Virtual Reality

Team 2:

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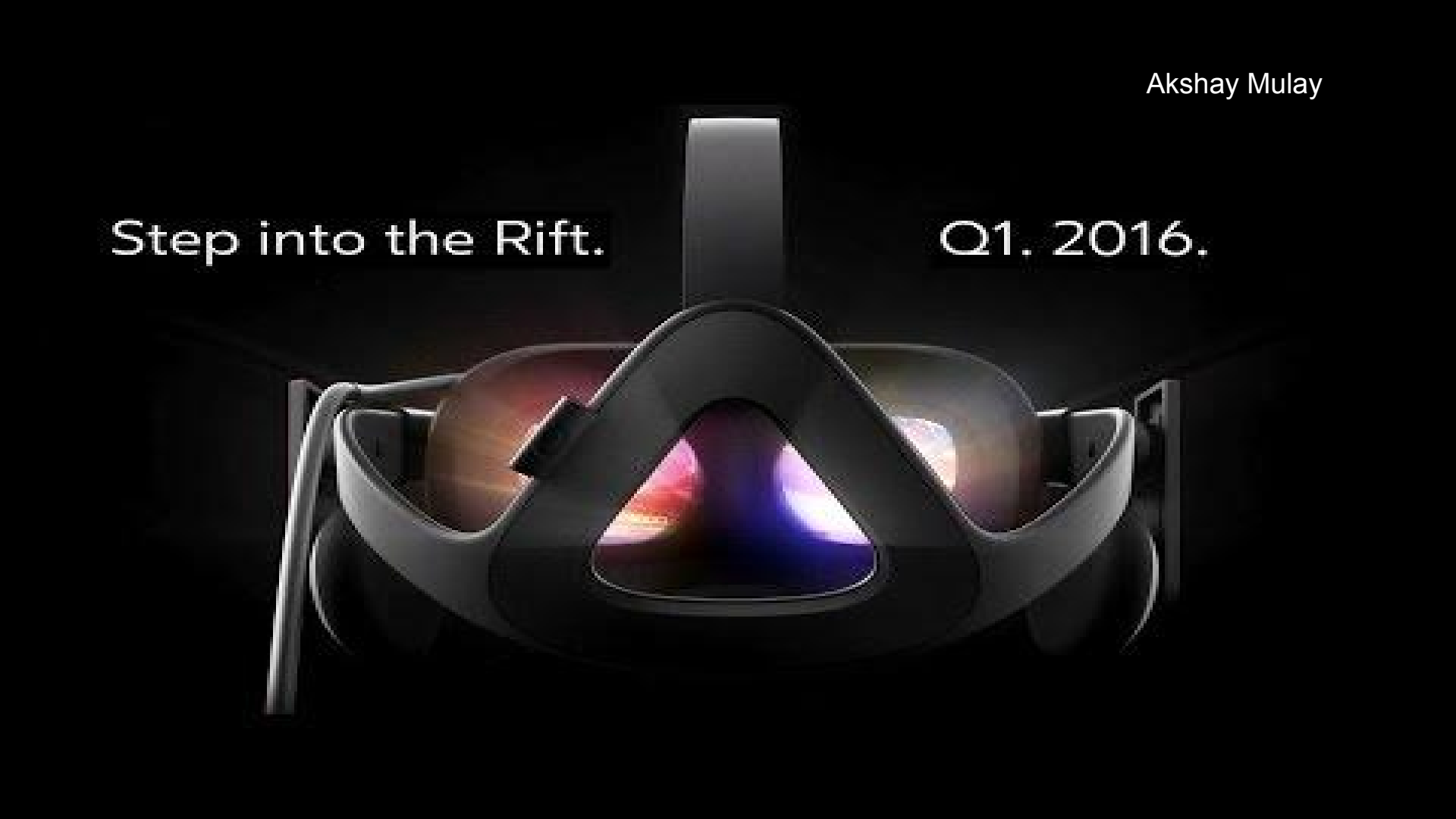
What is VR?

Akshay Mulay



Virtual Reality

Akshay Mulay

- Three Dimensional, computer generated environment
- A person becomes part of the environment, able to manipulate objects or perform actions
- *Sense of Presence : Hardware + Software + Sensory Synchronicity*
- Sensory Synchronicity is where person realizes of being in an artificial environment

Discovery

Akshay Mulay

•Ideas date back to 1930 by Stanley Weinbaum (Pygmalion's Spectacles)

•1950s – Morton Heilig’s Sensorama

•1960 – First Head Mounted VR

•1961 – Headsight (First motion tracking HMD)

•1965 – Ultimate Display by Ivan Sutherland

•1993 – Vega announced new VR glasses

Applications

Akshay Mulay

- Virtual Movies and Video games
- Architecture
- Sports

Problem Statement

Current Issues

Xiting Wang

- **1. MOTION SICKNESS**
- People get uncomfortable pretty soon
- **2. MOVING IN VR**
- Limited moving space
- **3. HARDWARE COST**
- HTC headset would cost $599

Constraints:

Xiting Wang

- **1.Integration of Constraints into a VR Environment**

-Geometry constraints

-Virtual sensation

Examples and Applications:

Wenpei Wang

Virtual Reality technology had been potential to change the world. Many industries can use this method to improve product performance and customer experience. Many companies have been invested in VR for expecting to increase working efficiency.

Examples and Applications:

Wenpei Wang

Education: Astronomy students can learn about the solar system and how it works by physical engagement with the objects within. They can move planets, see around stars and track the progress of a comet. This also enables them to see how abstract concepts work in a three dimensional environment which makes them easier to understand and retain.

Healthcare: A modern use of this technology is in robotic operation. This is where surgery is performed using a robotic device – controlled by a human surgeon, which reduces time and risk of complications. Virtual reality has also been used for training purposes and, in the field of remote telesurgery in which surgery is performed by the surgeon at a separate location to the patient.

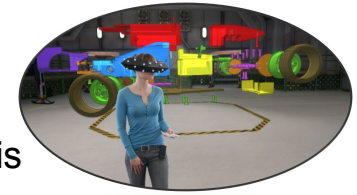
Military: Virtual reality has been used by the military especially useful for training soldiers for battle situations or other dangerous settings where they have to learn how to react properly. They can re-enact a particular scenario, for example, engagement with an enemy in an environment in which they feel this but without the real world risks. This has proven to be safer and less costly than traditional training methods.

Examples and Applications:

Wenpei Wang

Businesses: Companies can use this to test drive a product in the early stages of development but without any additional costs (or risks) to themselves. Also, it was useful for companies who produce dangerous or potentially harmful products which need to be estimated before use. They can test their product within a virtual environment but at no risk to themselves or their employees. And virtual reality technology has advanced to the stage where it has a high degree of efficiency.

Engineering: Car manufacturers use virtual reality for prototyping purposes during the design process. This enables them to create several versions which are then tested and changed as per the results. This removes the need to build a physical prototype and speeds up the development stage. The result is a cost effective streamlined process. This also allows the design team to observe their project within a safe environment and make changes as and where necessary. This saves both time and money.



Entertainment: The technology would create a view at different angles. Plus they can walk through this building, visiting different rooms to find out more about how people lived at that special time in history. They are using a tracking system which follows their movements and feeds this information back to a computer. The computer replies by changing the pictures in front of the person to match their change in perception.

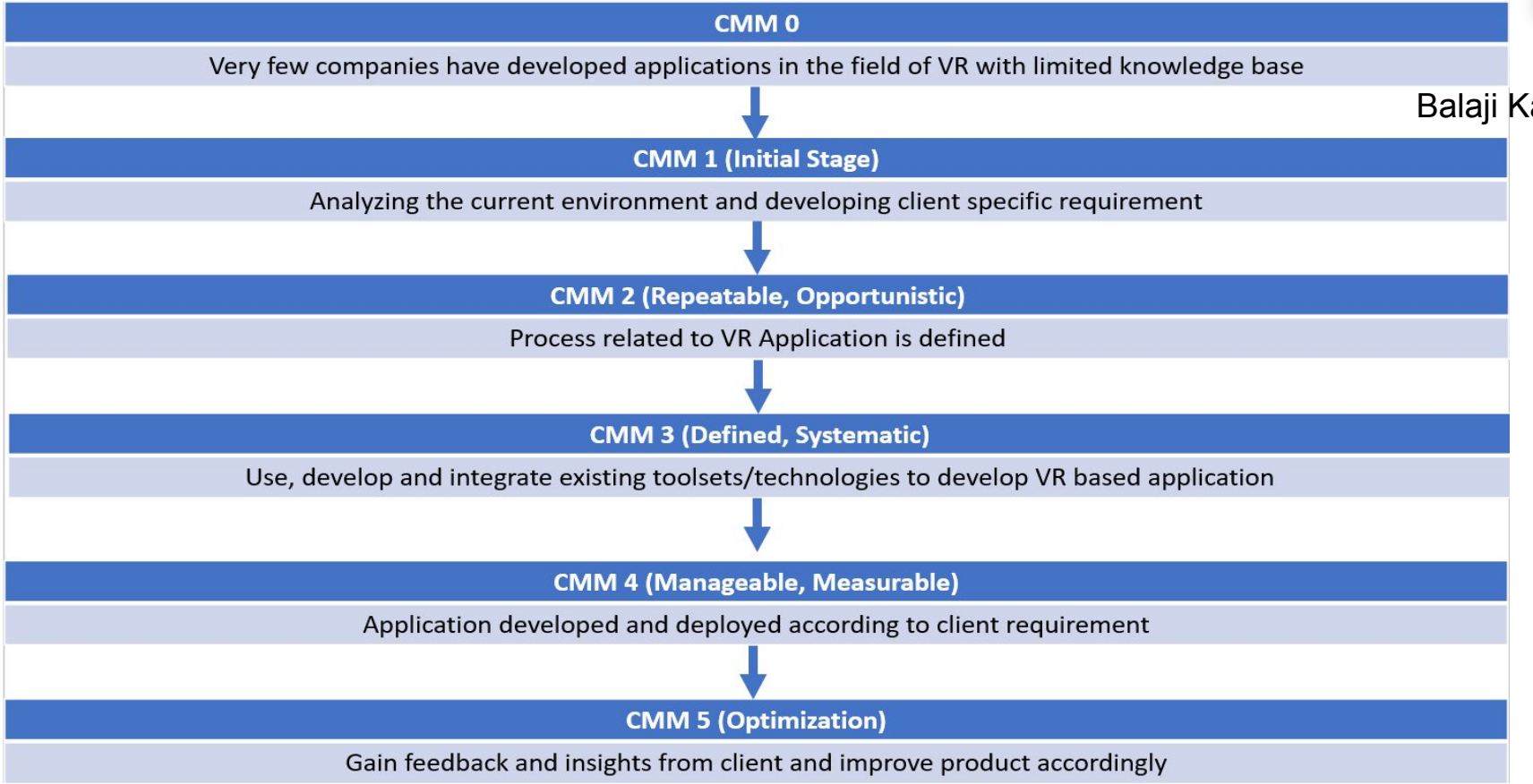
SWOT Analysis

Strengths	Weaknesses
• Real-Time Performance Feedback	• The Interface Challenge 1: Interaction Methods
• Cuing Stimuli to Support "Error-Free Learning"	• The Interface Challenge 2: Wires and Displays
• Self-Guided Exploration and Independent	• Immature Engineering Process
• Interface Modification Contingent on User's Impairments	• Platform Compatibility
• Complete Naturalistic Performance Record	• Front-End Flexibility
• Safe Testing and Training Environment	• Back-End Data Extraction, Management, Analysis, Visualization
• Gaming Factors to Enhance Motivation	Side Effects
• Low-Cost Environments That Can be Duplicated and Distributed	

Opportunities	Threats
• Emerging Tech 1: Processing Power and Graphics/ Video Integration	• Too Few Cost/Benefit Proofs Could Impact VR
• Emerging Tech 2: Devices and Wires	Rehabilitation Adoption
• Emerging Tech 3: Real-Time Data Analysis and Intelligence	• Aftereffects Lawsuit Potential
• Gaming-Industry Drivers	• Ethical Challenges
• Close-Knit VR Rehabilitation Scientific and Clinical Community	• Limited Awareness/Unrealistic Expectations
• Academic and Professional Acceptance	
• Integration of VR with Physiological Monitoring and Brain Imaging	

Balaji Katakam

CMM Model



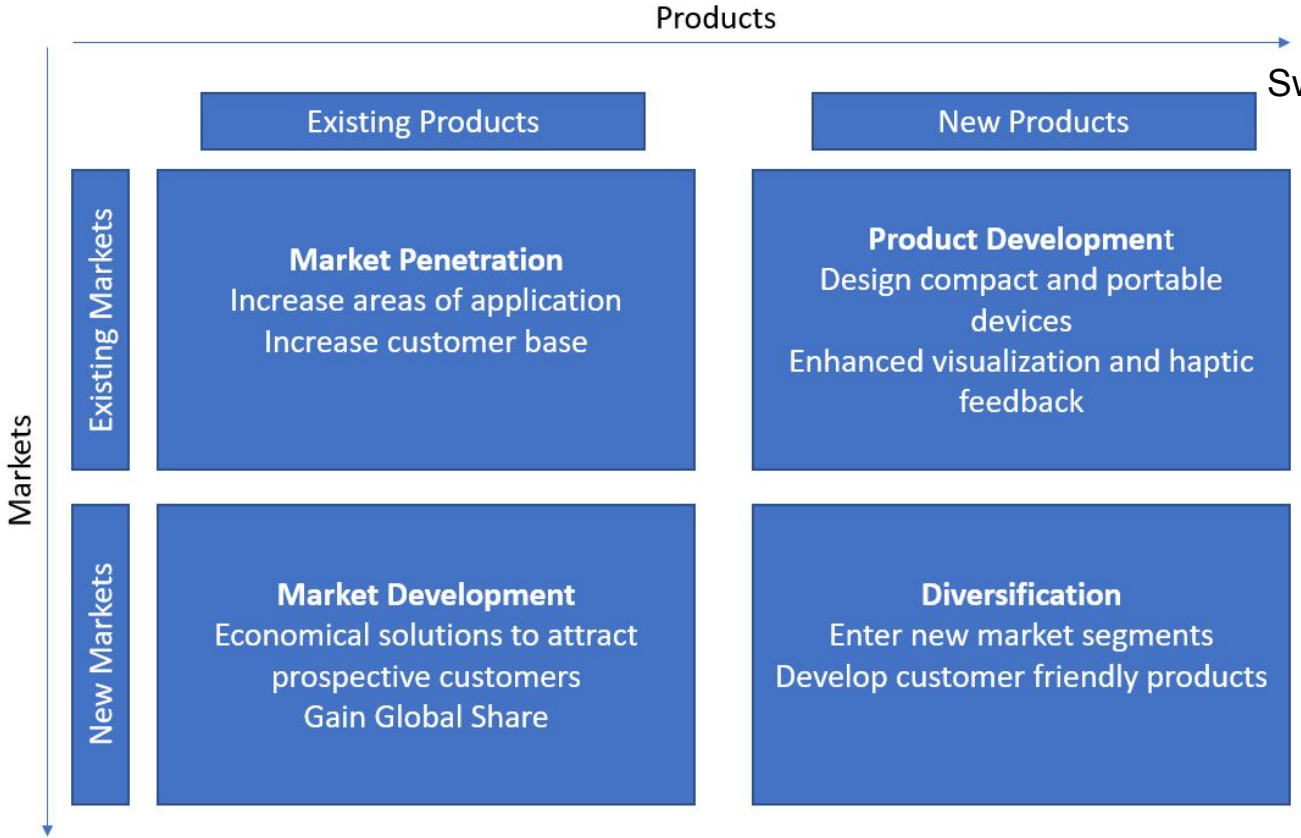
Balaji Katakam

AS-IS TO-BE Analysis

Swapnil Panchal

As-IS	To-Be
1. It offers a new way of seeing our world	1. Experience the world anywhere.
2. It will take a while for VR to gain traction	2. The future of VR could be our next computing platform.
3. VR Is The Evolution Of Communication	3. Virtual reality will eventually impact all of the senses.
4. Has not been adopted easily, since its expensive now.	4. Will be cheaper in the future.
5. VR currently focuses on Health, Communication and Entertainment.	5. We can see more applications in the future.
6. Currently it involves a lot of high end hardware components.	6. The Components would be more compact and portable.
7. Space Constraints in terms of portability.	7. Getting rid of space constraints.

ANSOFF Matrix



Swapnil Panchal

IT Strategy

Jiancheng Zhao

perspective

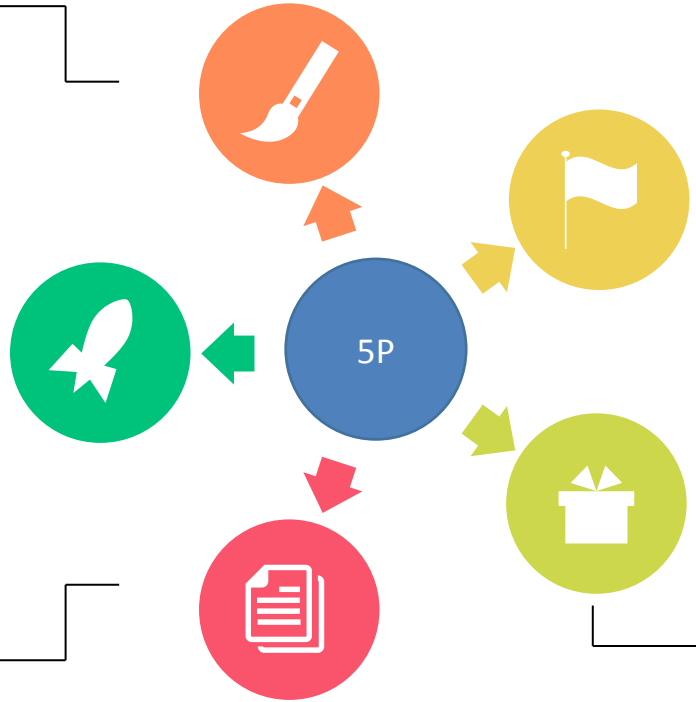
1) Be the leadership strategy in the enterprise
2) Make the strategy transparent to the customers

plan

1) Popularize the market
2) Develop new & easily available product
3) Infrastructure construction

PLOY

1) Catch up with the latest technology
2) Fix portability problem



position

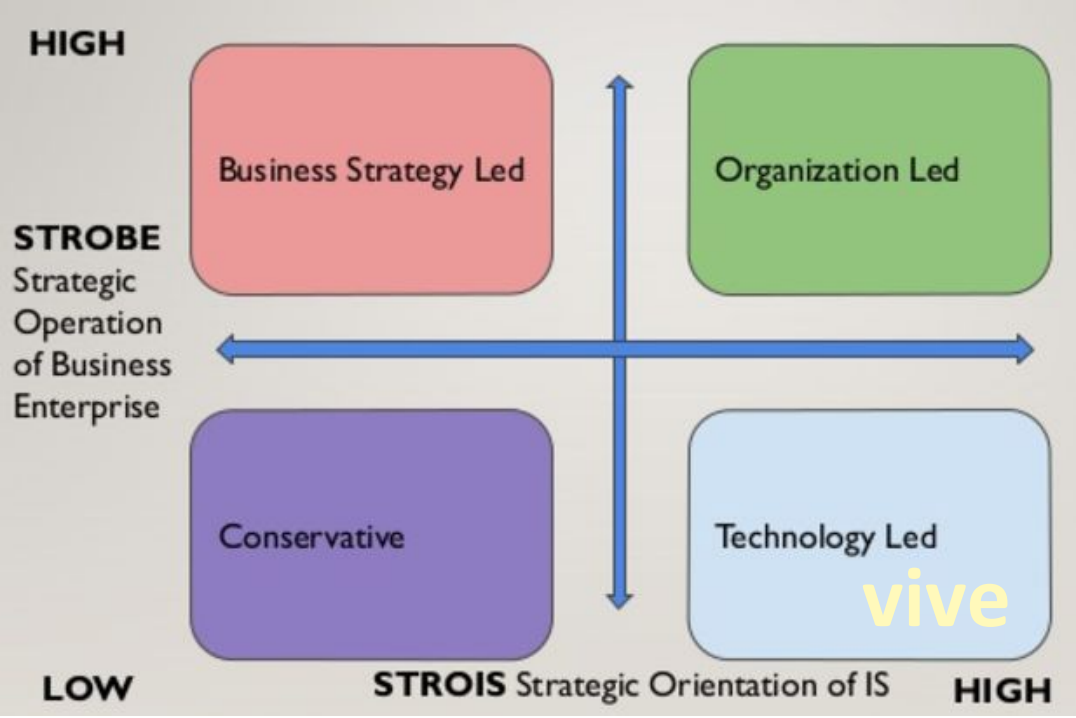
1) Infinite possible
2) Better experience for customers --immersion & sense of reality
3) forefront of the newest technology

pattern

1) innovation
2) value customer experience
3) open source

Strobe-Strois Matrix

Jiancheng Zhao



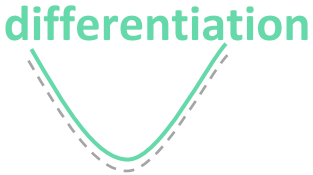
Business Strategy

Jiancheng Zhao

Product: high refresh rate

ease use

Company : lots of fundings from other business

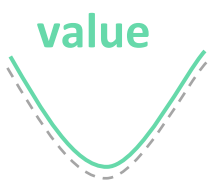


OpenVR software development kit

more open-source

Game player

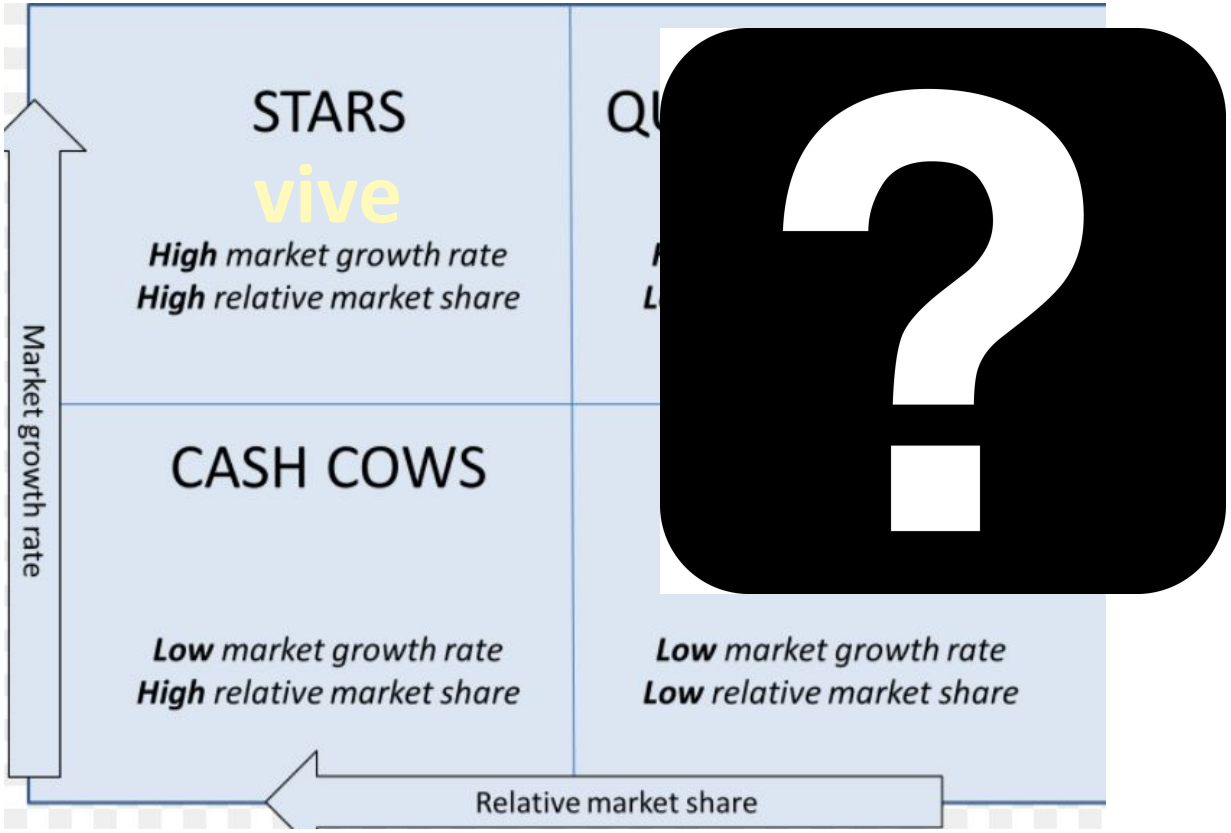
young



Entertainment

BCG Matrix

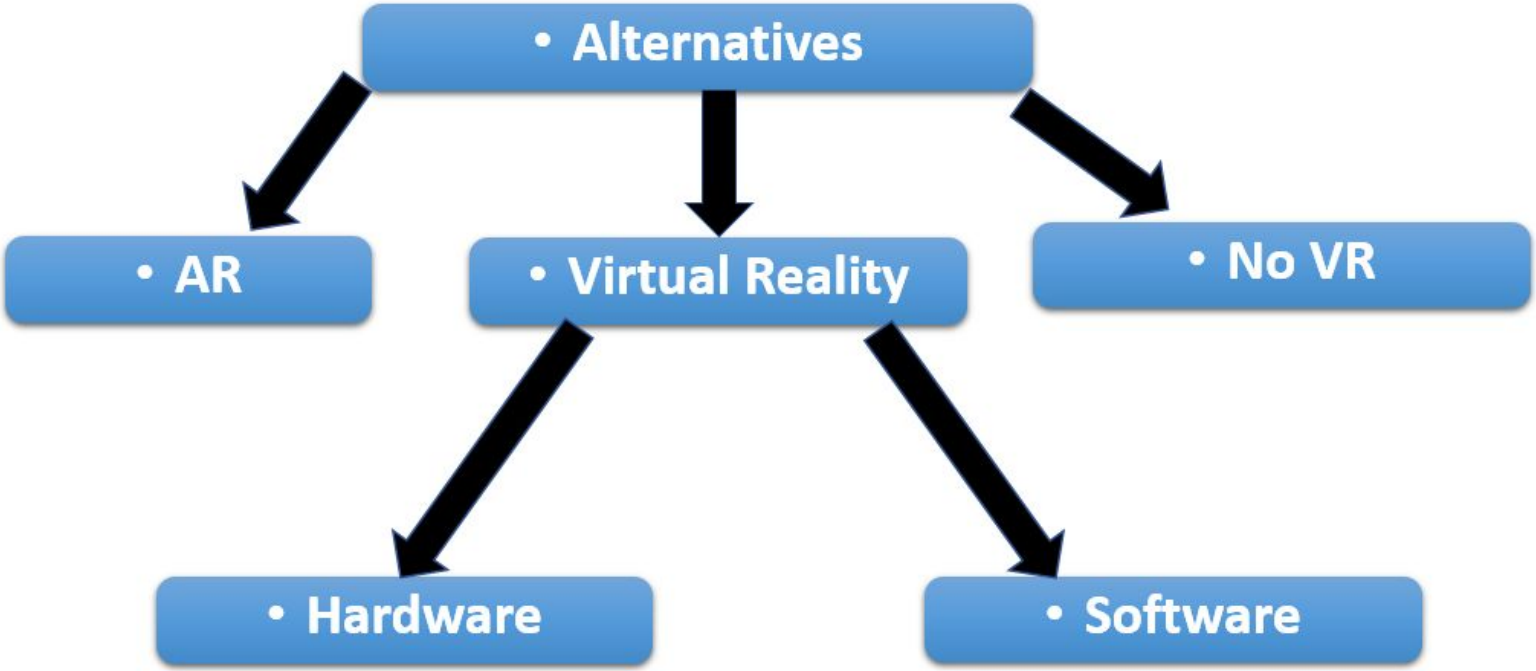
Jiancheng Zhao



VR Alternatives

Jianjie Gao

What can we do?



VR: Alternative Details

Jianjie Gao

VR

- VR needs strong hardware and software support
- Without sufficient support from infrastructures, VR will be meaningless.

MR

AR

- AR could help the define and interact with the world
- Direct reflect messages on real world
- AR is transparent, an unfiltered view of the real world

No VR

- Needs to continue increasing resolution to make video feeling real
- Increased waste on the processing ability of CPU and GPU

VR: Alternatives Evaluation

Jianjie Gao

NEED	VR	AR	No VR
Transparent real world	✗ (Opaque)	✓ (Transparent)	✗ (Opaque)
Viewed objects	✓(Large)	✗ (Small)	✗(Small)
Increase hardware availability	✗ (Low)	✓ (Higher)	✓ (Higher)
Increase software availability	✗	✓	✓
Use of system ability	✓ (Higher)	✓ (High)	✗
Portability	✗	✓	✗
Price	✗ (Higher)	✓(High)	✓ (Low)
Future	✓	✓	✗

Recommendation

Jianjie Gao

Current	AR	Portable, Affordable, Convenience, Friendly, Unfiltered
Development	**Hardware**	**More Affordable Price, Friendly Experience**
Explosion	Software	Content Explosion, More Interactive
Future	**VR**	**Easy Access, A Part of Daily Life**

Next Steps

Jianjie Gao

Description	Assigned to	Issues
Hardware Development	Researchers, Hardware Engineers	Portability, More Devices
Software Development	Software Developers	Program Environment, Content
Market Direction Decision	CEO, CIO, CTO	AR/VR, Technologies and Information included in the VR System

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Questions, Comments, Concerns?