

Recruiting digital twins to fix the factory

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Research in the *International Journal of Services Operations and Informatics* discusses how the concept of the digital twin might be used to improve factory layout. The approach could cut the time and resources needed to design floorplans for industrial plants and ultimately improve the efficiency of the factory.

A [digital twin](#) is a virtual replica of a real-world object or system that can be used to simulate the way in which that object or system might work if changes are made. It is not simply a three-dimensional model of the object or system, however. It includes information about connectivity between components of the system as well as about their behavior in the real world.

Andreas Lind of Global Industrial Development at Scania CV AB in Södertälje, Lars Hanson, Dan Högberg, and Anna Syberfeldt of the University of Skövde, and Dan Lämkuill of the Volvo Car Corporation in Göteborg, Sweden, have turned to the digital twin concept to help them demonstrate better factory design in the automotive industry. They point out that the extended communication framework offered by a digital twin can be used in the real world once a design has been implemented. It enables data exchange between virtual and physical objects and so could revolutionize the way industries operate.

The conventional approach to factory layout planning using virtual environments can be a time-consuming and iterative process. Its success relies on the expertise of the software user but is also susceptible to faulty inputs. The team suggests that the digital twin approach can overcome these limitations by facilitating rapid information sharing that allows the design to be created more effectively in the first place and the digital twin to assist with ongoing operations once it is in place.

The team discusses four key concepts: digital model, digital pre-runner, digital shadow, and digital twin in their work. These concepts illustrate how [data exchange](#) between virtual and [physical objects](#) leads to more realistic and accurate datasets. By accurately mapping data to the corresponding virtual model, simulations and optimizations can be performed, bridging the gap between the virtual and real worlds.

There are issues to be addressed before the digital twin concept can be

fully implemented, such as the standardization of virtual and physical object descriptions as well as the protocols needed for [information exchange](#) within and beyond the factory layout from sensors and signals, for instance.

Ultimately, the digital twin will help in the design of the factory and then become an automatically updated virtual environment representing the factory or manufacturing plant that can be used to improve ongoing decision-making and process optimization.

More information: Andreas Lind et al, Extending and demonstrating an engineering communication framework utilising the digital twin concept in a context of factory layouts, *International Journal of Services Operations and Informatics* (2023). [DOI: 10.1504/IJSOI.2023.132345](https://doi.org/10.1504/IJSOI.2023.132345)

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