

Smart Manufacturing

Connected Industries

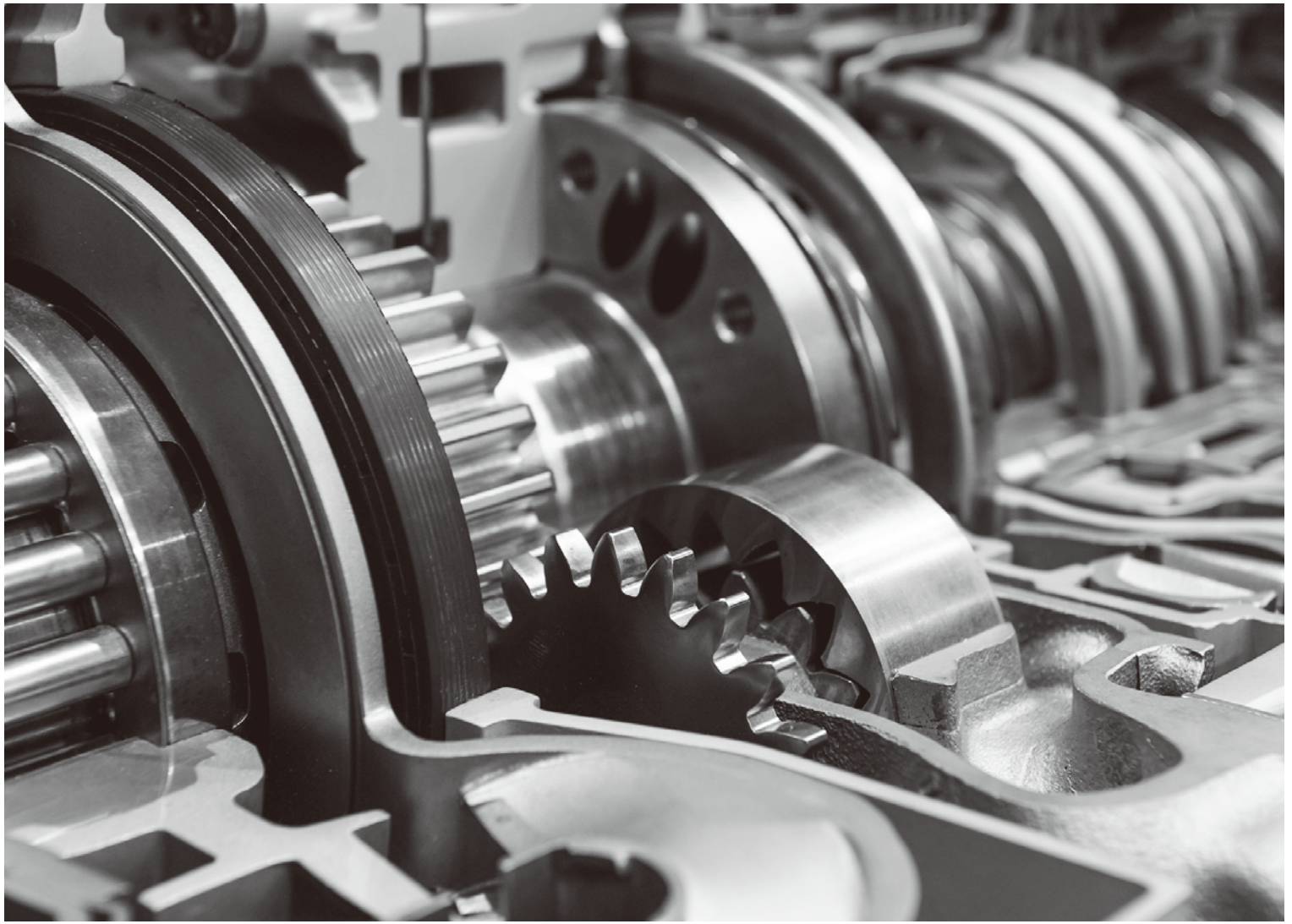
**Exploring
The Future
of Manu-
facturing**

製造業2030

Society 5.0



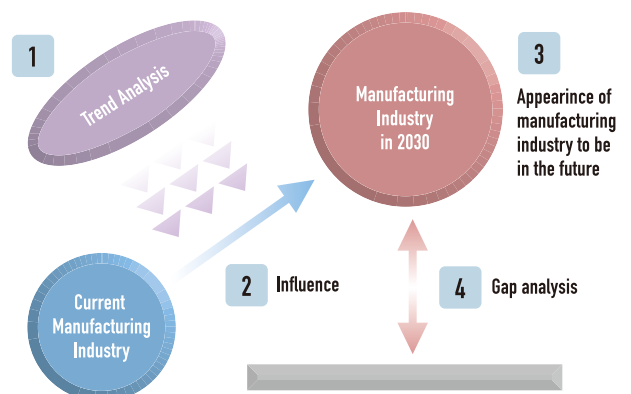
THE JAPAN ELECTRICAL MANUFACTURERS' ASSOCIATION



Prospects for Manufacturing 2030

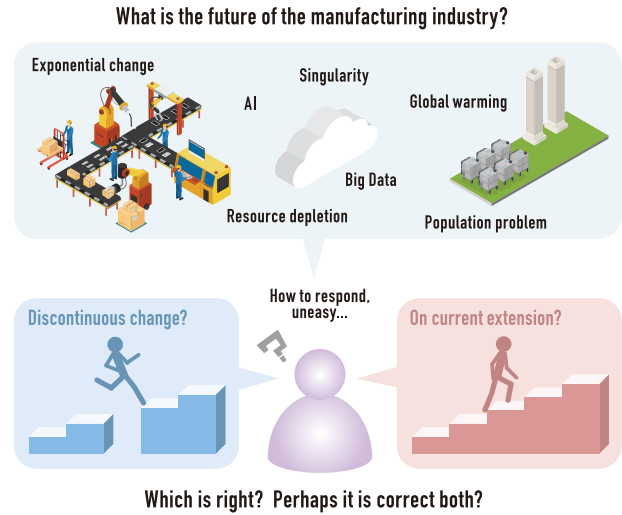
“製造業2030”

It is the time of change in industrial field once every few decades. In order to follow changes in the industry and business, JEMA initially envisioned the manufacturing industry in 2030. A large environmental change is expected by 2030. Global warming, sustainable development, and new technologies such as AI have a big impact on the industry. The discontinuous change point greatly changes the structure of the business. JEMA analyzed the gap from present to 2030 for the continuous growth of the Japanese manufacturing industry. By thinking about how to overcome this gap, we can step up to the new architecture of the manufacturing industry and business in the next era. JEMA contributes to the proposal of the next generation manufacturing industry and business.



Why did JEMA start thinking about the manufacturing industry in 2030

The Fourth Industrial Revolution brings about a major structural change to the entire industry including the manufacturing industry. It is necessary to find a future image concept and discuss countermeasures for its future image. Meanwhile, in the international standardization activities, an approach corresponding to future systemization has been adopted, architecture and concepts have been standardized and starting to exert a big influence. We set a future that we can discuss in cooperation among companies around 2030 and started discussions.



Flexible Business and Manufacturing (FBM): Our Concept for Manufacturing in 203X

Moving forward, business processes of manufacturers and surrounding industry will be more closely linked than they are today. Companies must deepen communication with each other to achieve mutual understanding then coordinate their actions for the sake of collective profit and to deliver value to their shared stakeholders. These processes and value chains will be born spontaneously in real-time, much like living cells, and the functions and business models within these processes (both individual and combined) must be flexibly revised. FBM is a visionary business system for 2030 and beyond conceptualized from these dynamic value chains.

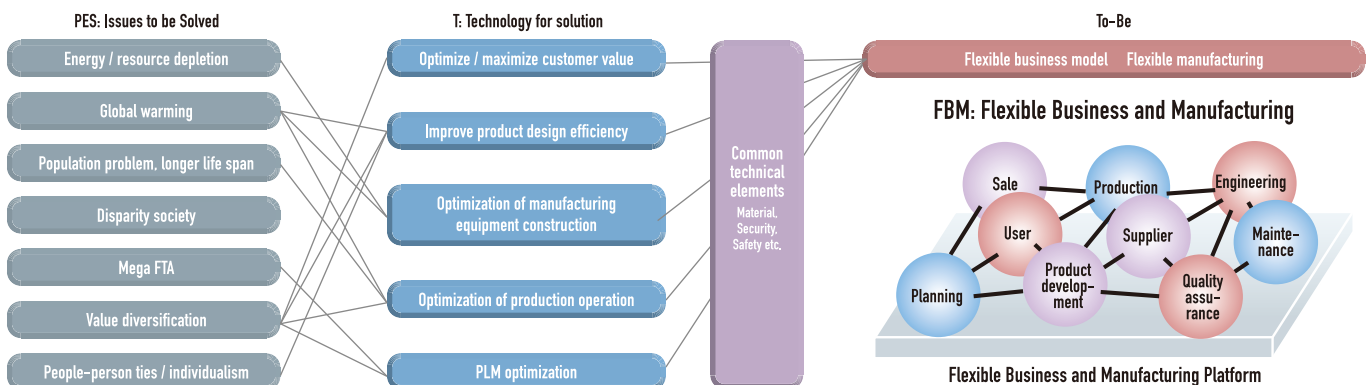
Flexible value based supply chain - examples

- A group of cooperating manufacturers can be formed in a short time (in hours or days)
- Its design and production procedure can be quickly (in hours) decided by organizations of manufacturers
- Unit/machine/equipment in production processes can be switched quickly (in hours)
- Delivery of parts, intermediate and final product can be set and optimized depending on the situation

Flexible improvement and implementation;

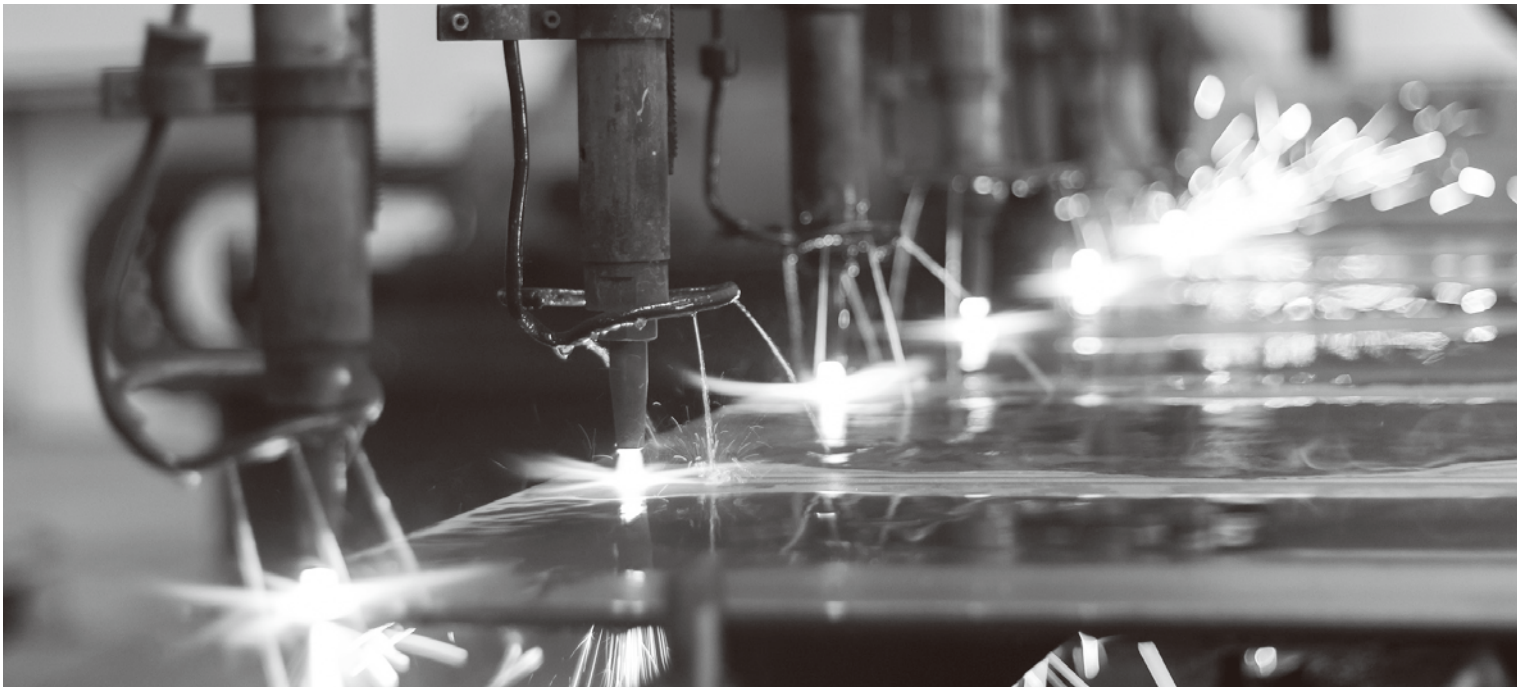
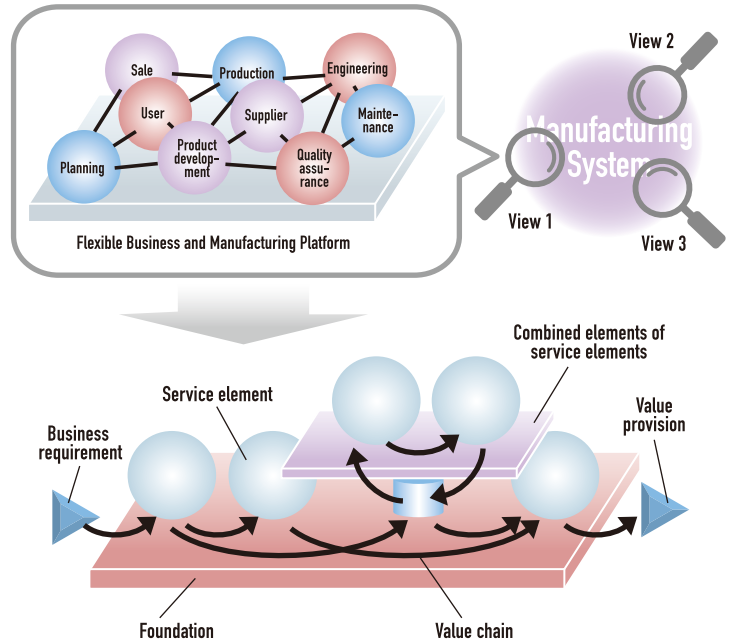
Based on data and/or report from the production processes, improvement point for the dedicated application can be found and implemented at appropriate timing, even "in production". For example;

- Production recipe/procedure for a product
- Measurement and control strategies inside production system
- Maintenance conditions of production unit/machine/equipment to keep availability



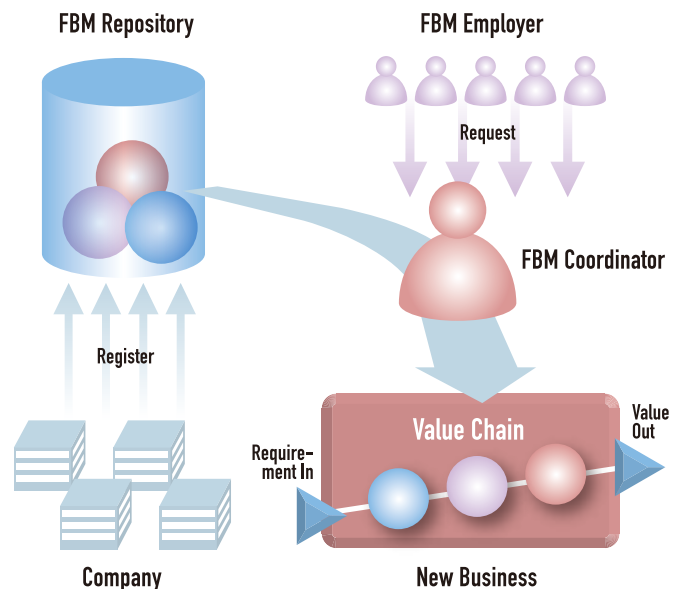
Description of manufacturing by FBM model

For the description method of FBM, it is important that it has the applicability to a various field, the easy scenery to understand, the permission for various operations, and the necessity to cover various requirements, etc. We propose the FBM model as a model description method to enable them. Each FBM model has its functional elements and several views. When you want to evaluate your target manufacturing system, using suitable view you can understand it and decide your system integration policy easily because you can see only your interested elements and value chain.



New Business (Value Chains) through the "FBM Coordinator"

In the future of the manufacturing industry, products will be built by combining various modularized components. Because each module made by an individual manufacturer has its own characteristics, the FBM Coordinator will play the vital role of determining which module by which manufacturer is needed to achieve the optimal result. They will also choose additional companies on the supply chain to provide important services such as maintenance and transportation testing. In other words, the FBM Coordinator swift revises the engineering and supply chains according to changing environments to create new business.



Actual cases of FBM model use

FBM models can be created using FBM Elements from FBM Repository.

This will show the relationship between the stakeholders, in a structured way, for each actual use cases. Once these FBM models are made, it is possible to compare and analyze across other projects, providing the point-of-reference for discussions. Then it is possible to store FBM elements in FBM Repository again for further use.

CASE 1 Services related to motors

By capturing and running detailed analytics to motors, many macro and micro situations can be visualized. Many business models can be created, compared, and adjusted easily using FBM models

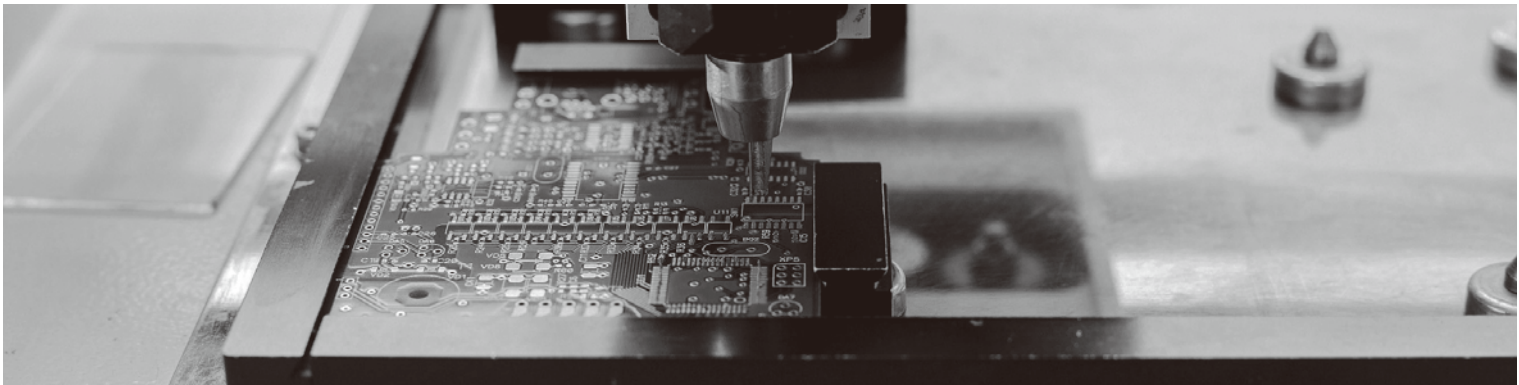
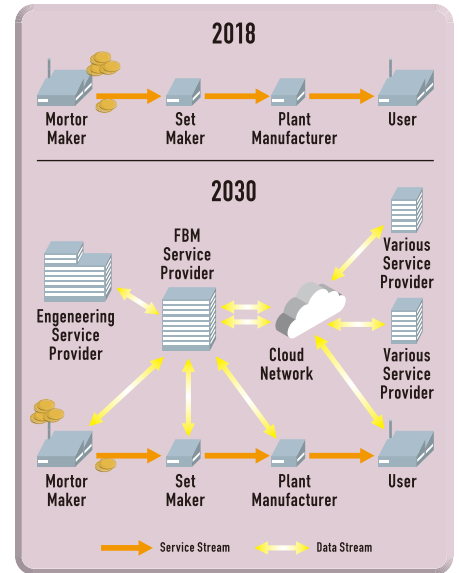
CASE 2 Services related to Pumps

Many services related to pumps have already been put into practice today. Further new businesses, such as, providing additional functions, enlarging the pump population or comparing the data at the national level, can easily be invented using FBM models.

CASE 3 Logistics for Manufacturing

Logistics for manufacturing are required at various levels, methods and locations. By creating total FBM model, these can be compared quantitatively.

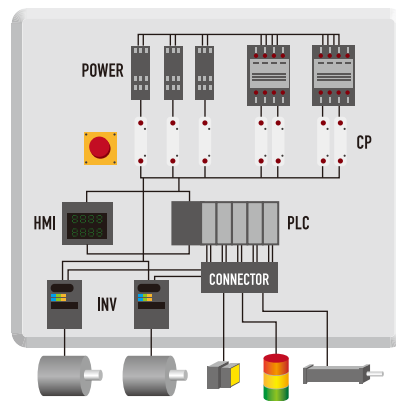
Expansion of Services related to Motors



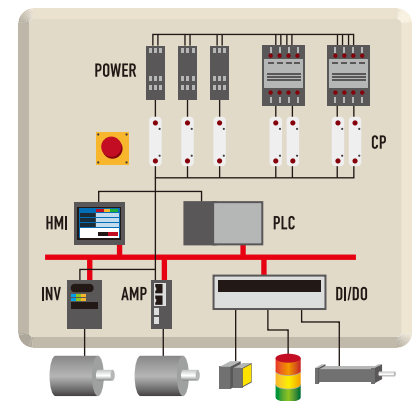
Evolution of control panels

Realization of FBM brings change to control panel. That means the design of the control panel is affected by FBM. Mass-production type control panels used in Factory Automation will be modularized for each function. Each module is communicated by wireless and take high reusability, it reduces design cost and manufacturing cost. Therefore, it is possible to flexibly deal with customer's individual requests. The coordinators can create value by the combination of modules.

YESTERDAY Complex wiring

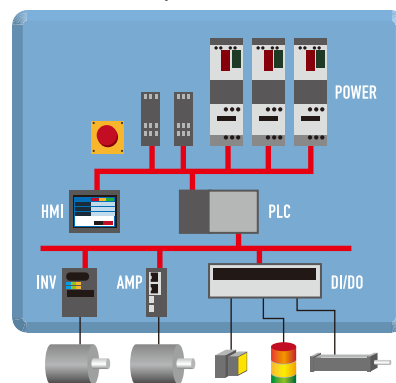


TODAY Reduced wiring



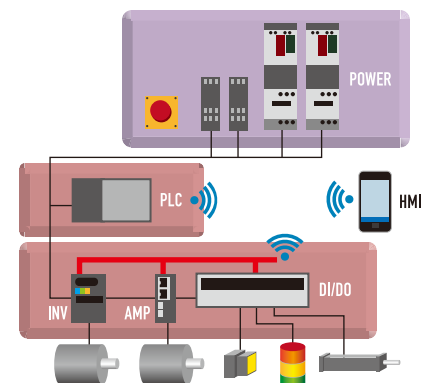
TOMORROW

- Power over Ethernet
- Hybrid devices



2030

- Wireless
- Modularization



Message from JEMA

Over 70 years have passed since the establishment of JEMA, the Japan Electrical Manufacturers' Association. For decades JEMA has supported the growth of the Japanese manufacturing industry. JEMA contribute to the realization of the "society 5.0" advocated by the Japanese government. JEMA imagine the new world that the Flexible Business and Manufacturing FMB bring sustainable growth and new value to the industrial fields.

