

How Metaverse will influence Industrial Innovation (Extended Abstract SID2022)

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Abstract

This paper will explore how Metaverse will facilitate the acceleration of industrial innovation and help the industry digitalize their global high-volume manufacturing environment. The authors conducted a live workshop (with around 30 participants) as part of the international conference Sibiu Innovation Days 2022. The workshop's proceedings and output is described here below.

Keywords: Metaverse

1. Introduction

The Metaverse concept in a manufacturing environment is nowadays understood through digital twins, process modelling, equipment, line and factory simulation. The final goal is to be able to create a mirrored world, a replica that duplicates a real-life industrial environment in a computer-generated reality. This generated industrial world shall encompass all relevant levels and their interaction: from complete productions sites to material/ people flow and down to individual manufacturing processes and machines; of course, this needs to be accessible through a networked extended reality, embracing all aspects of augmented reality, mixed reality and virtual reality. Having these in mind, one can imagine the Metaverse as a continuous flow of information between its pseudo-static nodes which are the virtual assets.

2. The Metaverse

2.1 Structure

During the workshop, the audience was guided through to a series of small sessions meant to explore all the aspects of the Metaverse, from the first mention of the term to its industrial applications and beyond.

The workshop was structured on the following 3 topics to guide the participants in generating the content for the 4 basic questions detailed in Figure 1:

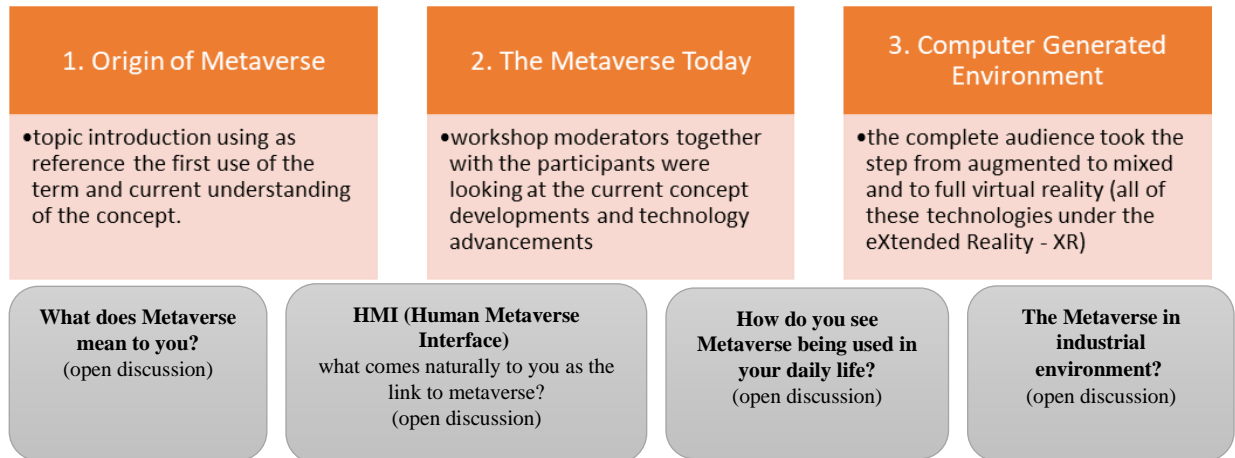


Figure 1 Workshop flow

2.2 Origin of Metaverse: Snow Crash by Neil Stephenson (published in June, 1992.

The Metaverse, a notion coined by the author as a successor to the Internet, constitutes Stephenson's early 1990s vision of how a virtual reality-based Internet might evolve in the future. Resembling a massively multiplayer online game (MMO), the Metaverse is populated by user-controlled avatars, as well as system daemons.[1] “In futurism and science fiction, the metaverse is a hypothetical iteration of the Internet as a single, universal and immersive virtual world that is facilitated by the use of virtual reality (VR) and augmented reality (AR) headsets. In colloquial use, a metaverse is a network of 3D virtual worlds focused on social connection.”[1]

The Metaverse Today is understood as a graphically rich virtual space, where people can work, play, shop, socialize and engage in any possible activity from real life and extrapolated to the impossible ones (e.g. flying through an uncharted galaxy, journey to the core of the Sun).

The concept of presence is the essential factor in today's understanding of the Metaverse. Having the feeling of being there and having others there with you too essential for creating the social connection.

What does Metaverse mean to you?

- a new communication space;
- massively multiplayer online role-playing game;
- going beyond physical boundaries;
- a world tailored to my needs;
- a digitally reconstructed reality;
- integration & interaction.

HMI (Human Metaverse Interface): the key to acceptance is understanding the most appropriate way to interact with this new, strange, non-natural virtual world. Despite

the current Web an Internet technological advancements the user interaction remains undeniable unchanged through keyboard, mouse/ pointer & display.

What comes naturally to you as the link to metaverse?

- tesla suit;
- BCI (Brain Computer Interface);
- gloves (haptic);
- smart glasses;
- aromatic/ olfactive generation devices;
- haptic chair (simulation chair);
- treadmill.

Daily life in the Metaverse used as a mean to entertain, learn, socialize and, most important, to fashion one's perfect world; why not a perfect industry?

How do you see the Metaverse intrusion in your daily life?

- digitally filtered reality (e.g. visit Paris without the traffic noise or the less appealing parts);
- gaming;
- body enhancement (persons with disabilities can live a normal life);
- study specific rare cases in medicine or rare events / situations;
- dangerous environment become NASA explorer without going to the moon);
- test different jobs and find the right one for you;
- commerce (trying out clothes);
- banking (blockchain and digital IDs);
- recreation/ entertaining/ tourism;
- attending events remotely/ Business meetings.

The Metaverse in an industrial environment is in a nascent state, but with unlimited applicability which is not really grasped today. Put in the right context, such a concept can enable a new way of approaching industrial innovations and speed up digitalization and its applications in the industry.

Contiverse example– as an initial full industrial automotive manufacturing metaverse:

- a fully immersive location visualization with real-time augmented information
- two-way connectivity: from virtual to real-world
- multiple levels of engaging interaction
- virtual assets tied to real-world products and processes
- a new way to experience social & professional networking

How Metaverse will influence industrial innovation?

- on-boarding/ accelerated learning outside my area
- simulate process (different scenarios)
- optimization of process through simulation
- training/ Learning/ Presenting
- try out new ideas: e.g. vertical production plant
- design for manufacturing (design a part of a system directly in the metaverse)

- remote control (e.g. industrial, medical robots)
- “safe” playground (physical + emotional); (safe failing environment)
- digital-physical work interaction
- cyber physical systems

3 Conclusions

Contrary to what was initially assumed by the authors and conductors of the workshop, the participants were familiar with the concept and idea of the Metaverse, leading to a fruitful and surprising result. Our discussion has shown that Metaverse has huge unexplored potential in our daily life and especially on industry innovation. Its implications are to be further identified and developed.

Reaching multiple levels of our society and professional life, supported by the current technological advances and social transformations, this mirrored world is moving from a mere idea in a sci-fi book to a real virtual product from which the industry and research can benefit..

References

- [1] <https://en.wikipedia.org/wiki/Metaverse>, last accessed November 2022.
[2] <https://www.nytimes.com/2021/07/10/style/metaverse-virtual-worlds.html>., last accessed November 2022.