



VIRTUAL ENHANCED CO-INNOVATION SPACES

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Abstract: *The pandemic has turned the world upside down and served as an accelerator for digitization and the rethinking of long-serving processes in many areas. This is also the case in the world of work, where the term “New World of Work” (NWOW) was established, in which employees have the freedom to decide whether they want to work from home or in the office. For this purpose, the physical office will be redesigned to meet the requirements of an interactive and sometimes even immersive meeting and collaboration area.*

While the process of switching to a NWOW and hybrid everyday life is still in full swing, there is already talk of new trends in a virtual working world and the metaverse. People meet in virtual worlds, interact and work together. Geographical distance doesn't matter here, as it should feel like you're in the same room together. But what are the advantages of working virtually and will it prevail in the long run? What does the renewed conversion of work processes mean for co-innovation spaces and will physical office space still be needed in the future?

Key Words: *Customization, Workplace, Collaboration, Co-Innovation, Hybrid Office, Metaverse*

1. INTRODUCTION

With the beginning of the pandemic in 2020 and the necessary measures, many of our habits were questioned and adapted to the new circumstances. At this point in time, the term “digitization” was already widespread in industry, but it was only due to Covid-19 that all other industries were forced to deal with the topic. For all employees who have been working in a physical company office, a very fast shift to a work setup in the “home office” was ordered. Very few companies were prepared for such a radical change and now had to change their processes as quickly as possible. For this purpose, the market was flooded with new software and hardware solutions. Since a large part of the employees are now still fully or part-time in the home office, the role of a company workspace and its requirements have changed drastically. This switch to a hybrid way of working is summarized under the term “New World of Work” (NWOW). There are many factors to consider for a successful transition into a new age of NWOW, of which we would like to highlight three that are closely related. The “new role of the office”, the “technical equipment” and the definition of “clear rules for mobile working”.

While much of the work can be done remotely, the importance of the physical office is evolving from being primarily a workspace to a meeting place. Where there used to be rooms filled constantly with physically present employees, there are now open and modular rooms that meet the demands of “activity-based working”. In addition, the office is largely responsible for how the employees identify with the company, how much the potential for collaboration and innovation is exploited and whether they continue to like coming to the office or prefer to stay in the home office. Since not every company is able to redesign its own office space in line with NWOW, a new type of shared external workspace is emerging, a “Co-Innovation Space” [1]. Companies can rent space there on a daily or weekly basis or even longer in order to complete collaboration-focussed innovation challenges, to exchange ideas and develop new products and services together with external innovators.

With this contribution to “Virtual Enhanced Co-Innovation Spaces” we want to take a closer look at the consequences of a hybrid working world in the physical office and classic workplaces. What has already happened in the last two years, what are the biggest challenges here and what adjustments are still to come, even in a fully virtual enhanced workspace setup, the Metaverse. Will working in a virtual reality prevail and what consequences would this have for the physical office?

2. REMOTE & HYBRID WORK - SUMMARY AND SUCCESS FACTORS

In the past two years, most of us have had significant experience with working remotely and hybrid working. The conclusion is sometimes different, which is strongly related to your own predispositions and possibilities (space and equipment) in the home office. However, one can say that both forms of work have their justification. Improving life-work balance through home office and independent time management leads to better morale and employee satisfaction, while working in the office promotes belonging, identity, exchange, creativity and innovation in the company. The initial skepticism of employers about the home office could thus be refuted and studies show that 75% of companies want to continue with the hybrid working models. It is expected that at least a third of employees will continue to work mobile and the average days worked in home office will triple from 2.8 [2].

While some companies were already able to lay the framework for a hybrid working model after the pandemic, there are also many who are only reacting to political pressure and are not actively driving change. It will be exciting to see how many of you fall back into old patterns and do not finally identify with a NWOW concept. Many factors are responsible for the successful implementation of a hybrid working model within the framework of NWOW, but as mentioned at the beginning, we want to emphasize three in particular. "Clear rules for mobile working", "technical equipment" and "new role of the office". The rules primarily concern the cooperation between employees and are intended to clarify topics such as attendance (presence information), working hours (presence vs. home office) and the availability of employees. All rules serve to ensure fair dealings with each other and smooth cooperation. Nobody should feel disadvantaged, regardless of whether they prefer face-to-face work or a home office. By technical equipment we mean both the technical infrastructure of the office (bandwidth, media technology, screens, cameras, ...), personal work computers and the software required to enable hybrid work, including the tools required to comply with the rules [3].

We see the new role of the office as a decisive factor, especially when it comes to the time after the pandemic and the continuation of a successful NWOW approach. While up to 90% used to function as a work surface, today it is much less, sometimes only 20-30%; the remaining area has been redefined as a "meeting area". Employees should meet in the office to complete workshops, discuss topics, work together in an innovative and collaborative way. The focused (alone) processing of topics can and should mostly take place in the home office, which is represented by the reduction in the work area. In the long term, three room concepts in particular will characterize the offices. "Spaces for focused work" where you can withdraw and work on topics or research in peace. "High-tech communication rooms" which are available to employees for working together on site or for virtual teams. The technology is required to successfully implement hybrid work and to hold efficient meetings. These are touch displays, digital whiteboards, variable camera work, automated logging, directional microphones, targeted moderation and much more. The focus of the modern working world is on creativity, innovative ideas and collaboration. The "Coworking Spaces", which are the heart of the NWOW office, are available for these topics. For this purpose, the corresponding premises are designed to be open and, above all, modular and agile. Depending on the activity, the room can be redesigned and adapted (activity-based working). In addition to the three room concepts, we also want to point out smaller closed units, which serve to get the increased need for video calls and the resulting noise level under control.

2.1. Remote & Hybrid Work - Challenges

The pandemic and the shift to hybrid working has brought many challenges. Companies had to adapt incredibly quickly to the new circumstances, which only worked to a limited extent at the beginning, since the technical equipment for this was often not available or the workforce did not really know how to deal with the new

circumstances. There was often a problem with network access, jerky video conferences, a lack of equipment or simple rules for working together for mobile work. With the onset of the pandemic, companies have upgraded, offices and employees have been equipped, office space has been designed for hybrid work, and software tools have been purchased to handle day-to-day collaboration. Only companies that were already using activity-based working before Covid and had already created the framework conditions had it a little easier here.

On the one hand, it is unbelievable how quickly and successfully the adaptation to a hybrid everyday working life has taken place, but on the other hand, many companies simply did not have the time to deal with the topic and the challenges. As a result, new systems and tools are not optimally integrated, interfaces are created provisionally and the staff have only been trained to a limited extent on new working methods and software. While the technical basics (hardware and software) were already there or were being developed in a hurry, there is still a great need for training in the competent use of the tools in order to be able to fully exploit the potential of hybrid work. Tools have been developed for all mobile collaboration issues, be it to replace the missing social aspect of the office, to improve collaboration during virtual meetings, to log them, to ensure asynchronous collaboration, etc. But due to the lack of standards and training, many of these are Completely unknown solutions, or there is no corresponding strategy to implement them.

With regard to a successful implementation and future continuation of the NWOW approach, we see the physical office itself as the greatest challenge. On the one hand, it represents the company and the employees identify with it, but primarily, based on its structure and premises, it specifies the expectations of the employees' way of working. A company that takes a hybrid approach while sticking to the conventional workspace will quickly find that the opposing concepts get in the way. The increased need for short calls and votes will significantly increase the volume in the office without there being any alternative. Assuming that many workers will be working from home, many of the workplaces in the office will remain unused. The increasing number of virtual meetings and conferences are beginning to lose efficiency if the appropriate technical options are not available in the conference rooms, and the potential for collaboration and innovation is not fully exploited if the appropriate coworking spaces are not available. In any case, it will be exciting to see how the return to the office will look after the end of the pandemic. Who will continue down the path of the NWOW and how many companies will fall back into old patterns, if only because a corresponding strategy for hybrid working was never created in the long term.

In order to go back to the importance of the NWOW for employees and the associated improvement in "work-life balance" at this point, it should be mentioned that during the pandemic a large proportion of all workers looked around for a new job. In addition to the industries hit by the pandemic (catering, hotels, health), one of the most frequently mentioned arguments is the improvement of the "work-life balance" and how companies deal with hybrid work. So it is not surprising when companies advertise for skilled workers with always attractive working conditions.

3. METAVERSE - THE "IMMERSIVE INTERNET"

Through the pandemic and the hybrid working model, we have learned to differentiate between which work environment we do which work most efficiently and which means are available to us in the respective environment. We now appreciate the advantages of a virtual call, where documents can be worked on together, the results are available in digital form, the work status of various participants can be displayed and logging can be carried out via video recording or AI tools. Some of us will have already found ourselves in the "analogue" office during a workshop by missing the appropriate tools and functions from the digital world. With this in mind, it seems only logical that the next step in the world of work is to drive the digitization of processes and documents, as well as the transformation of the physical office. Appropriately, Mark Zuckerberg, CEO of Facebook, announced last year that he would rename the company Meta and present his vision of a "Metaverse" within a two-hour conference.

The term and idea of the "metaverse" (engl. Metaverse) was already described by Neal Stephenson in his novel "Snow Crash" in 1992. Games like "The Sims" or the platform "Second-Life" can be mentioned as the first prototypes of a metaverse, and large companies like Microsoft, Apple, Google and Facebook itself have been working on the corresponding concept for a decade. For this purpose, new technologies in the form of hardware and applications are being developed, and companies that have the relevant know-how are being bought up. In this sense, M. Zuckerberg presented less a world first, but rather ushered in a new era, which will develop over the next decade and will virtually depict more and more aspects of our daily life. But what exactly is the Metaverse and what impact will it have on our work?

The Metaverse consists of interconnected 3D virtual worlds that the user can visit with their avatar and interact with other people. It is described as a new form of the Internet. Just as the web used to consist of text and images before videos and other media were added, the metaverse is intended to represent the next level and place the user at the center of interaction. Instead of following a video call on the monitor, in future we will meet in a virtual room and interact with each other's avatars. The joint film evening will not take place on the TV, but in a virtual cinema where I meet my friends and we watch the film together. Likewise, visiting sports and music events, or shopping in virtual malls and showrooms. The Metaverse, like the Internet, will cover many areas of our lives. However, it remains the decision of the individual how intensively and for what purposes he wants to use it. Optimally, the Metaverse is experienced through XR glasses like the Quest to allow for a sense of "presence" and "immersion" in the virtual worlds, but this is not a necessity.

The metaverse as Meta imagines it needs another 5-10 years of development. Nevertheless, the metaverse already exists here and there in small parts and prototypes and proves, especially among younger generations, that there is a corresponding interest and that a lot of money can be earned with virtual worlds and goods. So it's not surprising when Epic Games CEO Tim Sweeney claims: "Over the coming decades, the Metaverse has the potential to become a "multi trillion dollar" part of the world economy." Epic Games itself created the "Fortnite Metaverse", where

events or rooms for social interaction can be visited in addition to the successful Battle Royale game. Among other things, the rapper Travis Scott gave a virtual concert here. The Fortnite community has over 350 million members. Other examples of successful prototypes include the online gaming platforms "Roblox", "Decentraland" and "The Sandbox." Microsoft focuses first on its core areas of industry and the world of work. They have industrial AR glasses on the market (Hololens), are working on the mesh extension for MS teams (virtual work) and are developing holographic avatars. Incidentally, it should be mentioned that MS has risen to become the third largest game manufacturer through the acquisition of Blizzard and is consciously positioning itself here for the future in the Metaverse. Apple already has a billion capable AR devices on the market (smartphones and tablets) and is consistently developing technologies that underpin their vision. To name a few of these technologies, the AR framework "ARKit", the "Lidar-Scanner" technologies, their Memoji library (users are already using future avatars) and the "Object-Capture" should be mentioned. A lot of it is about recognizing and scanning the environment, expanding it with 3D models, digitizing handwritten working texts and materials or converting real objects into 3D data. The real and virtual worlds are increasingly merging in Apple's vision. The list of companies working on developments for the Metaverse could go on forever. In addition to the Metaverse of Meta, we also want to mention "Nvidia's Omniverse" at this point. A cloud-based collaboration platform in which users can create virtual worlds together and simulate them for industrial, social or environmental topics.

3.1. Working in the METAVERSE - the virtual office

For a future Metaverse, XR technologies will be crucial to gain a sense of presence and immersion within virtual worlds, or even to merge the real with the virtual environment. In recent years, many XR applications have been developed that already show the potential of XR and serve as a template for the metaverse. One area in which the technology is particularly effective is in the training of employees and the simulation of delicate situations such as in medicine, in the military or in the construction of highly complex products. It has been proven by the "learning pyramid" that you can remember something better (up to 70% higher) if you experience it in real life and apply it instead of learning it through passive technologies such as reading, hearing or seeing. Corresponding situations are simulated without causing any personal injury or material damage. The same applies to collaboration in virtual space. While meetings via screen are not very immersive and after a while concentration and receptivity decrease, virtual meetings remain interactive and are experienced by the participants as if they were in the same room with those present. Attendance, attention and productivity of the meeting have increased and we haven't even talked about the advantages of the digital world itself [4].

What are the effects of a virtual workplace for us personally and in relation to working with colleagues on various projects? One of the disadvantages of hybrid and mobile work is that we sometimes work at the kitchen

table, sometimes from the living room or on the go. In the office, the workplaces are no longer assigned, but can be freely selected according to availability. While the flexibility here is great, at the same time it is almost impossible to achieve a fixed configuration of workspace and assets used, which in turn translates into lost time and productivity. In comparison, we can design our virtual workplace as we wish, hang up the size of the room, number of monitors and tools such as pin boards or whiteboards. This virtual workplace is available to us from anywhere and is always unchanged. All data, information and tools are in the cloud. We only need our mouse and keyboard, as well as the VR glasses to be able to interact with the virtual world. If the desire arises to clean up the workplace or to work (virtually) in an inspiring place, this can all be done at the push of a button. In terms of working and collaborating with others, it means that professionals can be brought in from all over the world without the negative aspects of physical and social separation being of great importance. Virtual rooms are created for joint projects, which are subject to the requirements of the project and the team (activity-based working). Here you can work together and interactively, record results and redesign the room according to your needs. Neither the next project nor service team will enter the room to erase whiteboards or to bring in clutter. A separate room can be used for each project and topic (virtual area is not limited) [5].

Working in the Metaverse can help balance the “negative aspects” of a hybrid work environment. While technology has been primarily responsible for maintaining employee communication and interaction during the pandemic despite physical distance, the Metaverse aims to fill the social and personal gap that arises during mobile work. Many industries and professions rely on visual representations and prototypes based on 3D models. These include medicine, architecture, product design and prototype simulation as well as the construction industry. VR is already being used in all of these areas. Experts are working together on corresponding 3D models and prototypes, or simulating complete systems or cities. Digital twins are a cost-effective way to map reality and use it in production. All 3D environments, models and tools for simulating reality are available in the Metaverse and can be loaded into the virtual space at any time. The development of Nvidia's “Omniverse” is of great importance here.

The biggest advantage of working in the Metaverse is the fact that we are in a purely digital and virtual space. We are almost independent of hardware here, all that is required is the device to dive into the metaverse (XR device), including input devices such as keyboard and mouse. Both the computing power and the software used are loaded directly from the cloud, and work materials such as screens and whiteboards only exist virtually. All notes and elaborations from the Metaverse are digitally recorded and can be accessed. Entire meetings can be saved and filed by audio, image or complete 3D scene. Tools using AI can take over the logging or provide other important information during a workshop. Experts can be drawn into the virtual space without further ado (local independence) and exchange ideas with others, even if they do not speak the same language (AI support). The possibilities within a

virtual world are practically limitless and if the metaverse delivers what it promises then in the future we will have both aspects - a real world on our own terms in terms of location and work-life balance as well as an interactive, dynamic working world in which we can work together in virtual spaces and build on social and interpersonal components in a way that technology has never before made possible [6].

4. CONCLUSION “FUTURE OF WORK”

Although different industries have been using virtual technologies in everyday work for years, for the vast majority it is still a distant and very futuristic idea. However, if you look at the current developments, you will find that four of the largest collaboration companies have already joined the Metaverse. The company Zoom has teamed up with Oculus and developed the “Horizon Workrooms” platform. Here, participants in a zoom meeting can meet in virtual rooms and interact with each other via avatars. Virtual whiteboards are available and work materials such as the keyboard are taken into the virtual space. Other participants can join via video call and participate equally on the virtual whiteboards. The Cisco company introduced Webex Hologram, where participants of a virtual meeting have the opportunity to work together on immersive 3D holograms. Using an XR device, the participants see the same holograms in front of them and can interact with them. The hologram technology proves to be very helpful in professional fields such as medicine, technology, sales and technical support. The company Slack has also already announced entry into the Metaverse, although not many aspects of the project have yet been announced. Microsoft will expand its Teams platform later this year with a mixed-reality solution called Mesh. All team functions are available, which are expanded by virtual rooms, avatars and holograms. PCs, smartphones and MR headsets such as the Oculus are used to get started [7].

During the pandemic and the reversal of working life into a hybrid working day, we have experienced a strong individualization and “customization” in the form of “activity-based working”. Employees can decide more freely than ever before where and when they want to work, and the majority of the office has been converted into a meeting space in which collaboration spaces can be adapted and converted to suit the relevant tasks. The aim here is to increase the work balance and efficiency of the employee by means of individualization and customization. The Metaverse will be based entirely on this trend and will revolutionize the individualization of everyday work and the workplace. In the Metaverse, I can work when I want, where I want, and above all with whom I want, regardless of regional circumstances. When creating the avatar, you can decide how you want to appear in the metaverse and how you want to be perceived. The personal “virtual office” can be set up and modified as you wish, regardless of budget, room size or available technology limitations. And the best part is that I can take it anywhere and use it anytime. In terms of teamwork, it is similar to the NWOW premises, which are adjusted based on the activity to achieve the highest possible efficiency. The only difference here is that there are no limitations in the Metaverse as we know them from the real world.

At the outset, we asked ourselves what impact the Metaverse will have on the physical office and whether it might even make it obsolete. Our answer to this is clearly no. The new role of the office in the hybrid age has fundamentally changed and will remain so. In the future as well as today, some employees will work mobile and the others will be present in the office. If possible, collaborative tasks should be completed on site and together, while classic processing remains location-independent. Virtual work in the metaverse is intended to be an additional means of supporting and bridging the weaknesses of a hybrid work model. People who cannot be there, or meetings that are entirely virtual, will take place in the Metaverse in the future to ensure personal proximity and efficient collaboration. Corresponding tasks such as prototyping, simulation and training will increasingly take place in the metaverse, since they are much better off here. Over time, the "personal" virtual workspace will also prevail, as it offers us a hybrid everyday work routine and constantly changing workplaces without our own setup. The Metaverse will not replace the office, but will be an addition to both the home office and the office. Just like we carry our laptop from one workstation to another today, in the future we will take the XR headset for a walk. In principle, the physical office will continue to follow the path taken by the NWOW and will become more and more digitized and technically upgraded. While the individual employee walks their own XR headset, future meeting rooms will be equipped with technology to scan people and their actions and gestures and interact with other hologram participants at a different location using hologram technology. The advantage here is that no headsets and controllers are required and you can therefore interact freely. Other 3D models can be displayed as holograms and interact with all participants at the same time.

5. REFERENCES

- [1] P. Blazek, V. Aschenbrenner, "Creating Customizable Co-Innovation Spaces" in "Towards Sustainable Customization: Bridging Smart Products and Manufacturing Systems" in Proceedings of the 8th Changeable, Agile, Reconfigurable and Virtual Production Conference (CARV2021) and the 10th World Mass Customization & Personalization Conference (MCPC2021), Aalborg, Denmark, October/November 2021
- [2] n.a. "New Work: Definition, Konzept & Beispiele der Neuen Arbeitsformen" in: <https://www.avantgarde-experts.de/de/magazin/new-work>
- [3] F. Gurtner, "New Work Office ... oder: Was zukünftige Bürowelten ausmacht." in: <https://thinknewwork.com/de/newwork/new-work-office-or-features-of-future-office-worlds/>
- [4] M. Purdy, "How the Metaverse Could Change Work" in: <https://hbr.org/2022/04/how-the-metaverse-could-change-work>
- [5] A. Ramirez, "Are Virtual Reality And The Metaverse Ready To Support Collaborative Work?" in: <https://www.forbes.com/sites/forbestechcouncil/2022/02/15/are-virtual-reality-and-the-metaverse-ready-to-support-collaborative-work/?sh=6981bc1d716c>
- [6] n.a. "Microsoft's Satya Nadella on Flexible Work, the Metaverse, and the Power of Empathy" in:

<https://hbr.org/2021/10/microsofts-satya-nadella-on-flexible-work-the-metaverse-and-the-power-of-empathy>

- [7] D. Mattin, "A Journey to the Infinite Office" in: <https://www.workplace.com/metaverse-work-infinite-office>

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