MIS 760
Virtual Reality

Team 3:

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Prof . Michael Parfett

1997: "Don't sit too close to the tv it will damage your eyes"

2017:

Ayush Kalla

What is Virtual Reality??

- Virtual Reality (VR) is the use of computer technology to create a simulated environment.
- VR places the user inside an experience. Instead of viewing a screen in front of them, users are immersed and able to interact with 3D worlds.
- Simulates as many senses as possible

Ayush Kalla

Non-Immersive VR

- Non-immersive VR is a type of the virtual reality technology that provides users with a computer-generated environment without a feeling of being immersed in the virtual world.
- The main characteristic of a non-immersive VR system is that users can keep control over physical surrounding while being aware of what’s going on around them

Ayush Kalla

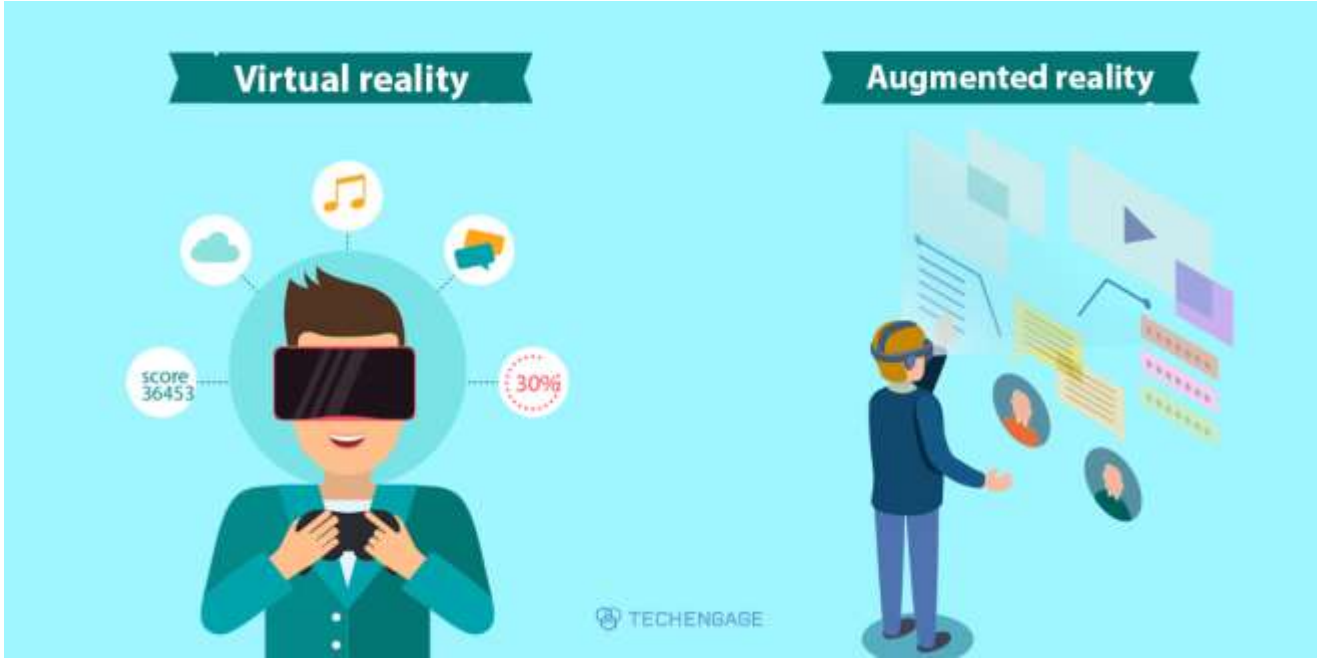
Immersive VR

- Immersive virtual reality (immersive VR) is the presentation of an artificial environment that replaces users' real-world surroundings convincingly enough that they can suspend disbelief and fully engage with the created environment.

Ayush Kalla

Augmented Reality

- Augmented Reality simulates artificial objects in the real environment.
- AR technology renders the 3D graphics as they would appear from the viewpoint of the camera, superimposing the computer-generated images over a user's view of the real world.



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Collaborative VR

- Collaborative VR allows people based in different locations to interact and collaborate with each other in the same space – virtually.
- Teams from different parts of the world can share ideas and experiences and work together in real time in a shared virtual 3D workspace.

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Web VR

- Web VR is an open specification that makes it possible to experience VR in your browser.
- Web VR uses VRML (Virtual Reality Markup Language to experience VR over the internet.
- You need two things to experience Web VR: a headset and a compatible browser.
- People get to interact and have real experiences with their friends on social media.

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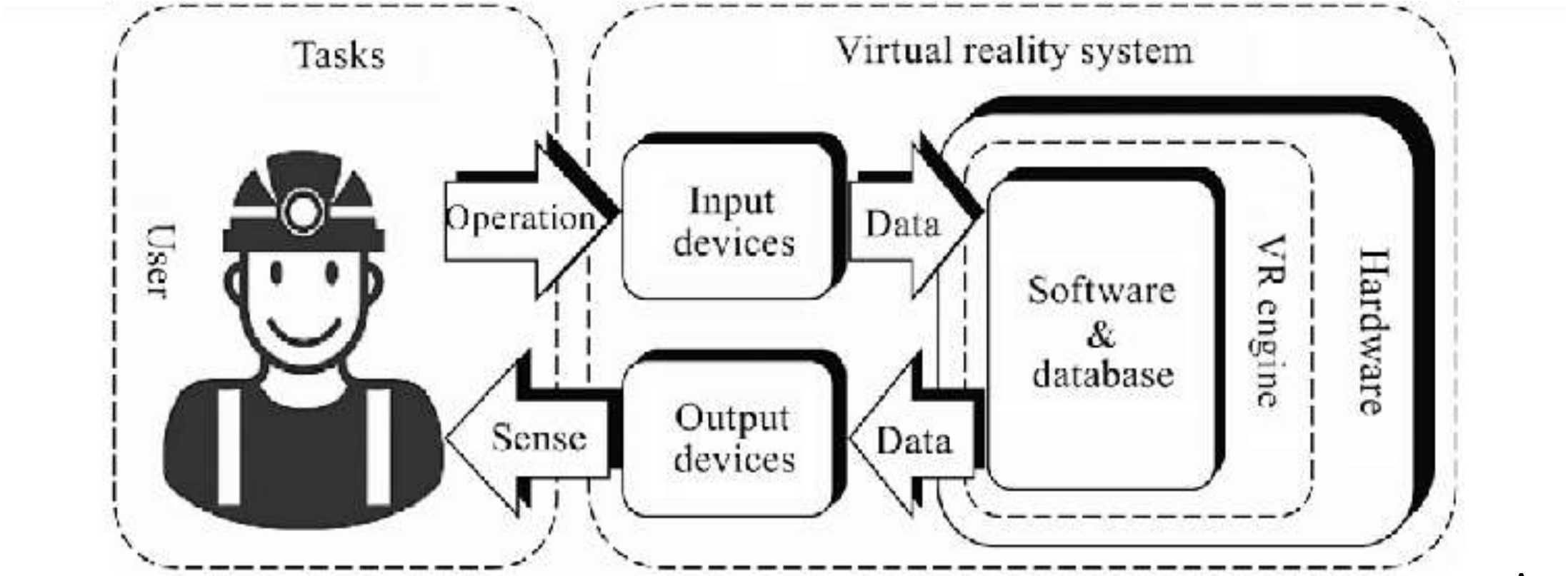
Components of VR



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History of VR

- 1956

Cinematographer Morton Heilig created Sensorama, the first VR machine (patented in 1962). It was a large booth that could fit up to four people at a time. It combined multiple technologies to stimulate all the senses: there was a combined full color 3D video, audio, vibrations, smell and atmospheric effects, such as wind.

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History of VR

- 1968
- Ivan Sutherland, with his student Bob Sproull, created the first virtual reality HMD, named The Sword of Damocles.
- This head-mount connected to a computer rather than a camera and was quite primitive as it could only show simple virtual wire-frame shapes.
- It was never developed beyond a lab project because it was too heavy for users to comfortably wear; they had to be strapped in because it was suspended from the ceiling.

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Growth of VR

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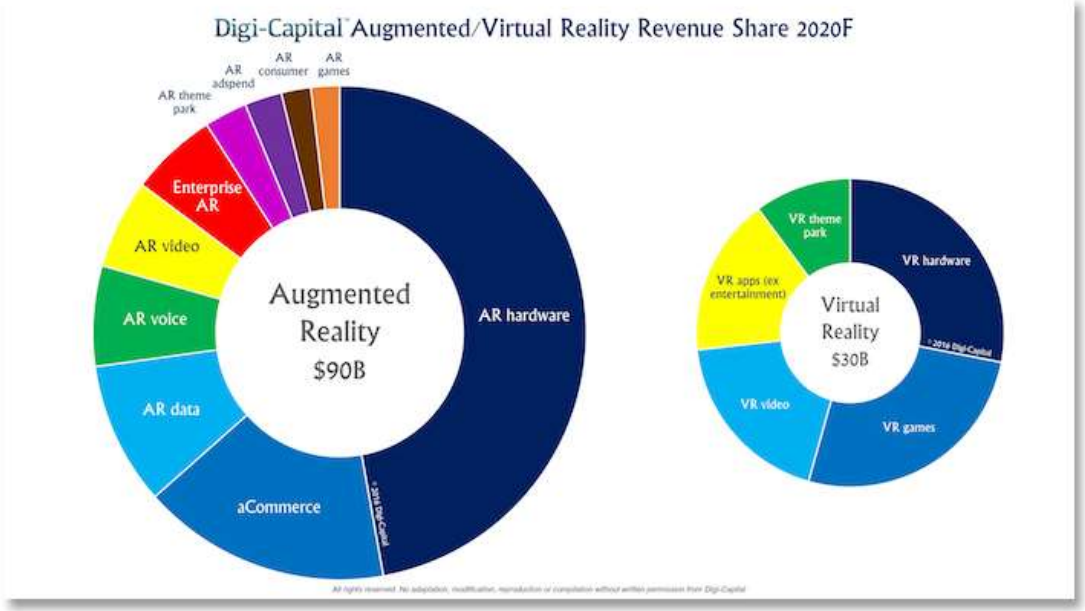
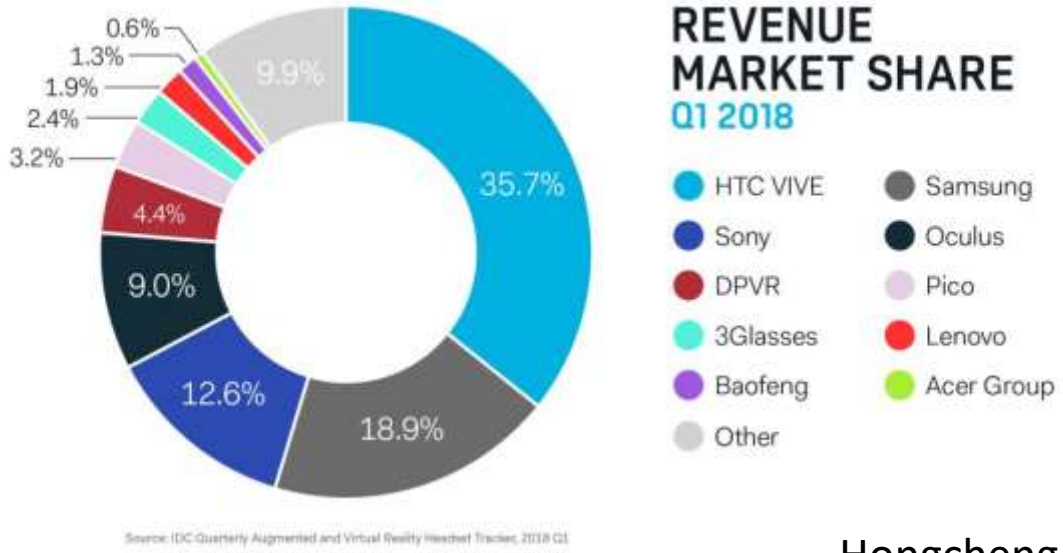
Case Studies Findings (Market share)

Digi-Capital, meanwhile, sees an overall VR/AR market totalling $120 billion by 2020. Here are the expected revenue shares for the two sectors in 2020:



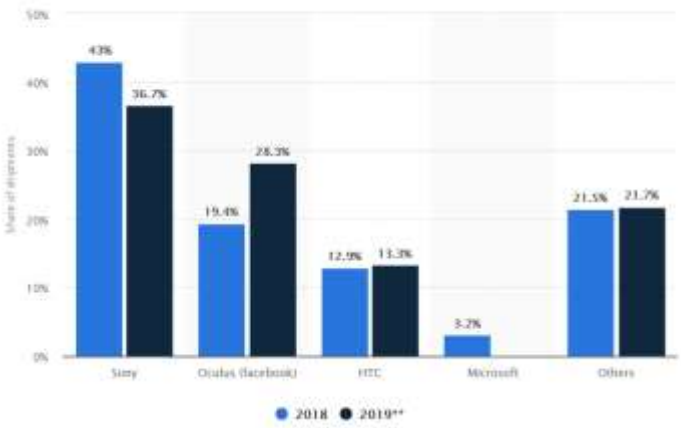
The market share in the 2018 shows the HTC VIVE occupy the most revenue market, the rest part is occupied by Samsung, Sony, Oculus, DPVR.etc.



Hongcheng Han

Case Studies Findings (Market share)

Estimated VR device shipment share by vendor worldwide in 2018 and 2019



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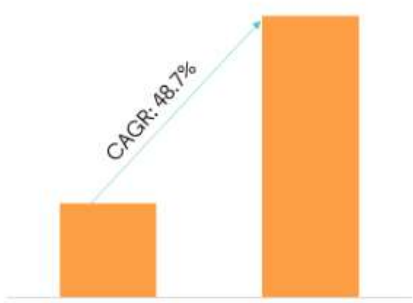
DESCRIPTION SOURCE MORE INFORMATION

by Shanhong Liu,
last edited Sep 5, 2019

In 2019, Sony is expected to remain the top position in the virtual reality (VR) device market, accounting for around 37 percent of total shipments. The other major players in the VR device market are primarily large tech companies like Oculus (Facebook), HTC, and Microsoft, each of which account for a relatively significant portion of the total market share, but still lag far behind Sony in terms of total unit shipments.

Virtual Reality Market Summary

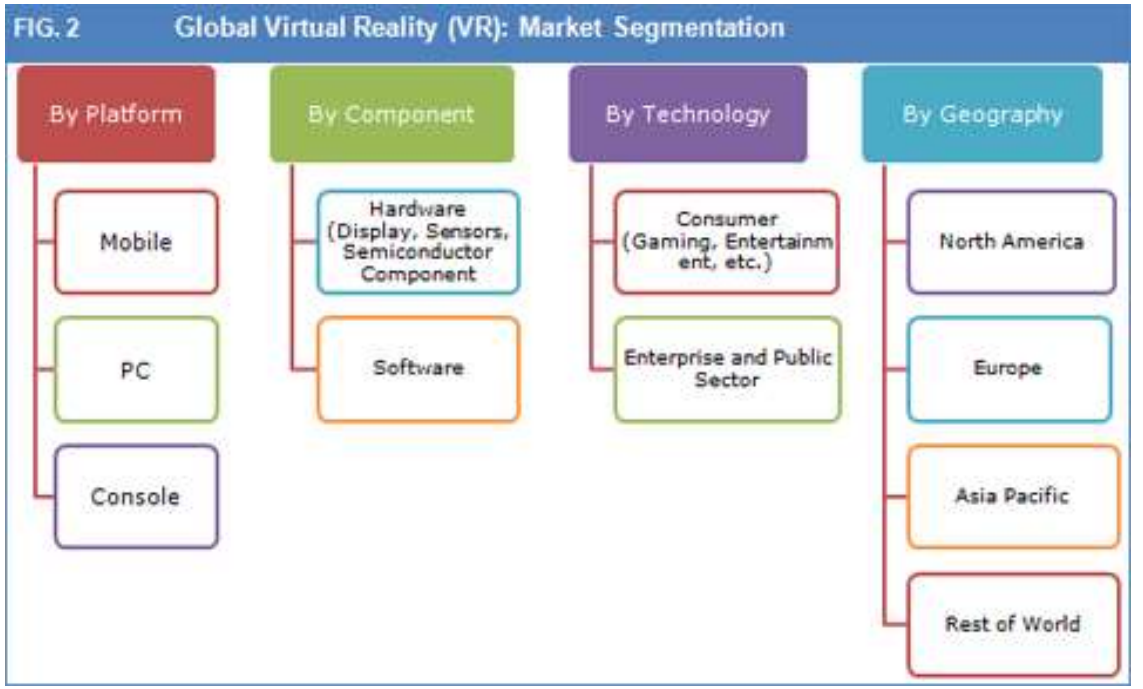


Source: Mordor Intelligence

Study Period:	2018-2024
Base year:	2018
Fastest growing market:	Asia Pacific
Largest market:	Asia Pacific

Key Players:

VIVE, SAMSUNG ELECTRONICS, SONY, oculus, Lenovo, Google



Case Studies Findings (Market Segment)

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Technology Used and services

- 1 Manufacturing
- Making product, checking the scope of industry

- 2 Hospital
- relieves the pain of patients

- 3 Education
- help children with learning disabilities, autism

Hongcheng Han

VR Products

- Modern science and technology has been providing us with varieties of newer and smarter products one after another over the last decade and Virtual Reality shortly known as VR is one of the most fascinating addition to this list.
- With its motion tracking and eye tracking features it really takes us to an exciting virtual world and makes us feel as if we are actually there.

Hongcheng Han

Applications

- Education and training
  - Ø Flight and vehicular applications
  - Ø Medical Training
  - Ø Military Uses
  - Ø Space Training
- Ø Entertainment
  - Ø Video Games
  - Ø Cinema
  - Ø Music and Concerts
- Ø Architectural and Urban Design
- Ø Health and Clinical Therapies
- Ø Engineering and robotics
- Ø Digital Marketing and activism

Advantages and Disadvantages

Advantages

- Helps to save money and resources
- Beneficial to a lot of business and management
- Uncomplicated educational system
- Helps in exploring geographical regions

Disadvantages

- Equipements and HMD devices used for VR are very expensive
- Low resolution content and large file size
  - File Size
  - Video Quality
  - Resolution
- Health issues and social consequences

Haritha Krishnankutty Nair

SWOT Analysis

S — STRENGTHS

Strengths provides an area to list everything done right either individually or as an organization. This section contains both strengths within the organization and external strengths, such as client relationships.

W — OPPORTUNITIES

Weaknesses are aspects of your business that detract from the value you offer or place you at a competitive disadvantage. You need to enhance these areas in order to compete with your best competitor.

O — WEAKNESSES

Opportunities are factors that represent reasons your business is likely to prosper. Such as being able to expand a franchise into a new city, while some may fall into your lap such as another country opening up its market to foreign business.

T — THREATS

Threats include external factors beyond your control that could place your strategy, or the business itself, at risk. You have no control over these, but you may benefit by having contingency plans to address them if they should occur.

Haritha Krishnankutty Nair

Strength

- Deep connection with the target group or consumers
- Beneficial to a lot of businesses and management
- Cost Reduction in organizations
- Real-life experience

Weakness

- Improper and less efficient technology
- Substantial time commitment during development
- High cost equipements
- High speed end user device requirements

Opportunities

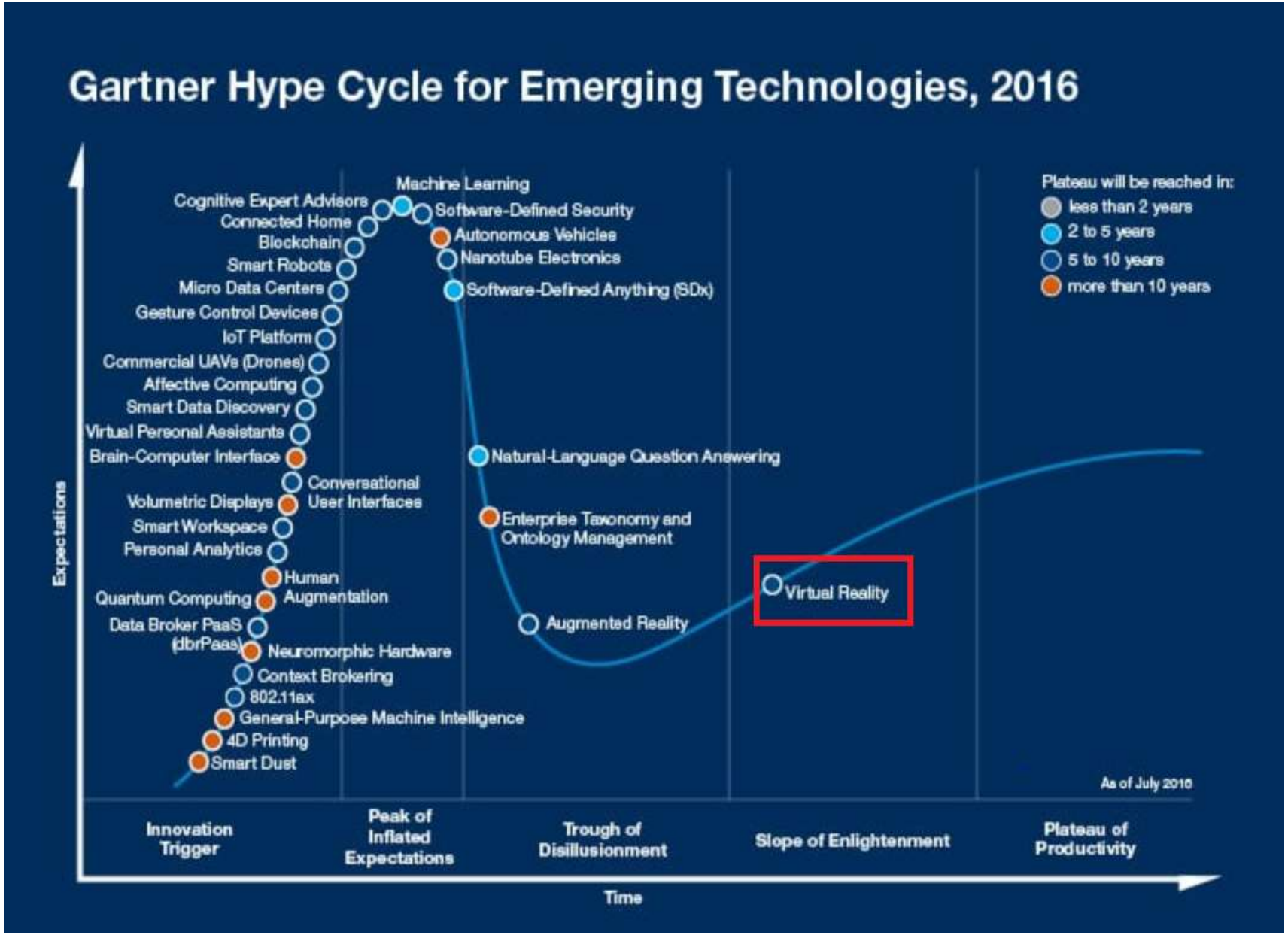
- Different types of potential markets
- Less competition as the technology is emerging
- Establishing a dedicated user base.

Threats

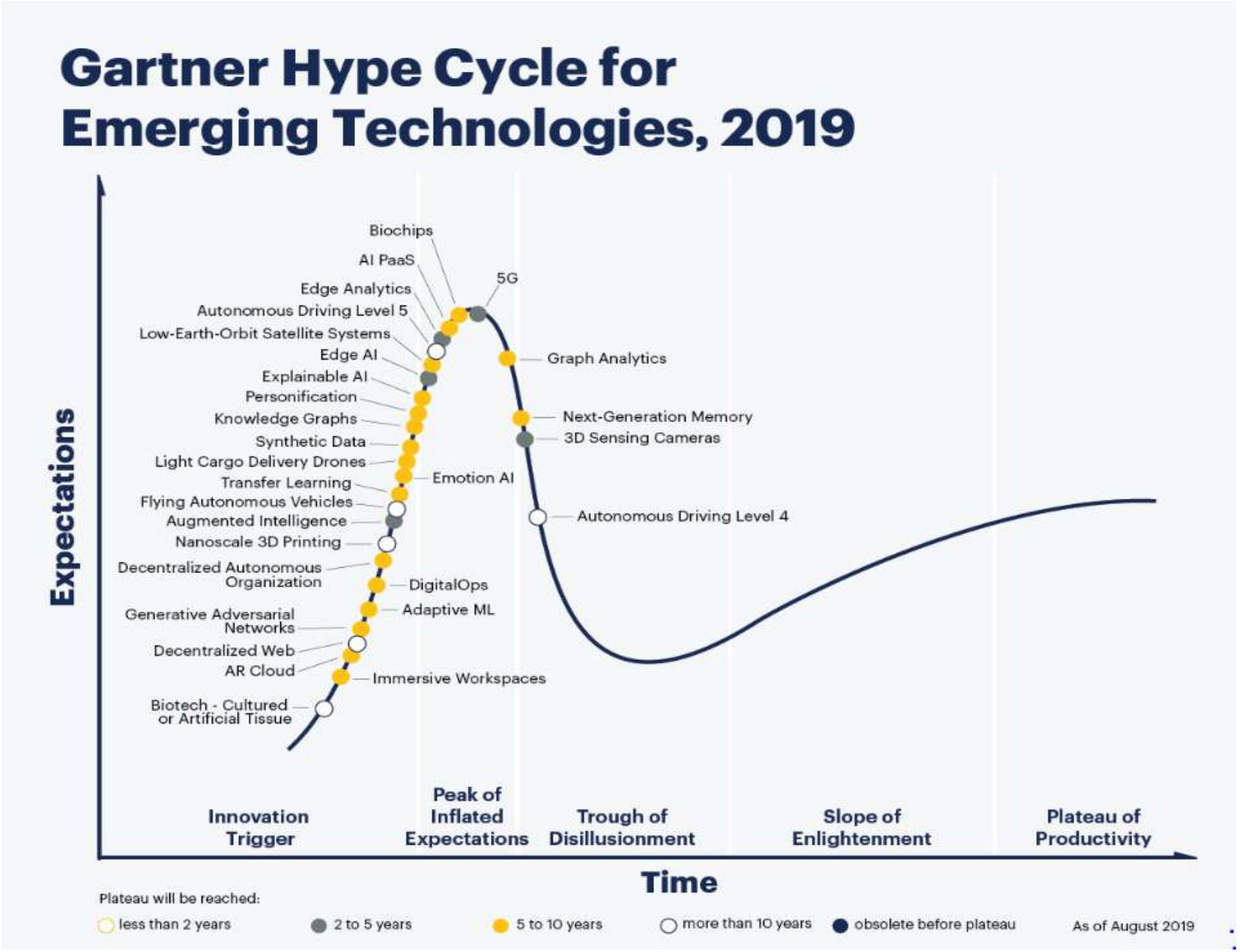
- Rapidly changing market needs
- Bad marketing and PR
- Wide adaption of alternative technologies like AR

Haritha Krishnankutty Nair

Gartner's Hype Cycle, 2016



Gartner's Hype Cycle, 2019



IT Strategy

AS-OF

- Currently, Virtual Reality is being implemented in Gaming and Entertainment Industry mostly, but everyone is taking note of the broader applications that are possible in the future.

- Virtual Reality applications are expanding constantly. But there are still some technological advancements required to implement these technologies.

TO-BE

- Not too far from today, Virtual Reality will be applied in the fields of surgical planning, interoperative navigation, and surgical simulations.

- Soon there will be provision to help a surgeon to practice a delicate surgical procedure on the patient's specific virtual anatomy before actually performing it.

Kumar Kovid

IT Strategy

AS-OF

- Cost Reduction, functionality and flexibility in the IT infrastructure emerged.

- VR is also beginning to revolutionize other industries such as healthcare, retail and education, which is already aiding tasks in the sectors, from helping patients with anxiety relax, and helping students learn more by experiencing what they are being educated on.

TO-BE

- The next innovation leap will be the integration of machine learning and Artificial Intelligence with current technology.

- The future will belong to AR when it improves task efficiency or the quality of the output of an experience for the user.
Eg. Virtual shopping and concert experience

Kumar Kovid

Business Strategy

AS-OF

- One of the biggest bottle-neck to the technology becoming mainstream was the cost and lack of adoption by masses.

- Trend of VR Devices being sold in past few years has been shifting towards mobile sector.

TO-BE

- With the current applications still being realized and improved, and future possibilities innumerable, VR today is the burgeoning industry.

- Mobile phone users are going to be the top market interest of VR device manufacturers.

Kumar Kovid

Business Strategy

AS-OF

- Currently the major users of Virtual Reality are in America or Europe.

- Market share of the Virtual Reality sector was 2.02 billion dollars in 2016. It was 8.9 billion dollars last year.

TO-BE

- There is a huge potential to grow the market in Asia Pacific region.

- The Global virtual reality Market is expected to exceed more than US$ 43 billion by 2024 and will grow at a CAGR of more than 33% in the given forecast period.

Kumar Kovid

Ansoff Matrix

	Existing Product/Services	New Product/Services
Existing Markets	● Focus on expanding sales of your existing product in your existing market ● Provide better service to the Existing customers	● Create synergy with the other services. ● Create an advanced version of the product for upgrade. ● Better Data Security
New Markets	● Cost efficient alternatives for the customers to gain recognition in the new market.	● Enter new markets like the more of the Asian and the African markets which are still untapped and have potential to be the market leaders.

Kumar Kovid

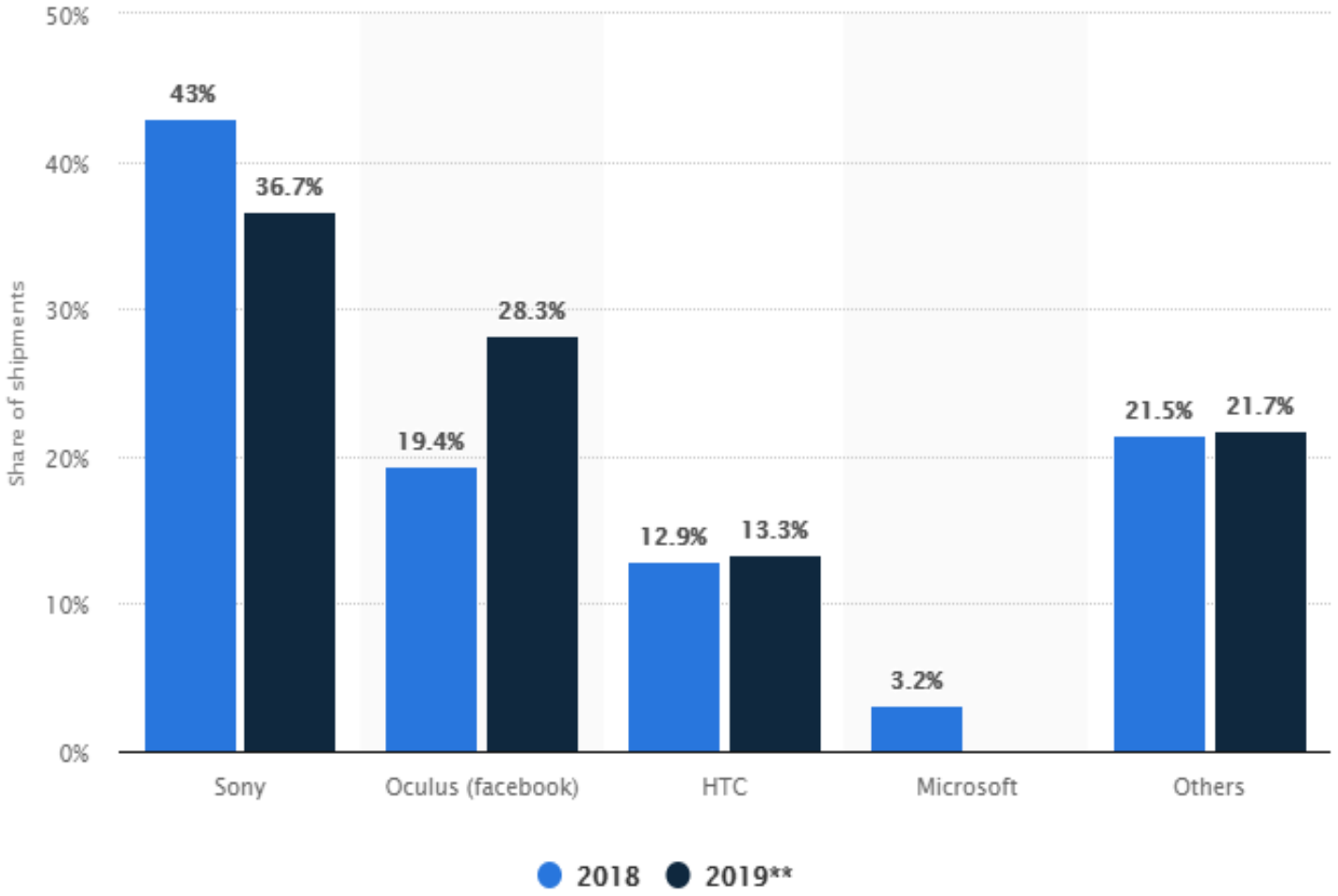
Porter's 5 Forces

<u>Industry Rivalry is HIGH</u>:

We can see that the industry rivalry is high among the organizations.

Even though Sony's market share is the highest.

The gap between the players is decreasing and competition is getting stiff.



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Porter's 5 Forces

Threat of new entrants is MEDIUM:

- Profit generating business expected to grow multiple folds in the next five years, encouraging more businesses to get involved.
- Barriers to entry due to complex product design and high initial costs but still no company has been able to sweep the market segment, thus there are opportunities for new entrants.

Bargaining power of the buyer is MEDIUM:

- As the competition is increasing, the customer may switch to another service provider but there are limited good quality choices to switch.

Porter's 5 Forces

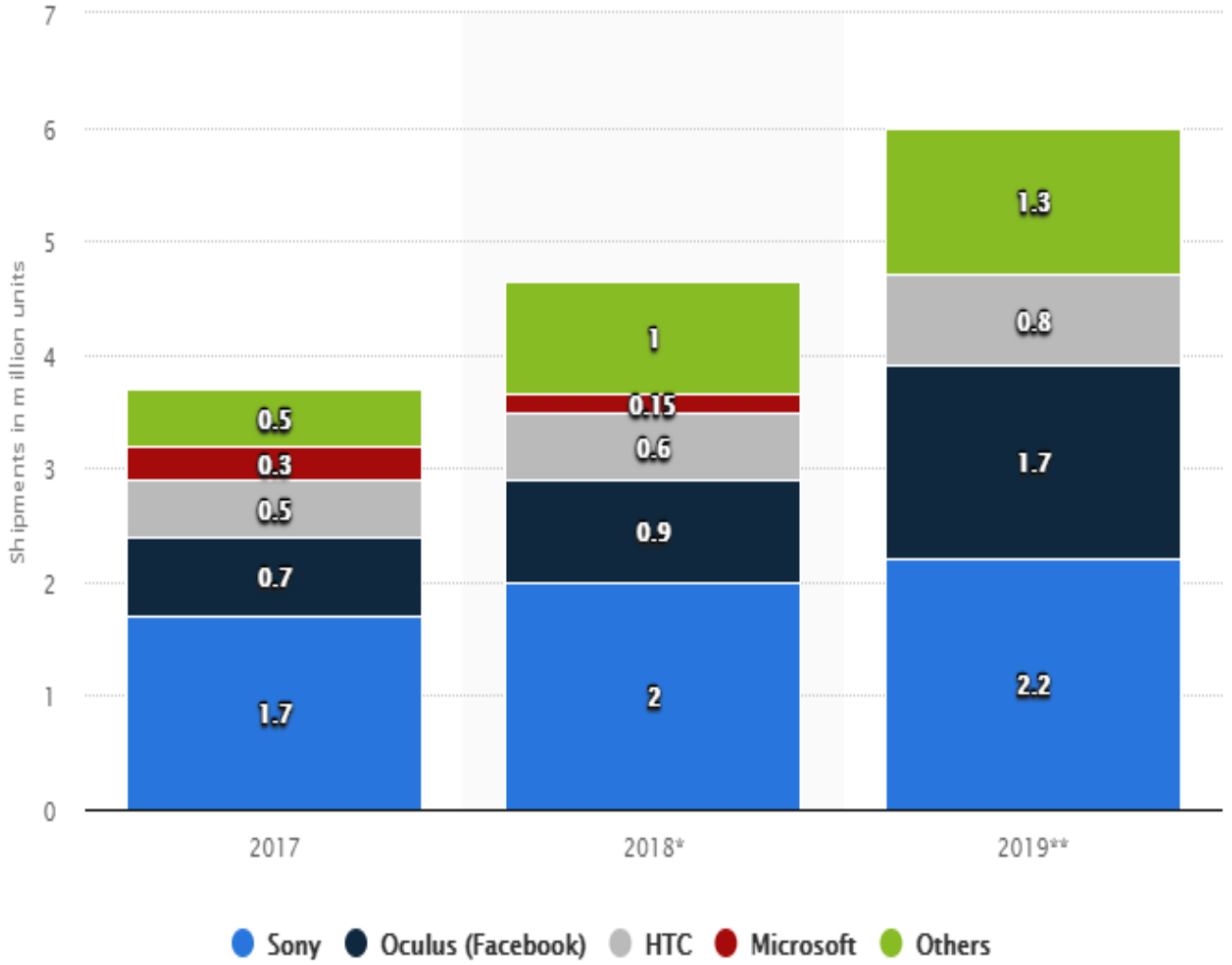
<u>Threat of substitution is HIGH</u>:

- Fear of losing business due to lack of advancement in technologies.

Eg. Microsoft lost the race in this segment

<u>Bargaining power of the suppliers is HIGH</u>:

- There are only few good quality suppliers to choose from.



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Mintzberg's 5 p's of Strategy

PLAN

- Identify VR's current opportunities and strengths
- Consider all the risks associated with the plan.
- Look at bridging the gap between IT and business.

PATTERN

- Continuous investment and research in infrastructure
- Invest in its namesake console, which is the most popular on the market and driving massive revenue for Sony.
- Maintaining leverage with developers.

POSITION

- Provide services at **low cost** with the help of economies of scale
- **Agile and elasticity** with the help of Sony's global reach
- **Secure:** Follow industry recognized certificates

PLOY

- Create synergies with other services providers
- Make switching to other VR service providers difficult
- Cheaper rates with special deals

PERSPECTIVE

- To be perceived as a company that inspires and fulfils enthusiasts' curiosity.

Kumar Kovid

VIRTUAL REALITY – BUSINESS CANVAS MODEL

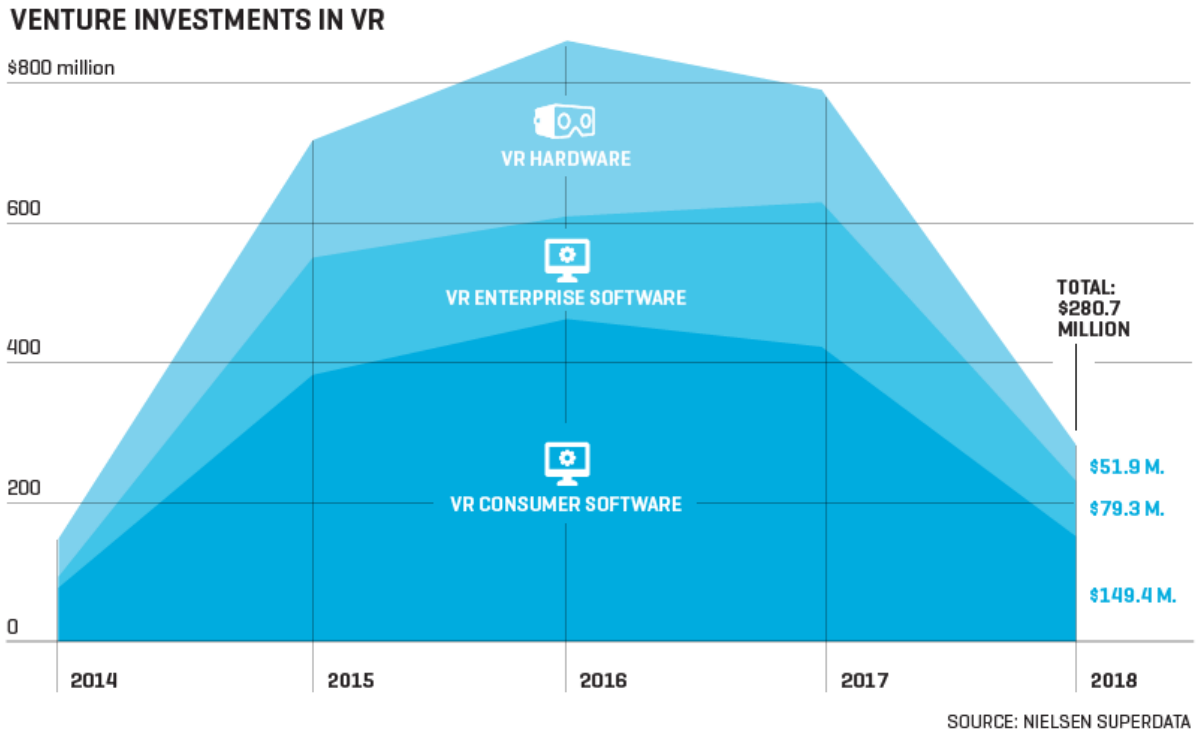
Arun Krishnasamy

VIRTUAL REALITY RISKS & CHALLENGES

- Declining investments
- Lack of viable business models
- Price and discomfort
- Health effects
- Lack of dedicated content
- Standalone technology
- Security risks
- Acceptability

DIM VIEW: VENTURE INVESTMENT IN VR TRENDS DOWNWARD

In 2016, VR's peak venture year, VCs pumped $857 million into VR startups. But in 2018, VR funding was down to $280 million, ceding ground to promising related technologies, augmented and mixed reality.



SOURCE: NIELSEN SUPERDATA

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RECOMMENDATIONS

- Price:
  - Though cheaper experience like VR-cardboard are available cheaper, The high-end VR devices are still a product of luxury selling at **high price range**.
- Marketing:
  - Virtual reality needs more marketing, in means of setting up more **experience zones**, to promote the technology and use case to the people as well as business
- Content Creation:
  - The virtual reality is in serious need of Interactive Interface, Software's, Dedicated games, and dedicated contents to wider adoption
- Adopting a business use case:
  - Virtual reality use cases are broader, where the businesses are still hesitant and neglect to adopt the VR business model to their existing model

RECOMMENDATIONS

- Standalone Device:
  - Currently almost all high-end virtual reality experience device are not standalone device, which doesn't give the user the comfortability to experience VR to its most.
- Open Source Platforms:
  - There are many commercial highly-priced VR platforms, aiming for the gaming industry, & simulation, which can be made open source which may aim to help engineers, startups to lower the cost their products and innovate.
- Need for Security:
  - The fear of security must be addressed by the Hardware/Platform creators to assure consumers to adopt the technology

VIRTUAL REALITY FUTURE VISION

- Massive multi operative interactive world
- Standalone
- Massive industry adoption/application
  - Virtual shops
  - Real estate
  - Healthcare
  - Dangerous jobs using robots
  - Military applications
  - Education
  - Employee training

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VIRTUAL REALITY FUTURE VISION

- Widespread Adoption
- VR as the broadcast content – Netflix / mainstream movies
- VR in the automobile
- VR in Drone technology and an autonomous vehicle
- VR and 5G
- New media adoption

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CONCLUSION

- VR technology projected to grow rapidly in the near future - Moore's law
- By 2020, the economic impact of virtual and augmented reality is predicted to reach $29.5 billion with projected selling of 82 million devices -- a **1,507% increase** from 2017 predicted totals.
- Virtual reality is a growing industry
- Huge business opportunities through implementing right business models
- New Reality comes with new responsibilities
- May affect social interaction
- Augmented reality (Competition or co-existence)
- Wide field of implementation

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