VR MARKET UPDATE: THE ECONOMIST'S VIEW

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Prologue

July 2017

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In june 2017 we offered a review about current investments of VC funds and market forecasts.

At the time, a certain optimism on the evolution of the VR/AR market was still present according to the figures provided by Digi-Capital.

An article recently published by The Economist ("Get Real. A reality check for virtual headsets") shows that the wind of change may be coming, that the massive technology adoption may be driven by gamers but that all forecasts fall short.

This e-paper is intended to update the scenario.

Virtual Reality (VR) has been identified by top investment funds, and by corporate and investment banks, as more than a hype: it is the next big thing to happen. **There are plenty of opportunities to invest and make a significant return.** There have been unicorns but also many bad experiences with significant losses.

What is the market forecast? Many sources state that the market will experience a huge growth. But again there are bears and bulls. In general terms, even the most cautious agree on the growth of the VR market, considering that the VR world includes Augmented Reality (AR) and Mixed Reality.

This post is intended to help on this with a marketing vision:

✔ **1.** What is the market?

✔ **2.** Who are the players?

✔ **3.** What are the forecasts?

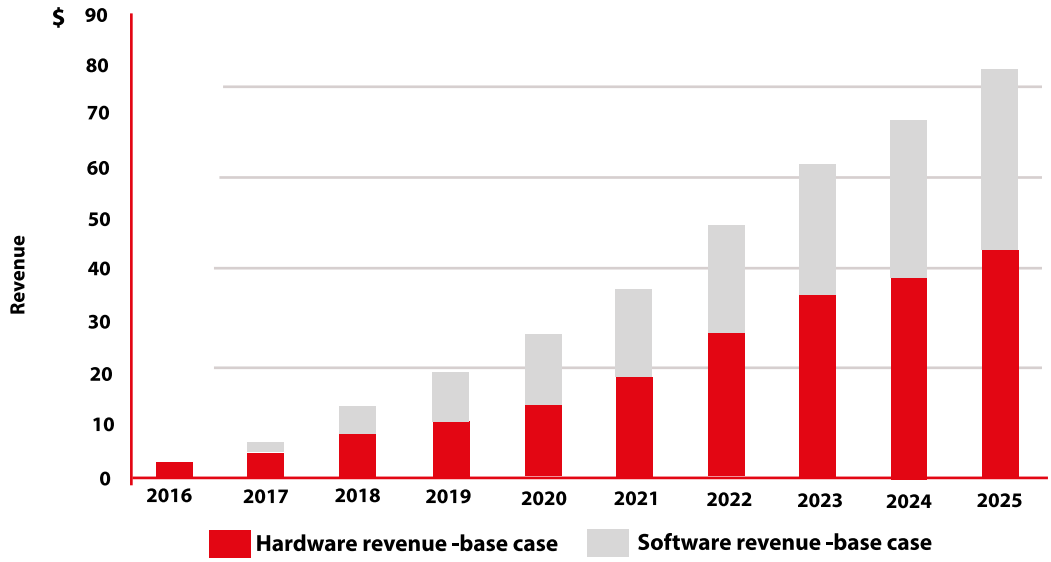
✔ **4.** With special attention to WiiFM (stay tuned to WiiFM)

The VR/AR market: is there a hype?

The acquisition of the VR startup Oculus in 2014 by Mark Zuckerberg's Facebook opens the era of serious investments in the VR arena. Many statistics still remark the disturbing effect that this visionary decision had in the market dynamics. But Zuckerberg described the VR technology as "incredible" and made an early movement that definitively caught the attention of other investors. Facebook recently hired Hugo Barra, a leading executive coming from Google and the Chinese fast growing success Xiaomi. **Barra is leading the VR division and has started to offer "Spaces", an innovative application were friends can socialize by means of VR meetings.**

The forecast made by Goldman & Sachs in January 2016 envisions US$80 billion by 2025:

THE PROGRESSION OF OUR BASE CASE HARDWARE AND SOFTWARE FORECASTS



Source: Goldman Sachs Global Investment Research

A very significant part, more than 50%, corresponds to hardware and its related key enabling technologies (KETs).

Goldman & Sachs literally states that the market will reach US$ 80 billion by 2025:

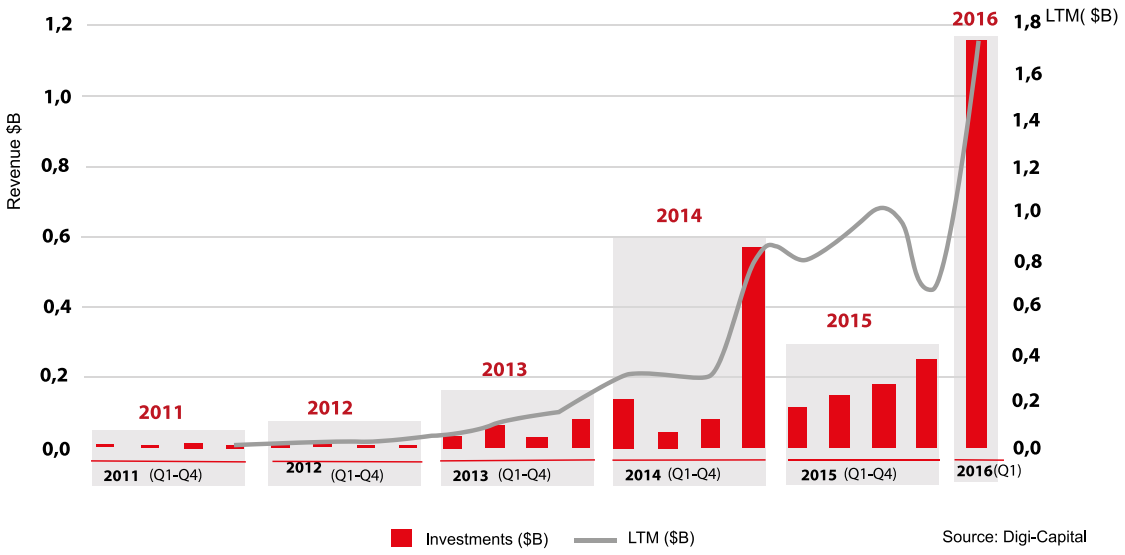
"The race for the next computing platform may be over. Heather Bellini of Goldman Sachs Research expects virtual and augmented reality to become an $80 billion market by 2025, roughly the size of the desktop PC market today. Bellini discusses how the technology has improved since earlier launch attempts and how it's already transforming sectors like real estate, healthcare and education".

Source: Heather Bellini.

Tim Merel, from Digicapitalist, thinks that it will take longer than expected; the AR and MR growth is going to happen but later and at a slower pace.

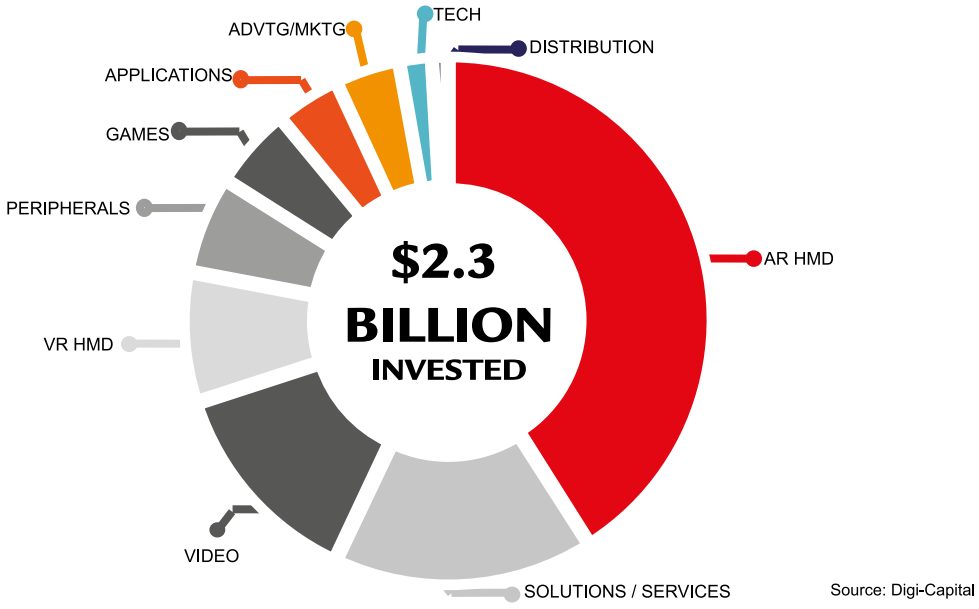
By March 2016, **venture capital funds had invested US$ 1.2 billion in VR**

AR/VR INVESTMENTS ($B)



The information published by the same source (Digi-Capital) shows a total investment at that time (March 2016) of US$ 2.6 billion.

VR/AR INVESTMENTS 2016

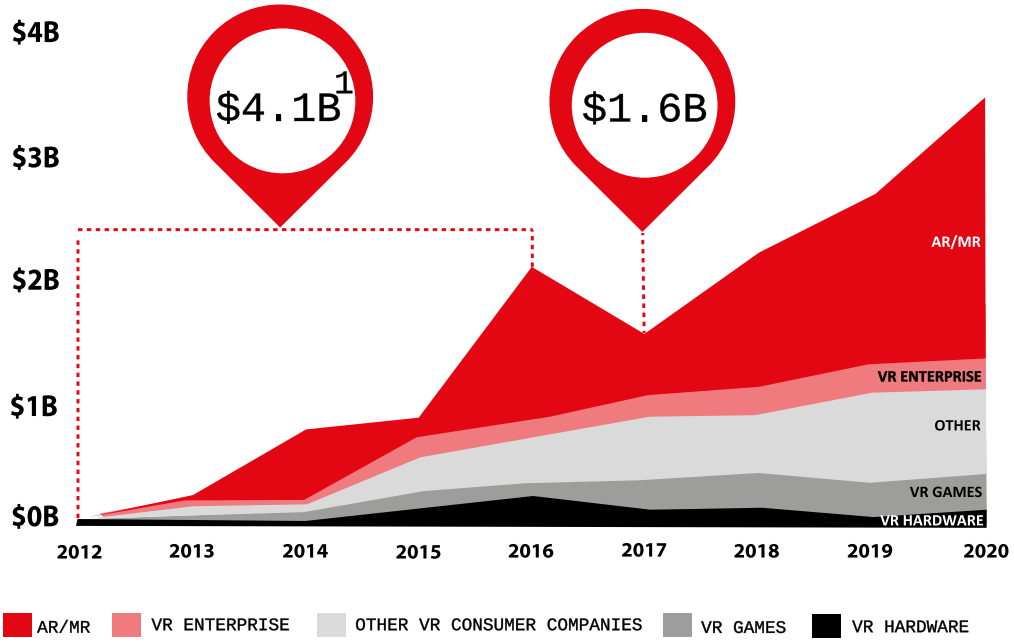


Finally, the same source indicates that the installed base of VR/AR/MR devices will grow to **300 billion units by 2020,** including PC and consoles (10%), mobile VR (20%), standalone AR/MR (35%), and smartphones & tablets (35%).

Appetite for AR & MR

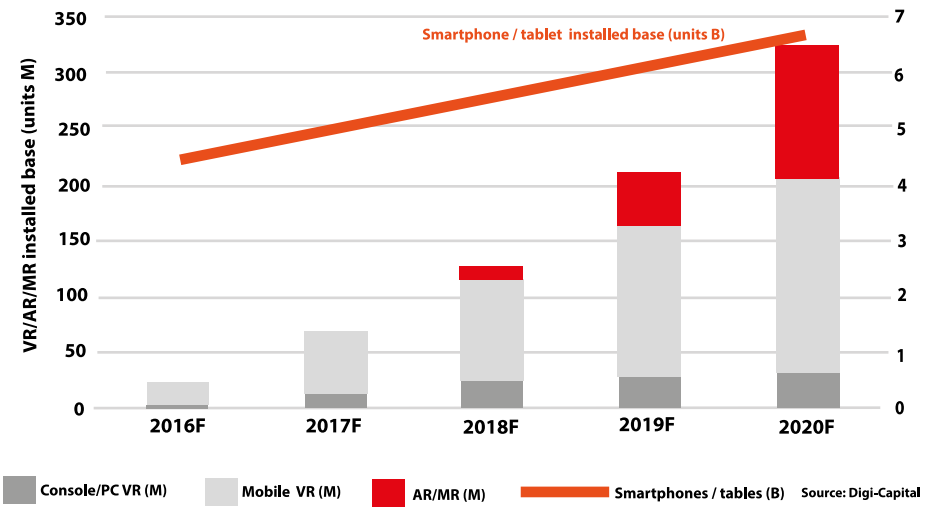
The market research company Superdata Research disclosed recently that VR funding is decreasing but that there is still plenty of appetite for Artificial Reality (AR) and Mixed Reality (MR):

INVESTMENT IN VR/AR/MR COMPANIES



Media content giants like HBO, Lionsgate or Disney (i.e., the Jaunt VR acquisition or the Disney Accelerator startups) are investing heavily or co-working with VR video content companies.

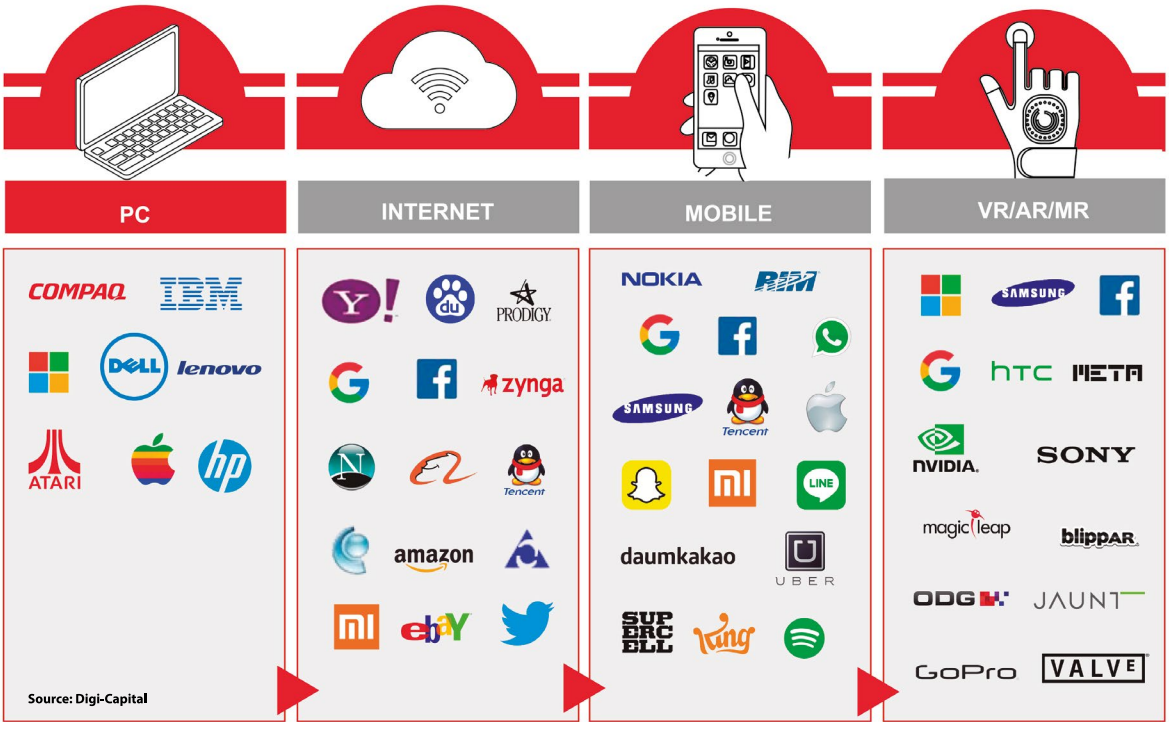
VR/AR/MR INSTALLED BASE (UNITS, NOT SALES)



Considering that Digi-Capital specializes in digital companies, with their work more focused than a generalist company such as G&S, we think that their analysis should be mentioned here. Digi-Capital describes several waves for the VR market, and states that in H2 2016 the new wave was the 4th one and **had just started with huge players now investing heavily and assuming a leading role.**

For further information we recommend you to visit their blog.

PLATFORM WAVES



In brief, this company advises their investors that **VR/AR/MR is the next thing to happen after the PC, Internet and mobile waves.** For those more deeply interested we recommend their full report. The new platform wave is VR/AR/MR, but who are the players? These are mentioned:

www.vive.com

www.oculus.com

www.jauntvr.com

www.nvidia.com

www.playstation.com

es.shop.gopro.com

vr.google.com

blippar.com

www.theverge.com

www.wired.com

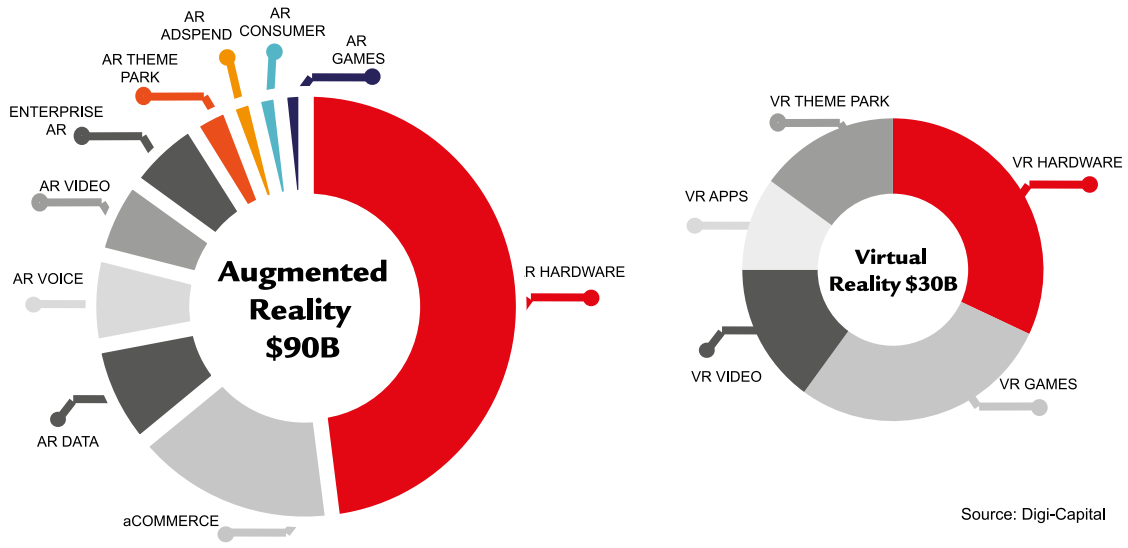
We miss many key players here: some enablers and other key players like Microsoft, NDI, Ascension, Polhemus, Mediatek, Nokia Technologies, Sixsense, and Nintendo, among others.

They warn literally that the tsunami and the waves are more like tides that can really destroy some business to bring new models to others. **What side of the tsunami is yours?**

"There are different ways you can pick a wave wrong. If the wave is smaller than you expect, you just bob up and down a bit. If the wave is much bigger than you think, you get dumped head first into the sand. Not fun. But platform changes are more like tidal waves, and are much more dangerous for incumbents than regular waves. When did you last use your Nokia?" (Source: Digi-Capital)

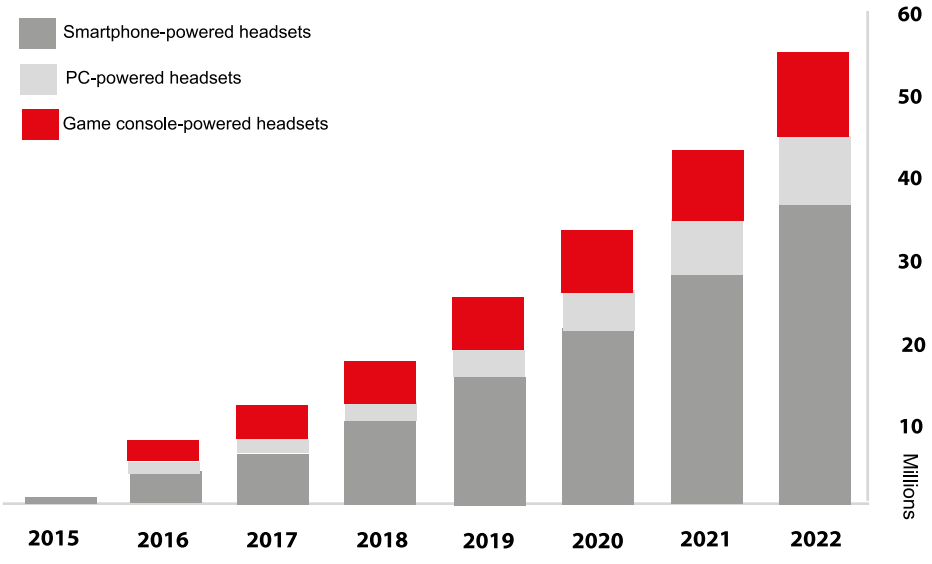
The big difference between our two mentioned sources is that AR is expected to be a market at least 3 times larger:

AUGMENTED / VIRTUAL REALITY REVENUE SHARE 2020F



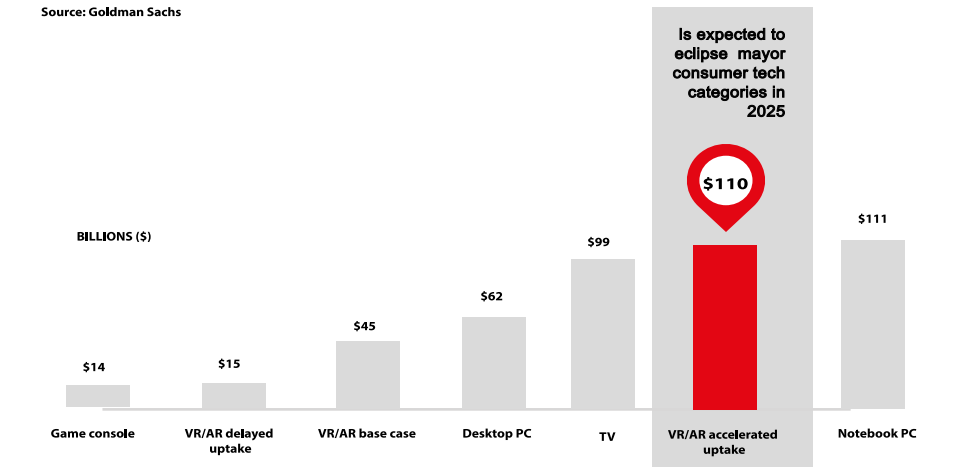
Source: Digi-Capital

A first obvious finding is that **AR or VR hardware will account for the lion's share of the cake.** This is why tech giants are turning their strategies into KETs. Anyone interested in this matter knows that VR/AR has infinite applications but the challenge is getting enough processing power (from GPUs and CPUs) with high precision, low energy consumption and low cost. In the end hardware is once more the key with a share of more than **US$ 30 billion by 2020.** Another KET corresponds to immersive technologies.

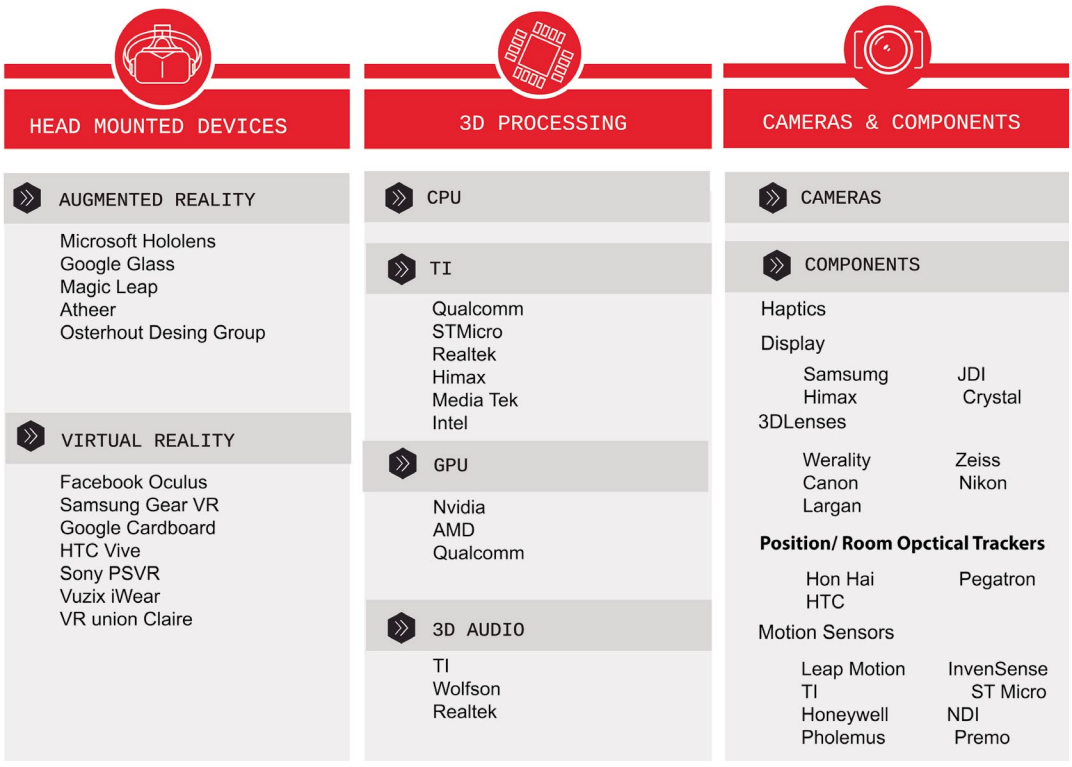


Business Insider has just published the last forecast made by G&S and has updated the figure under the "accelerated update" tag, which shows US$110 billion by 2025. In just one year the revised figure exceeds US$ 30 billion.

THE GLOBAL AR/VR MARKET



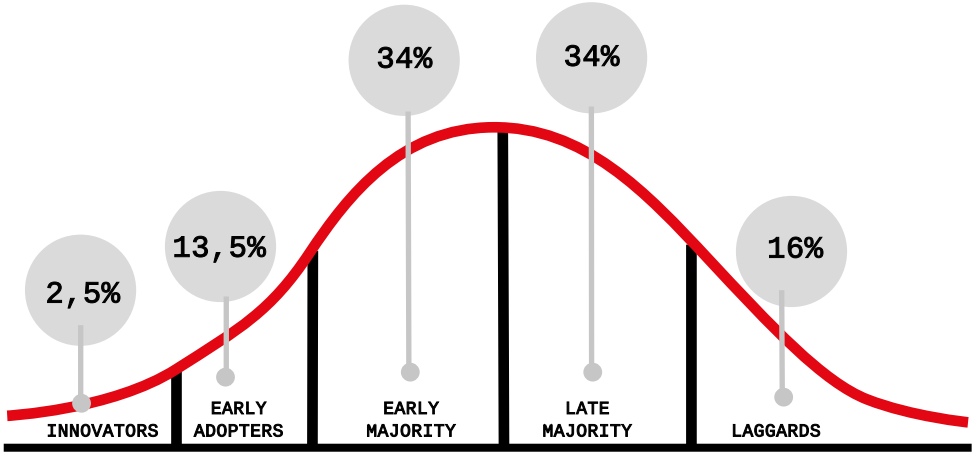
In terms of the current amount of technology adopters, it is significant that they are not any more just early adopters. In any case, there is a gap between users and business forecasts, so the adoption rate should be much higher. Another source, eMarketer, states that *"... asking its first look at the augmented reality (AR) and virtual reality (VR) video markets, research company eMarketer sees strong growth ahead in the U.S. In 2016, 30.7 million people used AR monthly, a number that will grow to 40.0 million in 2017 for a 30.2 percent increase. The company predicts 48.1 million users in 2018 and 54.4 million in 2019..."*



Discovering the immersive experience

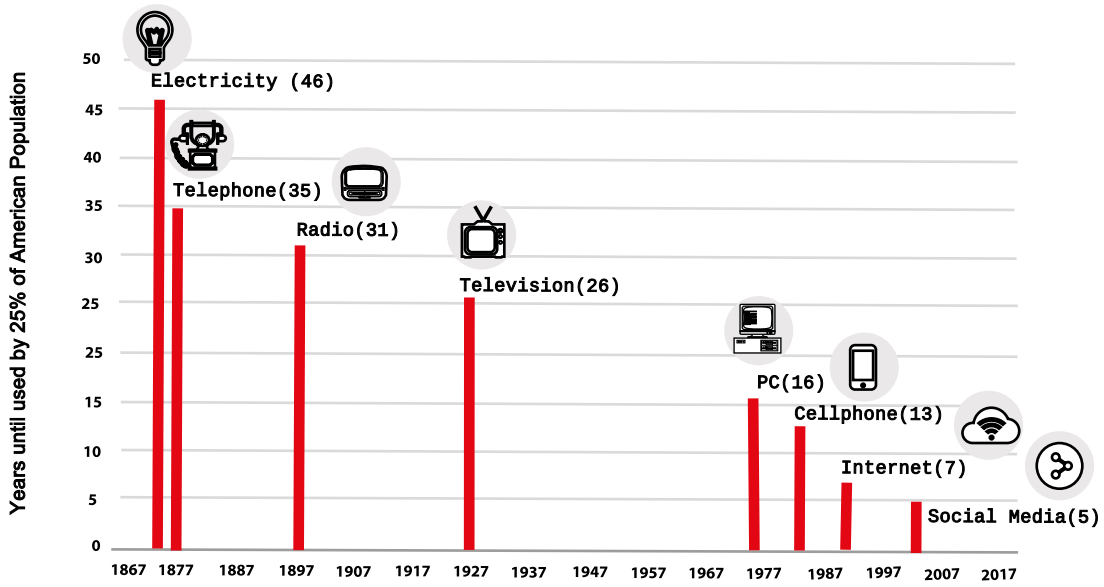
Immersive experience is the key for adoption

The technology adoption cycle is well-known:



We need to know whether we are addressing now the first 2.5% of innovators or entering a larger volume phase of the cycle. Early and Late Majorities probably will be the cash cows and the consolidation for the platforms, but as technology companies, **we know that standards and definitions are created in the first two steps.** While the adoption chart is known, we also know that the adoption speed is increasing dramatically due to economies of scale in an ultra-connected and globalized world.

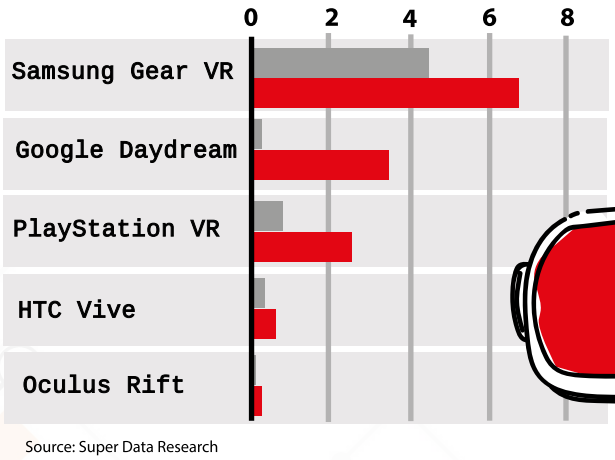
ACCELERATION OF TECHNOLOGICAL ADOPTION CURVES 1867-2017



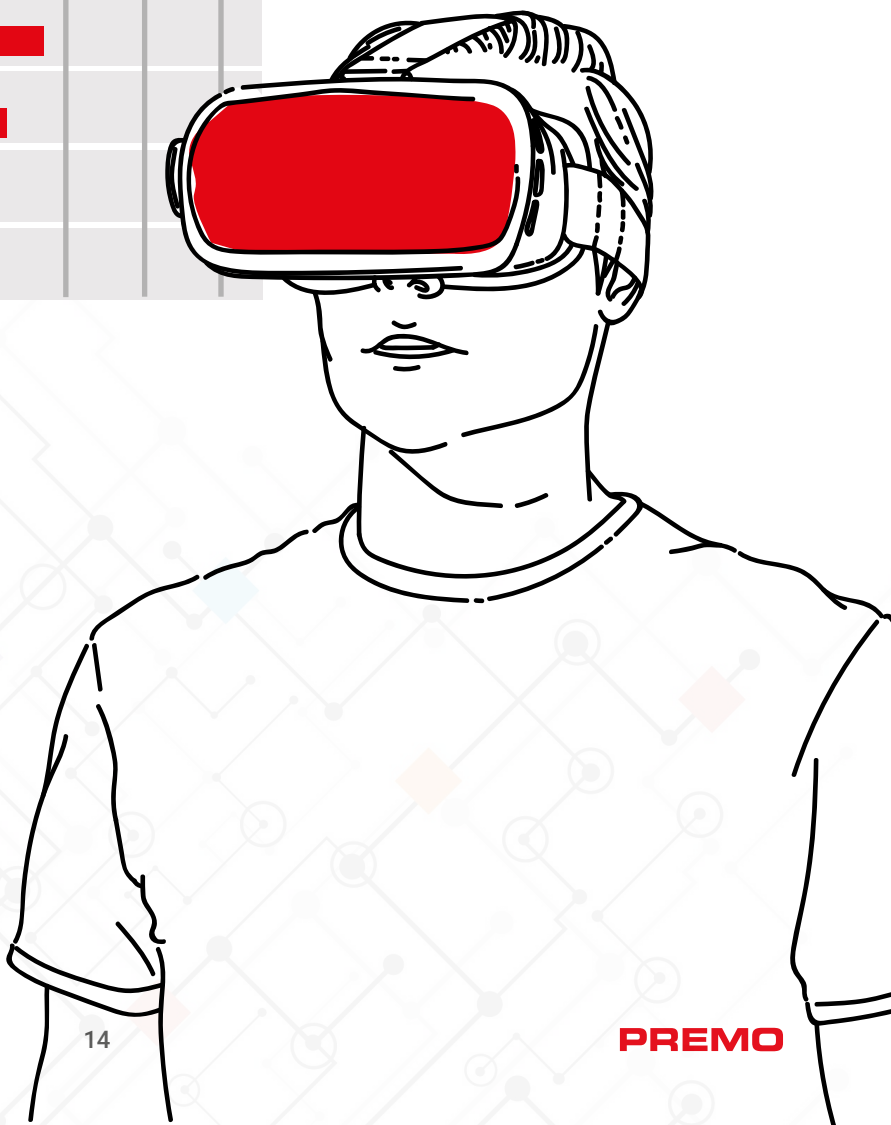
If telephone adoption by the first early majority took 35 years in the US, TV took 26 years, and Internet 7 and social media (Facebook, Twitter, Instagram…) just 5 years, make your bet. **How long will it take for VR/AR to be adopted by 25% of the US population?** It seems than it will take less than 5 years, probably 3, provided that HW, as a first bottleneck, is widely available, affordable, simple, and compatible.

And what about the rest of the world? Will the developing Asian countries just look? We rather doubt it; HTC , Sony, Nintendo, Samsung, LG, Lenovo are already big players but **the second largest world economy has a lot to say about this technology.** Chinese firms have been quick to research and invest in systems that are smaller, cheaper and wireless, and its industry is churning out new products. Most importantly, the Chinese Government is supporting this development as mentioned by Xi Jinping as they envision VR as an important vector for economic growth. Chinese tech giants are getting ready like Lenovo, Huawei , Xiaomi, ZTE…

VIRTUAL-REALITY HEADSET SHIPMENTS, WORLWIDE,M



Source: Super Data Research



The evolution shown by The Economist mentioning SuperData Research sources is promising. Most companies grew from 2016 to 2017 and the average market growth will roughly double to 106%. Nevertheless, analysts mention that supply constraints in headsets and lack of availability of devices like Oculus Rift in 2016 delayed both HW and SW revenues. However, as far as we now, those issues have been overcome and **big players are focused on developing more user-friendly, wireless HW platforms.** 2016 was considered the VR year, but the true reality is that just 6.3 million headsets were shipped, most of them simple and low-cost devices, like the Samsung Gear VR used with smartphones as the screen. The high-end market, i.e., Oculos Rift, only supplied 200,000 devices globally. A big success but still far from the early majority adoption group.
Most of last year forecasts have been updated to a lower adoption pace. For example, SuperData reviewed its January 2016 data and cut the total HW and SW revenue down to US$ 3.6 billion from US$ 5.1 billion.

Experts mention several hurdles to mass adoption:

- **Gear is expensive and awkwardly heavy or clumsy.**
  SOLUTION: New HW developments coming to market in the following quarters are lightweight, stylish, and wireless.

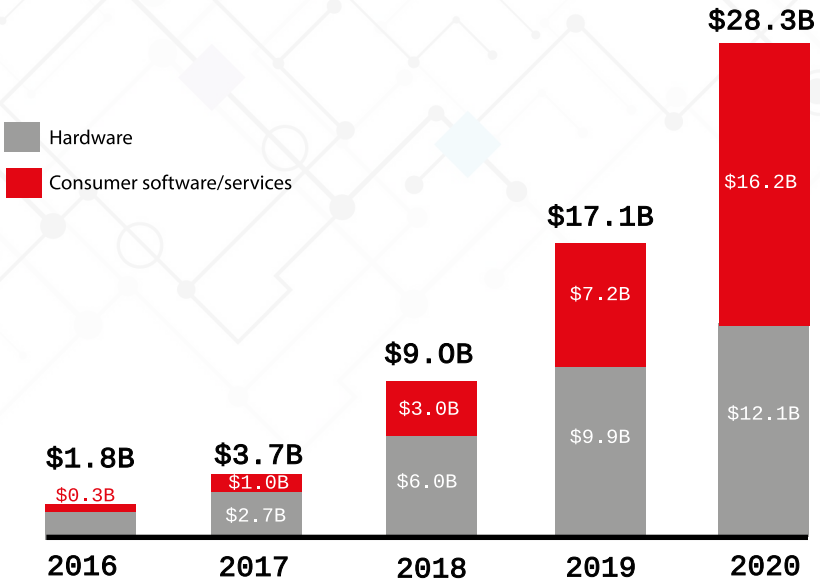
- **A powerful computer or gaming3ole is required.**
  SOLUTION: Standalone systems are being developed worldwide.

- **Consumers do not spend on a HW without many available applications/games.**
  SOLUTION: Big players are setting platforms to coders and developers and strengthening their ecosystems as announced by Facebook in F8 2017 ,Google I/O 2017 and Microsoft Build 2017 Developers Conferences.

- **Developers don't invest in a small and fragmented market of different not compatible headsets that require a lot of repeated coding efforts.**
  SOLUTION: See above.

- **The way 3s have to wave around handheld controllers to input movements falls short of VR promises.**
  SOLUTION: Electromagnetic Tracking, Electromagnetic Motion Capture and Wireless IMUs turn haptics, immersion and presence experiences into reality.

WORLDWIDE VIRTUAL REALITY REVENUE BY SEGMENT



We researched the sources and news are good, especially for us, HW developers and manufacturers, **as there is a clear need for high quality reliable, wireless and affordable hardware to run applications over.** Nevertheless, HW, as usual, will be surpassed by SW by 2020. We have seen this in other platforms (PC's, smartphones, ICT's and smart vehicles).

Removing the barriers of the market

Our own experience tells us that most of the barriers described above are being seriously addressed and most of them solved. Especially the need for haptics, sensors, and the feeling of real presence. **The full immersive experience will be a key issue, and this will change completely the way users interact with the VR environment. The massive use of Electromagnetic Motion trackers for MOCAP (Motion Capture) makes HW simple, affordable and wireless.**

In june 2017 in Los Angeles E3, a month earlier in Seoul during the World IT Show WIS 2017, later in July on the occasion of VAARWorld in London, a few weeks earlier in Madrid DES2017, and also in June in AWE2017, in Santa Clara we have seen a revolution in the offer and whole new set of companies addressing the issues of immersion and presence and a clear vision of large players like Microsoft, Google and Facebook, **to develop platforms and coders easier in order to accelerate their adoption.**

Gamers have a first and important voice. **Augmented and Mixed Reality, which allows users to overlay the digital world onto the real one, has more and more everyday applications.** Apple, Google and Microsoft, with its Hololens and its definition of MR, believe that AR MR will become a bigger phenomenon than VR.

These are our findings from the shows. For more information feel free to check out our articles on VR & AR World as a starting point and the Observatory of VR/AR Motion Tracking.

Author Bio

Born in Malaga, Spain, Ezequiel Navarro is a Industrial Engineer (MEE) from UPM. He has been Director, Chief of Sales and CTO of Premo (Global Leader in Innovative Magnetics) for many years and was promoted to CEO in 2006.

Passionate about engineering, he has dedicated his life to research and development, always aiming to improve the fields of the 4th Industrial Revolution: RFID, NFC, VR, AR, IoT, EV and M2M. He is an expert in growth and strategy, intellectual property, investors relations, business development, institutional relations, MBO and LBO funding, and has participated in the firm's expansion in Morocco, China, India, Japan, France, South Korea and Vietnam. He boasts extensive knowledge in the financial and technological sectors, and considerable experience in management and business management. Other than being an electronic engineer certified by the UMA and having a Master in Industrial Engineering, Renewable Energy and Sustainability given by UNED, he has also earned a Master in Corporate Finance, an Executive Master in Financial Management, an Executive MBA and a Master in General Management.

He is also a member of the Board of Directors of AMETIC (Association of Electronics, Information and Communications Technologies, Telecommunications and Digital Content Companies), and PIMEC (Micro, small and medium-sized businesses of Catalonia) and **fellow CEO member of the panel of participating companies at Cre100do.**

Additionally, **Ezequiel is a professor at Pompeu Fabra University,** teaching international negotiation and management skills to many eager students, and occasionally at some of the other main business schools in Spain, such as the Business Institute or EADA.

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