

Digital Twin – its Opportunities and Challenges from a Supply Chain Perspective

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At the forefront of the fourth industrial revolution, technologies such as digital twin seek to shift the way industrial companies operate. A digital twin is a virtual replica of a product, system or process. Historically, the focus has been on representing single objects but it is now shifting to interconnected processes, such as supply chains. Advanced versions of a supply chain digital twin can integrate physical and virtual spaces by, in real-time, replicating supply chains digitally. This allows companies to gain visibility of their supply chain and helps them make well informed decisions. However, there is a growing concern that digital twin might just be a buzzword, and that the hype will soon die down. As the technology is relatively young, it is hard to understand its true value. This question was asked by Northvolt, a newly established battery manufacturer in Sweden. We were tasked with investigating this and providing Northvolt with a point of view on how digital twin could benefit their supply chain.

What value is there in Digital Twin for Northvolt?

If a clear business case can be identified, there is without a doubt potential value in digital twin for Northvolt. A digital twin could help Northvolt achieve cross-company planning and provide them with material flow visibility, two characteristics they want to realise when the supply chain is operational.

What are important factors for Northvolt to consider before implementing Digital Twin?

A digital thread is a crucial aspect of a well-functioning digital twin and it is important to secure this throughout all supply chain operations. In addition, this includes that the digital thread must be supported by a digital strategy that covers all supply chain entities.

Interviews with Northvolt employees showed that Northvolt has very competent digitalisation and IT teams, with the ambition of making Northvolt a fully digitalised company. This entails that they have created a perfect growing ground for digital twin. Moreover, as Northvolt has a high level of vertical integration, it entails that they possess a lot of data in house. However, they must find a way to access the data from external parties in the digital thread if

they want an end-to-end solution. Suppliers of raw materials in the battery industry have a varying degree of digital maturity as well as a varied willingness to share data.

Recommendations for Northvolt

As Northvolt's supply chain and digital infrastructure are still being established, there is a lack of supply chain data which entails that they cannot currently implement a digital twin. However, it is recommended that Northvolt set up a cross-functional workshop to discuss potential business case(s) and take the important implementation factors into consideration.

What did the research result in?

Even though the research was conducted for Northvolt, the findings made are relevant to any company looking to understand digital twin. Furthermore, the results are relevant to academics looking for insights on digital twin that are rooted in industry, and who want to understand how theory presented in academia can be applied in a supply chain setting. As limited research has been conducted in the field of digital twin from a supply chain perspective, the research has contributed to bridging this gap.