Abstract

Organizational Learning Facilitated by the Utilization of Digital Technology to Extract Context-Dependent Gen-Ba Knowledge

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The decrease in the number of workers and the aging workforce in Japan's primary industries have become serious issues. This situation not only undermines Japan's economic strength but also poses a potential threat to the daily lives of its citizens. To prevent the loss of knowledge and skills among skilled workers, it is necessary to transfer knowledge to younger workers. However, approximately 70% of companies report that they have not implemented knowledge transfer. Taking this situation into consideration, the Ministry of Economy, Trade and Industry (METI) has pointed out the need for acquiring the ability to identify and solve problems collaboratively, utilizing tacit knowledge and craftsmanship. However, the tacit insights and skills possessed by skilled workers are often accumulated individually or dependent on specific situations, making them challenging to acquire. In this study, such knowledge is referred to as "Context-Dependent Gen-Ba knowledge."

This research aims to reveal a mechanism for leveraging digital technology to enhance the ability to apply experience and skills by extracting and sharing context-dependent knowledge. The study conducted trial evaluations in two industries: manufacturing and electrical safety. The manufacturing industry constitutes 20% of Japan's GDP and supports the backbone of the Japanese economy. ISOWA Corporation, a manufacturing company, designs, manufactures, and sells corrugated cardboard manufacturing machinery and related services. The focus of the trial evaluation was on the task called "adjustment," where each component of the manufacturing equipment is aligned to produce specified corrugated cardboard as the final product. It was anticipated that this task, dealing with products susceptible to changes in temperature and humidity like paper, would involve individual and context-dependent knowledge due to varying machine understanding among operators. Four trial evaluations were conducted at the company, capturing the adjustment tasks of both skilled and younger workers using wearable cameras. The results suggested the extraction of context-

dependent Gen-Ba knowledge, which could be learned by both individuals and the organization. The second organization, the Hokuriku Electrical Safety Inspection Association, operates in the electrical safety industry, conducting inspections of electrical facilities for individuals and corporations to ensure safety, promote awareness, and engage in educational activities. The inspection tasks involve confirming whether the installation conditions align with predetermined conditions. While this may seem like a standardized task, the situational dependence is high due to the different circumstances of installations, such as hygiene considerations for electrical facilities in restaurants or child-friendly inspection tasks in kindergartens and elementary schools. Four trial evaluations were conducted at the company, introducing a voice-based system to collect workers' insights and conducting reflections. The results suggested the extraction of context-dependent Gen-Ba knowledge, which could be learned by both individuals and the organization.

Based on the trial evaluations, the study explained the extraction of context-dependent Gen-Ba knowledge and organizational introspection through experiential learning. It also proposed a learning environment, including educational reforms and task reviews. However, due to the short duration of the trial evaluations in this study, it cannot be conclusively stated that all actual Gen-Ba knowledge was extracted. Additionally, the subsequent application of the learned knowledge and skills has not been verified. Therefore, longer-term trial evaluations are necessary in the future.