

Aalto University - Department of Communications and Networking

ELEC-E7830 Value Network Design for Internet Services

Case: Nokia Ozo Virtual Reality Camera

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Abstract

Nokia, one of the leading telecommunications infrastructure providers and mobile phone manufacturers has recently entered the professional video market with their 3D 360 camera named OZO, becoming a forerunner in creating professional 360 degree 3D content that the end-users can enjoy in Virtual Reality (VR) with the use of a VR headset. Our research topic was to find ways of creating winning services, use cases and business models using the OZO camera. In this research report we present new ideas of creating value, generating income, and ways of delivering the content to end-users and consumers.

In beginning of the research paper we present the analysis methods, which are Scenario Planning Analysis, Value Network Configurations and the STOF model (which stands for the Service, Technological, Organizational, and Financial domains of the business). Next we describe our case and analyze it using Porter's Five Forces. After that we create the future scenario matrix using key trends and key uncertainties, and in the following chapter we present our two Value Network Configurations. In the last part of the analysis we develop a new business model using the results of the previous chapters.

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1. Introduction

In the past few years, the emergence of the virtual reality headset market has also brought with it a need for both consumer and professional grade 360 degree cameras.

Nokia, with their extensive experience of 2D imaging on mobile devices, mainly smartphones, has decided to enter the professional segment of this market by releasing their own 360 degree 3D capable camera and integrated software suite called OZO. It was first revealed and released to market in 2015, and it's currently available for purchase for 45 000 US dollars or 40 000 euros.

The OZO camera and accompanying software suite promise to open up a new world of possibilities for content creators, and to usher in a new revolution in entertainment. In this report we explore new ways in which Nokia can monetize their expertise in imaging, 360 degree cameras, and accompanying software solutions to generate as much value out of them as possible.

2. Methods

The research methods we used in our case analysis are three well established and widely known complementary tools for strategic planning and business analysis. In order of usage, these are: Scenario Planning analysis (Schoemaker, 1995), which is used to identify the challenges (and the possible solutions to them) that a company faces; Value Network Configuration analysis (Casey et al., 2010), which is used to define the actors, their roles, and their value relations in a given business environment; and the STOF Model (Bouwman et al., 2008), which is used to analyze the service, technology, organizational, and financial domains of a business. Together these three tools form a solid basis for analyzing a business, improving existing business frameworks, and formulating new business strategies.

2.1. Scenario Planning Analysis

Scenario planning is a strategic planning method that is used to identify the key trends and uncertainties that will affect the operations of the business now and in the future. Out of these factors, multiple possible future scenarios can be constructed, which can then be used to guide the decision making of business leaders. Figuring out relationships and correlations between these trends and uncertainties might help out in identifying possible future scenarios that might otherwise stay unrecognized. This in turn alleviates overconfidence and tunnel vision, that are never beneficial in a decision making process.

The method consists of ten clearly defined steps. First, a scope is defined. This sets the time frame and extent for the analysis. The next step is to identify the major stakeholders who are affected by the topic of the analysis. These can include customers, suppliers, competitors, and others alike them. The third step is then to identify the basic trends affecting the business. These can be economic, societal, technological, political or any other types of trends. After finding them out, it is time to identify the relevant key uncertainties. These are events with uncertain outcomes that might significantly affect the issues the business in question is concerned with. These are usually related to the fields of trends identified in the previous step, like an outcome of a political event.

The fifth step is to construct initial scenarios out of the previous observations. This

starts by identifying the most extreme outcomes that could form out of the positives and negatives that were identified in the previous steps. These initial scenarios are then checked for overall consistency and plausibility in the following step, like if they fit into the defined time frame. In the seventh step the scenarios are given a final polish, including compelling narratives and descriptive names, which lend them to be used as bases for research and study, instead of being used just as tools for decision making. Thusly, the purpose of the eight steps is to identify research needs, to flesh out the understanding of key uncertainties and trends, and to fill in the holes in the company's knowledge base. The ninth step is then used to develop quantitative models for certain business interactions, and the final tenth step is used to come up with decision scenarios that are used to test new business strategies and to generate new ideas.

We did not employ the two final steps in our research, as we are not ultimately able to employ the results of our research on the topic of our business case. Thus, we focused on steps one through eight to develop three possible future scenarios for our business case, that were then used as the basis for conducting the two following methods.

2.2. Value Network Configurations

Value Network Configuration (VNC) analysis is a method that is used to construct different configurations between actors in an industry by first defining their business roles and then mapping out the business and technical relationships between them. It can be applied to both services and/or product based business models, and business relations can be based on both tangible and intangible forms of value exchange.

The processes of value creation specified in a VNC are thusly comprised of both technical roles and interfaces, and business roles and interfaces. A role consists of a set of activities and technical components, which are not co-owned or shared with other actors in the network. However, an actor (i.e. a company) can perform multiple different roles in the network simultaneously. Simply put, different value network configurations form naturally as actors take on roles and establish technical and business interfaces between each other.

Constructing different VNCs thusly consists of first analyzing what roles actors might take in an industry, listing their technical components and interfaces, mapping the

possible relations between them, and finally adding connections of value exchange, both tangible and intangible. Finding out which roles generate the most value are helpful for a company in determining which role(s) would be the most beneficial for them to focus on.

The difficulty in identifying which role(s) are the most beneficial arises from the fact that intangible forms of value exchange can be hard to quantify and turn into comparable monetary values. These intangibles can be in the form of services, knowledge or information, patents, copyrights, et cetera. Tangibles can be exchanged to intangibles and vice versa, which also complicates matters. And the larger and more complex a VNC is, the harder it is to perform this valuation.

2.3. STOF Model

The STOF model framework is a tool for creating business models, especially for ICT based ventures. The acronym stands for the Service, Technological, Organizational, and Financial domains, which are used together to formulate a business model design for a new service concept or idea. The model provides a comprehensive and connected view of the four domains of a new service, and thusly makes it easier to detect in advance the critical design issues that might be present in the service.

The Service domain consists of the interactions between the service provider and customer, which is the most important part of any service based business. Aspects like value proposition, ease of use, pricing, target customers, etc. are at the core of this domain.

The Technology domain is directly influenced by the Service domain, and analyzes the technical architecture, devices, and applications that enable the business and service to run.

The Organization domain consists of analyzing the value network that surrounds the business, which itself consists of all the required device, applications, and capabilities that are required to run the service.

The Finance domain lays out how value is distributed across the value network and its actors. Key concepts in this domain include revenues, profits, costs, risks, and investments.

Using the STOF method to design a business model has clear steps to go through. The first one is the quick scan, where the service concept and its design choices are investigated in regards to the service, technological, organizational, and financial domains. The result of the quick scan should be a broad outline of the business model.

The next step is to figure out the critical success factors (CSF) of the business model. These are factors that significantly influence the viability of the business, and the CSFs are in part influenced by the critical design issues (CDI) that relate to the design choices of the business model. Any issues brought up by the CSFs are ironed out through an iterative process of improving the business model. If any of these issues seem insurmountable, the process can be halted due to the lack of business potential. Once these CSFs are all accounted for, the business model can be considered viable. (Bouwman et al., 2008).

3. Case description

In our analysis we look at Nokia, the company which used to be the global leader in mobile phones, but whose business is nowadays mostly focused on fixed and mobile networks, applications and analytics, and related research & development. Nokia made great advancements in mobile phone imaging during the heydays of their mobile phone business, The expertise they accumulated during those years most likely prompted them to try their mettle by entering the new and rapidly developing market of 360 degree cameras.

Nokia entered the 360 degree camera market in 2015 by releasing their 360 3D capable camera called OZO (Figure 1.), which they sell directly from their website for 45 000 US dollars or 40 000 euros. It can also be bought or rented from Nokia's authorized partners. As the price might imply, it's designed for and directed at the professional segment of the market. The OZO package includes their software suite that is comprised of their OZO Remote, Preview, Creator, Live, Player SDK, and Audio applications.



Figure 1. The OZO camera

OZO's main competitors in the professional 360 degree camera market are Jaunt by Jaunt Incorporated, GoPro Odyssey and Omni, Lytro Immerge, and Facebook Surround 360, among other emerging products. However, all of these cameras are only capable of capturing 360 degree video in 2D instead of 3D like the OZO. These

cameras are offered through a variety of business models, including direct sales, rental or lease, and even as open source projects.

Our case was to figure out how to create winning services, use cases and business models using the OZO camera and its accompanying software suite. As the tools and frameworks taught to us during the course were mainly designed for analyzing service-based businesses and not physical products and accompanying software, this made the challenge of improving the OZO business to our team that much greater.

3.1. Porter's Five Forces

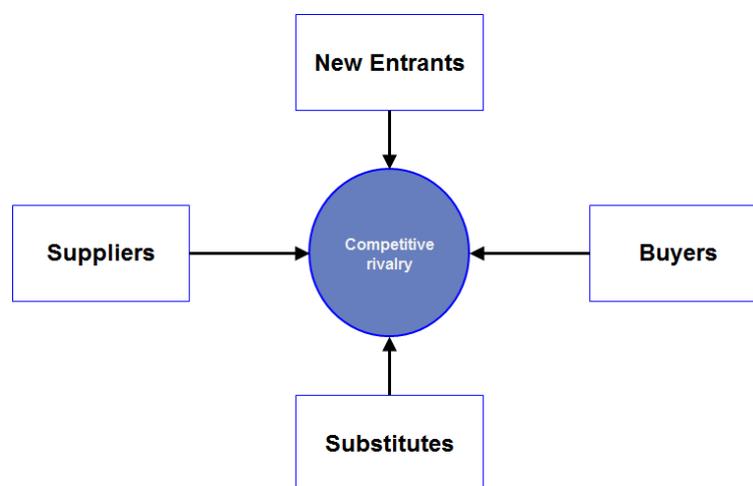


Figure 2. Porter's Five Forces

Porter's five forces framework helps to identify whether the company is attractive or not by analyzing five competitive forces affecting the industry. The visualization of the affecting forces can be seen in Figure 2. An attractive industry is offering good profit potential which depends on how high or low the acting forces are. If the forces are strong, then the industry is not an attractive one because it can be too risky to compete in it; there might be too much competition and pressure. In this section we will analyze the professional 360 degree camera industry and the forces that are affecting the competition within it. (Johnson et al., 2011)

The threat of entry

The most essential factors considered in threat of entry category are the barriers of entry to the industry. The barriers are factors that other potential competitors need to overcome to enter the industry. If the barriers are low then the entry is easy and thus the threat of entry is higher. The essential barriers that can be considered for entering

the industry of 360 degree professional cameras are: investment requirements, differentiation and access to distribution channels. There can be high investment requirements since the field is relatively new and the company will have to invest for R&D in order to create a competitive product. This barrier is therefore leading to the differentiation barrier occurring as well in this case. To enter this industry and manage to remain in it, turning a profit, the product has to be somehow unique. Professional cameras should provide first-class quality. There is also a need of access to distribution channels since the target market is relatively narrow.

These barriers can prove to be high for new companies entering this industry and therefore, the threat of entry can be considered low. The companies that can be considered as potential entrants to the industry are 360 degree camera producing companies such as Samsung, Kodak, Nikon, LG or GoPro (Sumra & Sawh 2017). The 360 degree cameras of these companies are intended for regular customers, not for professional use. (Johnson et al., 2011)

Threat of substitutes

Substitutes are products that can offer similar value and therefore can replace one company's product. The important factor that is also critical to substitution threats is price/performance ratio. Other high-end, but cheaper, 360 degree cameras can be considered as substitute products for professional ones. They can compete on price, which can be significantly lower than price of a professional solution, and still perform well offering satisfying quality and may offer other advantages such as size or weight. The examples of substitute products can be Facebook Surround360, Google JUMP Odyssey or GoPro Omni (Sumra & Sawh 2017). Threat of substitutes can also be high in this case. (Johnson et al., 2011)

The power of buyers

They buyers are the organization's immediate customers and they can affect the price of product by demanding reduced prices or buying from competitors. Buyer power can be considered high in this case because there is a limited market and there can be few large customers realizing the majority of sales. Considering the OZO camera, the price of it decreased from 60 000 USD to 45 000 USD. Another factor affecting the power of buyers is the switching cost from one supplier to another. In this case,

switching cost can be high especially in case of buying the camera compared to leasing it. This issue is decreasing buyers power since it makes them more engaged with an organization's product. (Johnson et al., 2011)

The power of suppliers

Suppliers are the ones that are providing the organization with everything that it needs to produce the product. As in the power of buyers, the power of suppliers can be high if there are only few major manufacturers who dominate the supply chain or if there is a high cost for a company to switch from one supplier to another. Considering the OZO camera case, the power of suppliers is low or nonexistent because Nokia is producing the camera by itself. (Johnson et al., 2011)

Competitive rivalry

Competitive rivals are the organizations with similar products who are targeting the same markets. Low entry barriers are supporting strong competition because the number of rivals is affecting the degree of competition in the rivalry. Strong competition can be harmful for incumbents within the industry. In this competitive rivalry, Nokia can have a dominant position since it has a first-mover advantage in the industry of professional 360 degree cameras. The industry is also growing fast and organizations can grow with the market. A factor increasing rivalry is a high exit barrier caused by investment costs while another factor can be low differentiation. If the products are poorly differentiated the companies have to start competing on price. The example of competitor professional 360 degree camera for OZO is Jaunt ONE.(Johnson et al., 2011)

Power of complementary

For a Virtual Reality camera, the essential sixth force is the power of complementary, since the success of these cameras is linked directly with the success of Virtual Reality and its attributes, VR headset. The price/performance ratio of VR headset also needs to be suitable for regular customers who are the end-users of professional 360 degree cameras.

4. Scenario Planning

This section would describe our case analysis for Nokia OZO VR Camera using scenario planning method. The concept or approach of “scenario-planning” is to help ensure planning processes and subsequent actions. This strategic method helps us to make flexible long term plans/strategies and planning. By building scenarios, the method takes into consideration the effect of multiple drivers of change and thus helps to discover the important possibilities, risk and opportunities inherent in current ideas and actions proposed. The outcomes of the scenario planning processes, i.e. “identified scenarios” are useful for stimulating discussions as how to respond to future challenges. This method helps to develop strategies that are robust, flexible and innovative.

We used this method to analysis and develop the scenario matrix for our case i.e. Nokia OZO VR-camera. The process includes a step by step approach, starting with identifying the main scope of the project which is “3D 360 video services in relation to existing video applications” considering multiple factors such as technology, product life cycle, political connections, etc. under the project time frame of 3 years. We consider this as a very big challenge for the VR industry with business in 3D services which is very new from a technological point of view.

During the analysis we considered that Nokia as of today is the sole provider of high quality 3D-360 camera services as an assumption and also assuming that the market for growth is very limited due to high cost of the product and advance technology which only attracts high end customers, for instance film industries and TV channels, but with future scope we also believe that there are many opportunities to expand the business and thus increase of market area which is explained in more details with our Value network configuration analysis and business network proposals.

Considering the above project scope, time frame and assumptions we have categories the major stakeholders for the Nokia case as below: -

- Camera hardware manufacturers
- 360 video editing software developers

- Content creators
- Ozo customers
- Content consumers
- VR headset manufacturers

We have identified the Key trends and Key Uncertainties in aligned with the product, manufacturing, service and market growth prediction for Nokia OZO VR Camera. These are very important forces that needs to be identified and once done we have used the trends and the two most important uncertainties to map the scenario matrix for our case as to propose the business and winning service models which are explained with more details during Value Network configuration description.

Considering the big market share of Nokia and its existing service capabilities we have considered the scope of 3D-360 video services as the key stroke of success for our case company in relation to existing video applications worldwide, and we look as what would likely to happen in a time frame of three years.

4.1 Key Trends

As an initial step for planning, we believe that it is useful to develop a system to monitor key trends in relation to each of the scenarios. These trends can be related to political, economic, societal, technological, legal and industry trends which are most likely to affect the issues identified during the scope of this project. The purpose of this is to identify “which scenario are we moving towards, and what are the consequences of this for Nokia. Trends are those important forces whose consequences have not yet unfolded. It is very helpful to use trends and list them to identify its impact on the strategies as positive, negative or uncertain. Each stakeholder in the business involved here must agree upon certain trends which would be continued, and the trends on which the stakeholders do not agree (within the time frame) are named as Key uncertainties.

The important trends considered of our case are listed as below:

T1. Development of VR/AR industry and devices

In the next three years, the development for 3D-360 video in the VR/AR industry will be continued. As the market has been launched and we have already witnessed the real-world performance, major tech player strategies are emerging and that has changed the views on VR/AR growth. Year 2016 was the breakthrough year for Virtual Reality and Augmented Reality. For VR technologies, big industries as Nokia OZO, Oculus Rift, HTC Vive and PlayStation VR all launched their offering in the market, bringing with them a flood of content and advance implementations that had early adopters evangelizing about the exciting new technology. On the AR side, the Pokémon Go brought Augmented Reality into the mainstream, setting App Store records in the process. As we are moving in 2017, the industry is looking to capitalize on this momentum and have good plans for continuous development.

T2. VR industry is working on a set of standards

The different industries are working as teams to create VR industry standards. The aim of the global Virtual Reality association is to make VR Software and hardware more cross platform friendly (Temperton, 2016). The main work is to promote responsible development and adoption of VR globally. The consumer expectations are considered to be of most importance, for instance the association should introduce compatibility between different VR hardware and software to introduce more flexibility in usage. It has been believed that continued growth will require standardization and some companies support the initiative for an open standard (Sartain, director and worldwide head of VR at AMD, 2016). Open standards will help developers to more easily create compelling, cross platform experiences which would in turn bring the magic of VR to everyone.

4.2 Key Uncertainties

Scenario planning method is effective to examine future trajectories and anticipate surprises to be used in situations of high uncertainty and low controllability. Uncertainties are those important forces whose outcomes are not very predictable. While uncertainty has always been relevant to natural resource management, not

knowing where, how and when the effects of climate will unfold has raised awareness of the influence of uncontrollable uncertainty in decision-making. For each uncertainty, we have tried to determine possible outcomes.

The most important key uncertainties observed for our case are listed as below:

U1. Does VR/AR become a successful industry?

This is a very important question as to know or judge if the VR/AR would be a successful industry in near future or not? What do the mainstream industries really think about this new Era of immersive technology? And, of course, what are the expectations of people from a VR application?

U2. Are there enough popular use cases for 360 video?

What wide range of applications can be performed via 360 video? Many market analysts are not yet fully aware of the potential for live 360 video and its applications in both social media marketing and event production. Using VR headsets might result in possible health issues which may lead to regulative action.

U3. Do other manufacturers out-compete the Ozo camera on HW and/or SW side?

If competition is high, the market share would be acquired by the company which offers product and service with best quality and best price for 3D- 360 video experiences to stay at the forefront. Race would be to innovate and accelerate time to market.

There are key hardware players in the competitions such as HTC Vive, Oculus Rift, Samsung gear VR that can be biggest risk and competition for our case company. Also, an open question is does the manufacturing or the service part would earn maximum revenue? For instance, China can grab the market in manufacturing by offering very cheap hardware, but is this the biggest risk or not?

Nokia Ozo camera provide its user the best experience of highest quality of virtual and mixed reality experiences possible with amazing 3D-360 video. As the objective of our analysis, the business with VR/AR technology for Nokia may vary with the

development, where different stakeholders can use AR and VR for training, film making, tours, demos, communication, prototyping and much more. The possible outcome of the first two and the most important uncertainties U1 and U2 can have the most powerful influence on the VR/AR technology for Nokia and its service models. Therefore, considering these two uncertainties we have built the scenario matrix for our case company.

4.3 Scenario Matrix

As mentioned in the section 4.2, uncertainties U1 and U2 are the most appropriate to understand the environment and business proposition of our case company. In this section we would present the plausible scenarios (Scenario Matrix) for our case based on the identified key uncertainties (Figure 3). The outcome of this method would result in four distinct future scenarios. Mentioned Below in the figure 3 are the resulted scenarios, what the basic idea is behind them and how they can help our case company nokia to think and predict about the possible situations in the future.

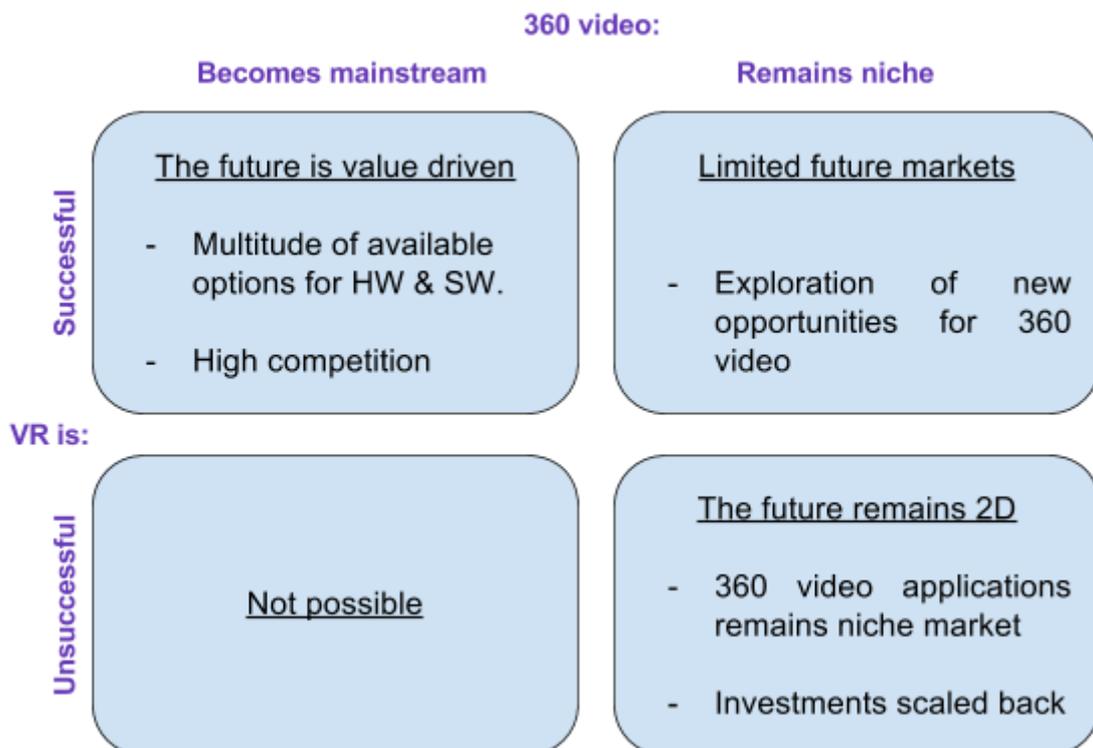


Figure 3. Scenario Matrix for Nokia Ozo VR

The underline points shows the general business outcome during the four scenarios considering if VR industry becomes successful or unsuccessful as compared to if the

3D- 360 video would become a mainstream market or the niche market. Flexibility and compatibility of Nokia hardware and software with other partners would be the key stroke to provide multiple different options to their customers. It's important to keep in mind the fact that the VR industry is yet not matured in terms of technology and lot of development is yet to be done to have a great package offering in all streams of this business. In the later section of Value network configuration analysis we would see what are the various options and opportunities for company Nokia, that would help them to provide more attractive solution and the technology to the customers for doing their required job. Providing affordable price tag to the product, its performance, quality and usability are the key pillars for success for their business growth. Many new market areas are explored in the study which can help Nokia to reach to many new business partners faster and provide opportunities to earn good revenues by offering better services and product as per different actors interest.

The four scenarios are named as “The future is Value driven”, “Limited future Markets”, “The future remains 2D” and “Not possible case” , these are self-explanatory with possible outcomes as per the two uncertainties that we have considered. When VR is successful and the 3D-360 video market becomes the mainstream market called as “The future is Value driven” scenario then we expect that the success factor would be the availability of different options in terms of hardware and software to offer to customers for their requirements which in turn increases the competition in the market and thus increases the speed of development and innovation from the key players in future. When VR is successful but the 3D-360 video market becomes the Niche market called as “Limited future Market” scenario then we expect that the industries would require to explore new opportunities and technology that can surpass the negative aspects of the usage and attracts the customers which would be the driving force for development. On the other side, when VR is unsuccessful and 3D-360 video market becomes a niche market called as “The future remains 2D” scenario then we expect that the 360 video application would attract only some of the high end customers and would not have new opportunities to grow and thus expecting that the investments in technology, research and development would be scaled back and a very slow growth will be observed in the future. The fourth scenario i.e. “Not possible case” is when the VR is unsuccessful and the 3D-360 video market becomes the mainstream market which is not possible.

As a conclusion of this chapter, the outcome of this method is a set of four scenarios indicating how Nokia can develop in future. These four scenarios enrich the strategic planning process by leading to creative thinking and an active engagement with the future.

5. Value Network Configuration

Considering the key trends, uncertainties and possible scenarios we have developed two Value Network Configurations as propositions to Nokia regarding how to further develop and act within their OZO VR Camera business. The VNCs serve to identify the main actors, business and technological roles and components together with the interactions that occur and lead to a value generating mechanism.

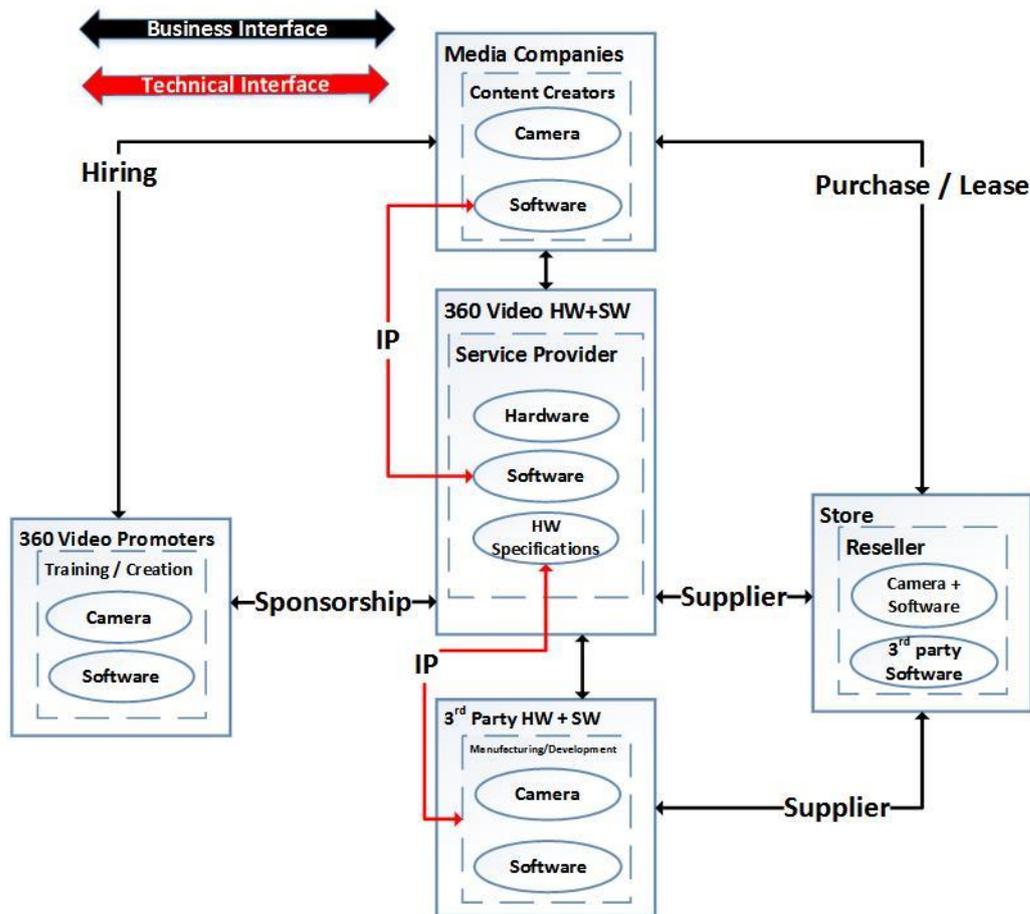


Figure 4. First VNC

This first VNC aims to capitalize on Nokia's innovator position by taking over the 3D 360 VR Camera market with both hardware and software by providing value to the ecosystem with plans for future financial gains. The main action that would generate this outcome is the opening up, to a certain degree, of the hardware specifications of the OZO camera to competitors without giving away proprietary innovation with the secondary action being an aggressive promotional campaign aimed at creators and film students.

By opening up the HW specifications, Nokia would achieve the following:

- Allow other manufacturers and developers to adapt their own products thus increasing interoperability and introducing new customers and users to the Nokia OZO products.
- Enable other companies to innovate on the platform further improving the OZO product line-up while providing 3rd party support
- Allow users to freely use their hardware or software of choice in conjunction with their OZO component
- Gain a huge PR boost as the company actively trying to improve the VR ecosystem by open collaboration and cooperation

Secondly, the campaign would consist of getting the hardware and software in the hands of as many people as possible through strategic partnerships. By offering students and upcoming professionals the chance to use, learn and experience the Nokia OZO products, similarly to how engineering software is free for student use, their proficiency and comfort within the ecosystem will consolidate and any future investment will favor the already familiar and tested OZO suite.

While the mentioned actions provide and generate value, little revenue is generated from them. In this sense, the already ongoing business plan of selling the OZO products to media companies, either directly or through 3rd party resellers, will continue unchanged.

The goal followed by Nokia would be to set the standard of 3D 360 Video in both hardware and software with an emphasis on the software business. Because the manufacturing business is a highly competitive one, especially with products from China flooding the market and competitors like Jaunt, in the professional sector, and GoPro/Samsung targeting the general consumer, a greater importance will be put on the software dominance in the industry, with the final goal of OZO Creator Studio becoming the go-to editing tool for 3D 360 video.

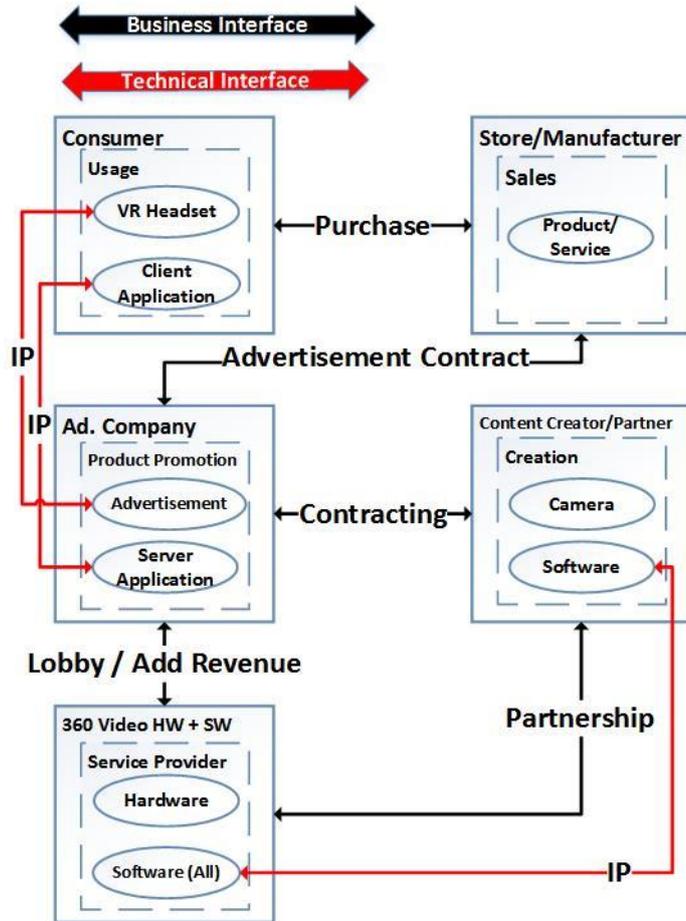


Figure 5. Second VNC

For the second VNC a more revenue centric approach was taken with focus on the proliferation of ads in everyday life. Since in the current situation, most if not all advertisements are created with conventional video technology, even if watched on VR equipment we propose a strong push for Nokia towards Advertising Companies to create content in 3D 360 VR in order to fully take advantage of the new medium.

The network would be driven by Nokia who would present a win-win scenario to advertisers: choose your content creator and we provide them with all they need to create your ad in 3D 360 with the promise that this medium will deliver more viewership and engagement with your users; in turn, this will boost sales of your advertised product turning a greater profit on your own contacts. In return, Nokia would get a part of the ad revenue generated by the advertisement created with the OZO suite and increase its own market reach and visibility in the industry while the customer gets to enjoy a new experience, one he will probably want integrated more and more into his entertainment package.

6. STOF model

STOF is a viable and feasible model, which consists of four main domains: Service, Technology, Organizational and Finance domains. As in any other business models the core of STOF model customer value of the product or service, which is satisfying customer demands. In this section we will analyze our main chosen VNC on basis of STOF model bringing important factors and Critical Design Issues in each domain.

6.1 Service Domain

Targeting

In service domain we have to define who the customer of the product is. Right now the main customers of Nokia OZO camera are professional media production companies, who are therefore creating a source of the main income from OZO camera. The created content is available for users who have possibility to observe it within Virtual Reality with VR headset. Nokia is selling directly OZO camera from a website or there is also another possibility to lease it from a third party company. We are considering the problem of current limited target market and as a solution for it we define in our VNC splitting the hardware and software of product which means that there would be a possibility to get individual income from OZO software platform and its applications, and from camera. This option could expand the target market. In our main chosen VNC the media content creators are still forming an important market segment for OZO, but are not the main source of income. Content creators would work with advertisement companies, which are in our VNC the main value creators. The end-users or consumer are people who are enjoying the VR content having a VR headset and client application where the content is available. (Bowman et al. 2008)

Creating and delivering value

The most important aspect of service domain is value creating for the customers. Customer value is usually based on newness and differentiation of the product. Nokia is also creating value for OZO by differentiating it from other 360 cameras providing a 3D VR content. Working on the quality of content produced by OZO camera is essential because it will attract more consumers using VR. Continuous updates and

transparency will also keep the camera up to date and providing worldwide customer support for both hardware and software will keep customer's trust. Branding is made through the advertisement companies that are thus becoming an essential value delivering segment. The way of delivering the product or in this case the content of the product to the consumers also matters. Innovative way to use camera content could attract more consumers who are keeping step with developing technology and are interested to watch VR content. Therefore the overall success of VR among consumers is also a crucial aspect affecting the success and value of OZO camera. The more successful is VR the more consumers there will be enjoying VR content and interested in buying the products that are advertised in VR. The success of VR is not directly controllable by Nokia, but the overall quality of 360 degree cameras will influence its success. (Bowman et al. 2008)

6.2 Technology Domain

Dealing with a physical device rather than a service, the challenges in the technology domain are linked to the product itself, whether or not it is capable of creating the intended value, and can be split into two distinct parts: camera quality and system integration.

Camera quality refers both to the ergonomics and manufacturing but also to its video output. In its current state, the OZO camera is a high-end product with impeccable fit and finish coupled with standard mounting brackets for increased usability. The output from its eight synchronized 2K x 2K sensors capturing video at 30 fps offers a 10px/inch 360 degree field of view which is matching the current generation VR displays. Although some hardware limitations exist, better quality can be achieved with software updates. Given the fact that the content can be consumed only on VR headsets, their display quality is directly linked with the viewing experience and no progress made by Nokia can negate a subpar display or VR headset.

The system integration aspect would be handled by Nokia with its opening of hardware specification towards the creation of a standard. On the hardware side, all cameras following the Nokia specifications will be compatible with its software creating a new user base while on the software side, all developers can make their programs compatible with the OZO camera further improving Nokia's penetration power in the industry. Having currently the edge in 3D 360 video processing, Nokia is

in the best position with its OZO Creator software to exploit this advantage and ensure its dominance in the video editing market.

6.3 Organization Domain

Organizational issues in the company are mostly related to resources and capabilities of technology, marketing and finances. Therefore the collaboration with other companies is crucial regarding delivering the right service to the consumers. Due to our main VNC Nokia would have to create a long-term partnership with media companies providing them HW and SW of OZO in order to maximize a usage of the camera worldwide and therefore enable a variability of created content. Nokia would also have to collaborate with advertisement companies on the business aspect since advertising companies are creating the main profit recourse. These partnerships involving important actors would make a viable business model for Nokia company and enable a value-creating process. (Bowman et al. 2008)

The created network would have some restrictions for example considering the media companies who would not have to buy the camera. Due to this fact Nokia would have to collaborate with trustable content creators, who would bring a possible value to the product. However the production and distribution process has to be also flexible and enable easy information flows. In this network chain the end consumers also have the significant role and are actively engaged in service process by providing information about the demands and personal preferences. (Bowman et al. 2008)

6.4 Finance Domain

Here in finance domain, considering the VNC proposed in our analysis, we believe that this configuration would help to generate revenues and value to all the stakeholders involved. This configuration would enable all the actors in the network to get good opportunities for profits and at the same time the VNC provides a balance between the revenues and investment, which is divided among different actors present in the network.

Revenue Model is based on both products as well service, which would be open and extendable as per the business contracts between the two actors. The revenues can be shared between the two actors using the business interface contracts like purchase,

lease, sponsorship, advertisement contract, Lobby, etc. For an example leasing the equipment to 3rd party can help them to increase their market share using 3rd parties trusted customers. As a part of promotion for the brand they can give offers to film institutes for using their camera and making it popular for use by these upcoming new film workers, i.e. investment in the future.

Investments aimed at resolving issues raised by customer feedback would help to create intangible benefits. Pricing strategy should be set in order to achieve maximum market share and adjusted based on competitor offerings. Our network configuration would help to provide balanced revenue streams and benefits, both tangible and intangible. Although, it needs to be considered and noted that this configuration is designed to initially capture new market areas where the profit margins and the revenue are expected to grow on a steady pace rather than rapidly, majorly due to the worldwide competition and immature technology.

5. Conclusions

In this report we analyzed the case of the OZO camera in order to come up with new ideas on how the camera can be sold and its content delivered to the customers. Our chosen timeframe was limited to three years in order to allow some predictability in our assessment as it would have been difficult to make valid predictions for a more distant future.

In chapter 4 we discovered two key trends and three uncertainties from which we chose two main uncertainties and created a scenario matrix, representing three possible futures. Using these possible futures as a guideline we went on to create two Value Network Configurations that could expand Nokia's market reach. We presented a new way of selling the camera by splitting the hardware and software components, which can expand the market of the OZO camera which is now quite limited. In the second VNC we proposed a new way of obtaining revenue from advertising created with Virtual Reality in mind using the OZO camera. During our research we found that there are many possibilities of creating VNCs, including and changing different actor roles and technical components. Our result is two innovative configurations that would bring a new viewpoint on value creation with the OZO camera and a new way of delivering the content to the consumers.

We deem our analysis reasonable and applicable in the current market given that the identified trends and uncertainties are relevant. The proposed business ideas, while new, are based on concepts that are in use by other companies with success and Nokia would stand only to gain by further assessing and adapting the proposition to their own business plan and roadmap.

In future research a deeper analysis and possibility exploration starting from the proposed VNCs can be made; for example. Issuing a case study to justify the value creation processes and study end-users reaction to the new way of experiencing the advertisement in VR.

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Feedback for the course

The workload was suitable since there is no final examination. The course schedule was suitable and clear.

I have found the workload matched with the amount of credits and well distributed across the course duration. The presentations were well spaced to allow research and preparation time without rushing anything. Considering the methods, our case was a bit different, that of a product instead of a service, so some of the frameworks had limited applicability and extra effort was needed to identify a suitable working methodology. Improvements could be made in the area of the company contact person, guaranteeing a set number of hours for consultations, and since the project could turn into a actual business implementation a pitching training session would be helpful.

Great experience from the course as an overall feedback, the workload was balanced and working with real company case has made the course learning very interesting. The Course structure was very good and provided a lot of opportunities to learn and develop skills as group work, time management and presentation skills. Schedule was ok for me as I was active during the whole course, thus it was balanced. The methods used for the case was easy to follow although we were not able to use all the steps of the methods during the course as they were not very useful for our case.