

Welcome to the VRinSight Training Programme

Module B : Virtual Reality for Business and SMEs

VRinSight Training Programme & Curriculum

The following lecture is just one in a series of lectures as part of the *VRinSight Curriculum*

The aim of this training programme for **HEIs** is

- to help you get acquainted with the technology of Virtual Reality
- demonstrate how VR technology can enhance Higher Business Management Education
- enable you to integrate VR technology into your own coursework and lectures
- enable you to introduce VR technology to your colleagues and demonstrate how VR technology can enhance coursework and lectures

Each learning session is complimented by practical work in the *VRinSight Interactive Classroom*

VRinSight Training Programme & Curriculum

The following learning session is just one building block in a whole range of learning sessions as part of the *VRinSight Curriculum*

The aim of this training programme for **SMEs** is

- to help you get acquainted with the technology of Virtual Reality
- demonstrate how VR technology can enhance business management
- enable you to integrate VR technology into your business operations
- enable you to introduce VR technology to your colleagues and demonstrate how it can enhance their business operations

Each learning session is complimented by practical work in the *VRinSight Interactive Classroom*

VRinSight Training Programme & Curriculum

- Module A: Outcomes of European survey of SME and Higher Education institutes
- **Module B: Virtual Reality for Business and SMEs**
- Module C: A comparison of VR developments around the globe
- Module D: Pedagogical considerations in Virtual Reality Learning
- Module E : Step by Step Guideline to good VR practice
- Module F : Introduction to the 25 VR applications of the *VRinSight Showcase*

All Curriculum Modules and the European Survey report are available in their entirety at the project homepage www.vrinsight.org

All 25 VR applications are accessible via the *VRinSight Interactive Classroom*

Module B : VR Technology for Business & SMEs

Module Content

- 1) Introduction
- 2) Industrial perspective on VR
- 3) Main Hindrances to Use of Virtual Reality
- 4) How does Virtual Reality benefits SMEs
- 5) Module content assessment

Module B : VR Technology for Business & SMEs

Introduction



Industry 4.0, and **especially key enabling technologies as Virtual Reality**, are becoming critical to face the company challenges and client needs.

- Level of connectivity between component involved in the organization process.

An organization is always in search of new technologies which can achieve the desired results in **minimum input and in short time period**.

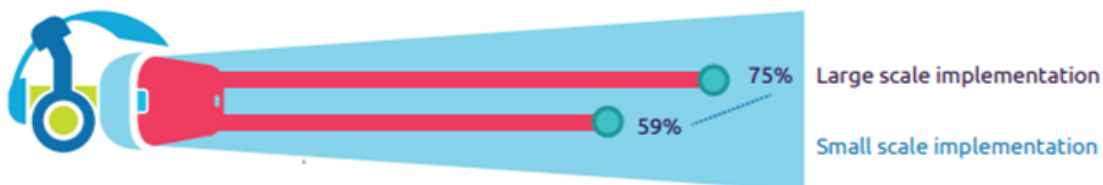
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Industrial perspective on VR

Early adopting **companies** that already use VR solutions come from:

- Automotive Industry (PSA, Renault, JaguarLand Rover, BMW, VW)
- Aeronautical Industry (Airbus, Dassault aviation)
- Transports sector in general (SNCF, Alstom)
- Energy Industry (EDF)
- Other industries where design is extensive. (Bosch, Siemens)

% indicates the share of organizations deriving more than 10% operational benefits



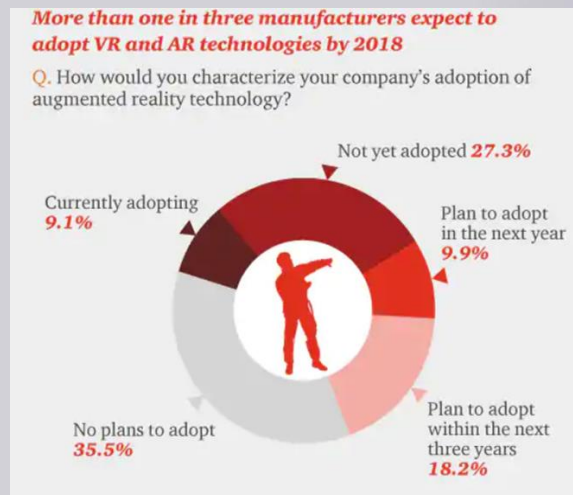
[\(Papgemini, 2018\)](#)

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Industrial perspective on VR

The visualization of 3D models and other content in VR applications give the possibility for different people to access them from **any location, to analyse and interact with them in a virtual environment.**

- Conception
- Research and design
- Development and assembly
- Prototypes
- Inspection, maintenance and repair
- Marketing and promotion
- Control of Robotics
- Workflows and benchmarking
- Training
- Floor planning



(PWC, 2018)

Radically reducing time and associated costs

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Main Hindrances to Use of Virtual Reality

Companies in the manufacturing industry find out **obstacles and challenges in VR technology** adoption. These obstacles and challenges are inherent to the production activity and the work force profile of this kind of companies, but most of them are extensible to other sectors and industries.

- Level of digitalization
- Lack of expertise
- Return of the investment (ROI)
- Technology integration

In traditional manufacturing SMEs this obstacles are maximized.

- Size and retn



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Main Hindrances to Use of Virtual Reality - Level of Digitalization

Mayor **challenge** is the **low level** of digitalization in the companies:

- **Digitalization strategy** missing or not implemented in most SMEs.
- Company representatives required network to connect **machines and devices** but also the need for a large bandwidth.
- **Sufficient data** in adequate quality is missing and cannot be collected due to insufficient networks. Old machinery 20-30 years old.
- VR work instructions might **require more effort** than maintaining the same content on paper.
- Creating VR work instructions requires certain **skills** that not all workers have.
- Difficulties to create **virtual assembly instructions** – too many products variations.
- Companies also fear **security issues** with VR applications for various reasons.

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Main Hindrances to Use of Virtual Reality – Level of Digitalization

Recommendations for increasing the level of digitalization
– VR implementation

- **Monitor Industry4.0** technology and other business opportunities (eg. Market/user's need, legislation requirements, ...).
- **Contact VR experts** in the region to contrast the strategic vision.
- **Attend informative meetings** usually set up by public organization, universities and professional organizations for understanding and testing the technology.
- Study the current **internal expertise**.
- Consider the **implementation of a VR team** as a department for spreading the technology inside the company and conceptualization smart products and services portfolio. Learn how to do it.
- Invest in developing and maintaining an **innovative company** culture and start involving more people within innovation processes.

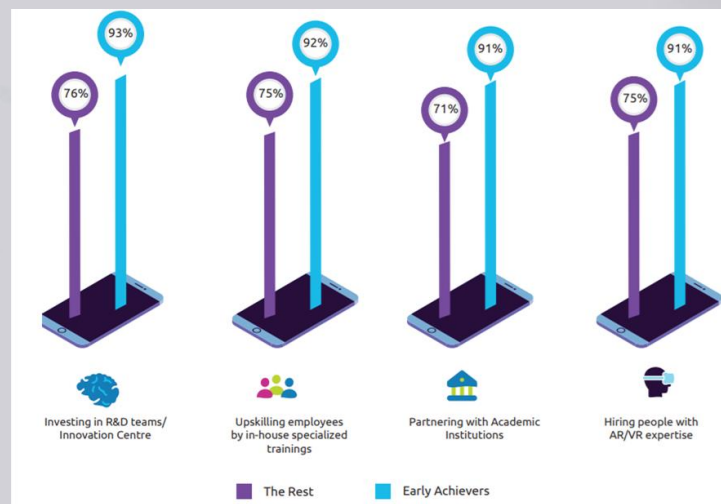


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Main Hindrances to Use of Virtual Reality – Lack of expertise

The **lack of knowledge, missing experiences and empirical values from VR** make usage more difficult for companies to assess the effort required to build VR applications or piloting activities.

People are **absorbed by their daily business** and that they will not be able to handle the additional effort that comes with the introduction of an VR application.



(Capgemini, 2018)

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Main Hindrances to Use of Virtual Reality – Lack of expertise

Some organizations, **early achievers**, that are advanced in terms of immersive technology implementation identified some **key factor** and they focused their efforts on the following steps:

- Invest in **upgrading talent** and focused research initiatives to gear up for future adoption.
 - ❓ Together with building internal capabilities, outsourcing subject matter experts with direct experience in immersive technology is an alternate way forward.
- Put a centralized governance model in place and build AR/VR awareness.
- Focus on **identifying the right use case** that provides lasting value and supports employees in this journey
- **Prepare technology infrastructure to integrate VR**



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Main Hindrances to Use of Virtual Reality – Return of Investment


The **missing resources** are seen as a principal restraining force for all companies, even more for new technologies implementation as VR.

Another restraint for adopting VR is the difficulty in measuring the **ROI (return of investment)**, an important issue for investment decision making.



Return on Investment Formula

$$= \left(\frac{\text{Net Profit}}{\text{Cost of Investment}} \right) \times 100$$


[\(Educba, 2018\)](#)

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Main Hindrances to Use of Virtual Reality – Return of Investment

The following are sample thought-starter topics for ROI calculations:

- Virtual prototyping
 - ❓ Cost of physical prototype and rework on previous prototypes.
- Reduce design and development cycles
 - ❓ Designer's time, opportunity cost, concerns about working on complex designs, benefits of collaborating in digital prototypes 1:1 scale instead of a desktop monitor, time cycles reductions improve responsiveness,....
- Collaboration
 - ❓ Efficiencies for products teams working together, errors and costs avoided, sooner assessment,...
- Decision making
 - ❓ Time spend in critical decisions, inform executives, assessment of product quality elements, enable better and faster decisions,...
- Sales and marketing
 - ❓ Early user feedback, competitive development technology, new client opportunities, advance sales orders, ...

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Main Hindrances to Use of Virtual Reality – Return of Investment

Getting Started: Consider a small-pilot to provide evidence about the possible implementation.

- 1) Start with a smaller-scale system like an HMD or small collaborative display. Consider the work that can be tested in such a system and how the results will apply to a larger roll-out.
- 2) Rent technology for a period of time to do a short-term proof of concept.
- 3) Partner with a university that has VR technology, and either rent time or create a student project.

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Main Hindrances to Use of Virtual Reality – Integration

Virtual Reality systems cannot be easily integrated with manufacturers existing design systems.

Some useful steps to follow a successful integration of VR

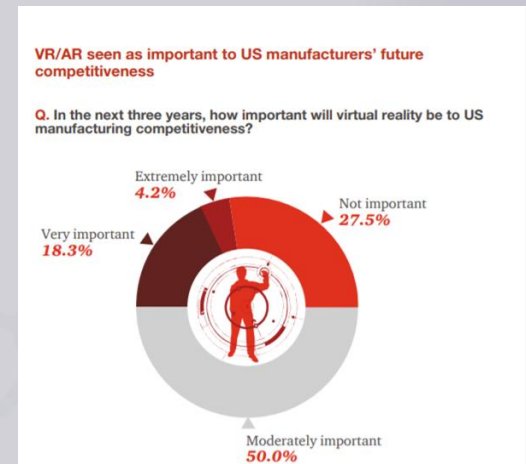
- ❑ **Ensure content availability** - repository of content and data available in the proper format for a well-functioning VR system.
- ❑ **Evaluate partnering with experienced vendors to minimize complexity** - software providers, often times found in a start-up company ecosystem.
- ❑ **Carefully consider connectivity requirements for your VR use cases.**
- ❑ **Integrate VR solutions with existing technologies to reap full benefits.**

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How does Virtual Reality benefits SMEs

While the technology is currently being employed mainly by large manufacturers, like additive manufacturing and the cobots before it, growing acceptance of the technology is likely to cause **prices to drop, allowing SMEs to take advantage of its powers as well.**

- Research and design
- Floor planning
- Review of workflows and benchmarking
- Training protocols
- Quality assurance and risk management
- Control of Robotics
- Disrupt traditional sales strategies



[PWC, 2018\)](#)

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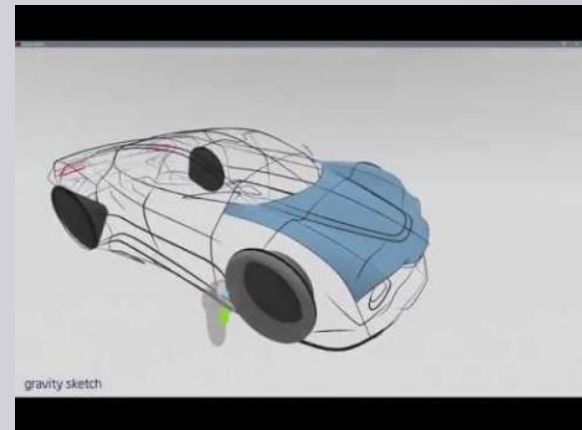
How does Virtual Reality benefits SMEs

Research and Design

Virtual reality is allowing manufacturers to reach the review process **without incurring any costs in creating the product.**



How McLaren Automotive uses virtual reality to design its sportscars and supercars



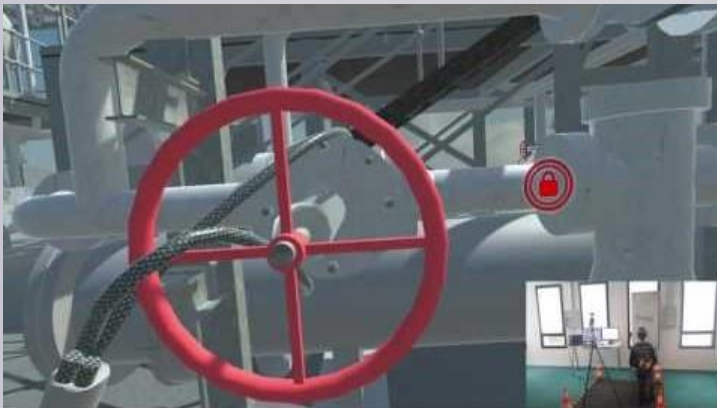
Gravity Sketch VR

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How does Virtual Reality benefits SMEs

Floor Planning

By recreating the actual areas in VR and placing the equipment models there, the **manufacturers can verify that everything is placed and connected correctly.** Companies can see in VR if all equipment is properly accessible, all safety distances are kept, and the production sequence is built in the correct order.



VR for process, Energy, Naval Industry



*BIM Augmented/Virtual Reality
App for Construction*

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How does Virtual Reality benefits SMEs

Inspection and Maintenance

For any routine or emergency inspection, companies need to invite experts of the plant that produced the equipment. Such inspection visits usually involve high costs and careful advance planning and scheduling. **VR can literally reduce time and space to nothing.**



Virtual remote maintenance & Inspection



Virtual reality motor maintenance

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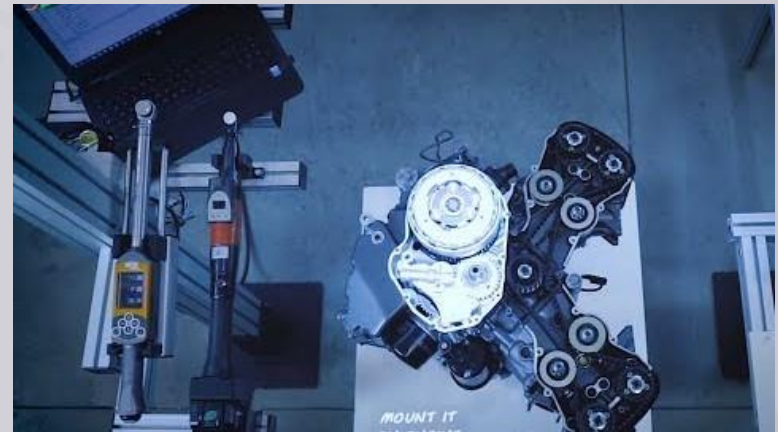
How does Virtual Reality benefits SMEs

Review of Workflows and Benchmarking

Manufacturers can see what's going on, review how workers' responsibilities could be changed, and determine if the **changes would save the manufacturer money**. Some organizations have moved from paper documents to digital documents.



Mixed Reality solution in process automation



System for production

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How does Virtual Reality benefits SMEs

Training Protocols

VR trainings are **eco-friendly and cost saving**, as no real resources are used, there are no safety hazards and they can be easily repeated. The **benefits of VR trainings are bigger where expensive or specialised machinery is used** in real-life or where there is an unnecessary exposure to danger.

- ▶ [How Virtual Reality Tools Train Dassault Falcon Aircraft Mechanics](#)
- ▶ [Weld VR Simulator](#)
- ▶ [Virtual Reality Training](#)
- ▶ [Foundry 45 VR Training for Manufacturing](#)
- ▶ [Virtual Reality Headsets To Train Workers](#)
- ▶ [Plant Immersive Training Simulator, Safety Services](#)

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How does Virtual Reality benefits SMEs

Quality Assurance and Risk Management

Virtual reality in manufacturing is being used to conduct **a more comprehensive QA checks** and manage risk by keeping all parties accountable.



Machine assembly in VR

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How does Virtual Reality benefits SMEs

Control Robotics

Companies are looking to VR technologies to **attract buyers, improve their time at dealerships and form a stronger emotional attachment** to a product they helped create.



Using Virtual Reality To Control Real Robots



Demonstrating VR for robot control

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How does Virtual Reality benefits SMEs

Disrupt Traditional sales Strategies

Companies are looking to VR technologies to **attract buyers, improve their time at dealerships and form a stronger emotional attachment** to a product they helped create.



VR for industrial marketing



Explore VR plant

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Module content assessment

VR- research




- Demonstrate the huge business possibilities of VR-technology, by introducing the VR-Headset to a company colleague. Based on your experience so far in the VRinSight training program, introduce your colleague to an VR-application that you consider could be useful for the company business.
- Write a brief report on the experience, describing the reaction and implementation possibilities in your company.

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Module content assessment

Desk Research

- Using desk research and the guidelines shown in **“The return of investment in VR (ROI) “ - page 10**, try to estimate the ROI number for one small-scale pilot activity in your company. Pilotong examples:
 - Start with a smaller-scale system like an HMD or small collaborative display. Consider the work that can be tested in such a system and how the results will apply to a larger roll-out
 - Rent technology for a period of time to do a short-term proof of concept.
 - Partner with a [university](#) that has VR technology, and either rent time or create a cooperation project.


$$\text{Return on Investment Formula} = \left(\frac{\text{Net Profit}}{\text{Cost of Investment}} \right) \times 100$$


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