



# *Analysis 1 – Technical and didactic readiness of companies*

## *Upper Austria*



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## Introduction

During the program period, a number of companies were approached regarding augmented and virtual reality technologies. The result of this process was a set of twenty interviewed companies whose responses were analyzed. These results are presented on the following pages.

In the initial phase of the project, emphasis was placed on network development, so a large part of the time was devoted to finding suitable network partners. Many phone calls and meetings with researched contacts followed. Most of them could also be obtained for the network, so the first webinar was organized on June 1, 2021. The speakers were Mr. Klaus Stöttner, CEO of Pool 3, and Mr. Andrej Barguca, co-founder of Virtual Lab, who informed 41 participants about VR training at the webinar "Virtual reality - the future of training". On July 6, an Austrian round table was held under the title "Auf in neue Welten". Based on various Austrian examples of use, the benefits of VR/AR were discussed together with 35 participants. After the main speeches of Jeremiah Diephuis (FH OÖ Campus Hagenberg) and Florian Hofer (Ars Electronica Center) on VR research perspectives and relevant Ars exhibitions five application examples were presented to the Electronica Center.

Afterwards, each of the experts supervised a topic table to discuss the example they had brought and answered questions: from low-cost virtual reality in schools to WheelSim VR - e-wheelchair training in virtual reality to "next-generation learning" through 3D animation mixed reality models.

Another approach in the first months was the preparation of a regional analysis. Analyzes were created together with all project partners, and finally the LimeSurvey online survey tool was added. After that, already obtained and suitable partners of the network were approached and asked to fill in the questionnaire. The meeting often included a presentation of the project and filling out a questionnaire. The questions related to general issues of digital transformation (industry 4.0) to specific questions in the area of AR/VR. Finding Upper Austrian companies that use VR/AR in their own company was much more difficult. Many of the requested companies did not respond to our project, canceled it or were simply not interested in it. In addition, the impression that many companies do not realize the importance of VR/AR or do not pay attention to it due to time constraints has been reinforced.

We have overcome many difficulties to successfully implement this regional analysis. Several shutdowns and other restrictions caused by the covid pandemic forced us to improvise and change the plan in some areas. However, thanks to the joint efforts of the project team, we managed to collect and analyze valuable data.

### What industry are the company i from?

Automotive
Food business
IT
Mechatronics
Medical technology
Other

## Management, employees and the company's openness to digitization

We decided to start our survey with general questions about digitization in the surveyed companies. These answers help us understand companies better. Most management is aware of the importance of digitization and brings with it the necessary skills. Digitization is a very important topic for most companies.

### The company's management is aware of the importance of digital transformation

Among the company's executives, there are many that we have yet to win over to the idea of digital transformation.	2
Company management supports innovation and the process of digitization and automation, but not everyone has the skills to implement a digital strategy in practice.	7
Company management is able to implement digital transformation into daily operations.	11

### Digital transformation is a basic prerequisite for company growth

It is a tactical matter for us, we implement partial projects.	4
It is an important topic, we are preparing for digitization, we are carrying out pilot projects.	6
Yes, that is our most important strategic task	10

### The organization already has the necessary digital skills and knowledge to work effectively

we are currently preparing an employee development concept, collecting information on the current status and readiness of employees to work in a data environment	2
Currently, our employees already have all the necessary digital skills and knowledge to work effectively in the new situation of the digital environment	10
We are not yet concerned with the readiness of employees and their potential development in this area; this topic will probably only be relevant when the digital transformation strategy is implemented	4
We are currently investing in the education and training of our employees in the use of technology and digitization throughout the organization	4

The employees of most companies already have all the necessary digital skills and knowledge to work effectively in the new situation of the digital environment.

## Operating model, environment for creating digital value and digital management

### Do you have a digital strategy in place?

<b>We have developed a digital strategy and are finalizing the integration of systems, processes and data</b>	<b>4</b>
We have developed a digital strategy, which we have been concretely implementing for some time	8
We have developed a digital strategy and are implementing the first pilot projects according to it	4
We are working on a digital strategy	3
We have not developed such a strategy	1

### What (if applicable) is hindering the implementation of a digital strategy in your company?

<b>Lack of support from management</b>	<b>1</b>
Lack of know-how	1
Lack of vision and conceptual approach	2
Lack of employees	6

### Do you expect digitization to radically increase efficiency?

<b>Thanks to digitization, there is an exponential increase in efficiency, we have managed to create and dominate new markets that we serve more or less automatically</b>	<b>3</b>
We expect some efficiency gains to show up later	9
We are increasing efficiency many times, the introduced automation is starting to bear fruit	8

Many companies already have a digital strategy and are actively implementing it.

Lack of skilled employees is the biggest obstacle in implementing a digital strategy

All companies expect to increase efficiency. All companies believe in increasing efficiency through digitization.

## Technology

We asked companies the question "What modern technologies do you use/solve?". And we also wanted to know in which departments.

	IoT	Cyber . Safety	AR/VR	Automation and robotics	Simulation Digital twin	Cloud computing	Big Data	3D printing	RFID/NFC	AI
<b>Production</b>	4	3	2	2	5	7	6	2	2	7
<b>Development</b>	5	5	7	4	6	8	7	3	3	10
<b>Services</b>	4	3	5	1	3	8	4		3	1
<b>Health and safety</b>	1	1	3		1	1	1		1	1
<b>Marketing</b>	1	2	4		2	8	2		2	3
<b>Trade</b>	1	2	4	1	2	4	1		1	
<b>HR</b>	2	4	1	1		5	4			
<b>IT</b>	5	16	4	2		13				

It can be seen that the technology drivers are located in the development and IT departments.

### When do you plan to implement AR/VR?

<b>Already implemented</b>	<b>8</b>
Within a year	1
Till five years	5
In more than five years	2
Implementation is not planned	1

### What technologies do you use?

<b>virtual reality (VR)</b>	<b>8</b>
Augmented Reality (AR)	6
Mixed Reality (MR/XR)	3

Most companies are involved in virtual reality. Then there is augmented reality, and at the moment, the fewest companies are dealing with mixed reality.

### How long have you had your VR/AR device? When did you purchase them?

<b>Purchased in the last 2 years</b>	<b>3</b>
Purchased within the last 6 years	5
Purchased more than 6 years ago	1

Most of the companies that answered this question have been involved in AR/VR technology for several years. Within this answer, we can divide companies into three groups

### What or who led you to the purchase decision?

Customer requirements
Inner motivation; immersive technology as another added value in the value chain.
Management/was tested, is excited, was purchased
At that time still a very limited selection; prototype development; Trevisio with VGA resolution
technical criteria
Travel restrictions due to corona

The motivations for investing in VR/AR technologies are very different. Not all survey participants explained their motives in more detail. Currently, many companies seem to be still in the experimental phase with new technology. It is also interesting that travel restrictions during the corona motivated investments in technology.

### What kind or types of VR/AR headsets do you have?

As you can see below, the majority, 41% to be exact, use a computer with outdoor monitoring. The remaining 59% is split evenly between a PC with internal monitoring and a standalone headset.

PC with outdoor viewing (HTV Vive, Oculus Rift,... )	7
PC with internal tracking (Windows Mixed Reality, HTC Cosmos,... )	5
Separate headsets (Oculus Quest)	5

#### What computers do you use for VR? (Laptops/desktops/is the performance sufficient?)

<b>Notebook</b>	<b>4</b>
Desktop PC	7

*Comments Notebook: Gaming notebook, New graphics cards not yet supported in Oculus Quest 2, partial; 1 Alienware laptop*

*Comments Desktop: Gaming PC, Software customized for the device; so below the minimum requirements, there will be an update in the near future*

#### How did you fund VR/AR?

<b>Own resources</b>	<b>7</b>
Grants	4
Loans	0
Gifts	0

The majority of respondents (54%) financed VR equipment from their own resources. The remaining 46% were able to purchase equipment thanks to various grants. None of the respondents took out a loan to buy VR equipment or received it as a gift.

#### Who oversees VR/AR implementation for you?

<b>Internal expert</b>	<b>7</b>
External consultant	3

The majority of respondents (70%) integrated their VR solutions with an in-house specialist. The remaining 30% had the support of an external consultant.

#### What software are you using?

<b>Custom development</b>	<b>7</b>
Contract development	3
Commercially available	7
We are still looking	0





41% of respondents use in-house development and 41% contract development. The remaining 18% use commercially available software. The comments below clearly show the popularity of the UNITY environment when dealing with custom development:

*android, windows/ None in the field of employee development./ Unity, WebVR/ MS Teams Remotesupport, MS Dynamics Guides/ Together with research partners, we develop special solutions for AR/VR in the field of manufacturing (machining technology) and medicine (visualization and simulation of interventions). / ua AR-Assist/ Unity 3D/ Unity development environment, WheelSim VR/ Unity for 3D simulation; Steam VR; / Custom development/ vLearning/ Remote Assist/ ARiiVA*

**Do you think VR training is more effective than other options?**

A strong majority here clearly spoke in favor of the effectiveness of VR. 9/10 respondents are convinced of this.

## Companies without VR experience

A total of 10 of the participating companies have not yet implemented a VR solution.

### Are you planning to implement VR/AR?

No	2
Yes	5

### What activities do you plan to use VR/AR for?

Production (training process)	0
Development (visualization, simulation, testing)	1
Service (process training, remote connection)	0
In the field of health and safety at work (training on correct and incorrect procedures)	0
Marketing (employee benefits, customer communication)	4
Business (visualization, virtual meetings, training, services)	2
HR (soft skills training)	1
Different	2

Half (50%) of participating companies that do not currently use VR/AR plan to use and implement it in the future. 20% do not currently plan to implement VR/AR. The remaining 30% of companies did not provide an answer. This shows that companies are aware of the added value and benefits of using VR/AR, but awareness needs to be raised.

Companies that plan to use VR/MR want to use it for marketing purposes. It is also interesting for companies to use VR/AR for business (visualization, virtual meetings, training, services) or development (visualization, simulation, testing) purposes. Additionally, some companies would like to implement VR/AR for HR (soft skills training) or other purposes. This shows that there is a need to create more awareness about the implementation and use of VR/AR in education and training. VR/AR offers many advantages in these areas that should be brought closer to companies.

### Why don't you plan to use VR/AR?

Financial investment	1
Insufficient technology	0
Complexity of implementation	1
No added value	1
Insufficient human resources	1
Different	0

The reasons why companies do not want to implement VR/AR technologies are mainly the obstacle of financial investments, the complexity of implementation and the lack of human resources. Additionally, some companies see no additional benefit in implementing VR/AR.



**Are you currently registering any demand from employees or customers?**

No	5
Yes	2

Most currently see no demand from employees or clients to implement VR/AR.

**Are you considering working with partners on new innovative solutions and products for your or other companies?**

No	1
Yes	8

The vast majority of companies are considering cooperation with partners on new innovative solutions and products. This testifies to the companies' willingness and interest in innovation and progress.

## Value attitudes towards AR/VR

This matrix consists of nine questions focused on multiple aspects of respondents' perception of AR/VR technology. The results were analyzed based on the number and percentage of the entire

	I definitely agree	I rather agree	I rather disagree	I definitely disagree	Not applicable
AR/VR opens up many new possibilities for the economy.	8	12	0	0	0
AR/VR opens up many new possibilities for education.	11	9	0	0	0
The use of VR/AR should be taught in schools.	7	9	3	0	1
The benefits of AR/VR outweigh the cost/effort.	7	9	4	0	0
AR/VR is too controversial for the health of its users.	0	2	11	5	2
AR/VR is relatively easy to use.	4	8	8	0	0
I have a general interest in VR/AR.	14	6	0	0	0
The main purpose of AR/VR is entertainment/gaming.	0	2	3	4	11
In the next three years, I will probably be using VR/AR in my work.	8	3	7	1	1

sample.

	I definitely agree	I rather agree	I rather disagree	I definitely disagree	Not applicable
AR/VR opens up many new possibilities for the economy.	40%	60%	0%	0%	0%
AR/VR opens up many new possibilities for education.	55%	45%	0%	0%	0%
The use of VR/AR should be taught in schools.	35%	45%	15%	0%	5%
The benefits of AR/VR outweigh the cost/effort.	35%	45%	20%	0%	0%
AR/VR is too controversial for the health of its users.	0%	10%	55%	25%	10%
AR/VR is relatively easy to use.	20%	40%	40%	0%	0%
I have a general interest in VR/AR.	70%	30%	0%	0%	0%
The main purpose of AR/VR is entertainment/gaming.	0%	10%	15%	20%	55%
In the next three years, I will probably be using VR/AR in my work.	40%	15%	35%	5%	5%



## Summary

All companies interviewed have a general interest in AR/VR. Most of the companies surveyed strongly agree that AR/VR opens up many new opportunities for business. All companies interviewed are aware of the potential of VR/AR for business. Likewise, most companies surveyed strongly agree that AR/VR opens up many new opportunities for education. All interviewed companies are aware of the potential of VR/AR for education. They consider it essential that VR/AR is taught in schools. For the majority of companies interviewed, the benefits of AR/VR are greater than the effort required for implementation or the financial burden.

Most companies do not agree or strongly disagree that VR/AR is too problematic for the health of their users. They agree that VR/AR is relatively easy to use. 70% of companies even strongly agree with this statement. The majority (70%) strongly disagree that the main purpose of VR/AR is entertainment/gaming. 15% of companies also disagree. The remaining 15% agree that the main purpose of VR/AR is entertainment/gaming. This shows that most companies see the benefits of VR/AR in areas other than entertainment/gaming.

The majority (40%) of respondents strongly agree that they are likely to use VR/AR in their work in the next 3 years. 15% of participants also agree with this. 35% of respondents disagree with this opinion and therefore do not expect to use VR/AR technologies at work in the next 3 years. Only 5% strongly disagree. This shows that the expectation of future use of VR/AR strongly depends on the respective job position. However, these technologies are expected to be increasingly used at work in the future.