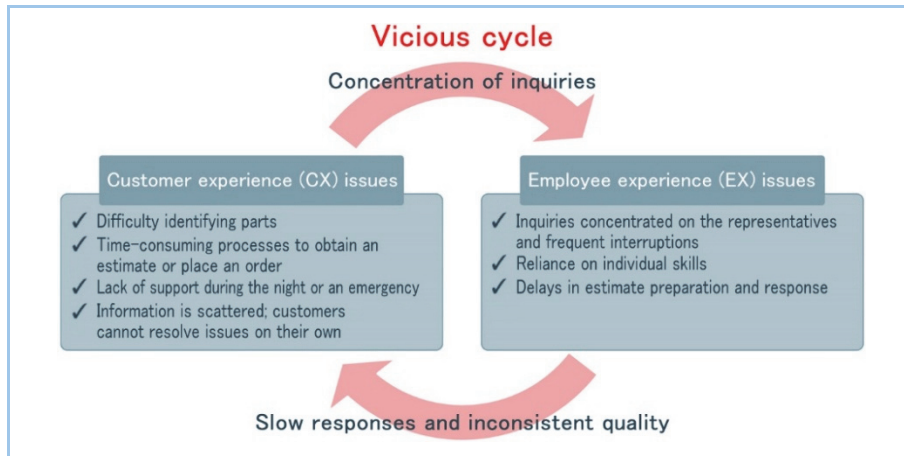


Figure 1 Mutually reinforcing vicious cycle between customer experience (CX) and employee experience (EX)



Figure 2 Overview of the 6C model

3. 0→1 Phase: Product creation through co-design with individual business departments

3.1 Common customer experience in MHI after-sales services

Although commercial channels and product characteristics vary by business within MHI, common patterns exist at the contact points needed by customers in the after-sales service domain. These include experiences such as referring to information in manuals, purchasing parts, and making inquiries. MHI has organized services handling these common customer contact points and defined concepts of a product lineup as "Contents" for information reference, "HOJYU" for parts purchasing, and "TANOMI" for inquiry handling. An overview of the lineup is shown in [Figure 3](#).

3.2 Example of individual product development (HOJYU)

As a representative example from the 0→1 phase, this section describes HOJYU, a service for the parts purchasing experience, launched through co-design with the Printing & Packaging Machinery Headquarters of Mitsubishi Heavy Industries Machinery Systems, Ltd. Since the

technical details of HOJYU are described in a previous report ⁽¹⁾, this report outlines the key points from the perspective of experience design.

In the development of HOJYU, the starting point for MHI was the question of what the fundamental issues in the customer's parts procurement really were. Interviews and observations with business department representatives and customers revealed that the customers' true need is "reliably obtaining necessary parts when needed." However, the series of actions required to achieve this, namely "identifying parts," "obtaining estimates," "processing orders," and "checking shipping status," exists as disconnected experiences, posing an issue. HOJYU was designed to provide these four actions sequentially as a seamless experience and to provide access to past estimate and order histories, thereby keeping the experience smoothly connected even when reordering. The flow of the customer parts acquisition experience provided by HOJYU is shown in Figure 4.

3.3 Horizontal expansion to multiple businesses and multiple experiences

It has been confirmed that the approach of "connecting experiences end-to-end, starting from the fundamental issues of the customer" developed through co-design in HOJYU can be applied using the same methodology to other product businesses and other experiences. Although the target experiences differed for other products such as "Contents" for information reference and "TANOMI" for inquiry handling, development proceeded following a similar co-design process while accumulating actual implementation across multiple businesses and multiple experiences. Accumulating experience and achievements between business departments and the in-house digital development organization regarding various experiences occurring in the after-sales service domain formed the foundation of Σ SynX CX, the standard product suite described in Chapter 4.

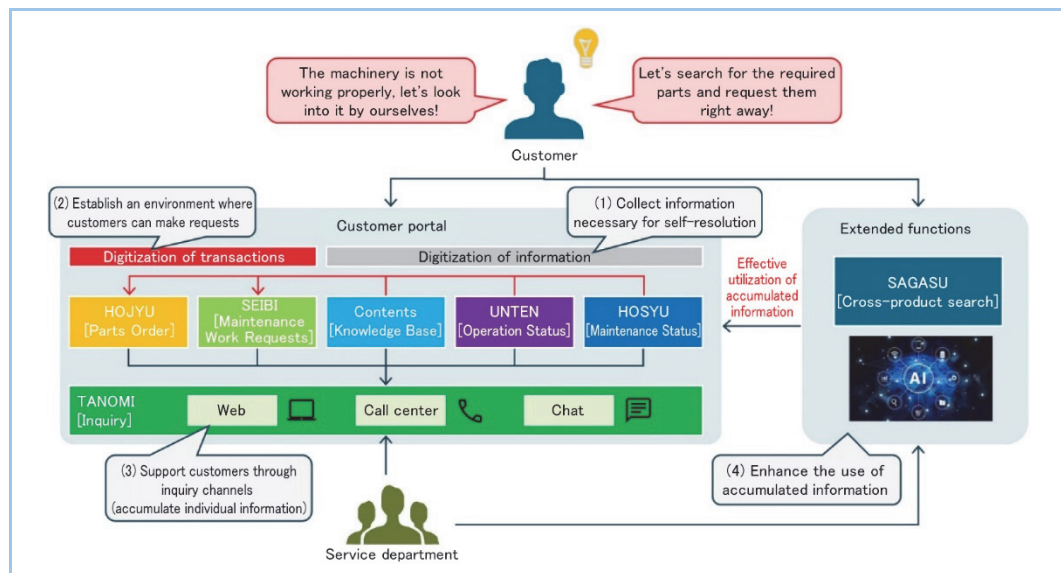


Figure 3 Overview of the product lineup

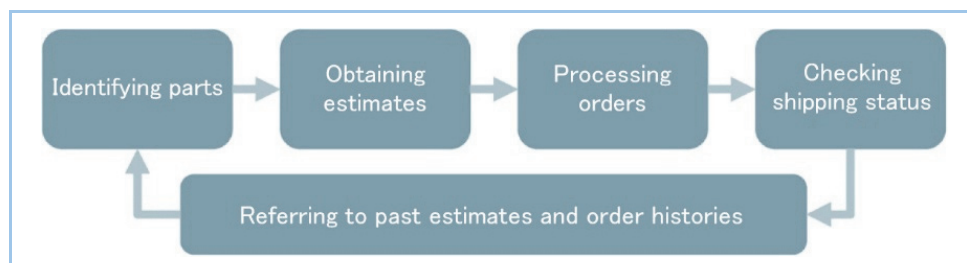


Figure 4 Flow of the experience of the customer to acquire parts provided by HOJYU

4. 1→10 Phase: Abstraction, standardization, and horizontal expansion of practical knowledge

4.1 Evolution into the standard product suite Σ SynX CX

Based on the practical knowledge accumulated across multiple businesses and multiple experiences during the 0→1 phase, MHI elevated this knowledge into Σ SynX CX, a standard

product suite for customers. Σ SynX CX provides the customer contact points and experiences commonly required in the after-sales service domain as "standard functions." These standard functions are configured so they can be easily toggled ON or OFF through the settings according to the business needs of the customer and business departments, allowing each business department to flexibly select the required combination of products.

On the other hand, for business department-specific requirements that cannot be addressed by standard functions, the configuration allows customization as needed. By managing these standard function groups and the customization layer across business departments using a single source code, the system is designed so that an improvement made for one customer is also delivered back to all other customers.

4.2 Principles emphasized in horizontal expansion

When expanding Σ SynX CX horizontally to new business departments and regions as well, development proceeds with an emphasis on the issue-driven approach described in Chapter 2. In other words, rather than starting from the premise that the standard product will be introduced, we first reconfirm the issues faced by the customers and the business issues of the target business department, envision the desired future state, and only then apply Σ SynX CX to the areas where it can contribute to realizing that vision. By following this sequence, the starting point of development always remains focused on the "issue," even as standardization progresses, leading to genuine behavioral change among stakeholders and to meaningful outcomes.

4.3 Status of deployment and circulating knowledge

Since the initial release of HOJYU in 2021, Σ SynX CX has steadily expanded its product lineup and has been deployed to multiple business departments and to overseas operations.

In Japan, application to the Infrastructure Facilities Business Division (Food & Packaging Machinery) of Mitsubishi Heavy Industries Machinery Systems, Ltd. has been completed, and deployment to other business departments is ongoing. Overseas, deployment to the US operations of the Printing & Packaging Machinery Headquarters of Mitsubishi Heavy Industries Machinery Systems, Ltd. has been completed. The product is used by approximately 4,000 users at some 600 customer companies in Japan and overseas (as of April 2026).

Domain knowledge gained through new business applications is circulated back as improvements to the standard product. Continuously updating the experiences provided across all deployment destinations contributes to improved customer value and business value.

5. Results achieved

5.1 Improvement in customer experience (CX)

The introduction of Σ SynX CX allows customers to perform operations such as parts purchasing, information reference, and inquiry handling "any time and from anywhere," improving the degree to which customers can resolve after-sales problems on their own. In one business, for example, not only were more than 50% of parts purchases made via HOJYU, but the time customers spent obtaining estimates could also be reduced by a cumulative equivalent of more than 2,000 days per year.

In overseas deployment, a large number of customers began using the product shortly after service launch. Regarding inquiries, now that accumulated inquiry information can be utilized across the organization, access to knowledge without relying on individual MHI representatives is improving.

5.2 Improvement in employee experience (EX)

Along with improvement in the degree of customer self-resolution, routine tasks (such as creating estimate sheets) by MHI representatives have been reduced, allowing representatives to focus on higher-value-added operations such as proposing services tailored to customers. Furthermore, automating tasks such as preparing estimates on Σ SynX CX has made response quality more consistent. For service information, publishing Contents on the customer portal, where customers are notified of it and can refer to it, has enabled prompt and reliable delivery of the information they need.

At MHI, the time created through such operational efficiency improvements will be allocated to providing more substantial customer support.

5.3 Connection to business value

Improvements in both CX and EX lead to the creation of business value in different ways. Improvement in CX contributes to a higher operating rate (uptime) of the MHI machinery owned by customers, increasing the business value of the customers themselves. Meanwhile, EX improvement enhances response quality of MHI representatives, increasing MHI business value through building a long-term relationship with its customers.

Furthermore, improvements in CX and EX mutually enhance each other. When customers are able to resolve issues on their own, the concentration of inquiries on representatives is alleviated (CX improvement → EX improvement), and when the quality of response by a representative improves, customer experience improves further (EX improvement → CX improvement). In this manner, CX and EX cyclically enhance each other, generating a virtuous cycle that leads to the creation of business value. This virtuous cycle model is shown in **Figure 5**. This structure is the exact inverse of the vicious cycle shown in Figure 1 in Chapter 2.

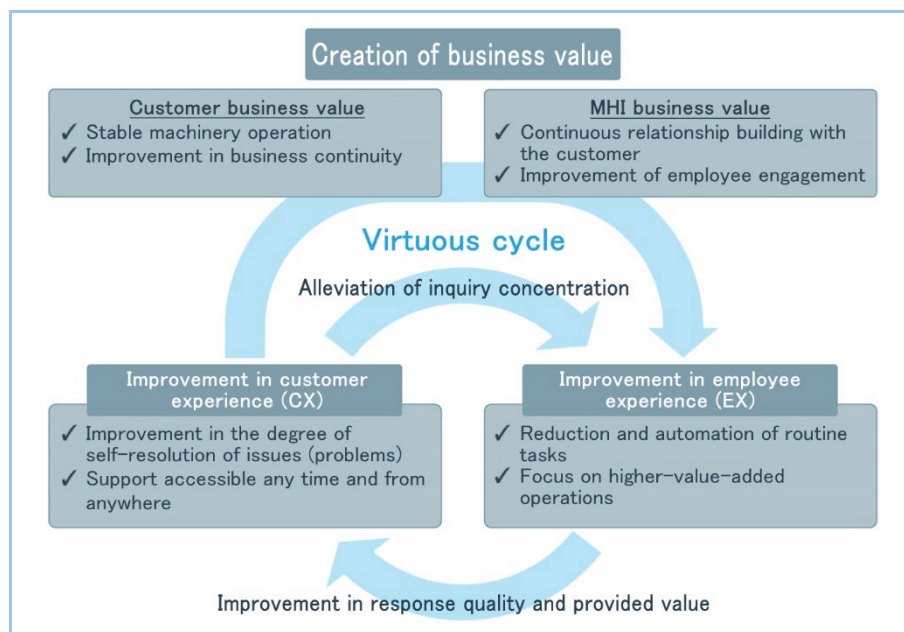


Figure 5 Virtuous cycle model of CX, EX, and business value

6. Conclusion

This report described the initiatives to digitize customer contact points within the after-sales service domain of MHI, where an issue-driven co-design approach was implemented instead of a solution-driven approach. The accumulated practical knowledge was abstracted and standardized to develop and expand Σ SynX CX, a standard product suite for customers.

By combining the 6C co-design process based on design thinking with hypothesis-testing agile development, MHI improved both customer experience (CX) and employee experience (EX) as an integrated whole. Furthermore, by deployment to multiple business departments and overseas, improvement in the degree to which customers can resolve issues on their own and greater efficiency in representatives' work have progressed, confirming a virtuous cycle that leads to the creation of business value.

In the future, while advancing EX improvements that contribute to increased CX, Σ SynX CX will be deployed to a wide range of business domains within the MHI Group, to further improve the customer experience.

Σ SynX[®] is a registered trademark of Mitsubishi Heavy Industries, Ltd. in Japan and other countries.

References

- (1) Y. Yamada et al., Development of E-Commerce to Improve Customer Experience in Parts Purchasing, Mitsubishi Heavy Industries Technical Review Vol.60 No.4 (2023)