

The direction of technological innovation: 3DWooW case study

Graziela Fusaro
Long Island University

Arlene Peltola
Long Island University

ABSTRACT

3DWooW Technology Co., Ltd (3DWooW) is a professional 3D image content supplier founded in 2015 by Li Gangyue. The company is based in Shanghai, China at the National Public Pilot Base for Entrepreneurs, one of the country's most prominent incubators. 3DWooW focuses on one-stop solutions for film and television series, medical images, commercials, and corporate image displays. The company boasts a patent in the self-developed Pixel and Depth Auto-Retrieval Technology (PADART), which is able to convert the video signals shot by common single camera into vivid 3D equivalents. The company is establishing itself as the thought leader in virtual reality, augmented reality, 3D content production and technological innovation. 3DWooW flourished in the National Public Pilot Base for Entrepreneurs (the incubator). The incubator boasts a 50.5% success rate, 618 of the 1,224 startups grew to become full-fledged enterprises. Due to a \$1billion investment from the government, 3DWooW was able to take advantage of human resources and social public space. 3DWooW was able to successfully soft launch its business by focusing on the movie and film industry. However, given the expected growth of other segments and future market challenges, Mr. Li Gangyue and his executive team are interested in identifying its most lucrative direction to scale the company for rapid growth and first mover advantage.

Keywords: 3D Technology, Virtual Reality, Augmented Reality, Incubator, Technological Change

Copyright statement: Authors retain the copyright to the manuscripts published in AABRI journals. Please see the AABRI Copyright Policy at <http://www.aabri.com/copyright.html>

INTRODUCTION

3DWooW is a professional 3D image content supplier that focuses on one-stop solutions for films and television series, medical images, commercials, and corporate image displays. It is one of the few companies equipped with the most vanguard graphic processing workstations and non-linear editing system (NLE) with patented technology. The Pixel and Depth Auto-Retrieval Technology (PADART) can be seen as a milestone of relieving the pressure caused by inadequate video sources, high production costs, and long working periods. The company developed a disruptive technology based on intellectual graphic algorithms and created the 3D element natural alignment that has been proved an effective replacement of manual frame-by-frame retouching. The new technology allows for a zero-step delamination transition from 2D to 3D signals, applicable to any films or telefilms available now.

The company has expanded over the last few years. The team grew from two founders to sixteen employees. In addition, they have attracted experts with more than 30 years' experience in a variety of fields including film and television special effects, animation CG integration, Ph.D. experts in the field and talented marketers. The company has substantially benefited from these experts due to their familiarity with both domestic and international experience. The company structure today has grown into five major departments; R&D, HR, Marketing, Sales, and Finance.

3DWooW has been acknowledged as one of the market leaders with potential applications in a variety of segments:

- ✓ Visual tracking, virtual interaction, real-time 3D modeling, multi-thread rendering, psychology of vision, overcoming motion sickness, and 360° immersive image syntheses.
- ✓ Technical support for online interactions such as content transmission, displaying, 3D bullet screens (words, cartoons, or images).
- ✓ Comprehensive support for 3D displaying and broadcasting, including 3D cartoons, 3D screen production and syntheses.
- ✓ 3D contents produced/transited by 3D element natural alignment compatible with almost any 3D-embedded displays.
- ✓ With the application of self-developed mathematics modules and exclusive algorithms, pixels of the original images are enhanced simultaneously during the process of being transited from 2D to 3D, thus bringing spectacular visual effects.

In 2017, Li Gangyue and the management team evaluated the possibility of expanding the business and use its state-of-the-art technology to enter the medical market, specifically in minimal invasive operation display. 3DWooW teamed up with International Consulting Group ("ICON") to analyze the probable path to success of entering this market.

3D IMAGING SEGMENT

The global 3D medical imaging segment is growing exponentially as indicated in figure 1 (Appendix). The segment includes applications in movie, design, healthcare, entertainment, defense, manufacturing, and construction. In 2014, The global 3D medical imaging segment was valued at \$3.5 billion. By 2021, the market is expected to reach \$18 billion. 3D Imaging in healthcare has a compound annual growth rate of 26.8%. When examining the 3D imaging by region, North America has the highest current market share of 49%. This dominates the other regions, Asia Pacific 20%, Europe 26%, and ROW (rest of the world) 5%. Asia Pacific is the fastest growing market consisting of electronics, healthcare equipment, and industrial equipment, with a compound annual growth rate of 28%.

3D TECHNOLOGY APPLICATIONS BY SEGMENT

3D Movie Segment

The 3D movie segment is mature and highly concentrated. The major players in this segment are NBC Universal, Sony, Time Warner, Walt Disney, and FOX. The 3D movie segment revenue was \$6.2 billion in 2016. Despite the industry's current decline experienced in recent years, -0.9%, the future projection turns positive with a +2.2% annual growth rate by 2020. The disruption is being caused by players such as Netflix's and Hulu's consumers opting to stream video from home versus going to theaters or facing the lack of 3D capabilities in the most televisions.

Television Segment

The global television segment has a fragmented market of new and old players. The projection of the television segment has growth leading to \$16 billion in revenue by 2020. More specifically the movie segment currently has \$6.2B in revenue with revenue's expected to increase as indicated in figure 2 (Appendix). At-home streaming boosts home viewing making this segment a growth market with emerging players. Projections find that younger generations prefer cord-cutters; defined as getting rid of landline phones. The penetration stands at, 76% of households now have streaming technology. Of these subscribers, 57 million are in the United States. As the popularity of Netflix's streaming service has increased, the company has seen its DVD segment decline. Having reached 5 million subscribers in the 3-month period ending in June 2018, Netflix has reached 130 million streaming subscribers worldwide.

3D Gaming Segment

The global 3D gaming segment has grown +7.8% with \$108.9 billion in revenue as of 2016. Gaming revenues today are up across the world and future projections estimate that this segment will grow to \$128.5 billion by 2020. This industry is fragmented and may sustain a disruption to casual games to mobile. This means games are being played across multiple different technologies.

The 3D Gaming Industry is expected to grow from its current revenue of \$108.9B to \$128.5B as indicated in figure 3 (Appendix).

3D Medical Imaging Segment

The global medical imaging segment was valued at \$28 billion in 2015. The 3D Healthcare device segment is a niche yet to be further developed. There are a number of new players in the segment bringing disruptive technologies to the industries but there is no dominant established player within the 3D technology when compared to the movie and gaming segments.

The Medical Imaging Technology Segment is extremely attractive with signs of potential applications for 3D Technology even though most of the imaging systems still use traditional 2D technology as indicated in figure 4 (Appendix). From an equipment/device perspective the segment can be divided between diagnostic imaging and image-assisted surgery. Potential applications for 3D technology in diagnostic imaging include nuclear imaging equipment, magnetic resonance equipment, computer tomography scanners, and ultrasound systems. Although X-ray devices are a part of this segment, X-ray is the only imaging technique that still works with single images, while CT (computed tomography) makes use of several x-ray image slices. Consequently, 3D applications could be integrated in CT rather than X-ray.

On image-assisted surgery there is a potential for further development in the segment by applying technology to convert 2D images in real time to 3D images. This technology would allow the traditional endoscopic providers to launch new equipment that will significantly increase the image precision of minimum invasive surgeries and as a result dramatically increase the procedure success rates. 3DWoow has this technology fully developed.

Endoscopy Devices

The global endoscopy device market was valued at \$30 billion in 2015 and is projected to be valued at \$41.8 billion in 2020 at a 6% compound annual growth rate. China's endoscopy device segment is showing rapid growth of \$640 million within 5 years with a compound annual growth rate of 6% from 2014 to 2019. The rapid growth of the Chinese endoscopy segment makes it attractive for new companies and technologies. Factors driving the market for endoscopy devices include the increase in aging population, reduced healthcare cost, improved patient quality of life, technological advances, and the use of minimal invasive procedures as indicated in figure 5 (Appendix).

The increase in aging population is one of the major drivers for the Chinese endoscopy device segment. Population data shows that from 2000-2030, 65+ population will grow exponentially, while the younger 20-24-year-old population will increase only slightly. According to Statista, in 2016, China's 15-64 years old age group consists of 72.5% of the population and the 65+ age group stands at only 10.8% of the population. These statistics show that since the current 65+ age group percentage is quite low, there is room for growth in the upcoming years.

THE PROBLEM

3DWoow was able to successfully soft launch its business by focusing on the movie and film industry. However, given the expected minimal growth of this segment, +2.2% by 2020, and

future market challenges, top management is discussing if other segments will better provide rapid growth and first mover advantage.

ASSIGNMENT

After analyzing the potential for each industry that applies 3D imaging technology, what strategy would you recommend to 3DWooW:

- 1 – Focus on the growth strategy and develop a path to become dominant in the movie segment of the 3D imagine business?
- 2 – Develop a strategy to enter a new segment and secure first mover advantage? Detail
 - a. Which industry segment? What is the growth potrnial?
 - b. Who are the key players?
 - c. What is the profile of the target customer?
 - d. What is the best strategy to penetrate that market?

Footnotes

1. ICON is a student-run, global consultancy that bridges interdisciplinary college students to real-life projects with companies in various industries and countries. ICON has operations in the United States, China, Sweden, Israel, Mexico, South Korea, Switzerland, and Brazil. This consultancy was based out of Long Island University POST led by Professor Graziela Fusaro.
2. Jonathan Lieberz and Samantha Piccolo, business majors at LIU, served as ICON consultants throughout this project. We thank them for their contributions to this paper.

REFERENCES

(2016) 3D Imaging Market – Global Industry Analysis, Size, Share, Growth, Trends and Forecast 2015-2021. Received from <https://www.transparencymarketresearch.com/3d-imaging-market.html>

(2017) 3shape. Retrieved from <https://www.3shape.com/products/trios/intraoral-scanners#myModal>

(2015) 3DWoow. Retrieved from <http://3dwoow.com/en/about.aspx>

(2017) 3DWoow executive interview

(2017) *Endoscopy Equipment Market by Product (Endoscope (Flexible, Rigid, Capsule) Visualization Systems, Endoscopic Ultrasound, Insufflator), Application (GI Endoscopy, Laparoscopy, Cystoscopy, Bronchoscopy, Colonoscopy, Arthroscopy) - Global Forecast to 2022*. Received from <https://www.marketsandmarkets.com/Market-Reports/endoscopy-devices-market-689.html>

(2017) Frost and Sullivan. Retrieved from <https://ww2.frost.com>

(2016) IBISWorld. Retrieved from <http://clients1.ibisworld.com.proxy2.library.illinois.edu/reports/us/industry/atagance.aspx?entid=5488>

(2017) Med Device Online. Retrieved from <https://www.meddeviceonline.com/doc/the-role-d-displays-in-medical-imaging-applications-0001>

(2016) Mordor Intelligence. Retrieved from [https://www.mordorintelligence.com/industry-reports?search=global%20endoscopy%20device%20market%20growth%20to%20\\$41.8B](https://www.mordorintelligence.com/industry-reports?search=global%20endoscopy%20device%20market%20growth%20to%20$41.8B)

(2017) *Newzoo Q2 2017 Update*. Retrieved from <https://newzoo.com/insights/articles/newzoo-cuts-global-games-forecast-for-2018-to-134-9-billion/>

(2018) *Number of Netflix Streaming Subscribers Worldwide from 3rd Quarter 2011 to 1st Quarter 2018 (in millions)*. Retrieved from <https://www.statista.com/statistics/250934/quarterly-number-of-netflix-streaming-subscribers-worldwide/>

Richter. F (2018, October 18.) *Netflix Reaches 130 Million Subscribers*. Retrieved from <https://www.statista.com/chart/10311/netflix-subscriptions-usa-international/>

(2016) *Age distribution in China from 2006 to 2016*. Retrieved from <https://www.statista.com/statistics/270163/age-distribution-in-china/>

(2018) World Health Organization – Medical Device – Full Definition. Received from http://www.who.int/medical_devices/full_definition/en

TEACHING NOTES

We suggest beginning the lecture by identifying the key questions that needs to be answered in the case. The first step would be to ask the students to brainstorm all the different aspects from an industry and technology stand point to a company core competencies analysis.

1) Organize a Brainstorming Section

The class can be divided into groups to promote more interaction and participation. The discussion should be guided towards:

- ✓ For the overall market: Growth/size opportunity, competitive environment, industry trends and disruptive technologies
- ✓ For the company: strategic alignment with the 3DWooh Technology and target industry demands, technology development needs, geographic coverage and distribution capabilities, product details

2) Build an Issue Tree

After all the ideas from the brainstorming section have being collected it is time to organize key issues in an Issue Tree. Using each of the assigned questions in the case, the branches should represent areas to be researched, starting from the major question and branching down into individual issues.

Students should address the MECE rule when identifying branches (issues) of the project. Each branch should be Mutually Exclusive, with no overlaps and Collectively Exhaustive, leaving no gaps in the analysis.

A complete issue tree can also allow for allocation of student contribution in case the class is divided into teams. In this scenario, each student on the team could be assigned specific branches of the issue tree as indicated in figure 6 (Appendix).

3) Case Analysis Planning

The scope of the analysis should be planned in order to identify activities that should be performed and approved by the professor before a secondary strategy is developed.

A detailed approach should include two different stages for analysis and business plan development as indicated in figure 7 (Appendix).

Phase I – Company and Market Analysis

- Understand 3DWoow
 - Profile - industry, business development, operations

- Technology – product offered and delivered, value proposition, previous deployment of products, market usability
- Market study
 - Current state of each potential industry
 - What are the technologies or methodologies used for the industry?
 - What is the demand and trends?
 - Identify precedents around the world
 - Investigate the current and potential applications of 3D technology in each industry around the world
 - Identify key players
 - Analyze competitors
 - Is there a company already using this technology?
 - How does their technology compare to 3DWoow?
 - What's their value proposition?
 - Business model comparison – what are other revenue streams of the competitors? what type of partnerships do they have that increases their competitive advantage
 - Identify potential clients/partners

Phase II – Scale up Plan

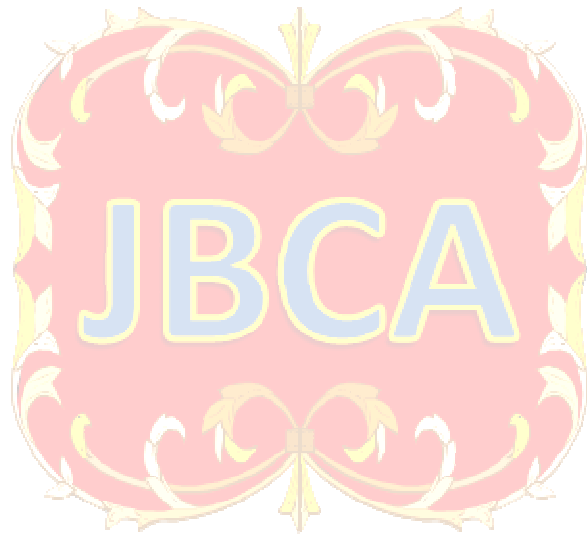
In Phase II the findings from Phase I should be used to develop a sustainable scale up plan that will allow 3DWoow growth potential or first mover advantage.

- Map industry stakeholders
 - What partnerships are needed to launch this initiative?
 - Distributors
 - Suppliers
 - Insurance companies
 - Regulations
- Create launch plan
 - Develop a strategy map to outline tier rated partnerships needed for soft launch and roll out in the selected industry

Define:

- ✓ Segmentation – what is the target industry?
- ✓ Products and services – what products/services should 3DWooW provide with its current capabilities? what products/services should 3DWooW consider developing in the short/long term? Is 3DWooW producing software, hardware, or both?
- ✓ Partnerships/commercial outreach – what types of new partnerships and commercial leads needs to be developed to leverage the business?
- ✓ Road map - Outline the steps 3DWooW needs to take to enter the selected industry;

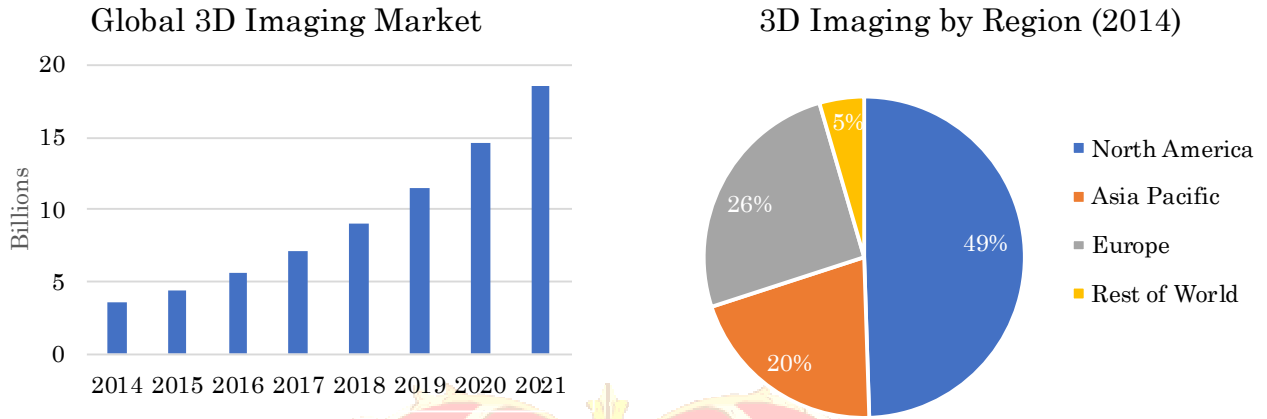
recommend macro timeframe and identify key milestones; identify potential risks and mitigating actions



APPENDIX

Figure 1

Global 3D Imaging Landscape



Source: Transparency Market Research

Source: Transparency Market Research

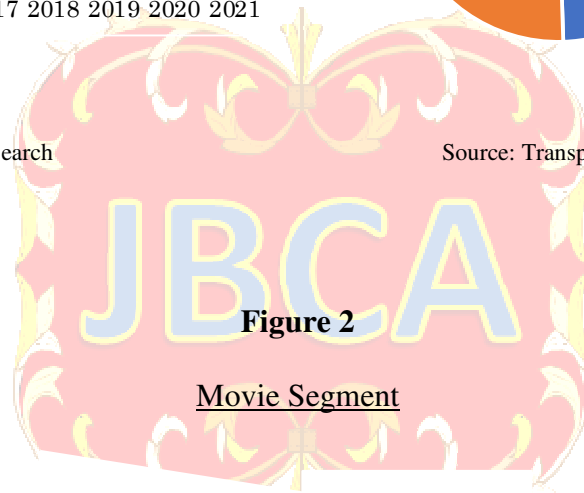
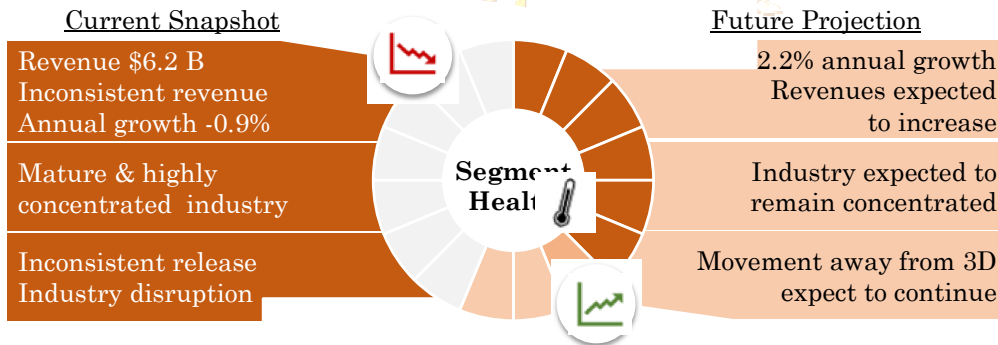


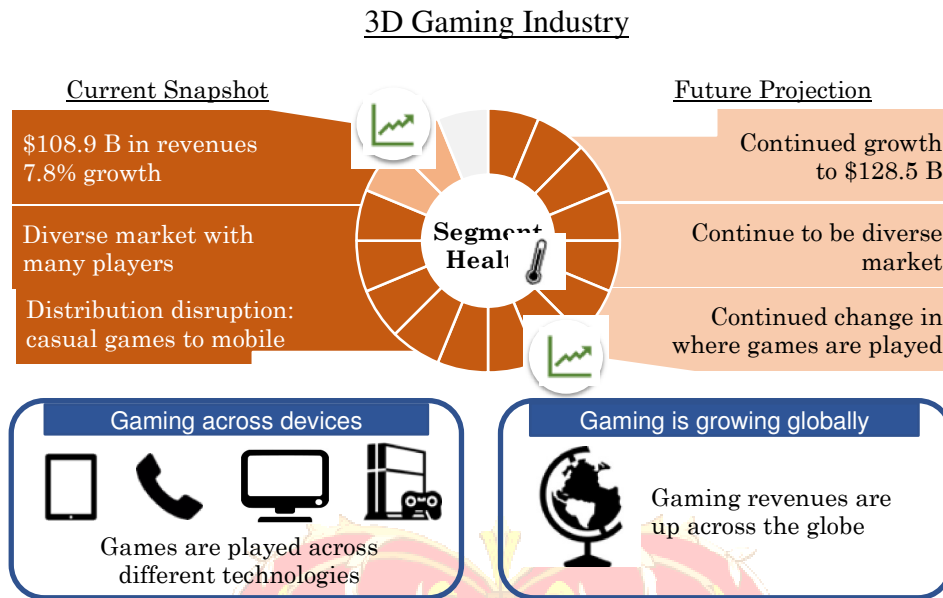
Figure 2

Movie Segment



Source: IbisWorld

Figure 3



Source: Newzoo Q2 2017 Update

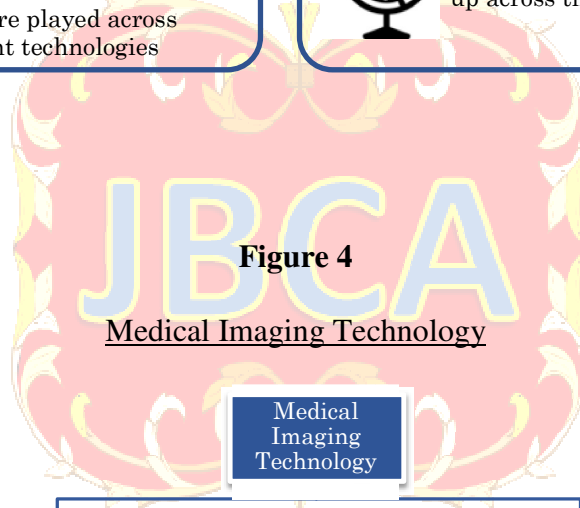
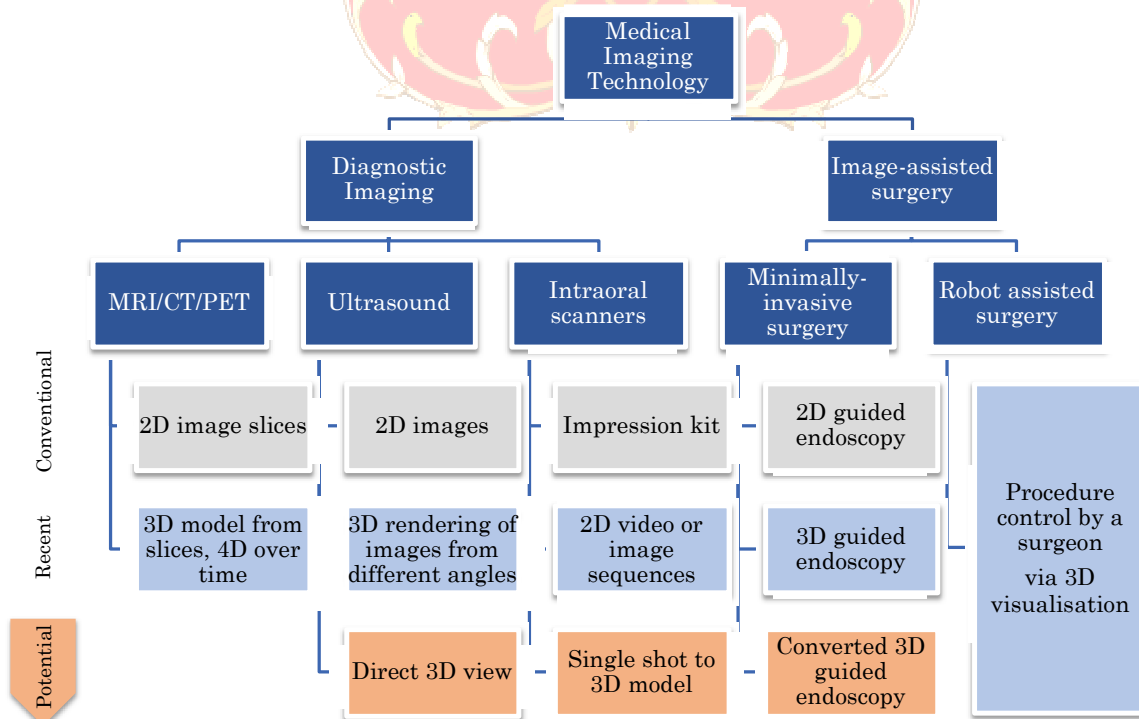


Figure 4

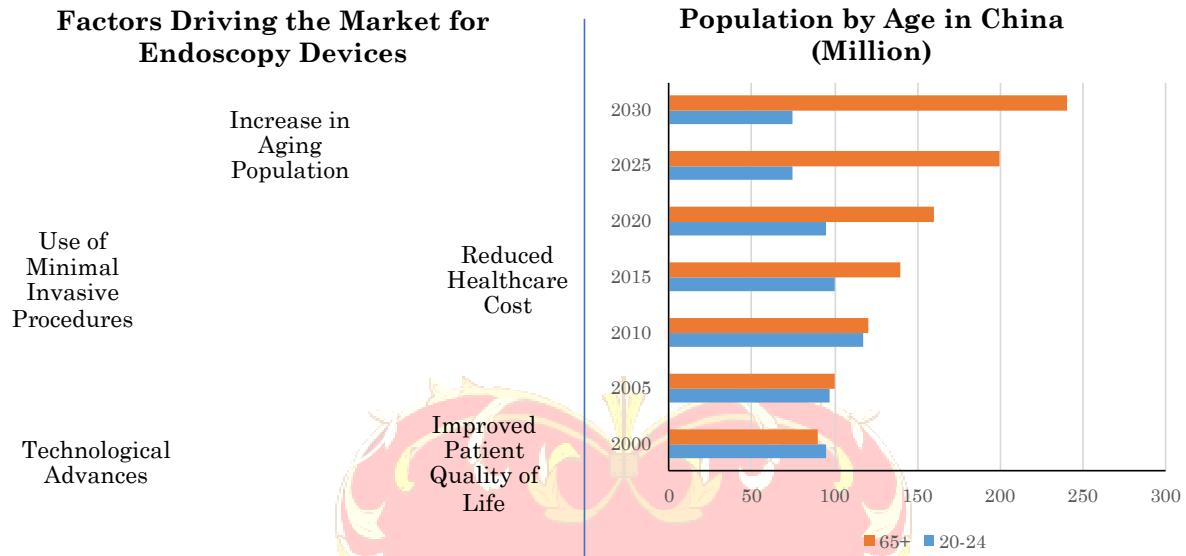
Medical Imaging Technology



Source: 3D Imaging , 3shape, meddeviceonline

Figure 5

The Endoscopy Market



Source: Mordor Intelligence

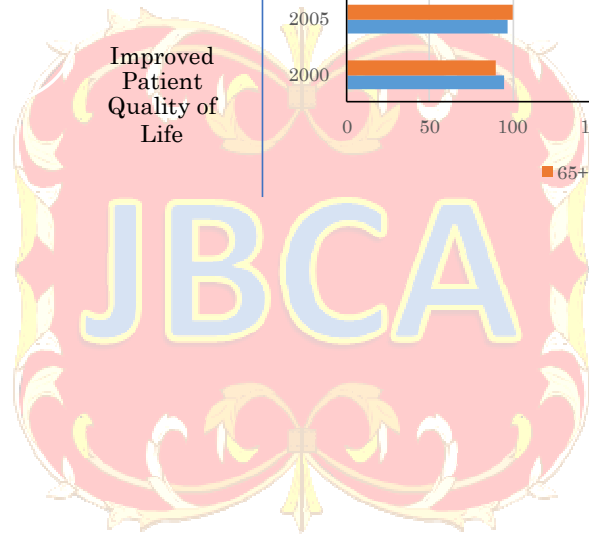


Figure 6

Issue Tree

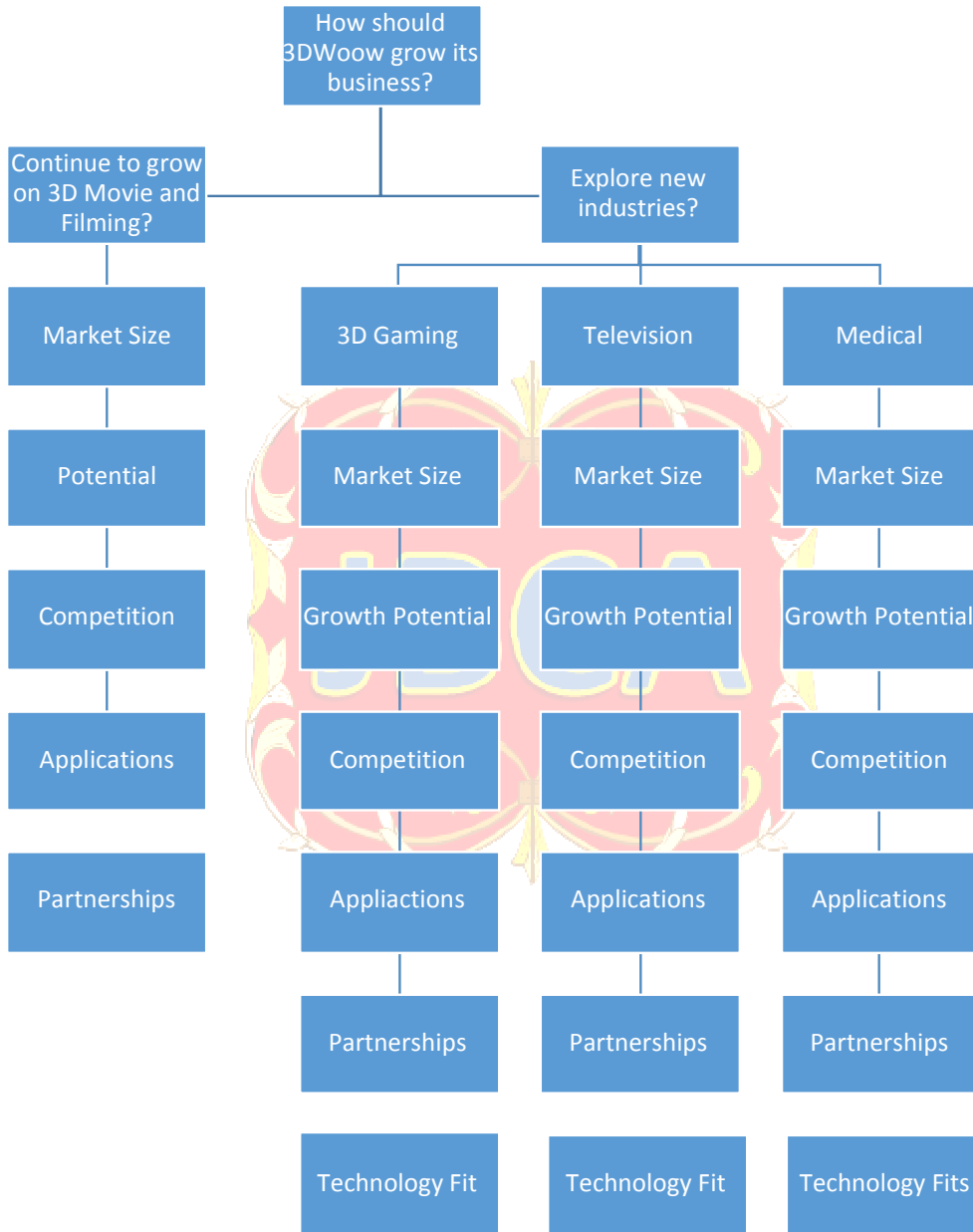


Figure 7

Proposed Approach

Approach

