

MHI Group's Global Enterprise Management System for Data-driven Business Management

Data-driven Management



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Mitsubishi Heavy Industries Group has laid a framework for controlling financial data from the moment of its generation according to the group's shared master data and business processes, and forwarding them to the analytics platform almost in real time. This is enabling the visualization of business management indicators across the group and speedy decision-making without the need to pay attention to the differences among the companies. This report describes the components and underlying technologies of MHI's global enterprise management system (GEMS), which was developed with the aim of preparing data for use in business decision-making in a timely manner by standardizing financial data based on the globally shared master data.

1. Introduction

At Mitsubishi Heavy Industries, Ltd. (hereinafter referred to as MHI), the use of ERP (Enterprise Resource Planning) dates back to around 1997. Originally, MHI's Kobe Shipyard & Machinery Works introduced SAP software to enhance its accounting operations. Previously, accounting work mostly centered around batch processing using a host computer. The transition to real-time processing shortened the financial closing process and improved work efficiency.

As packaged software for managing business processes inside a company in an integrated manner, ERP is characterized by centralized management of data on a "One Fact in One Place" basis. Its implementation enabled the integration of previously fragmented business data and improved the overall workflow consistency.

The software adopted by Kobe Shipyard & Machinery Works was later deployed company-wide as well as in group companies (hereinafter referred to as GCs) both in Japan and overseas, and was also updated to the then-latest version. MHI promoted the ERP-based integration of business processes for about 20 years. However, a new challenge emerged in terms of group-wide data utilization (**Figure 1**).

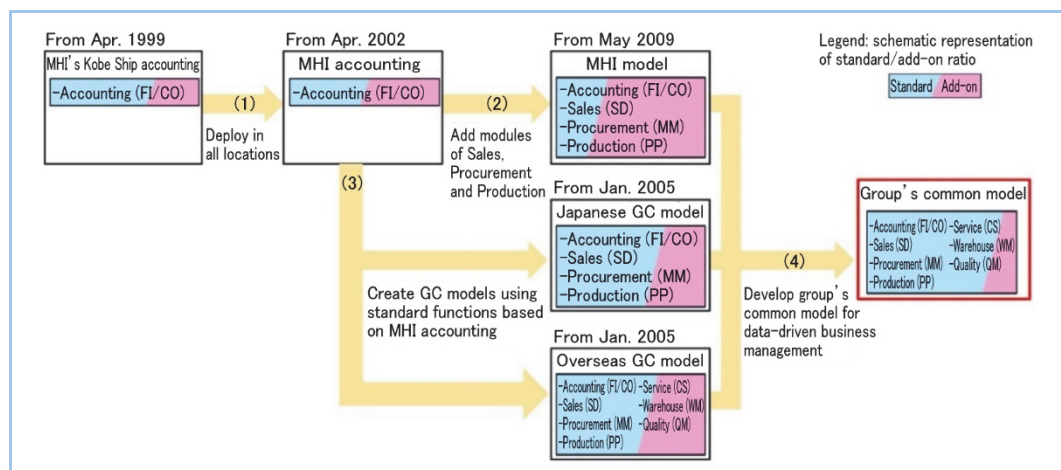


Figure 1 History of MHI's ERP-based integration

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2. Challenge toward data-driven business management

Although the same ERP was in use, each company optimized the implementation according to its own work requirements. The result was the coexistence of three different models within the group, namely, the "MHI model," "domestic GC model," and "overseas GC model."

While the MHI model offered high business suitability by incorporating a number of add-ons to deal with complex contracts and transactions, it faced issues such as increased operational load and heavy verification load during upgrades. In contrast, the GC models were intended to utilize standard functions; however, as the definitions of master data and business processes were not standardized, resulting in differences in interpretation and granularity even for the same data.

To address these issues, an integrated financial database for the entire group was created, and accounting data was consolidated. An attempt was made to convert master data into ones that can be shared by the group to enable comparison. However, automatic conversion was difficult due to inconsistent master data management among the companies, requiring a large amount of manual work. Consequently, resources became concentrated on data preparation, preventing the data from being utilized for decision-making, which was the original objective.

Thus, this post-collection data integration approach proved to have limitations. It became clear that data control at the generation stage was essential.

3. Overview of GEMS

Based on the challenges described above, MHI decided to develop a GEMS (Global Enterprise Management System) as a unified ERP system for use by the entire group. GEMS was designed to both control from the stage of data generation and visualize it across the group.

The system consists of four functions: the business management dashboard, master data management (hereinafter referred to as MDM), consolidation, and the group's common model. Of the former three functions, the policy for this project was to supplement the consolidation function using existing systems. Therefore, efforts were focused mainly on dashboard, MDM, and common model (**Figure 2**).

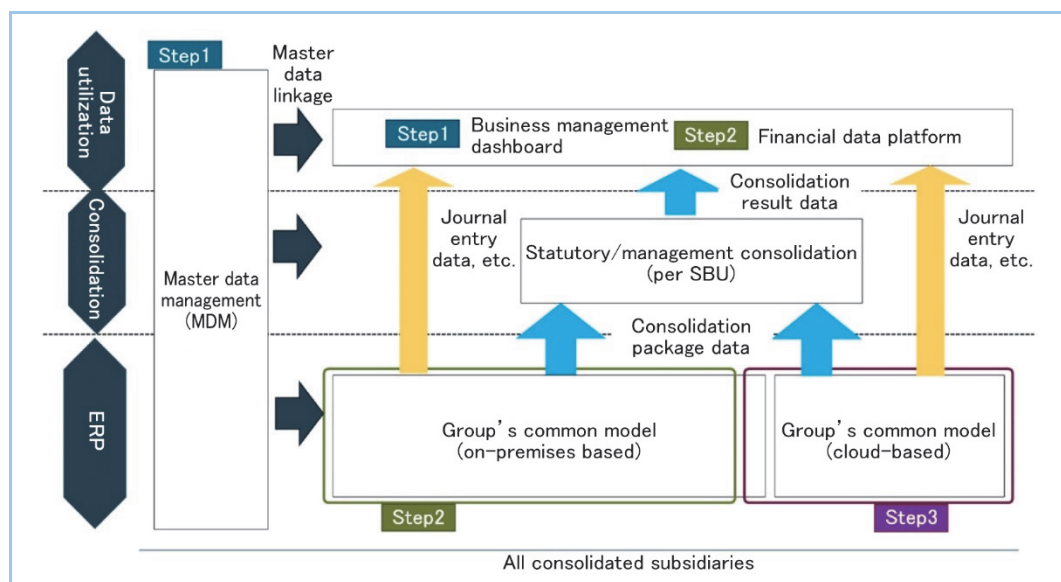


Figure 2 GEMS architecture and scope

In this project, a step-by-step approach was adopted. First, Step 1 focused on dashboard and MDM to enable data control and create a visualization platform. Next, Step 2 deployed the on-premises-based common model in the companies already operating the three models. Lastly, Step 3 involved developing a cloud-based common model and implementing it in the remaining companies with none of the three models in use.

This approach has two key features.

The first is the prior development of the business management dashboard.

Generally speaking, the development of operational systems precedes data aggregation and

visualization (bottom-up approach). In this project, however, the creation of a visualization platform came first, in order to present the outcomes to the management. This helped management to recognize the benefits of GEMS at an early stage of the project, enabling the top-down approach to system design starting from the necessary data and business management indicators. Consequently, the core axes of business management could also be clarified at the early stage.

The second is to also make the cloud-based version available as the group's common model.

The existing three models were designed for an on-premises environment, making them difficult to deploy to companies unconnected to MHI's network. In contrast, GEMS is intended to apply to all consolidated companies. While network unification was considered, it was deemed unrealistic from the viewpoints of cost and feasibility. Thus, cloud-based ERP was adopted to ensure high applicability.

Although a certain number of companies have not implemented the group's common model due to their business strategies or individual circumstances, the compliance with MDM was made obligatory for all companies on the grounds of data control.

4. Development of MDM

MDM is the core functionality of GEMS, by which data control is made possible from the stage of its generation. In this initiative, major master data were reorganized for standardization across three elements: definition, request process, and system.

First, for master data definitions, the key code structure and naming conventions were standardized to establish a consistent data system across the group. As a general rule, Business Partner (BP) master data are managed uniquely across the group. In order to align with operational requirements, management by region is partially permitted as an exception (Figure 3).

Next, the request and registration processes were standardized, thereby implementing control to ensure the uniqueness of master data. SAP software specialized for master data management was also introduced as a platform, achieving centralized management and real-time linkage of master data information.

This framework has enabled transaction data to be collected under standardized definitions from the moment of creation, thus eliminating the need for data transformation for analysis. However, there remains challenge in that the workload for master data management is concentrated on-site. Therefore, promoting operational adoption through user support and training is important.

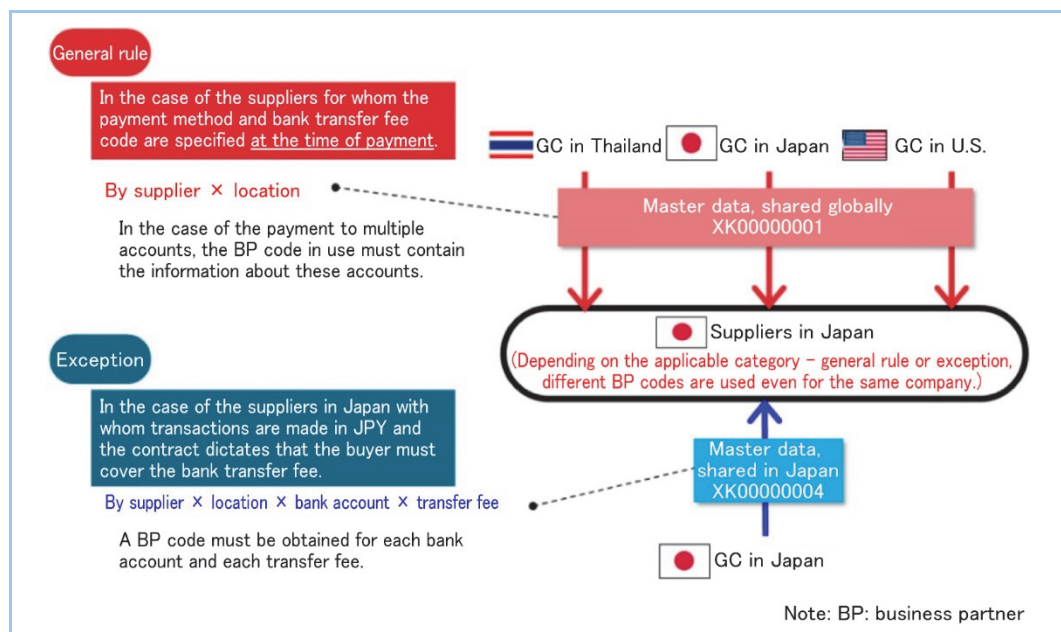


Figure 3 Key code design with consideration of actual operations

5. Development of group's common model (on-premises based)

The development of the group-wide on-premises-based common model is a pivotal step in this project. Providing a uniform framework for business processes and data generation across the group, this model has the broadest impact as it is directly applied to daily operations of each company.

In developing the model, the latest version of SAP ERP software was introduced because of its extensive business process coverage and the ability to leverage expertise accumulated through past ERP usage.

Migrating to the latest version of ERP software can be done by either of the following two ways: the brownfield approach in which the existing systems are utilized, and the greenfield approach in which a model is newly designed from scratch. In this project, the greenfield approach was taken, because standardizing business processes and data definitions was the top priority, and it was determined that migration while retaining variations in the existing models would not achieve the primary objective.

However, it turned out that this development was extremely challenging. The compatibility with MHI's three existing models was evaluated on the assumption that the software's standard functions were utilized to the maximum extent. The results confirmed that most areas could be covered by standard functions, except for the sales and distribution (SD) module. In the SD module, the compatibility rate remained as low as $\approx 50\%$, which became a significant challenge.

This was due to the business characteristics reflected in the MHI model. MHI's businesses involve long-term contracts, multiple-currency transactions, and complex billing and payment terms, which have been conventionally managed through add-ons for handling invoice/payment schedules, cash application/payment matching, and other related functions. The software's standard functions could not fully support these requirements. Despite the initial objective of standardization, certain add-ons were selectively retained.

Furthermore, issue arose in securing quality, because of the difficulty in requirement alignment and design. The resulting delays in the schedule of system testing eventually led the decision to temporarily suspend the project.

Following the suspension, the development structure and processes were fundamentally reviewed, specifically including reconsideration of the scope of standard functions, refinement of requirement definitions, and strengthening of the quality control processes. The project was resumed after this restructuring. In the end, the on-premises-based common model was implemented in all target companies in Japan including MHI.

Through these initiatives, business processes and data generation were successfully standardized, and a data control platform linked with MDM was established.

6. Development of group's common model (cloud-based)

Although connection to MHI's network was a prerequisite for the use of the on-premises-based common model, not all group companies were connected. Thus, its deployment across all the consolidated companies faced limitations. Since most of the companies unconnected to MHI's network were relatively small, the ease of implementation and operation was also a key requirement.

To address this issue, this report presents the development of the cloud-based common model for the group, assuming internet connectivity. Considering the compatibility with the on-premises-based model, SAP's cloud ERP software was adopted.

Initially, the know-how about the on-premises-based common model was expected to be useful, because these two models were basically the same. In actuality, however, their development approaches and functional restrictions were considerably different from each other, revealing a significant gap in initial perception.

The most significant difference lies in the underlying development concept. In developing a cloud-based model, applicable standard processes provided by SAP are selected, and configuration is performed based on these processes. Unlike the case of the on-premises-based model, therefore, add-on development to meet individual requirements is not assumed. Although this caused a

concern about the degree of alignment with business operations at the initial implementation stage of a cloud-based model, the advantage was to have the characteristics of guaranteeing the standardization of business processes and data consistency.

Considering such fundamental differences, the design and implementation processes for the cloud-based model were reviewed, enabling the systematization and standardization of GEMS implementation know-how (Figure 4). As a result, efficiency has been improved to the point where the system can become operational in about two months from the start of implementation in a newly founded company.

From the perspective of data utilization, the cloud-based model is considered to ensure data control to a degree equal to or greater than the on-premises-based one, as the cloud-based model operates based on the SAP standard processes. Group-wide data consistency is also expected to be maintained through compliance with MDM.

However, verification regarding integration with the analytics platform is required, specifically for cloud data extraction methods and data structure differences from the on-premises-based model. Regarding data acquisition methods in particular, although technical equivalence is expected, whether any operational differences will arise remains an issue to be examined in future work.

The items with a check mark are needed by each company for the deployment

ERP standard functions were selected according to the scope of GEMS.	Scope item name	Sales subsidiary	Production	Module	W54	Z86	Y72	Z62
					38	52	10	12
J58	Accounting and Financial Close	✓	✓	FI	Implemented	Implemented	Implemented	Implemented
J62	Asset Accounting	✓	✓	FI	✓	✓		✓
1ZT	Managing Material Price Changes and Inventory Values	✓	✓	FI	✓	✓		
1J2	Advance Compliance Reporting	✓	✓	FI	✓			✓
J54	Overhead Cost Accounting	✓	✓	CO	✓	✓		✓
2QL	Universal Allocation	✓	✓	CO	✓	✓		✓
	Accounts Payable							
(Omitted)								
		✓	✓	FI	✓	✓		✓
1HB	Financial Plan Data Upload from File	✓	✓	CO	✓	✓		✓
2FM	Financial Planning and Analysis		✓	CO	✓	✓		✓
BD6	Basic Credit Management	✓	✓	FI				
3F0	Event-Based Production Cost Posting		✓	FI				
BEG	Standard Cost Calculation		✓	FI				

Figure 4 Reorganization and standardization of know-how

7. Conclusion

As at the end of April 2026, the implementation of GEMS was completed at 69 domestic and 12 overseas locations. For companies utilizing the on-premises based common model for the group, financial data is sent to the analytics platform about every 15 minutes. Data utilization based on MDM-standardized master data has begun.

As a result, financial data, whose aggregation and compilation had to be done by each company, can now be visualized across the entire group through common dimensions such as profit centers and management layers, without the need to pay attention to differences among the companies.

What this project achieved is, in essence, lies in shifting from a system of post-collection data integration to a system to control data at the stage of generation. As a result, the workload required for data correction has been reduced considerably, and a platform that can be directly utilized for analysis and decision-making has been established.

On the other hand, the implementation scope of GEMS remains incomplete. Challenges remain regarding the integration of cloud-based model data with the analytics platform, as well as the ingestion of MDM-compliant data from non-participating companies. Furthermore, the differences in data structures between the on-premises based model.

Going forward, MHI aims to establish a data-driven management platform to support rapid and sophisticated decision-making by resolving these challenges and facilitating the integrated utilization of financial and non-financial data.