How AI capabilities enable business model innovation: Scaling AI through co-evolutionary processes and feedback loops

The article is a presentation of an AI framework aimed at integrating AI into the manufacturing business models, the essence of which is AI scaling and innovation. It emphasizes three AI capabilities: the data pipeline, algorithm development, and AI democratization, which are the vital factors needed to scale AI. To integrate these capabilities into their business, firms should adopt the principles of agile customer co-creation, data-based operations, and ecosystem integration. The study demonstrates how co-evolutionary processes involving AI capabilities and business model innovations are reinforcing each other, thus revealing the need for interdependence, scalability, and feedback loops in achieving an effective and widespread AI implementation.

The data pipeline : this ability is one of the defining features of AI effectiveness in manufacturing, mainly aimed at systematically obtaining, cleaning, integrating, validating, and sharing data. It provides a stable, sustainable, and scalable infrastructure for AI algorithms that rely on well-organized datasets. Encompassing the capability to integrate data from multiple sources such as industrial sensors and external data bases is an important part of this feature and enhances the overall applicability of insights. Secure data sharing policies and efficient data management methods need to be in place for the predictive and analytical capabilities of AI technology to be actualized, and for successful AI implementation and innovation in digital servitization.

Algorithm development capabilities : in AI, it aims at developing predictive models and cognitive tasks suited to the particular purpose of a certain business. It is about identifying the significant data, designing and training algorithms with a high-quality industrial context knowledge, and continually validating and refining the algorithms using the real-world performance. The success in this aspect will largely depend on the blend of the technical AI skills and domain expertise thus manufacturers will have the ability to derive actionable insights and achieve operational improvements

AI democratization capabilities : its intention is to make AI tools and insights available to the organization in a broad sense which will create an environment where employees will be able to use and train AI to enhance their decision-making and operational efficiency. This is done by creating routines for identifying AI use cases, promoting cross-functional collaboration for solution development, and also looking into training and tools that would make the AI insights understandable and actionable for non-experts. Democratizing AI enables AI's benefits to be employed to the maximum extent possible, thereby triggering innovation and competitive advantage through the active participation and application by many.

The integration of AI into manufacturing is critical for the organization to stay competitive because it helps in the optimization of operations, improvement of product quality and customization of offerings, thus leading to efficiency and innovation. AI applications, like predictive maintenance and smart manufacturing processes, are able to provide the right solutions in the right time, which translate into reduced downtime and costs while enhancing efficiency. In addition, AI-based ideas may result in new business models and revenue streams, guaranteeing manufacturers to be on top