



# LEVERAGING METAVERSE IN THE MANUFACTURING INDUSTRY | INFOSYS

## Abstract

Manufacturing could be defined in multiple ways, but the core will remain the same – creating a new physical object or an article. On the contrary, Metaverse, in layman terms, could be defined as a Virtual Reality (VR) space where humans interact virtually and in real time. So, how do we imagine something that is physical, something that is created using raw materials or assembled using components, and using division of labor, in a virtual reality world? The future may beckon newer technologies that could redefine the paradigm of Metaverse in manufacturing. But for now, through our POV, we lay down a few use cases for implementing and bringing the best relevance of Metaverse to the manufacturing industry.



Metaverse is expected to be all-pervasive in the coming decade. For now, manufacturing companies could look at transposing their planning, R&D, training, and compliance, activities to the Metaverse. This can help achieve the objective of the manufacturing activity or task. For manufacturing companies, it may not seem to make immediate economic sense to invest in this new technology. But it is just a matter of time before a competitor uses Metaverse as a competitive advantage. Manufacturers can garner higher customer recall and brand loyalty through innovative usage of Metaverse. A uniquely positioned brand always captures mind space of customers. Metaverse may be the next frontier, in the quest for higher brand loyalty and customer acquisition.

## Social VR: A Precursor to Metaverse

In the corporate world, social VR has been used for hosting virtual events, conferences, and get togethers. The COVID-19 pandemic transformed the experience of hosting and participating in remote events. The shortfalls of a remote event aside, it offered a perspective to organizations on how a corporate Metaverse may evolve.

The same social VR platform can also be used to experience a replica of the corporate office that could be half a world away in real, physical terms. Employees sitting in Asia could virtually experience – on their own and at their own pace – the marvelous architecture of the corporate campus in California, unlike a video of the same campus.

Social VR could also help customers set-up virtual product briefing rooms. Vendors could invite a customer to experience and gather information about the vendor's products, company, philosophy, and background using an assorted set of collaterals, including videos, posters, banners, 3D charts and whiteboards.

## Shopfloor Metaverse

Shopfloor Metaverse is a virtual reality space, in which physically remote shopfloor employees can interact through their digital avatars and in real-time, with the equipment under their control as well as with the avatars of their co-workers. Shopfloor workers of the future will work in a hybrid environment. While remote, they will execute tasks and undertake training through shopfloor Metaverse and while on site, they will be connected workers.

### Connected Worker

A connected worker is equipped with real-time, insightful data and visualization tools, on the site, through devices that improve product or service quality, worker productivity, personnel safety, shopfloor or field decisions, reporting, and compliance. Using AR/VR hardware, a [connected worker](#) can collaborate with an SME at a different shopfloor or country, in a shopfloor Metaverse. This could replicate plant operations and help troubleshoot, build scenario-based simulations, and offer on-the-job training.

### Factory Audit

A factory audit report could be presented to the corporate headquarters in a shopfloor Metaverse. The report's highlights and non-compliance observations could be tagged in the Metaverse. A company executive can be accompanied by an auditor, in the Shopfloor Metaverse, and point-by-point observations and suggestions could be explained in the virtual world. In areas of incremental condition deterioration cases, the audit report observations will be seen in the context of real-time data through IoT sensors, rather than dated information published in reports. Thereby, an executive from headquarters may be in a better position to analyze an audit report in the shopfloor Metaverse, rather than having to read a document and make interpretations.

### Remote Monitoring

A shopfloor Metaverse will allow for real-time equipment health status to be available within the Metaverse, using IoT and 5G. ML models will help companies build predictive maintenance plans to work upon and simulate scenarios within the Metaverse. A remote supervisor or manager can enter the shopfloor Metaverse and monitor plant equipment status and take decisions. A managed service model may also evolve, wherein resources across different plants are shared for critical decision inputs, while onsite technicians perform the activities.





### Digital Twin

Digital twin is the most famous Metaverse use case in manufacturing. Real-time data from the cloud and sourced from IoT sensors is overlaid on a digital twin of the shopfloor equipment. This helps in remote monitoring of equipment health. Simulation models can be run on historical data to predict failures. Models could also be used to visualize planning scenarios. Using a shopfloor Metaverse, the experience of the digital twin can be enhanced. Instead of looking at plain data on a digital twin dashboard, the same could be overlaid on a 3D replica of the equipment within the Metaverse, while playing out simulations in the virtual world.

### Shopfloor Training

Manufacturers can bring about a paradigm shift in their training programs for shopfloor workers and new employees, in the Metaverse. Video-based training can be replaced with shopfloor Metaverse training. Here, employees will be provided with AR/VR headsets and an immersive training experience that will be equivalent to hands-on training. The key difference would be that unique scenarios could be played out in the shopfloor Metaverse, to train and assess employees. Such training will be essential especially in hazardous industries like chemical, steel plants, and mines. The interactive nature of the Metaverse will mean that employees will look forward to yearly mandatory refresher trainings. The Metaverse will also empower trainees from different plants and countries interact with and learn from each other, in the virtual training center.

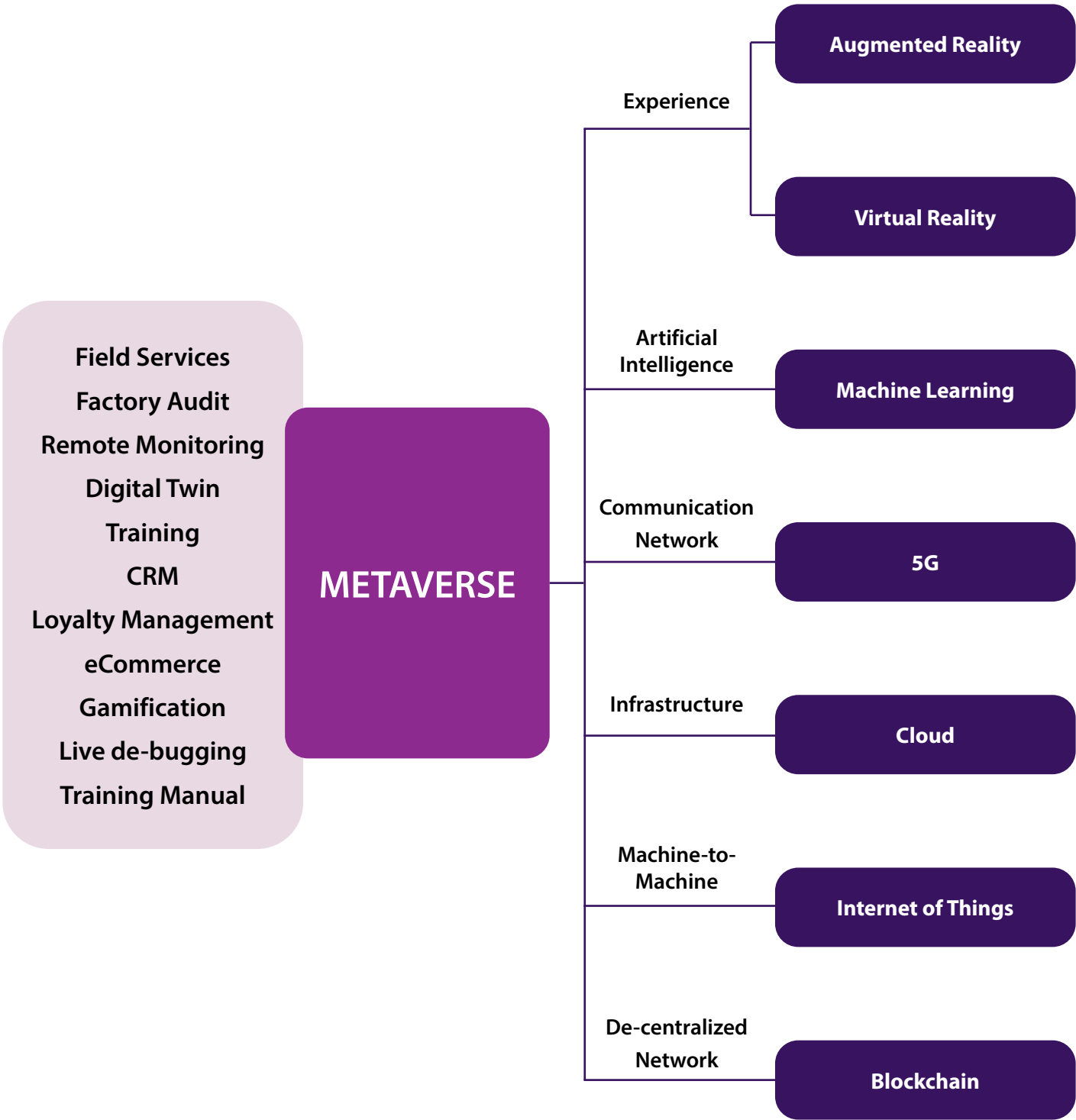
### Vendor Product Selection and Participation

One of the advantages of a Metaverse in manufacturing is that you could provide access to vendors to bring and showcase their products in your shopfloor Metaverse. Vendors could present their products and offer a virtual product for 'anytime assessment' by the procurement team of prospective clients.

The shopfloor Metaverse could also be an avenue where an equipment vendor could place their equipment within your existing production line and be a part of any simulation, like a digital twin, which may be needed for the program. Vendors could also help in simulated process change exercises.

### Visitor Trainings

The shopfloor Metaverse could also be used for guided tours and safety trainings for visitors before they visit the actual shopfloor. Instead of playing videos on a tablet, visitors can be given avatars to learn about safety signs and exits. An immersive experience would make visitors better acquainted with plant environment rather than videos.



## From sci-fi to reality

Although Metaverse is still in its infancy in the manufacturing sector, it is an undeniable fact that it holds enormous potential for transformative growth. While we still have some time for the concept to become mainstream, early adopters will stand to gain significantly. The first step to unlocking these benefits is the adoption of the building blocks that already exist, such as IoT and digital twins. As more and more manufacturing enterprises hop on the Metaverse bandwagon, distinct functions and benefits will emerge, thereby delivering competitive advantages to manufacturers.



## About the Authors



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Avinash has 21+ years of experience in consulting clients across the manufacturing, resources, agriculture and telecom industries on understanding and adopting new technology use cases. He consults in areas of Machine Learning, Internet of Things, AR/VR and 5G. He also has vast experience executing complex transformational projects across the globe.



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Alok has 29+ years of experience working across multiple organizations ranging from products to solution, for varied industry verticals like energy, utilities, manufacturing, mining and agriculture. He has extensive knowledge in identifying market trends and requirements to convert them into solutions through innovation, including creation of business cases for leadership. In his current role as Head of IoT, AI and New Tech for the manufacturing, resources, and hi-tech industry verticals, he partners with customers in their digital transformation journeys, leveraging multiple technologies like IoT, AR/VR, etc. to create innovative solutions and deliver value across their business value chains.



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