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Opportunities of Virtual Reality in SMEs



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1. Introduction

Immersing in another reality, a Virtual Reality, which not long ago seemed like science fiction and after the world of video games, has emerged as a disruptive tool in the business world. Technology is an ally for the growth of SMEs, and in this case we will explore what Virtual Reality (VR) is and what uses it can have in the world of SMEs.

VR creates a lifelike environment, in which, through a device such as VR glasses or helmets, the person perceives that world as if he/she were immersed in it. In other words, the physical presence of the person in that virtual world is simulated.

This technology, which is particularly appealing for entertainment and art options, also offers numerous opportunities for applicability by companies of different sizes, including SMEs. It is especially popular in sectors such as medicine, architecture, education and culture [REF-01].

It is one of the technologies with the highest growth projection, being of special interest for digital business transformation.

2. Definition of Virtual Reality, Augmented Reality and the evolution of the technology

Virtual Reality (VR) provides a totally virtual environment that can simulate a real environment or create a fictitious one. The person accesses the virtual environment through devices such as glasses or helmets, these are used to position the user in the center of the scene which will consist of a 360° image that the user can consume by looking around. The glasses can be accompanied by more devices, such as gloves with sensors, motion-controlled controllers, special suits, positioning cameras for walking or touching virtual objects, thus achieving greater interaction with the environment, intensifying the perception of stimuli and the feeling of immersion.

It should be noted that VR is not the same as looking at a screen. With VR, the brain gets the feeling that you are really immersed in a virtual universe and reacts as if you were there. It is not like a 3D movie either, because what is generated is a three-dimensional scenario in real time where you are freely moving and interacting. It would be more like being inside a movie [REF-02].

Along with Virtual Reality, Augmented Reality has grown a lot, so here we explain their difference. The first one, as we mentioned before, is a totally virtual environment. In the second one, a virtual layer with objects, images, texts, etc. is added over the real world that is being presented through a camera of a device, either mobile or glasses. A clear example is "Pokemon Go".

Both Virtual Reality and Augmented Reality create what are called "immersive experiences" and have a wide field of application, from leisure and art, such as concerts or exhibitions, to fields such as medicine, where advances can improve surgical operations [REF-03].

In addition, with the integration of **Artificial Intelligence** within VR, innovative experiences can be created. Similarly, with the use of 5G/6G networks, it will be possible to connect more devices and people with lower latency.

VR has its origins before the 50s, with the creation of Link Trainer (or Blue Box) a flight simulator and Sensorama, an immersive technology based on cinematic techniques. However, the term was coined in 1987 by Jaron Lanier and Tom Zimmerman.

During the 20th century, the rise of video games developed and the use of this immersive technology was explored. In 2012, the device that makes us understand VR as we do now is created. It is achieved thanks to Kickstarter crowdfunding funding the first prototype of VR viewer. Oculus, the company developing this prototype, is bought by Facebook in 2014. After this, a corporate race to invest in this technology begins [REF-04].

Experts forecast growth in the **European market at a rate of 24.9% year-on-year until 2027**. The consumer, retail and production sectors will account for most of this investment [REF-05].

VR can be combined with Artificial Intelligence (AI) to multiply its possibilities, which has been boosted in more recent years. Thanks to AI, the VR experience can be customized to the user's needs and preferences, the experience can be made more realistic, and highly complex scenarios, such as emergency medical situations, can be simulated [REF-06].

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3. Applicability of Virtual Reality in SMEs

The applicability in the SME business environment is diverse. The main function for SMEs, in general, is to provide a sample of products not available with real effect and to create immersive experiences. This applicability is further detailed below.



Marketing and Promotion: The use of VR can generate a "wow effect" by creating impactful and memorable experiences and content. VR can offer unique and original experiences for product promotion, from interactive product demos to more immersive creations in the form of advertising. This is called **gamification**, i.e. displaying content in the form of a game [REF-03].



Virtual showrooms: These are specialized spaces to showcase a product. It would be the demonstration of a product in 3D or 360, through immersive websites or immersive content, which allows to see the product in a more realistic way and interact virtually with it. It can also show the beginning of its manufacture or other facets of interest depending on the product. They are a growing trend among the most pioneering types of marketing. Simple examples of this type of marketing are simulated testing of a mobile device, a car or a piece of clothing [REF-07].

It allows all products to be presented without having them in person or in stock. For example, Ikea has put a VR point in a selection of stores in Germany, they could see how their future dining room would look like by choosing all the furniture they want, which is unthinkable to do in physical form for each user.

Another example is in the use of hotels, being able to show in detail the rooms before staying. In this sense, it also applies to architectural projects and not exclusively commercial products [REF-06].



Education: These technologies are focused on **trainings** for **complex, insecure environments** or trainings that allow repetition without additional cost. In the purely academic field, there are fewer initiatives to create content for education, as they are more focused on training, but further growth is expected in the future [REF-08].



Use for training of SME teams: Use for SME team training: More active training, not only passive, **learning by doing, with glasses, learning through experience simulation**, they can **experience objects and tools**, it strengthens learning. It is a training that can be standardized and used as many times as necessary, it is flexible in terms of time and dates, it can be done when it is more convenient. It is about enhancing "Gamification", learning through play, and it reduces distractions by being connected to a device without being able to do anything else. It allows to count on metrics to know the grades and evaluate automatically. They are multi-device: it is usually complemented with interactive 3D simulator on computer and VR with specific devices.



Psychotherapy: In psychotherapy, the use of VR is quite novel, **as it gets the subject out of a passive position**, allowing them to move around the environment and interact with it in different ways. VR can be used as a form of diagnostic and therapeutic intervention. The main applications developed so far relate to exposure techniques commonly used to treat phobias, but advances have also been made in other areas such as eating disorders. In addition, VR has many applications in psychological and psychomotor rehabilitation.



Medicine: Used for both **patient care and medical training**. It allows the use of telemedicine, interacting remotely with patients. It is also used for physical rehabilitation, for example, for mobility and coordination therapy. In addition, it can also be used for brain injury rehabilitation through games. In terms of training, it can be used to simulate surgical procedures and perform risk-free diagnoses on patients [REF-09].



Tourism: VR makes it possible to visit **inaccessible environments and travel without moving**. It serves as an experience in itself or for the advertising of destinations in a very powerful way, which is used by travel agencies.



Industry, Research and product improvement: In the industrial field it is possible to configure customized products, generate more specific budgets, optimize designs before manufacturing, making prototypes and testing them before putting them into production (Digital Twins). In addition, by testing products and prototypes you can improve your processes, without the need for actual creation, which saves costs and is much more environmentally friendly. It should be taken into account that there are products with a very high manufacturing cost, so in industries such as automotive or construction, the use of VR for working and testing designs is gaining importance. It is a breakthrough to be able to test a prototype without the need to manufacture it.



Architecture: Following the general lines applicable to the industry, design and visualization are allowed, being one of the fields where it has more applicability.



Culture, art, entertainment: Virtual tours can be offered or augmented reality artifacts can be included in museums and exhibitions. Likewise, its use in the audiovisual world and video games is especially powerful.



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4. Benefits of using Virtual Reality in a business environment

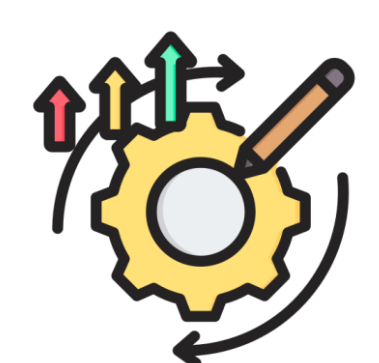
The benefits are varied, and also depend on the type of SME involved. For example, some are specific to SMEs that need to test models before launching them into production, or that need training for their staff. In any case, the variety of existing benefits are outlined below:



Wow Effect and Differentiation in promotion: VR's ability to impress can empower it to differentiate in a competitive market. VR can create immersive experiences that impact and attract audiences. In this sense, it can be used to win customers and to build customer loyalty or retain them.



Cost reduction in training: VR can also be applied to employee training, reducing costs by allowing it to be done remotely, without personnel, with automatic corrections, unlimited repetitions, at any time of the year and at any time of the day.



Efficiency in design and manufacturing: being able to test the models and prototypes created in a production process allows more design and product testing without a real cost of creation and development.

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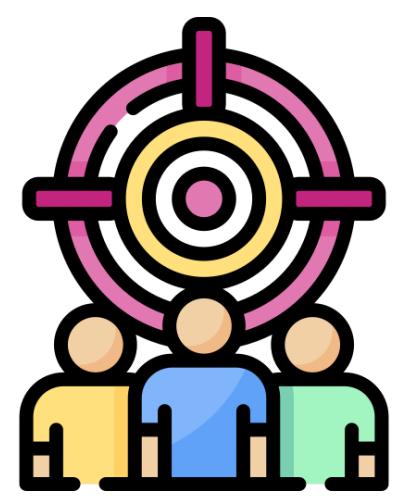
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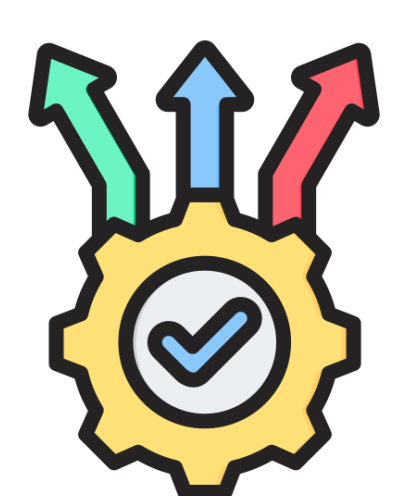
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Expansion of target audience: VR can reach global audiences, thus extending the international market.



Improved decision making: complex data can be visualized to facilitate decision making, and in turn, by visualizing prototypes, decisions can also be made on how to better focus products.



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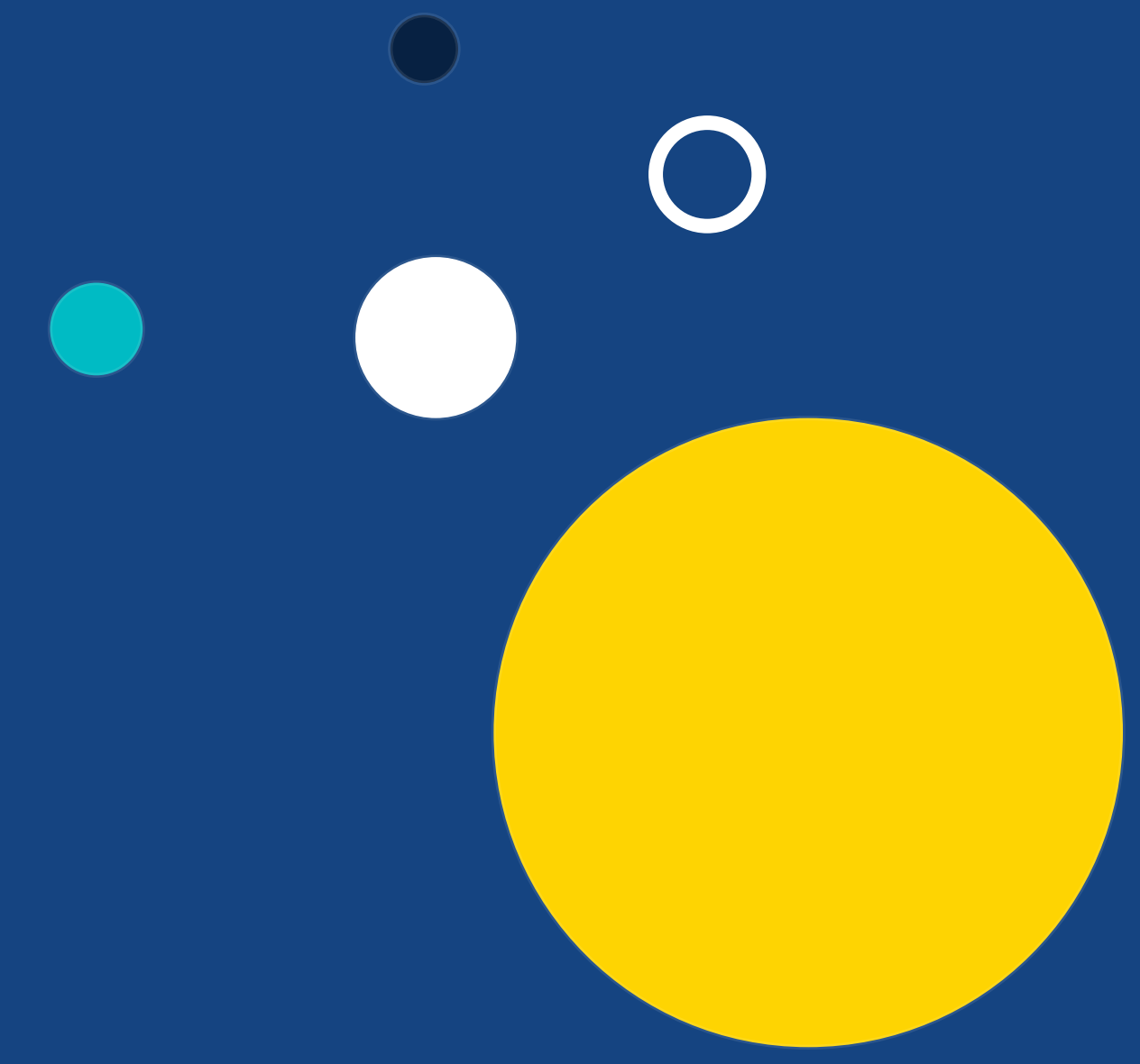
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5. Steps to follow for implementation

The first step is to define the scope for which VR is to be used, its purpose, for which expert advice to analyze the SME's business and its possible uses can be a good step.

Once this use has been established, a series of steps are carried out in which, as for any other development, the collaboration of different professionals is required at each stage.

- 1.** **Requirements analysis:** establish the platforms where it will be developed, the scope of the application, its use and functions.
- 2.** **Interface development (UI/UX):** looking for the best "user experience", it is about defining how the user will interact with the application, to make it more attractive, accessible, functional and optimal.
- 3.** **Development of 3D elements:** it is about all the visual elements that the user will see and interact with, which makes VR different from other technologies.
- 4.** **Software development:** that is, writing the "code" of the application as such. Or, failing that, the use of some of the platforms on the market.
- 5.** **Quality control (software testing):** finding and correcting errors that affect the experience or performance.
- 6.** **Change management:** it is key to explain the added value that these new technologies have in the chosen areas and to accompany the training in the use of these new tools.



- 7.** Launch: publish the application in the corresponding media or implement it on VR workstations (if it is an activation).
- 8.** Publicize: whether it is an application for commercial purposes or for internal purposes (e.g. for training), communication of this new technological solution will be important.
- 9.** Maintenance: maintain quality control after launch to ensure an adequate experience for users.



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6. Virtual Reality tools or technologies for SMEs

The applicability of VR in the business world is manifold, which is why major technology firms such as Google, Samsung, Microsoft, Sony, HTC and Meta (Facebook) are investing in it, aware of its possibilities in the professional arena.

VR devices:

We are currently faced with a wide range of VR devices. Thanks to advances in component shrinkage, more comfortable, more realistic and, above all, more economical systems have been developed. In addition, the extension of the competing market means that they are gradually becoming more affordable [REF-07].

The following is a sample of the latest technology devices, as well as some of the best sellers and those considered to have the greatest market penetration. In any case, there are many websites where the characteristics of all of them can be compared at a more technical level. It should also be noted that it is common for pioneering companies to have models for more commercial and recreational use and models specially designed for industrial or business use. Depending on the needs of the SME you can choose the model [REF-10].

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Meta (Facebook, Oculus)

Meta has several products, which are summarized below:

- The Oculus Quest 2:

The Oculus Quest 2 is a VR headset manufactured by Oculus. It is the company's seventh VR headset and is lighter and smaller than the predecessor. Its main features are that it is self-contained and does not require a PC for use, has an above-average headset and can be purchased with two special controllers. Since the rebranding from Facebook to Meta, the headset is officially known as Meta Quest 2, and all Oculus products and services are gradually being rebranded with the Meta name.

- Meta Quest 3:

Improved design over the recently released Quest 2, which in addition to VR is fervently committed to Mixed Reality.

- Meta Quest PRO:

These are the company's most "premium" glasses. The helmet is aimed primarily at business customers, with several notable improvements over the company's consumer helmet, the Quest 2. It is designed for working, creating and collaborating. Collaborators are invited to join the space and work collaboratively on shared designs in real time. These are lighter glasses, with better lenses (with 22 pixels per degree which makes images more vivid, with better contrast and a more intense chromatic range) [REF-11].

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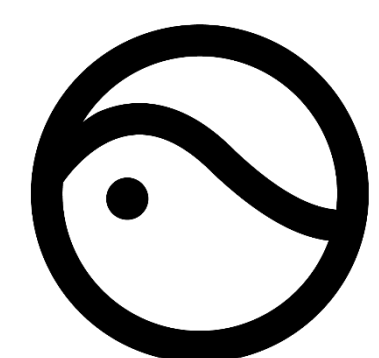
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Pico

- Pico NEO 3

This is the ninth VR headset they make and is designed especially for business use. It is self-contained and does not require a PC for use. It includes proven solutions and best practices for enterprises to increase efficiency in developments and reduce technical implementation barriers. Pico 4 This is a lighter case, as the front end and thickness have been reduced. It also has a higher resolution display [REF-12].



Pimax

Pimax Crytal QLED is the latest creation of this company, another high-end device, with interchangeable lenses [REF-13].

bigscreen Bigscreen

Bigscreen beyond features a custom-made facial interface that is designed from a 3D scan of the buyer's face, allowing the helmet to fit more precisely, reducing light ingress and increasing wearing comfort. This device requires connection to a PC.

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Apple Vision PRO

A VR headset made by Apple that has been unveiled, but not released. Apple Vision Pro is Apple's first XR device, intended to be used primarily for "mixed reality" content.

It features a peculiarity, a front display that shows the user's eyes, allowing him or her to make eye contact with other people outside the helmet. It is the first spatial operating system that merges digital content with the physical world.

As explained in the presentation, "visionOS has a three-dimensional interface that allows apps to cross the boundaries of the screen and appear side-by-side at any size.". [REF-15] The VR2 is the first spatial operating system to merge digital content with the physical world.



PlayStation PS VR2

PlayStation VR2 is a VR headset manufactured by Sony. It is the company's third VR headset. PlayStation VR2 is a VR headset with 4K resolution per eye, designed to be used in conjunction with PlayStation 5. PlayStation VR2 is Sony's first VR headset to make use of eye tracking [REF-10].



HTC Vive XR



The HTC Vive XR Elite is a VR headset manufactured by HTC. The company's eleventh VR headset. It is lightweight and high-end. It aims to compete with Meta's Quest Pro, with similar price and usage [REF-10].

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Plataforms:



Meta

Meta has its Platform for the creation of immersive "worlds", Horizon Worlds, is a closed platform where each user can create their world and can visit other people's worlds. This is closer to the "metaverse" context but can be used for whatever purpose you consider. In this area, Meta has a range of training for its creators on its platform, <https://about.meta.com/es/immersive-learning/> in which it offers training around its platform and also the different technologies, with the possibility of becoming certified by Meta.



Apple

Apple, with its recent release of its extended reality device joins the race to have an area of creation closely linked to the specific device. Apple is slated to launch a plethora of offerings in terms of MR and VR. They currently have the option to purchase a development kit for Vision PROs.



Engage

It has platforms for creating spaces, showroom and events. It is a private platform but is growing in users thanks to its heavy investment in scene creation and usability and ease of content creation.

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Spatial

Spatial

It is a similar spatial and content creation platform. It provides a drag and drop based creation tool and easy creation of spaces.



NAKA (NTT DATA)

It is a SAAS platform, accelerated immersive experiences aimed at the business environment. It facilitates the creation of events, trainings and metaverses in VR, with authentication service, cloud hosting, securization and support.

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7. Conclusion

VR has been with us for many years and is becoming more and more present, this is due to technological advances and the arrival of new partners who have seen the relevance that this technology can have in the next 50 years.

Technology always comes to improve our world and to make our daily life easier, so will VR opening windows to new worlds and new experiences and ways of understanding how, where and with what tool we work daily.

While this is happening, Virtual Reality is today a powerful tool for risk mitigation, presentation of immersive content and/or content that is not easily accessible and a way to transport users to environments that make things happen. There are already many large companies that have joined a fast-paced race to be the leaders in this technology and tools.



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