

News Release

Developing a Manufacturing Process Improvement Solution that Helps Finding Optimal Manufacturing Processes, and Enhancing the Informatics Business

Combining digital technologies such as generative AI and our expertise in products including measurement equipment

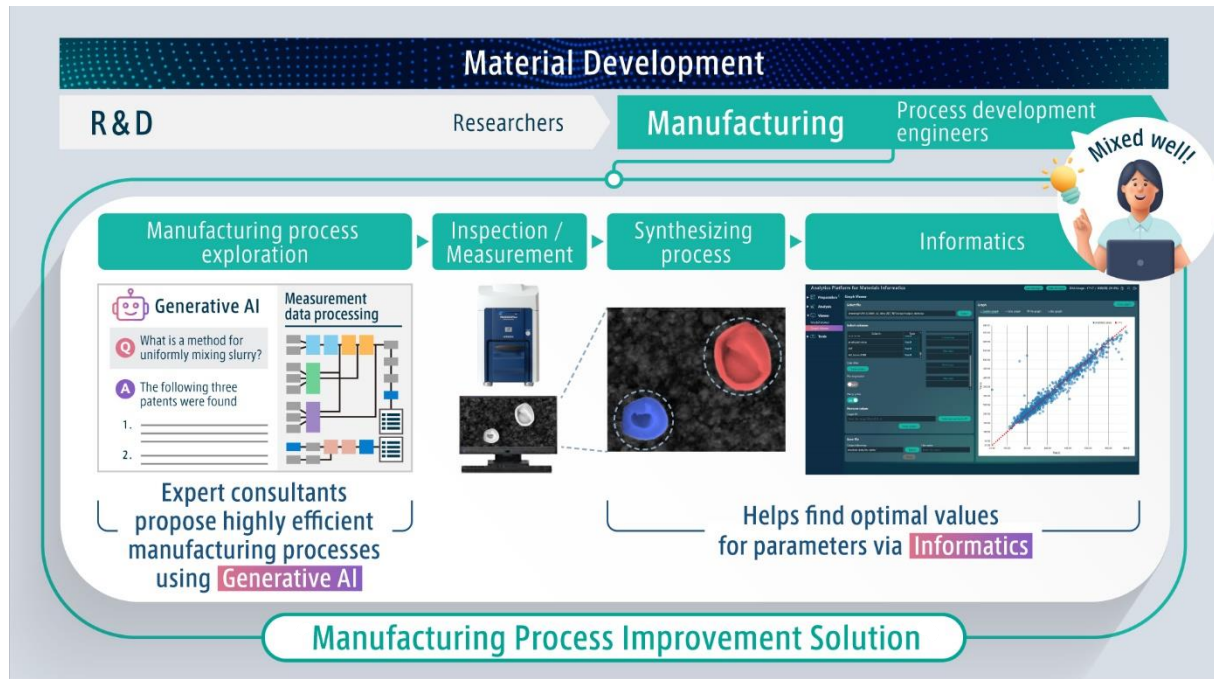


Image of Manufacturing Process Improvement Solution

Tokyo, January 23, 2025 –Hitachi, Ltd. ("Hitachi") and Hitachi High-Tech Corporation ("Hitachi High-Tech") are developing a Manufacturing Process Improvement Solution ("this solution") to help find optimal manufacturing processes, and are enhancing our informatics business to accelerate digital transformation in industrial fields. Hitachi and Hitachi High-Tech have contributed to highly efficient research and development ("R&D") by providing customers with solutions related to materials informatics ("MI"). With the provision of this solution, we will help optimize manufacturing processes as well as R&D.

Material development involves a phase where prototypes developed by researchers are scaled up for large-scale manufacturing. So far, process development engineers and others relied on their experience and knowledge in trial and error, and find the best manufacturing process that maximized the properties of materials. In this solution, Hitachi Group's expert consultants can propose highly efficient manufacturing processes and solutions using our proprietary database accumulates manufacturing process information from various fields, as well as generative AI. We also offer a system that allows customers to use informatics to find out the optimal values for various parameters. This enables to explore new manufacturing processes, and thus achieve advanced process exploration, reduce wasteful costs, and improve productivity of frontline workers such as process development engineers. This solution will be provided by Hitachi High-Tech after conducting a proof of concept starting in April 2025, with customers such as semiconductor, battery, and materials manufacturers who can test and introduce it.

Background

Against the backdrop of rapidly changing market needs in recent years, there is a demand for faster production of more precise materials and products by the manufacturing industry. Nowadays accelerating all aspects of the material development and mass production process is essential. In the past, process development engineers and other people in charge of scaling up manufacturing have relied on individual knowledge, such as past cases and the expertise of veterans, to establish manufacturing processes through trial and error. However, this was time-consuming and expensive, also it led to increased CO₂ emissions and waste produced by repeated manufacturing tests.

In response to this situation, Hitachi and Hitachi High-Tech have provided the MI Solutions to materials manufacturers and others. Hitachi has been involved in the development of solutions using digital technology and has helped accelerate R&D through data-driven development optimization. Hitachi High-Tech has also provided customers with measurement and analysis equipment such as electron microscopes, and accumulated domain knowledge in the manufacturing industry.

By combining the technologies and domain knowledge of the two companies, the MI business for conventional materials development has been expanded to include areas for manufacturing process exploration and improvement, as well as being strengthened to accelerate digital transformation in industrial fields.

Features of This Solution

(1) Proposals of highly efficient manufacturing processes using our proprietary database specialized for manufacturing processes and generative AI

Hitachi Group's expert consultants will propose highly efficient manufacturing processes by using our proprietary database specialized for manufacturing processes and problem-solving generative AI.

Hitachi is building a database accumulates manufacturing process information by combining vast amounts of open data such as patents and generative AI related technologies such as RAG^{*1} with unique knowledge gained from Hitachi High-Tech's measurement and analysis equipment business. We are using this database to build a generative AI capable of figuring out optimal manufacturing processes. By utilizing our proprietary database and generative AI, Hitachi Group's expert consultants can leverage knowledge of manufacturing processes in various fields and propose bespoke manufacturing processes.

This will enable us to consider our customers' manufacturing processes from a new perspective and contribute to finding optimal processes and further enhancing them, improving yields^{*2} and increasing efficiency while reducing the workload required for process exploration.

*1 RAG (Retrieval-Augmented Generation): A technology that improves the accuracy of responses by using a language model in conjunction with retrieval of external information.

*2 Yield: The ratio of manufactured products that are of sufficient quality (yield = number of good-quality products ÷ number of products manufactured)

(2) Using informatics to help find optimal values for parameters in manufacturing processes

By using informatics based on MI-related technology and knowledge, we provide a SaaS solution that assist in finding optimal values for various parameters, such as setting conditions for each process. Informatics is performed after accumulating a variety of numeric and image data. For example, in the case of image data captured using an electron microscope or other device, feature values^{*3} can be extracted and quantified using image analysis. In addition, numeric data such as material formulation conditions and process conditions can be used to search for optimal conditions using informatics.

This will aid in establishing highly efficient manufacturing processes and contribute to rapid improvements in yield, which is a challenge when scaling up, as well as reductions in wasted costs.

*3 Feature value: A numerical value that quantitatively expresses the features and characteristics of data and objects being analyzed

Future Outlook

Hitachi will continue to enhance this solution including improving the accuracy of generative AI responses, with the aim of creating solutions that contribute to solving customer issues. Hitachi High-Tech will provide this solution to a variety of domestic and overseas customers, including semiconductor, battery, and materials manufacturers, to help solve a wide range of on-site issues in materials development and to provide environmental value.

Hitachi and Hitachi High-Tech will continue to develop Lumada*4 solutions that combine the digital and product technologies and expertise of both companies, while actively supporting digital transformation advancement for manufacturing customers.

*4 [Lumada](#): A general term for solution service technologies that leverage Hitachi's advanced digital technologies to create value from customer data and accelerate digital innovation

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About Hitachi, Ltd.

Hitachi drives Social Innovation Business, creating a sustainable society through the use of data and technology. We solve customers' and society's challenges with Lumada solutions leveraging IT, OT (Operational Technology) and products. Hitachi operates under the 3 business sectors of "Digital Systems & Services" – supporting our customers' digital transformation; "Green Energy & Mobility" – contributing to a decarbonized society through energy and railway systems, and "Connective Industries" – connecting products through digital technology to provide solutions in various industries. Driven by Digital, Green, and Innovation, we aim for growth through co-creation with our customers. The company's revenues as 3 sectors for fiscal year 2023 (ended March 31, 2024) totaled 8,564.3 billion yen, with 573 consolidated subsidiaries and approximately 270,000 employees worldwide. For more information on Hitachi, please visit the company's website at <https://www.hitachi.com>.

About Hitachi High-Tech

Hitachi High-Tech, headquartered in Tokyo, Japan, is engaged in activities in a broad range of fields, including manufacture and sales of clinical analyzers, biotechnology products, radiation therapy systems, semiconductor manufacturing equipment, analytical instruments, and analysis equipment. Also, we provide high value-added solutions in industrial fields such as mobility, connected, environment and energy, etc. Through business based on our core Observation, Measurement and Analysis technologies, we will contribute to the realization of a sustainable society by solving social issues.

The company's consolidated revenues for FY2023 were approx. JPY 670.4 billion. For further information, visit <https://www.hitachi-hightech.com/global/en/>

Related Link

- [Hitachi's MI Solutions](#)
- [Hitachi High-Tech's MI Solutions](#)

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