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ABY Interactive: A Business Plan for an Interactive Media Company

Abdelaziz Ben Yahia

Worcester Polytechnic Institute

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ABY Interactive: A Business Plan for an Interactive Media Company

By

Abdelaziz Ben Yahia

A Thesis

Submitted to the Faculty

of

WORCESTER POLYTECHNIC INSTITUTE

In partial fulfillment of the requirements for the

Degree of Master of Science

In

INTERACTIVE MEDIA AND GAME DEVELOPMENT

May 2018

APPROVED BY:

Advisor: Jennifer deWinter _____

Readers: Brian Moriarty _____

Lee Sheldon _____

Abstract

Interactive Media and Game development are experiencing an incredible growth the recent year. Digital devices are in constant evolution, and the developers/artist are glad to unleash their full potential by creating innovative content that take advantage of those capacities.

Although creation and innovation is not what is limiting this field, the business side to this industry is the biggest challenge to this kind of content. Making a good product needs a team effort, and these employees will obviously need good money for their expertise, which, means the product needs to be funded to make it happen.

In this context I find myself in the perfect position for this kind of adventure as I both love games and I like to play the role of the entrepreneur/problem solver.

As a Fulbright scholar I feel my self-obligated to help my country back with all the knowledge and the opportunities I got offered by coming here and learning from U.S professionals in the industry

This brings us to the core of this thesis, by doing a Co-op job in Petricore, shadowing its CEO and surrounding myself by a huge community of professionals from the industry, researching the best way to start my own startup “ABY” in the same industry in Tunisia.

I will also using auto ethnography and interviews to collect relevant data in an ultimate goal of building a lightweight business plan to guide me in starting this adventure in my home country.

Preface Acknowledgements

Many thanks to my advisor, Jennifer deWinter, who supported me heavily through this project. Her continuous help was crucial towards this achievement. Her experience in the industry and her pedagogy were vital to the execution of this research. In addition to my advisor, I would like to thank the other members of my thesis committee Professors Brian Moriarty and Lee Sheldon for their feedback and advice, which, improved the quality of this project.

I am very grateful to Ryan Canuel and his team, who welcomed me in their company, sharing with me in all transparency all their data which, proved to be necessary for the research. I thank Monty Sharma who introduced me to Ryan's team and suggested me to do this Co-op experience. I also want to thank all the participants that provided me with great information through lengthy interviews and often very private.

Thanks to the other Master's students, specifically Keenan gray, Mitchel Stevens and Bolin Zhu for their help and support throughout this process.

Ultimately, I would like to share my love and thanks to my Family and friends, who were constantly encouraging me on any task or challenge I was facing.

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1. Creating an interactive media business

Interactive media represents digital services and products on electronic devices, which, respond to a person's actions with diversified audio-visual content. In this thesis, I share the process of learning how to create an interactive media/game development company. The focus of our products will be on augmented reality applications, a technology to be used in different fields, such as healthcare, education, marketing, and entertainment and game business.

The purpose of this project is to do a research on augmented reality, the industry around it and the opportunity to make a profitable and stable business out of it. The money secured from interactive development will help fund the game development side of the company. In Chapter 3, I detail how I collected data from different resources and methods, online research, conferences, interviews and shadow successful entrepreneurs working in this industry. I processed the evaluation and analyzed the results, discussed and summarized the experience with the goal of building a business plan.

1.1. Background

I have a software engineering degree and am currently pursuing a MS in Interactive media and game development in WPI, funded by the school itself and Fulbright. I started as a web/mobile/desktop application developer, I finished multiple projects as a freelancer, from local stores to French companies or entrepreneurs looking for subcontractors. I was making good money, but I wasn't learning, flourishing or enjoying what I was doing, which, made me pivot my career to interactive media and game development. A first internship at DigitalMania (the first game company in Tunisia) opened my eyes to this new industry and provided me with a professional experience in this field.

After that, I went to France in PointCube as an intern and within the first month I was promoted to lead developer, programmed an augmented reality application to help conference organizers sell booth spaces. Following that, I went back to Tunisia where I had to wear two hats, I was a technical salesman and a lead developer as I got our company 3 projects with 2 Multinational Companies such as HENKEL and CHAFFOTEAUX, negotiated the specification notes, prices and deadlines, then I developed those applications while supervising my team to deliver a polished product. Coming to the US, I worked with MassDigi where I was the Producer/Developer of my team, leading them in making a new mobile game soon to be released on IOS/Android called "Leap a Head.". As for my soft skills, I speak 4 languages, my communication abilities allowed me to convince judges in multiple challenges such as NASA App Challenge, HultPrize in Tunisia and secure the Fulbright Scholarship.

1.2. Environment

The whole process was executed with the cooperation between Petricore Inc. [1] and Worcester Polytechnic Institute [2]. Petricore Inc. develops digital games and software applications for worldwide clients ranging from vascular surgeons, to big data companies, to museums. The company, operating out of the Worcester Innovation Center in the downtown, has released two games, Mind the Arrow and Gelato Flicker. Both have earned accolades and more than 400,000 downloads. Founded in January 2015, Petricore has successfully delivered over 30+ projects for clients. The team is capable, fast, and flexible, helps the client in every step of the way. Ryan Canuel currently serves as CEO of Petricore, Inc. the company he founded just before graduating from Becker College. Mr. Canuel was named 2015 entrepreneur of the year by the Worcester Regional Chamber.

1.3. Introduction to Augmented reality

Augmented reality is a live superposition of a virtual computer-generated model image or sound on a real world extracted video, audio or GPS data.

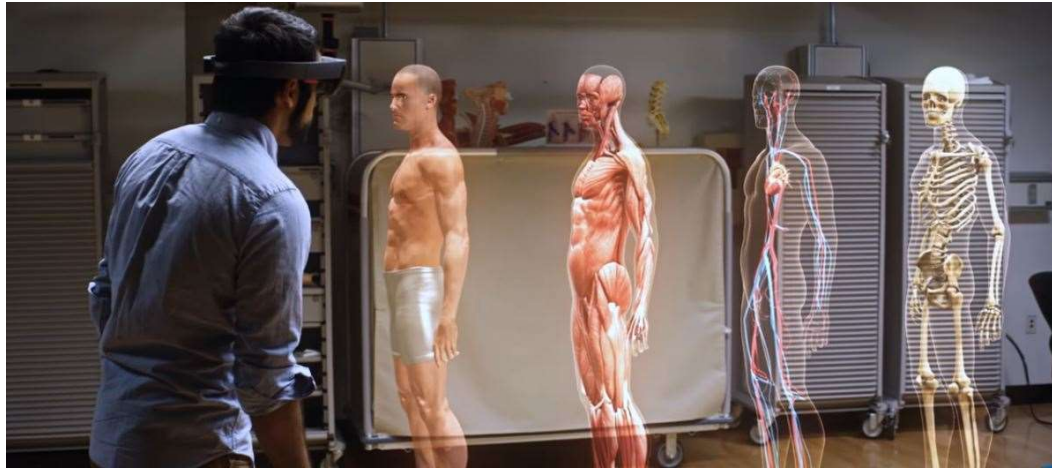


Figure 1. Augmented reality [3]

Different from virtual reality, which, puts the user in an entire virtual world, augmented reality uses your existing real space and overlays virtual information on its surface. Augmented reality users experience an enhanced natural world where visually virtual information aids in everyday activities. Many Industries take advantage of this technology such as education, healthcare, air and spacecraft, marketing, journalism, travel, real estate, skilled trades, automotive and retail.

Examples:

In healthcare, the Australian research made to help Red Cross Blood service, using cutting-edge infra-red-light technology to visualize blood donors' veins during blood donation.



Figure 2. Vein Viewer [3]

In figure 1.3, Vein Viewer, Augmented Reality is superimposing vein maps on a living arm to guide nurses and doctors in their needle placement.

In Education, PiRuby for example combines interaction with augmented reality visual information to books and articles, allowing the kids to get an entertaining experience while learning about geography, chemistry and many other fields.



**Transform Education
with
Augmented Reality!**

Figure 3. AR Piruby [4]

In Advertising, IKEA made an application that enable the customer to virtually visualize furniture in their home before purchase, avoiding any possible disappointment.



Figure 4. Ikea Augmented Reality App [5]

In figure 1.3, Ikea Augmented reality App is superimposing Ikea Products to user's living room, enabling them to visualize how it will fit the decor and the color palette of the room.

Technavio [38] provides an in-depth analysis on the market for this specific industry and it forecasts the AR market in advertising to grow at a CAGR of 31% until 2021

Quartz media [39] and Statista [40] both confirm that prediction with a close number of 30% during the same period.

For these reasons ABY Interactives will focus on marketing, education and healthcare, either through a direct contact with the buyer or under a subcontract job. During my research, I will define how and in which capacity I will work in this industry. The NAICS number for this industry is 511210, converted to SIC it is 7372. This number represents establishments engaged in design, development and production of prepackaged software. This establishment may also provide customized prepackaged software to adapt it to the customer needs.

Description for 7372: Prepackaged Software

[Division I: Services](#) | [Major Group 73: Business Services](#)

Industry Group 737: Computer Programming, Data Processing, And Other Computer Related Services

Figure 5. NAICS SIC codes [6]

This image is a screen shot from the government's website where I got identify this type of product's NAICS SIC codes.

1.4. Conclusion

To sum up this chapter, the goal of this research is to define the opportunities around augmented reality and the market around it in order to orient my research in the right direction. To accomplish this, I provide a review of the literature concerning AR and VR industry and the opportunity identification in chapter 2. Following this, I outline my methods for analyzing successful small businesses in chapter 3. In chapter 4, I detail my results and discussions resulting from my research. In Chapter 5, I go through my plan of action for ABY Interactives. Ultimately, this thesis will provide me with a blueprint for starting my company in Tunisia, a lightweight business plan with the purpose of planning my steps through time rather than a tool to convince exterior investors to put money in my business.

2. Literature review of the AR/VR industry and opportunity

identification

In this chapter, I identify opportunities in the AR market, verify its success, its risks, potential competitors and existing ones, the cost of production, pricing and market accessibility. According to Medium [68], the opportunity identification process is very efficient to steer numerous ideas from different perspectives and redeem some of them to be worthy of being taken forward.

Jay-Ann Contad [64] emphasizes that this process is a crucial characteristic of an entrepreneur starting any new business and that it splits into three important steps; Generating ideas, screening process and Formulating the concept of the business.

In the article *Opportunity Identification and Its Role in the entrepreneurial Classroom* [65], it is stated that this process is emerging as an important content area in entrepreneurship, they even cut it down to a simple question “*why, when and how some people, and not others, discover and exploit opportunities.*” I am following these advices by analyzing the key players in this industry, determining the industry size and growth rate, evaluate the competition and define how expensive AR VR is to produce and how much money can be made along with the selling methods.

2.1. Key Players

The prominent players in the AR market are the giants, Google, Apple and Microsoft for owning the main devices for this kind of applications, accessible through Android, IOS and Windows Operation systems.

2.2. Industry size and growth rate

According to marketsandmarkets [33] mixed reality apps was valued at \$504.5 million in 2016 and is expected \$5 billion by 2023 at a CAGR of 36% during the forecast period. Business Wire [35] expects the mixed reality to be reach 5 billion dollars by 2023 and that it is already valued at 729 million in 2017. According to the Grand View Research [34], the Augmented and Virtual reality in health market is expected to reach \$5.1 Billion by 2025. The AR market is predicted to reach \$79.77 billion by 2022 at a CAGR of 69.85% during 6 years, the main reason if the increasing use of smartphones and tablets [7]. According to Statista, The US is the country that spent the most on mixed reality with \$3.2 billion in 2017 and expects the whole developed world to experience at least a growth at CAGR of 120% from 2017 to 2020.

In three other different sources [35][36][37] agree that the AR market is an experience that grew and will keep on growing at CAGR of 82.25 during 2017 to 2021. Another source states that VR although big, AR will single-handedly outplay it and will ultimately last longer. Expectations state that in 12 months the VR/AR market is predicted to reach \$108 billion, with AR taking \$83 billion as its share [9].

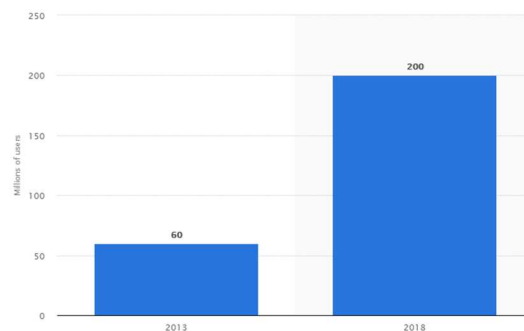


Figure 6. Global mobile augmented reality (AR) market size in 2013 and 2018 (in millions of users) [8]

This Figure shows a graphical representation of the market size growth between 2013 and 2018 in millions of users, 60 million at first and multiplying up to 3 times towards the end.

2.3. Competitive Market Share:

The major players in this industry share 45% of the global market revenue. The giants are Google, Qualcomm, Microsoft and Wikitude, the rest of this market is divided through many niche players accounting for small shares individually [10]. This second half of competitors are indie companies and startups with smaller team, and more limited financial resources which, is more reasonable for me to compete with than competing with the giants, reducing risk and saving money I can't afford.

2.4. Porter's five forces:

This technique is used to analyze competition of a business, separating five axes and defining competitive intensity, profit, opportunity and attractiveness [41], each of which, I discuss in more detail below.

1) Intensity of Existing Rivalry

As stated before, I am not competing with the giant firms but instead with the smaller companies, going for smaller projects. The closest competitors to my company for this field in Tunisia are DigitalMania [42] and MediaNet [43], which, are aiming at the advertising market in Tunisia solely. In the future chapter, I attempt to check if this location will allow me to compete with other companies for its cheap cost and labor while having the access to the same existing technologies.

2) Bargaining Power of Suppliers

Suppliers are important elements on which, companies depend, for this field these suppliers are widely available by recruitment or by online purchase. Human resource is considered to be one of the most important resources in this field, such as artists, designers, programmers, user experience specialists, community managers and marketers. According to the wired [67], employee's value increases the more time they invest in the company and losing an old employee to another competing company can be even disastrous. Another Important supply that can harm the business is the server company, a good choice of servers and their maintenance is very important to the success, According to IGN, Niantic lost a huge amount of players in the beginning because their servers were shutting down.

3) Bargaining Power of Customers

This axe represents the bargaining power of potential buyers, it refers to the pressure suppliers like my company can put by raising their prices, lowering their quality or reducing availability. The industry is still in early growth, and the market is highly fragmented as explained previously, which, means there a high number of customers willing to update their business with the latest technology to be able to compete in their industry [45]. This high demand makes it easier for negotiations. AR and VR are still new, the customers are not homogenous, which, makes it hard to have a standard to compare with when negotiating with potential clients.

4) Threat of Substitutes

Every product designed and developed for a business or a client is totally replicable in this industry of software development, reverse engineering allows to know how each device works, which, means even the hardware is replicable. Reverse engineering is also a threat, which, is defined by Search Software [66] as a process of taking apart an object or a solution to see how it works in order to duplicate it, enhance it and resell it.

5) Threat of New Competitors

Advanced technologies make it hard for potential competitors to access the market because they would have to develop those technologies before effectively competing. The need for the most updated technologies make it harder to get new competitors.

2.5. Cost

The development of an AR application is mostly based on the time of production, the company uses free 3rd party plugins to develop those applications, and all that is left is:

- 1) Documentation with an average cost of \$500 to \$1000, licenses averaging another \$1000
- 2) Design, Development and art are calculated hourly. [11] below are the worldwide development rates

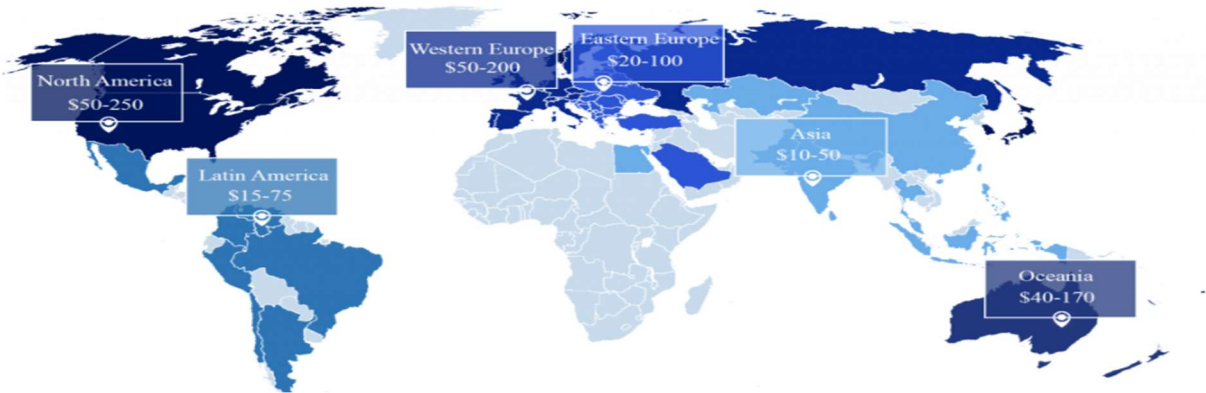


Figure 7. Worldwide AR development rates [11]

In This map we can see different Person hour rates, it varies from 15 dollars in Latin America and 10 in Asia up to 200 dollars in UK and 250 in US.

Note that in Tunisia, Artists and developers get an average of 400 and 685 dollars each a month, coming with the lowest cost per hour, about 4.2\$/hour right after Asia with 10\$ to 50\$ per hour [12].

3) Devices, hardware and office supplies can be very expensive depending of the team size, Computers are around \$1000-\$2000 each, multiplied by the number of employees, VR/AR headsets average \$500, tablets and screens as known as display tools are averaged between \$300-\$500 each and we expect them to stop function after 2-3 years.

4) Maintenance, internet, labs and storage are part of those expenses are averaged to cost \$5000 according to DigitalMania and MultimediaTN.

2.6. Selling methods

Free and low-cost AR apps: Some Companies offer a do-it-yourself service, providing some simple tools to create free-of-charge watermarked applications; it is often used by students

and educators to make a prototype and show a visual experiment of their idea. As soon as the user wants more features such as 3d storytelling or more customization, the price goes to \$60. Providers such as Layar [13], Auras [14] and Zapper [15], created a limited platform for those kind of DIY experiences [16].

One Time purchase Custom AR apps: Custom made augmented reality experiences are usually requested from corporate marketers, agencies and event marketers; such a product should adhere to their brand guidelines and set them apart from the crowd by having a better The price of this kind of application averages approximately \$25 - \$30K [17]. Other sources states that Mixed reality games approximate the price of \$20 - \$25K [18] According to Julyrapid, a multiplatform AR application will average the \$50 - \$75K [19] Through my experience in Firstak Tunisia, I made such an application for the franchised company CHAFFOTEAUX [16]. The company was showing 25 new radiators they made. The problem was the space: in the event, they only had a space for one or two products, but my solution was to provide them with an augmented reality application, allowing them to show more products with the same space, the clients loved it and the company bought one more product from us. Because of NDA reasons, I can't share images of this precise project.

Undetermined period AR solutions: This kind of solution is focused on using scalable AR application to solve industrial issues such as retail, logistic and publishing. Price varies a substantially depending on usage and content, usually comprised of licensing, support and usage volume fees [17].



Figure 8. Example of Modiface for Sephora [18]

2.7. Pricing

To determine the price of a custom app, some companies such as Marxentlabs (Jo Anne Brenzo, July 2014) start by asking questions, listening to clients and distilling the client's vision into technical and creative requirements. First the hardware and operating systems need to be defined, then I need further information like whether the application will be published or installed on a precise number of devices, or whether maintenance and updates will be required. Number of targets, 3D models, interfaces and features will determine the charges added to the price. Finally, there are other variables to be considered such as integration of data collection and processed information in a database, which, are heavier on the development side of the project. After proceeding to all this analysis, a timeline is set, and the hours are counted to express how many man-hours are going to be counted in the development of such an application. In my case, I will not only base myself on this data, but it will be done throughout my research, using a shadowing method, Autoethnography and bench marking to identify how to price my products with different situations.

According to the CSIMARKET the software engineering market is making an average margin of 76% through the 3 past years. According to MBS the overall market margin averages the 33% through the past 3 years. As a start I expect the company to have a low margin to attract a bigger number of clients and projects.

3. Method for analyzing successful small businesses

My Goal is to study successful startups and small sized businesses to learn about which practices I need to follow and which common mistakes I need to avoid to ultimately choose my own path for my company. To do so I will go three methodologies, shadowing, auto ethnography and interviews in order to build a blueprint for my company, a lightweight business plan on which I will start my baby steps.

3.1. Shadowing

This methodology is used when exploring a research domain to gain a rich understanding of user/customer/employee motivation and to capture what people do and not what they say they do. Shadowing can be conducted over long periods of time if budget and schedule allow or apply more rapidly to gain a quick understanding of a problem [18]. Shadowing is used to gain understanding of an individual's behavior, opinions and drivers as well as to understand a person's role and paths through an organization or interactions with other objects or people in a given setting. It is used in organizational change assessment, product marketing or positioning, and experience and service design.

Domain and Demographics

This involves, locating the environment, location and looking for the right persons to follow while understanding their communication and the issues they face.

In Bonazzi's article, in the **Induction**, it is written: "The results of fieldwork research by the shadowing method on two supervisory roles in the Fiat plant of Mirafiori (Turin) are discussed." By that, he defines that he is locating the place, which, is the company Fiat, then he identifies the roles he is shadowing. In the "Animal foods and climate change" article, the researcher identifies

the domain stating it in the chapter **Methodology: shadowing**, “In this study, our curiosity was in exploring the specificity of food practices such as shopping, cooking and eating, in what Probyn (2000) calls ‘actors’ raw and visceral’ engagements with the world.” While in the same article, they identify the shadowed consumers, “In this section, our six participating households are briefly described, and then considered in terms of their relations to animal foods, followed by their relation to environmental concerns.”

To execute this, I shadowed Petricore. Petricore is located in Worcester Massachusetts, one hour away from Boston, one of the first cities to hold a big number of indie developers in the game development industry. Ryan is the CEO of Petricore, he acts as the main salesman, producer and manager, I have decided to shadow him as he experienced the hardest part of a company, the successful start! Petricore is now situated in MassDigi new Venture center building, this involves having the possibility to interview Monty Sharma, MassDigi’s CEO, and many other guests that come to this building, looking for a partnership or probably just visiting the new offices. Through my Research I also interviewed many other entrepreneurs, but the main ones were Ryan Canuel, Ralph Sutter who is a character artist and animator, does a lot of freelance work which, has many similarities with our more general industries. I also interview Walid Sultan Midani, a Tunisian CEO of DigitalMania, the first game development and interactive media company in our country, his adventure was mostly limited to national market, which, is sort of similar to what Petricore is experiencing. The main Issue I located as soon as I arrived Petricore was the Payroll, which, consists of more than 88% of their expenses, expansion is in order, and the team either needs to reduce members or add more sales persons to the team and double the income. This risky decision will be decisive in the future of Petricore and yet they still decided to go for a console game

without any reference or previous published game in this platform. Game development represents 1% of their income and this decision contradicts these numbers, the team is aware of the risk but their devotion and motivation is helping them survive this crucial and difficult period. *Secure Access*

Acquiring access and permissions is essential for this method to be executed, without authorization or consent I have no right to note any result, record or observation about the company's actions and results. In the "Animal foods and climate change" article, the researcher secures the access, saying it in the chapter **Methodology: shadowing**. "All such information was recorded with the fully informed consent of all participants. Care was taken to ensure that no identifying information was recorded that might compromise the anonymity of the participants, all of whom are referred to by pseudonyms." In the "Notes from the field on organizational shadowing as framing" article, the researcher states in the part **Shadowing as framing**: "Through the interaction between shadower and shadowee(s), a kind of "contract" is established, one that is constitutive of a particular twosome (Czarniawska, 2007,2008) and corresponds with the contingencies of the field. This contract helps to set the limits of the field in terms of time and space and thus provides a sense of fragile/delicate stability security to both the researcher and research participants." This last researcher expresses the security measures to access such information and the persons it protects.

With this in mind, I got my IRB certificate to interview my targeted persons. Working with professionals inside the company grants access to their full experience, I already have restrictions such as the non-disclosure agreement but that is as far as I can get in terms of access and permissions. Ryan Canuel was very generous and helpful to let me learn about his experience as

he was totally transparent and shared with me all the numbers of their incomes, expenses, payroll and even client's information which, is very risky to him knowing that I will be a direct competitor in a country that has a way cheaper labor.

Develop Trust

This important step requires a lot of good social interactions, healthy rapport and trust with the persons being shadowed in order to gain critical information and shared knowledge related to their experience. In “the Shadowing in/as work: ten recommendations for shadowing fieldwork practice: article the researcher identifies that this kind of method can be difficult for both sides of the interactors “because of this give-and-take if shadowing researchers have begun generating ideas for how to operate within the ambiguity and uncertainty inherent to the tensional tradeoffs of work-base shadowing that are based on their own experiences.” The same article expresses the need of establishing a good relationship during this type of research methodology, “We kept in mind that although it is impossible to create a perfect shadowing experience, it is possible to approach and engage the situation thoughtfully to support a productive and pleasurable working relationship among the shadower and the shadowed.”

In this project, I developed a healthy friendly relationship with Petricore's team and MassDigi's staff along with Becker's faculty, I try to be as helpful as possible while being professional within Ryan's due hours, I am always in time, assisting him in every meeting and supporting him in conferences after work. This type of relationship granted me crucial and confidential information that I would not be able to get my eyes on if I was not considered to be a friend who tries to help instead of an unfriendly employee who spies on them.

Record

In the “Animal foods and climate change” article, the researcher records participants, saying it in the chapter **Methodology: shadowing**. “All such information was recorded with the fully informed consent of all participants. Care was taken to ensure that no identifying information was recorded that might compromise the anonymity of the participants, all of whom are referred to by pseudonyms.” In “the Shadowing in/as work: ten recommendations for shadowing fieldwork practice: article the researchers identify many ways of recording everything and its benefits “Putting thought into how to take and manage notes can go a long way when it comes to managing and analyzing data. In our experience, the details (such as maps, diagrams and sketches) and structures (such as “timestamps” became ways to punctuate and begin to make sense of our data. When typing up our field notes, we were able to keep better track of our experiences and observations.”

Throughout my research, I recorded and compiled the field notes, added debrief notes to keep the experience described in the same timeliness. I did 5 business plans to get a better view and help analyze Petricore’s situation.

Analysis

In this phase, I analyze the data accumulated through that period, this could include story boards, narratives and character sketches. In the “Notes from the field on organizational shadowing as framing” article, the researcher, does this process repetitively through the article,

after every part of his research he synthesizes the result in what calls “Reflections” and he finalizes his article by a “Conclusion” where he sums up all his ideas from his records and explains his results.

Observing how Ryan works and learning from his experience was one of my most important tasks, he was being interviewed periodically and on special events during the projects. Following my shadowing phase, I sat with the field notes and with my autoethnography and interview notes to see what main themes emerged—that is, what topics were discussed at least one time in each of my research domains. From there, I looked for all instances of that theme in the data collected from shadowing to see what claims could be made.

3.2. Auto-ethnography

Auto-ethnography is an approach to research and writing that seeks to describe and systematically analyze personal experience in order to understand cultural experience. This approach challenges canonical ways of doing research and representing others and treats research as a political, socially-just and socially-conscious act. A researcher uses tenets of autobiography and ethnography to do and write Autoethnography. Thus, as a method, Autoethnography is both process and product.

Clarify the domain and expertise

In this part the researcher must specify the domain like in the shadowing method, but also describe his own experience in this field to be able to give credit to his thoughts and reflections, especial as a scientific researcher.

In “The Article Ethnography as invisible work”, the writer gives it importance as he says “Many technical people see ethnography as something that either requires no particular expertise or for which, their present expertise already equips them. To them, it’s” just a matter of common sense.” Ethnography runs counter to common sense, since it requires one to identify and problematize things that insiders take for granted (and thus tend to overlook). It takes a good deal of training and experience to learn to do this.”

Observation and recording

In the article “Auto-Ethnography: Paradigms, Problems, and Prospects”, the author shows how relevant it is to observe closely and record every action happening to provide information to be analyzed and processed in the future and enforce his arguments with proofs or statistics , “For auto-ethnographers, intensive participant observation is often the most important field method, perhaps to the neglect of other research tools such as questionnaires, structured interviews, psychological tests, field experiments, or formal ethno-scientific procedure”.

Analysis

This part is where the researcher introspects with himself, using all his collected data and gets an understandable outcome out of it, like stated in the article “Analytic Autoethnography” : “The purpose of analytic ethnography is not simply to document personal experience, to provide an “insider’s perspective,” or to 386 Journal of Contemporary Ethnography evoke emotional resonance with the reader. Rather, the defining characteristic of analytic social science is to use empirical data to gain insight into some broader set of social phenomena than those provided by the data themselves”.

Execution

Clarify the domain and expertise

As identified previously, the domain is about software development, interactive media and game development, in the first chapter I detailed my background, my technical and soft skills align perfectly with this domain, although my lack of entrepreneurship and marketing experiences are my main weakness.

Observation and recording

For four months, I faced many challenges and had different questions which, I shared with my advisor Professor deWinter weekly. Every time I wasn't given a direct answer but a method on how to research the solution, for example I built 8 business plans, in order to decorticate Petricore's business and identify its main elements and define its weaknesses and strengths.

Within the company, Ryan organized weekly, monthly and end of the year meetings where I recorded changes.

I expected to ask the same questions and identify the evolution of their answers through the period within the company, but instead I ended up adapting my questions to new problems that I discovered over time.

Analysis

From my previous work experience, I have acquired some knowledge about customers needing this kind of product and willing to buy it at a high price.

In Point Cube France, I worked as an intern, I saw their main product which, was a sale helper for pools, using the oldest technology in the world of Augmented Reality, a real picture with static 2 D models added to it, like an instant Photoshop.

Their main clients are still buying 60 six months long licenses for 600 dollars each and had been selling it for the last 10 years.

When I was working for them, the technology had its limit and we couldn't provide this level of precision and detection to create a real-time 3D augmented reality, otherwise it would have been a gold mine for them.

Building on this kind of experience, I learned more about the industry and how to approach potential clients.

In Petricore, I learnt that I still need more experience to be able to secure financial stability in my company, I always thought that in US, opportunities will come to me, "The American Dream", but I saw how Petricore was hardworking to provide enough money for the company to survive. Many other startups closed because of all the expenses. One of the main lessons that I learned, is to not jump fast into conclusions, interviewing professionals from the industry made me question myself about fundamental principles I believed in.

3.3. Interviews

According to Vinay Kumar [71], an interview is a verbal discussion between two persons with the purpose of collecting important information for the purpose of a research.

McNamara stated that interviews are specifically useful to get the story behind a participant's experiences, the interviewer can pursue in-depth information around the topic and answer his/her questions and concerns.

In this website specialized in research methodologies, it stated that interviews can be defined as a research technique that involves "*conducting intensive individual interviews with a small number of respondents to explore their perspectives on a particular idea, program or situation*" [72]. I considered this method efficient considering that I was surrounded with very talented and successful entrepreneurs, professors and professionals from the industry, to do so I prepared surveys and specific questions to each one of them after making them sign an

agreement to use that data on my research. I also got my Certificate of competition to protect the human participants.

In the end of this Co-op opportunity, I ended up interviewing 67 persons, Professors, company founders and professionals.

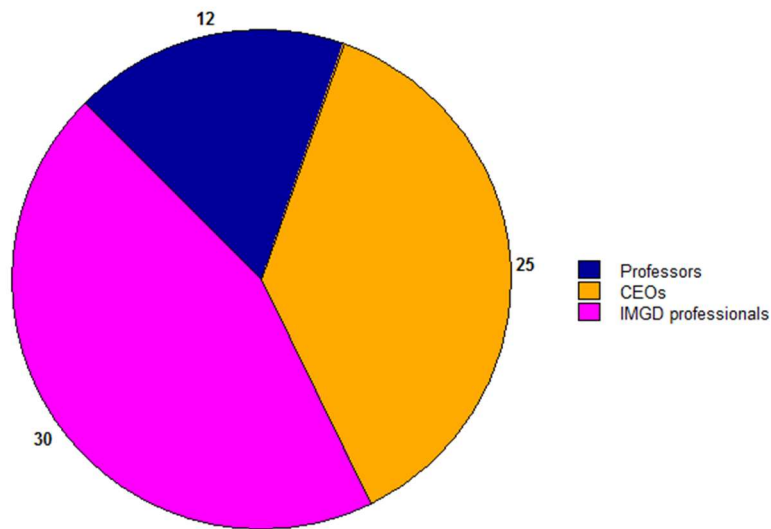


Figure 9. Pie chart visualization of the diversity of participants

Nearly 50% of them from my first circle of connections, WPI, Becker, ESPRIT, INSAT, Petricore and MassDigi, the other half comes from networking events such as PAX East, Woo Pile and other entrepreneurial events in downtown Worcester.

How I selected those participants and why: Before starting my research, I was expecting to prepare a set of questions and surveys, identify the best persons with the right experience and background, interview them and get answers to my same questions. Although the real experience was different from what I experienced, every week or two my questions changes, my challenges

multiplied, and I needed a more diverse population of participants and a dynamic set of questions. Business persons gave were hard to interview as they have a tight agenda and I had to adapt to their schedule, PAX East helped a lot in a way, where it centralized many of them in one place. For example, I interviewed for example Ryan regularly because of his presence and his close experience to the kind of business I want to start. I interviewed doctors for their specific knowledge and close work on subjects that I was researching. I also questioned game developers, artists and producers to get their feedback on production, process of development and what qualities of a CEO they like and dislike.

4. Results and discussion after data collection

After three months of interviews and data collection through recordings and personal notes, 20 themes were often repeatedly brought up to light and discussed from different perspectives. In figure 4.1 below, I show the multiple subjects that emerged in my research during this period.



Figure 10. List of Themes discussed in the research

Speaking about my issues and challenges to those persons opened some common points and concerns I was going to face in the near future. I was warned that I will probably have a hard time finding the right answers once I will have limited access of this US-based network. The most important points will be discussed in the next part.

4.1. Discussions of Office Space

The first phase my plan is to ask everyone working remotely since having an official real office space doesn't make sense; it is going to be expensive and unused. In the case of a well-funded by important investors, having an official building will be important to have clients, investors and potential partners to meet us there where we have space to regroup, work, and eventually even do workshops to help the local community learn from our experience and

connect with them. Our space can have different purposes, such as a co working with other startups that might need space, hardware and consultation. This will make us be seen as a reference and leaders to be followed and eventually even referred to work with or get a product from.

4.2. Marketing

One of the most urging situations in the Petricore's team is marketing. The team is larger than their needs, a secondary sales person will be needed as reducing the size is not even being considered.

This sales person will be needed in my team too, his tasks will be to network with previous clients, keep relations refreshed.

Their roles would be the following:

- Write weekly and bi-weekly updates for publishers and fans
- Organize meetings and managing office supplies
- Help build pitches and presenting game ideas to publishers
- Track and follow up on finished projects, the clients and their financial situation
- Publish periodically on social media
- Attend conferences and networking events
- Be the ambassador of the company and its face in TV and radio.

4.3. Channels

Our products have different channels, for games it is generally the same, mobile video games go on Apple Store and Google Play, PC games on Steam/UPlay than can be converted to consoles such as Nintendo Switch/XBOX one/Playstation4.

Some of the serious games might be manually installed into the private school's devices.

For the interactive applications, it differs from the hardware targeted, but most of it as it happens for Petricore's project, it can be executed from distance.

For special cases, one of our employees will travel to the customer's location and install the product manually.

4.4. Pricing

After meeting with Ralph Sutter, Ryan Canuel and Walid Sultan Midani, I noticed they are all using different existing methods with some tweaks to adapt it to their needs.

I will start by exposing how they sell their product and then make my own method.

Ryan Canuel:

His clients expose their available for their requested project, hardly negotiable, he defines the estimation of person hour and the amount of time it will take to develop the product or in another way make it task based contract.

His prices are always constant with old clients and becomes more expensive with new incomers as his quality and brand name improve.

Payment method varies with clients but generally it is 50% in the beginning, delayed payments or one payment in the end, while offering Package deals

Ralph Sutter:

Most of the time he asks for the tasks he will be doing and then determines his own price that he suggests to the specific company, usually a high price because of his background and experience.

Of course this price is determined after he researches some of his competitor's prices and after a deep estimation of the full amount of time necessary for the delivery.

He was many times presented to the risk of people stealing him unrightfully which, made him adapt and make milestones payments, for example, he will split the project into 9 steps and he gets paid before starting any step for those specific tasks. Another protection he uses is a half security deposit required from the start of every project. He also offers package deals, for example, 30 models for 10 dollars, 60 for 15.

Walid Sultan Midani:

He is mostly similar to Ralph's strategy but he also executes some genuine ideas such as sponsorship which, involves his company's name being advertised many times through events, TV and social media. Another original solution is the service for service, to be more precise, he offers a software for another.

4.5. Production and Team Management

Our motto will be transparency before anything, I've seen it work perfectly in Petricore and I believe in its power to generate those top qualities:

- Involvement
- Trust
- Loyalty
- Comprehensive behavior
- A group effort for everyone's benefit

In Petricore 88.6% of the past annual income went into payroll expenses. The team is bigger than the needs of the company.

The Payroll expenses of 1 year would be enough to pay 6 years of payroll in Tunisia for the same team size.

We plan to work our projects with freelancer friends with whom I am used to work with, following this solution, the company won't lose money if there is no project, everyone gets paid when the project starts and finishes, no risk for the company.

Scrum is our agile framework, I will use it to manage work with an emphasis on software development.



Knowing that the team is composed of remote workers, a source control tool is needed, I choose GitHub as a source control.



In order to track the tasks and the deadlines, I will use Asana which, is a web and mobile app designed to help teams record their work. This tool was founded by Facebook Co-founders who were working to improve Facebook's productivity.

As we are all remote and considered temporary in every project, we won't have monthly meetings but instead small daily meetings in order to update each other on what is blocking, advancing or threatening our progress.



To communicate efficiently we will need Slack which, organizes our conversation in separate channels, every project on its own, random chats on another, incoming meetings and events on another and a last one general for all the clients to communicate with us, either for support or first contact.



To store our documents, guidelines, contracts and projects, we will use Google drive, it will help us write documents, make presentations, synchronize our agendas and get a common easily accessible resource.

As soon as the production becomes too heavy to handle I will hire a producer, delegate those tasks to him/her while I will focus on other tasks.

4.6. Project attraction

Starting a new company means no experience and no references. The first project will be hard to acquire.

Petricore and most of the other companies that I've been part of are all getting those from their close network and friends.

I am planning to go for startup funding events, pitching the ideas stated above and start on those projects rather than trying to get clients randomly in conferences and events. It makes more sense as our company will be based in Tunisia which, implies very limited network and not as fruitful conferences to attend locally, adding that traveling to other countries for these kinds of needs will be expensive in the start.



As soon as I start my company I will apply for The Alumni Engagement Innovation Fund on which, I will be eligible.



My Fulbright network will be handy in sharing a word about my startup, making it a big window for opportunities.

Game dev is too risky, 99% of Petricore Inc. revenues comes from contract work.

Once I secure some savings, I will attack the game ideas or serious games projects with private schools and organizations.

To keep the work flow sustained I will use social media to share our current projects, updates and plans.



Facebook, twitter, Instagram, art station and cgtrader will be the targeted platforms to connect with our fans/clients.

4.7. Conclusion

These methodologies proved useful in the collection of data as they are both heavily dependent on recordings and interviews, both were very available and easily accessible.

The execution was flexible and adaptive to the changing situations, needs and issues.

Shadowing a business person without being part of the company would have been hard, I didn't expect the CEO of a small team to be so busy and I would not have been able to record and collect all the data if not for this opportunity.

This fruitful information led me to a logic ascertainment explained in the next chapter on how to proceed on the first steps of the company.

5. Plan of Action for ABY Interactives

In this chapter, I present the most prominent advantages in starting this type of business in Tunisia and then pitch and define the opportunity in 6 ideas: three game ideas and three other interactive media applications. After that, I compare those ideas and decide on which, I will move forward with. Ultimately, I will make a self-guiding business model for that specific project to help ABY Interactives in its start.

5.1. General advantages

I have a number of general advantages in establishing an interactive media company in Tunisia.

- 1) Interactive media development is in growth as detailed in the Literature review chapter
- 2) Payroll is 9 times cheaper in Tunisia, as detailed in the literature review, Payroll comes at an average of at least 50 \$/h per person where in Tunisia it's about 4.6 \$/h per person
- 3) Tunisia Startup Act which, is interpreted as taxes exonerations, light and fast registration procedures and now wage or employer charges for the first 2 years. In addition to that, investors don't pay taxes on their investment to a certain extent.

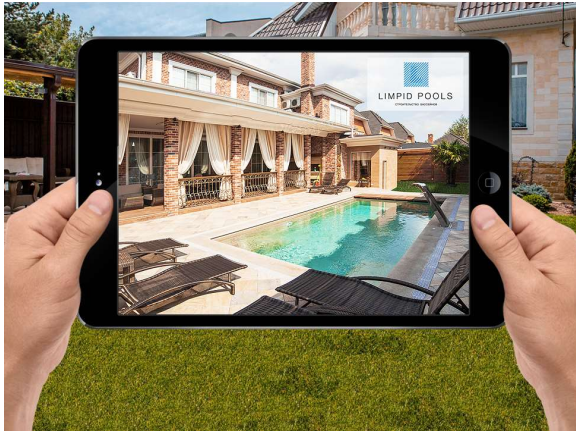
Tunisia Startup Act which, is interpreted as taxes exonerations, light and fast registration

5.2. Project ideas

The previously cited advantages are true for every new company in the same field in Tunisia, to be able to have a more concrete plan, investors and banks would need more proofs.

Below are a listed three games ideas and three interactive applications on which, the company could get money from grants or angel investors.

5.2.1 Virtual Product



Pitch:

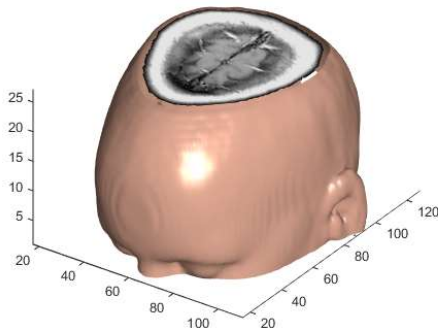
Imagine yourself going to Lowe's or Desjoyaux to buy a 7'x 12' Pool and install it in your backyard, the actual pool costs at least \$15 000 [55] just for the pool without delivery and installation. This type of purchase can be expensive for some persons or families, which, increases the hesitation for the client, and makes it harder for companies to close deals by selling their products.

My solution is to offer a real time visualization solution of the product in your environment, the salesperson will have my application in a large tablet for a better display, choose the product that he/she wants to show to the client and place the item virtually superposed to the real-world video stream. The client will be able to see the product in his/her place, record a video with it, share it with his relatives and friends to get their feedback and get an easier decision to make. According to my previous Boss in PointCube, the before and after effect was very effective on any person and helped the businesses make more sales. The same application will adapt to each category of product, every client has the option to provide his own 3d models or I create them for him/her.

This product is advantageous for the company for its cheap development cost. Through my experience I noticed that this kind of product has a large production margin. I already have digital prototypes to help me pitch this idea to potential investors.

My worries are that some potential client already made their own tool like IKEA, centralizing all the products under one application might make it not flexible to changes and finally this kind of application is easily replicable and hard to legally stop any competitor from making a substitute.

5.2.2. MRI Visualization



Pitch:

While magnetic resonance imaging (MRI) data is itself 3D, it is often difficult to adequately visualize the concerned human part clearly. Usually, findings of MRI studies are often presented in 2D. A solution is to generate 3d models from MRIs and present them to Radiologists that interpret those after a meticulous study in a report to the surgeon, this kind of product already, one of the most important ones is slicer. Through my research and interviews I understood that surgeons are having a hard time interpreting certain details from the representations they get, which, makes them loose in accuracy and precision. Some of those doctors complained also about how difficult it is to share their interpretations with their patients,

a lot of discomfort and anxiety is felt by them, exactly what I felt when I was getting my tumor removed.

My solution is to provide an interactive application that displays a 3D visualization of the body part targeted by the MRI machine, this application will be focused on UX/UI to make as friendly and intuitive to use as possible for the surgeon, for example, the surgeon will include the MRI 2D input in the application, wait until it converts it to 3D and instantly he/she will be able to see it, turn it, measure it, cut it and split it into parts to be able to understand better what is happening while showing it clearly to the patient. It would be advantageous to build this solution for its cheap hardware and its existing infrastructure, According to Hafedh Jemel and Ouafi Marrakchi, the market is in need for such a simplified product. Although this could be successful, it is still a risky business as the same interviewed persons warned me about how expensive it would be for me to make everyone aware of its existence, plus no errors are allowed in the medical field which, will make both testing it and legalizing it very difficult and pricy.

5.2.3. Time Lapse



Pitch:

Evolution appears under many faces through our life in different aspects and durations. It can be as a bad or good evolution, noticing its changes is vital in our life. History is all about tracking events at a large scale, thousands of years. What if we had a tracking tool for smaller duration changes, like infections, weight loss, building process, painting process or a board game play through. Sharing videos of those changes, could help doctors get a better diagnosis, students will visualize actual processes in real time and be able to stop and analyze critical points, inspiring others that change can happen, and that time is always a needed part of any type of evolution.

My solution is to create a mobile application that notifies the user periodically to take a picture in a specific position to be able to visualize the differences in the same context. After that process the user will generate a video that will stick all those pictures in one video that he or she can share on social media or just save it in their device. In the possibility that a user records pictures over a year or more which, is a lengthy period for a mobile application use period, the application will generate different videos, with smaller periods videos to encourage them with a similar effect that a teaser provides. The targeted platform will be PC, Android and iPhone. The social media aspect of this product could be very helpful for its marketing, we have seen many successful applications on Facebook being used widely and spread very fast such as the Star Wars campaign [56].



Figure 11. Facebook API changing profile photo with theme

This is could be pivoted to a health application only, offering the possibility to jump on the health grants, as I will detail it later in the next part, those grants are one of the most numerous and available grants. It would be risky though to develop this application as it has many other competitors such as Time Lapse Camera [58] and Frame Lapse [59] that are already successful. Focusing only one aspect might make the application unique but it is still easily reproducible and potential competitors might have a more powerful human and money resources to just push our application under their shadow.

5.2.4. Humble / one click one meal / game for charity / click for charity Mobile clicker game for charity:

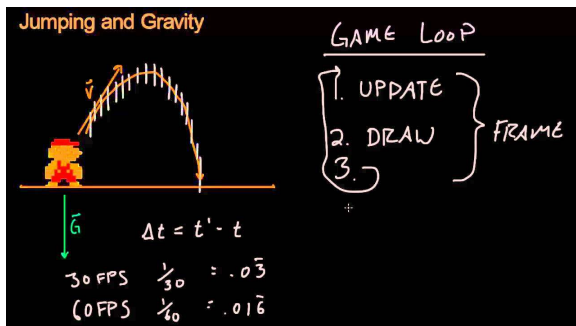


Pitch:

Video games are more than an escape to a virtual world. It can also be an effective way to raise funds for people in need especially for the homeless. About 1.56 million people, or about 0.5% of the U.S. population, used an emergency shelter or a transitional housing program between October 1, 2008 and September 30, 2009 [60]. I want to make a game that joins a useful helpful purpose to an entertaining experience, this application will be a clicker mobile game that generates money through advertisement and donations to be given as a charity to help homeless

people. The game involves taking care of a virtual homeless person and raising his/her standard of living and thus the more the gamer plays the happier his homeless will be! All funds will go towards providing necessary stuff, food and shelter for real homeless persons. This will provide a good public relation to the company while opening a potential partnership with the famous company Humble Bundle. If this game becomes successful, other variations of this concept will be then created to generate help for children, hungry people and refugees. I am planning to market this product with the help of the organizations to which, I will be donating the money generated from the game. I am worried though that the idea of donating money through a virtual platform can be hardly accepted by some people, also the reliability of the project can take a certain period to be proven. Again, the product is easily reproducible, and competition is again a heavy threat for this project.

5.2.5. Mathematician



Pitch:

When I was a student in Tunisia, I taught many high school kids math and physics, I noticed that the hardest part was to understand how curves are drawn from equations, they were always wandering how this could be useful. I tried many solutions to provide them with explanations while getting their attentions, I remember some of them if there was any interactive applications that could help, I directed them to websites like mathisfun[61], desmos[62] or

scratch[63] from MIT. The result was amazing as reported from those kids, the entertaining method was more efficient, which, led me to my idea to gamify a tutorial around this chapter.

This serious game has the purpose to teach kids how to use mathematical functions to create the right curves that will lead them to collect stars and reach an end point. Controls are easy, the player will have to activate/deactivate some presented functions to move his character into the desired direction, E.g.: $f(x)=1$, he will keep going straight, $F(x)=x$ he will go up ...

This game will be on multiple platforms such as Android/IOS or PC on steam. My recent project developed within MassDigi “Leap A Head” gave me enough experience and confidence to develop this unique concept. I also like this idea because of its flexibility whereas, if it doesn’t succeed on those stores, I can pivot this product to be a Business to Business project by trying to sell it to high schools, if it succeeds on the stores, I can still pivot this as a premium Business to Business project where the service will include more targeted and adaptive solutions to the school’s needs. I am though worried again about this product being easily duplicable. Also, the design of the mechanic will be hard to make it fun while teaching efficiently, it will need numerous iterations until it becomes intuitive for kids.

5.2.6. Escape the room Digital



Pitch:

In this game, all the players play the main character, who suffers from total memory loss every 15 minutes. The problem is, how do I get the players to forget everything about the last 15 minutes of gameplay? This is simply a matter of some creative game design.

Here's how gamers do it: Players go one after the other into the game and play as the same character. They aren't allowed to watch each other play; each player has the potential to complete the whole game, but he or she is pressured for time and must complete difficult puzzles.

Therefore, the player needs the cooperation of fellow players, or risk losing it all. The player can accomplish this cooperation using some interesting gameplay mechanics such as written memos, taking pictures, recording their voice, and even choosing where to faint and reset when the next player takes over. However, these capabilities that the player has are limited, so he or she must use them wisely.

To control the possibility of having players just leave the code for a puzzle in a memo, I will design the game so that the puzzles change slightly in each reset. For example, the first player hears 4 different sounds repeating in the background. He or she is smart and realizes that they are a sequence, as follows: high note, medium note, medium note, low note. The puzzle in front of him asks for four digits and the options are 1, 2, and 3. The player puts in 3, 2, 2, 1 (because of

the musical sequence) succeeds, and decides to leave the code written on a memo for his friends saying "3221," goes onto the second puzzle, and bam! He or she resets.



Figure 12. The Code Machine from the Escape the room's board game

The second player sees the memo, tries the code, but no! It doesn't work and he or she doesn't understand. This is because although the puzzle is the same, the notes in the background and the corresponding code changes every reset. The players have to somehow convey HOW to solve the puzzle, not just the answer. If the first player had said something like 'The key is in the music notes', then perhaps the second player would have been able to figure it out.

Players will be able to play this kind of escape the room game from their own home, by buying the core game on their accounts and getting three rooms to play with their friends. They can then buy more rooms and play them with their mates for free, kind of like a free invite. They can then share their results and achievements on social networks. If it succeeds, a moddable mode would be great. This way, players could make their own rooms and share them with their friends. This strategy worked for many games, such as Gmod, Counter Strike, Rust, Ark, Warcraft 3, Portal 2, and others.

The positive side to this kind of project is mainly is uniqueness and innovative system, I have looked online for a competitor using system and I only found that this system is only used as a custom fan made map/mod for other user, but none of those game made the user share their advancement with their friends to finish them. I pitched this ideas to different professionals in the industry in PAX East and they all approved it. The multiplayer feature doesn't need any complex networking development which, will avoid unnecessary expenses for a starting company. This same feature enhances its chances dramatically of getting published and invested in. I also built many maps and mods in Warcraft 3, Gmod, Minecraft and I believe that getting a community invested in improving the product and create their own levels will involve them in its marketing process and its maintenance.

Partnering with the actual creators of escape the room will help a lot as they already thought about starting de digitalize the product but not with this concept. Once this accessible project is done, it will be a nice reference for future PC/Console projects. Knowing that the game plays at least by 4 players, one player will have to refer it to 3 other players to be able to finish it which, multiplies its chance of selling. Solo players will have a bad experience playing as playing this with other persons, won't make the same effect as playing it with your real friends. That is why I would like to follow Electronic Arts' way of selling successfully their Co-op game "A way out" [64] where only the first player buys the copy. Having a new concept involving unexplored territories and risks, the lack of competitors of existing similar products will scare publishers. Also Monetization will be hard to define because of the lack of comparison. Finally, I believe that it will be a hard challenge to design the experience of remembering an event a person didn't live.

In the next part I am detailing in depth why and if any of those ideas can be successful according to interviews and researched data online.

5.3. Benchmarking

Virtual decor

Thoughts on why this product could be successful:

It reduces the doubt in the customer's decision as he can see the final result before buying, the "before and after effect" makes the client decide faster to close the deal, we can see this practice happen more often with expensive and long delivery period products, such as buildings, cars and airplanes .

This was mentioned many times by the focus group led by PointCube in France when I was doing my internship.

Making all the products presentable on the application makes it easier for the company to reuse the same project and adding a module to it rather than recreating a whole new system.

In PointCube, they had only a very low quality product but that one product provided enough money for the company to last 11 years, while only focusing the pool and gardening parts.

I saw how maintenance and support was easy to manage in PointCube, a short training is needed for the sales person such as an hour or two a day from one of the engineers, was more than enough to fix bugs and unpredictable behaviors within the application, a CRM tool was required to maintain good relationship with clients and save valuable data.

The fact that the application can be installed on multiple platforms such IPad and tablets, will make it easier to display and more accessible for the customers to download and install the application on their own device.

Once a customer gets profit from using our application, his competitors will be more interested to keep up with the market and eventually buy from us.

MRI Visualization

Thoughts on why this product could be successful:

Though a 3D 'glass brain' rendering of fMRI activations can sometimes be difficult to interpret, they are useful in showing a more overall representation of which regions are activated, whereas the traditional slices show a more local view of the results. [Creating 3D visualizations of MRI data: A brief guide]

Adding the gamified tools to cut the body part and get real measures will make it easier to interpret, highly iterated testing will be needed to provide a great user experience, but the result would be more useful than the existing solutions and it's complementary.

The infrastructure is already existing in the medical field, doctors already have it in their routine to visualize MRI results in static 2D/3D, which, will improve the precision, and this type of accuracy is always needed in the medical field as it reduces the risk of a surgery or improve a diagnostic.

This project could be easily extended to simulate movement with a broken/damaged bone for example, showing to the patient future risks or simulate how a tumor could grow, making pressure on other parts of the brain and generate a report of what can be damaged or lost if it continues.

In grantwatch.com, I did a research on grants for health and medical solutions and I found 621 active grants with at least 1000 to 5000 dollars and goes as up as billions of dollars.

Time lapse:

Thoughts on why this product could be successful:

The produced video is obviously more dynamic than a static image, for example a picture of water is not as expressive as the water flow in motion shown in a video.

The project could cover many aspects such as health, construction and social media which, offers flexibility to the company when developing the business plan for it, allowing us to choose one multiple niche opportunities. This application will make video time lapses more accessible to the novice film makers which, would like to generate more content but lack of video making knowledge.

Competitors such as Time Lapse Camera[58] and FrameLapse [59] are really successful on both google play and apple store, they both do a generalized use of time lapse, but if focused one field only, it's use might be a clearer need for specific uses.

Building on the previous application, grants for health are available in big numbers which, makes it easier and less risky for us to develop.

Charity game:

Thoughts on why this product could be successful:

Fundraising is really successful in the gaming industry, for example Humble Bundle which, sells other games for a charity purpose and got bought by IGN.

According to reuters.com there are more than 500.000 homeless persons in the U.S, they are mainly concentrated in the big cities such as New York City, San Francisco, Seattle and Boston, Partnering with associations in those cities might help us promote the application for free as we are doing the same noble task of helping others as a nonprofit.

According to Wikipedia [45] there are 168 homelessness organizations in the US only, this might likely create a ripple effect where if an organization started helping us, others could

follow their lead. Having a simple concept accessible on any type of device will make it easier to use and download from any available store.

Partnering with us on this charity game would improve our public relation and the partner's public relation too, which, could be a great argument.

This project can be expanded to different fields such as medical issues, wars, refugees and scholarships, reusing the first solution as a template for new versions, using the same monetization system and design.

After pitching this idea to my sponsors in Fulbright, they loved the idea and they even promised that they will help me market it by sharing it with the network of 800 000 alumnis from different countries, diverse fields and at multiple important positions which, could be really valuable and an opportunity to get more partners.

Math Game

From my experience as a private teacher, I taught many high schoolers mathematics and physics, they were Tunisians, French and even US citizen, function visualization was the hardest part and doing exercises on it was confusing and frustrating to those kids, making a game that introduces this game will help them and avoid frustration by replacing it with fun and challenge in solving puzzle.

The global serious games market was valued at \$2,731 million in 2016, and is projected to reach \$9,167 million by 2023, growing at a CAGR of 19.2% from 2017 to 2023 [75].

Mobile game production and development are my forte which, I will leverage from my experience and execute my best learned practices, our company is comfortable with mobile low

scoped games. According to GrantWatch.com there are 60 active grants for education, with an average of 20 000 dollars.

Partnering with Private schools and colleges is a great opportunity, as I actually made contact with some of my old professors and highly ranked members of the ESPRIT, they want to help me develop this game with free of cost interns, guided by their professor advisors for free, providing the interns with housing and food, somewhat like the Summer innovation program.

Escape the room:

Unique and original mechanic which, attracts potential curious customers, attracting the Escape the room fan base into a new innovative experience.

The network system is easy to develop as it doesn't involve live synchronization or latency issues, while taking advantage of the popularity of multiplayer games and their advantageous side to get a publisher

Partnering with the actual Escape the room was demanded by them to Professor Dean O'Donnell from WPI students, so if through the same opportunity, I could pitch this to them, it might be happening.

At the end of 2014, there were 22 escape room companies in the US, by mid-2015, there were at least 100, at the end of 2015, there were 450. Today, in mid-2016, there are over 900. By the end of 2016, there were over 1,400, At the end of Q2 2017, there were over 1,800[76].*

5.4. The Chosen One

5.4.1. Reason behind this choice

Starting on 6 ideas on the same time was not realistic for a starting company.

A choice was to be made and questions were raised, on how to choose and which one to go for.

After interviewing many CEO and concerned participants about every idea pitched above, games were quickly out of the table because of their high risk of not getting investment, especially that the company won't have any previous games performed under its name.

MRI Visualization ended up making those entrepreneurs more comfortable voting to go for it as a start point for the reasons listed below.

5.4.2. Opportunity

5.4.2.1. The problem and solution

What is the primary pain point for my clients?

Though a 3D 'glass brain' rendering of fMRI activations can sometimes be difficult to interpret, they are useful in showing a more overall representation of which regions are activated, whereas the traditional slices show a more local view of the results. [Creating 3D visualizations of MRI data: A brief guide]

This is still true for other parts of the body other than the brain. Precision and risk reduction are always needed in the medical field while also being hard to achieve.

How do they solve their problems today?

The Patient goes into an MRI machine which, involves blocking them from any movement for 30 to 90 minutes, then the computer gets 2D images of the body part sliced in different perspectives and positions.

The 2D resulted can be visualized as printed semi-transparent papers, exposed on a lit white board.

These same pictures are also taken as input to other medical image tools that generate a 3d model to be visualized on a desktop computer, one of the most used one is Slicer [76]

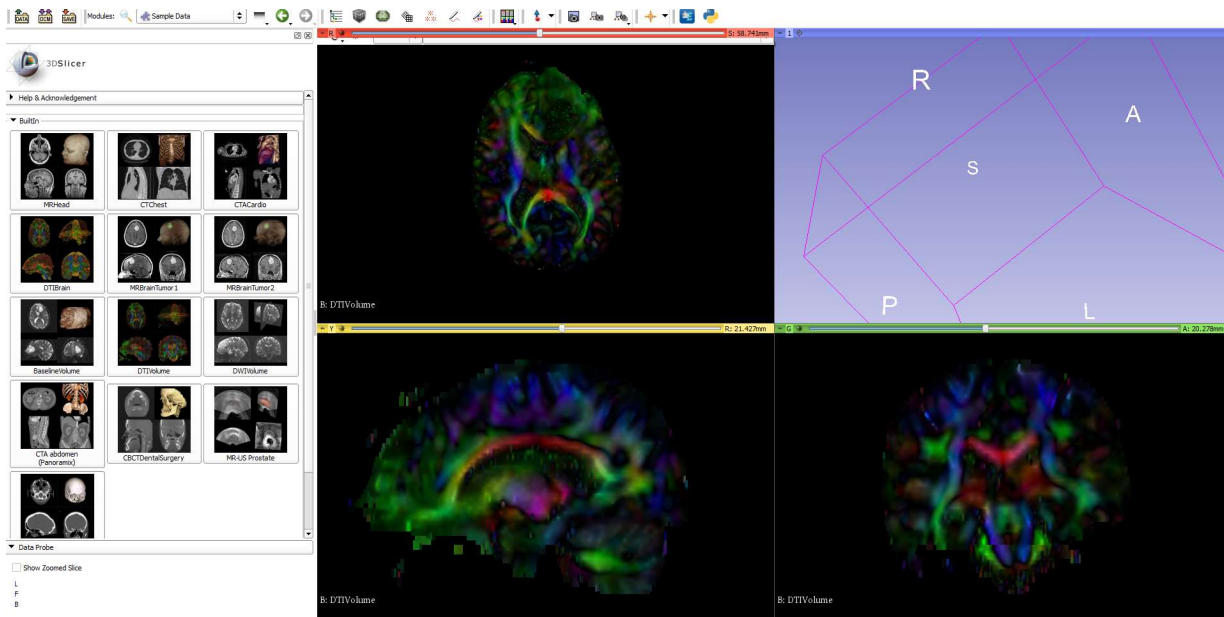


Figure 14. Slicer in app Screenshot

I tried the application and as an experience software engineer /game developer, I can easily assess this application as being non-friendly user and that it requires training, tutorials and easier/more accessible tools for the doctors.

Defining the issue that I am solving for my clients is by far the most critical element of my business plan and crucial for my project's success.

To make sure, Monty Sharma advised me to get away from my computer and go on the field, asking potential customers and end point users, by doing so, I would validate that my assumptions are correct and then pitch them my solution, get feedback and adapt my business plan to their specific need.

I interviewed Dr. Ouafi Marrakchi, Founder of El Farabie clinic and Ceo of the Polyclinic Les Jasmins, both based in Tunis, Tunisia, he has 40 years of experience in this medical field as a doctor, surgeon and Ceo of those clinics.



I asked him about the existing means to visualize the MRI, he confirmed that they used exactly the same worldwide existing solutions.

He also confirmed 4 main issues:

- 1) Legal procedures being lengthy, expensive and different from place to place.
- 2) Making doctors and clinics aware and trained to use this tool will need a great amount of marketing, conferences and references.
- 3) Testing the software will be a heavy task as doctors will need to feel safe and secure using this new tool
- 4) This tool shouldn't be marketed as a solution that replaces the current one but instead as a complementary until it gets widely spread and used by everyone.

I also interviewed Dr. Jemel Hafedh, the best known neurosurgeon in Tunisia, he actually helped remove my Tumor successfully two years ago.



I reminded him how I saw him look at my MRI results and how unsecure I felt when I saw him doubting the actual size of the tumor, the contact points with my optical system and my Hypophysis/Pituitary gland and the possible risks that could happen during the surgery.

He told me that because of the lack of precision and high risk of me losing my sight, he ended up removing only the third of the tumor's size and deal with the rest of it with radio therapy which, eventually inevitably damaged my Pituitary gland for life.

He stated that the perfect tool would be one that generates what I described to him in real time, based on that idea, I suggested a tool that would put markers on 3D specific points in order to help simulate the surgery, imagine entry point, process and organize the steps during the surgery.

These both interviews shaped my idea and offered me a better understanding of the problematic.

5.4.2.2. Target market

My application benefits potentially both the domestic and the foreign market.

The U.S market includes Managed healthcare groups, hospitals, independent physicians and medical supply groups. 25% of the U.S healthcare is taken by Managed healthcare groups and roughly 30% by physician groups making these the most potential customers.

The foreign market includes the same targets as the U.S market along with important distributors.

MARKET ANALYSIS							
		YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	
Potential Customers	Growth						CAGR
Managed Care	25%	300	375	469	586	733	25.02%
Hospital Groups	10%	200	220	242	266	293	10.02%
Physician Groups	10%	400	440	484	532	585	9.97%
Independent Practices	0%	200	200	200	200	200	0.00%
Foreign Markets	50%	100	150	225	338	507	50.06%
Other	0%	10	10	10	10	10	0.00%
Total	17.77%	1,210	1,395	1,630	1,932	2,328	17.77%

Figure 15. Market Analysis

5.4.2.3. Competition

Who else is providing solutions to try and solve your customers’ pain points? What are your competitive advantages over the competition?

Direct Competition Matrix

	My idea	existing
Reduce patient anxiety	YES	NO
Cheap	YES	YES
Diffusion Tensor Imaging	NO	YES

Neurosurgery planning	YES	YES
Image slicing	YES	YES
Image Registering	YES	YES
Multiplatform	YES	NO
Accessible	YES	NO
Friendly use	YES	NO

Figure 16. Competition matrix

Indirect Competition

Biomedical imagery solution developers could be considered as indirect competition until they start working on MRI visualization.

Example:

Philips, IBM, biomedical researchers /developers.

5.4.2.4. Future products and services

The healthcare field is always open to upgrading and developing which gives my application a great growth potential.

My future plan includes adding VR features to our product making the visualization easier and clearer to the patient which is one of our primary goals. I am planning on developing this goal further by also including a simulation phase to the product that would make it possible to visualize a virtual copy of the existing case, helping both the doctor and the patient observe possible failures or problems that might beget from the patient’s condition.

5.4.3. Execution

5.4.3.1. Marketing and sales

Positioning

MRI Visualization positions itself as a low-price offering healthcare solution with a great quality compensating to its available open-source competitors. Public and independent physicians, and patients will appreciate my solution as it offers to all parties a simple visualization and understanding of the diagnosis compared to the complex solutions of its competitors.

Pricing

- **Covering my costs:**

My delivered product will include, research, development, marketing, design, maintenance and delivery.

In case of getting medical grants, those costs may reduce as I won't have to cover them from the product's price which, will allow the application to be more accessible.

- **Primary and secondary profit center pricing.**

Separate from the primary price I can include different separate modules for different clients on a separate price which, will include maintenance and extra expenses for the client.

Promotion

The Product will be delivered digitally through google play and apple store which, will not include any packaging although it will need other means of promotion:

Advertising

Social media, a website and traditional media like TV and radio.

Content marketing

A popular strategy for promotion is engaging in what is called content marketing.

Publishing tips, advices on Imagery visualization will attract customer views.

It is all about educating my prospects on topics that they are interested in, not just on the features and benefits that I offer.

This could be done through educational videos shared on social media or via Health Conferences which, is more common and where most doctors head to learn about the most updated theories, technologies and methods.

Strategic alliances

The potential partners of my solution are Health organizations and clinics, along with publishers and reviewers.

I also have an already established partner being the Fulbright Program grant bureau which, also opens the possibility of partnering with other existing grants giving programs.

Operations

Design

The application offers a sober design that is user friendly. The simplicity and clarity of the interface makes the solution stand out from the existing complex solutions and offers therefore a positive user experience.

Distribution

The application is available directly through Google Play or Apple Store for the application download, service payments are done through the website.

Milestones

- Marketing research
- Design
- Prototyping
- Testing
- Development
- Testing
- Publishing and marketing

Metrics

- Number of installs
- Online clicks
- Customer reviews.

Risks

- Too many competitors with open source solutions.
- Possibility of unavailability of a grant, making the costs greatly overwhelming
- Teaching the doctors how to use the tool efficiently and introduce it into their routine will be a difficult task

- No errors are allowed, any medical error happening because of the application will result in heavy consequences on the company, everything needs to be heavily tested which, might be expensive and unpredictable at this moment.
- The legal part of the process will be long and expensive.
- Making doctors and hospitals aware of this product will cost a lot, many conferences and showcases need to be held in order to spray the word.

Sales forecast

The sales will depend directly on the clients' growth.

The sales forecast will follow an exponential graph, the first year being the hardest to acquire clients and build a popularity in the following years the product popularity would grow as the client network would grow.

Personnel plan

CEO: 1800\$/Month

Developers: 680 \$/Month

Artists: 680 \$/Month

Salesperson: 800\$/Month

Interns: 200\$/Month

Use of funds

In my case I will be raising money from investors and grants which, require me to detail how I am planning on using that cash.

Monty Sharma stated that most of the expenses that the company will have a hard time handling by itself will go into marketing and R&D.

Exit strategy

The exit strategy of the product branches into two possibilities:

- Transforming the application into a serious game and selling to universities
- Selling the license to a potential competitor

6. Early Business Plan for my company

ABY Interactives is a start-up that will be located in Tunis, Tunisia. The company's goal is to concentrate in its first year on projects heavily in AR in all fields possible; medical, industrial... Our ultimate goal is to expand in the near future after building a stable financial capital into the game industry which. is still a novice field in Tunisia with not many competitors and a great potential for expansion and innovation.

The Market

The game industry is very young in Tunisia and therefore the market is owned by few but stable and experienced competitors, from which. I can cite DigitalMania and Nuked Cockroach, our marketing and executive strategies were created in order to penetrate the market smoothly with those competitors in thought.

The products will be delivered online and the marketing will be happening continuously through our operations through different means; social media, TV, Partners and mouth to mouth.

I will be the sole proprietor of this business and I will manage the whole company remotely, my team as well will work from home on a contract base as monthly paid employees. The operating plan covers the estimate of how I will proceed the first 4 years with an emphasis on the 2 first ones that seem critical in a starting business.

As for the financial plan, I stated below how I will go through grants or pay the employees when the projects get paid.

6.1. Business/Industry Overview

Augmented reality

As stated previously in the first chapter 1.4 Industry and the second chapter 2.2.2 Industry size and growth rate, the augmented reality Industry is in growth and it is needed in diverse fields such as games, health and education.

Interviewing Mike Levine the CEO of Happy Giants was very fruitful, HappyGiant are concentrated on developing Augmented & Virtual Reality experiences for mobile and cutting edge technology devices. Creators of the award winning "HoloGrid: Monster Battle", the AR platform for a new type of board games.

Founded in 2012, the company already developed 100+ interactives and games for big clients such as Hasbro, Disney, Spin Master, Universal Parker Brothers, WHBH, Paramount, Lucas Arts, THQ and MATTEL.

Mike confirmed most of my validations on how successful AR is and how hard it would be to get project attraction from Tunisia without an ambassador from the U.S.

Game industry

The video game industry is a sector that involves in its production; marketing, development and monetization of digital entertaining games. Products that integrate many fields such as History, Education, Health and Art.

It englobes dozens of disciplines and its main component employ thousands of engineers, artists and marketers around the world.

The Position of the company

This company will focus on developing augmented reality and video games, the first part will be a business-to-business kind of projects that finance the risky industry of game development, especially that in the beginning no publisher or investor will put money on an idea if

6.2. Market Analysis and the Competition

Market Analysis

1) Game industry

This Industry too about &9.5 billion in the U.S. by 2007, \$11.7 billion by 2008, \$25.1 billion in 2010 and it reached \$36 Billion in 2017. It is still in growth according to the ESA annual report [66]. “The spectacular growth of our industry in 2017 proves video game developers, artists, and storytellers are the brightest lights in the US economy, finding more ways to delight the world’s 2.6 billion gamers each year,” said Michael D. Gallagher, president and CEO of ESA.

US Video Game Industry Revenue	2017	2016	Growth Percentage
Hardware, including peripherals	\$6.9 billion	\$5.8 billion	+19%
Software, including in-game purchases and subscriptions	\$29.1 billion	\$24.6 billion	+18%
Total:	\$36 billion	\$30.4 billion	+18%

Figure 17. ESA comparison of Game industry Growth [66]

According to Venturebeat, the game Industry is growing faster than expectations, 10.7% with a total of \$116 billion by 2017

Although it is highly rewarding it also highly risky as an industry, that’s why DigitalMania, Petricore and HappyGiants are doing interactive media applications to fund it, all their CEO confirmed this reality along with Arstechnica [67].

Game Wisdom also considers the game industry to be the riskiest market saying “The Game Industry despite what it seems can be a very risky business to enter. This is currently an industry where there is no defined concept of value and pricing, and games with millions of dollars of development and marketing are being priced next to those that spent a fraction of that. In an industry of boom and bust, you never know what game will become the next Minecraft or Undertale, and the ones that just fade into obscurity.” [68]

Competition

In this part I compared 2 existing Tunisian companies working in the interactive media Industry, Digital Mania and Medianet, pulled up their annual review, team size, price and quality through my interviews and researches done online to compare them to what I expect my company to do through its first year.

Business	DigitalMania	Medianet	ABY Interactives
Est. Annual Revenue	\$1,000,000	\$300,000	\$500,000
Employees	15	10	5
Price	Average	Average	Average
Quality	Good	Average	High
Network	Large Locally, small internationally	Medium Locally, Absent internationally	Absent Locally, Medium Internationally

Figure 18. Estimated competition matrix

6.3. Sales and Marketing Plan

Product or Service Offerings

According to our research study and our various interviews with specialists I decided to focus fully on AR as our studies led that interactive is a wide field and focusing on it, with our line of products and our company being still small, would be counterproductive in our case.

Next, in order to safely enter the marketing place and succeeding at it, I plan on focusing on the affordability of our products, opting for average prices which, would allow up to smoothly manage to the market penetration.

Our goal is not only to gain customers but also keep them. To manage this goal, our strategy is to work heavily on good Customer relationship and full availability through technical or customer support.

Pricing

In the beginning, the company won't have any references or done projects, which, results in hard negotiations. Thus, I will need to comply with the customers' needs:

- Budget will be determined by the client
- We will offer the cheapest price without much margin of production
- Security deposit will be still needed
- We will offer Package deals

As soon as I get some projects under our belts I will be able to make the deals more flexible and better for us this way:

- Price will be determined by us
- Milestones payments
- Security deposit

- Contract made by our company

Sales and Distribution

The MRI Visualization product is going to be fully e-commerce based, the transactions will be done through the Application which, will lead to payment through the official website. After payment the client would receive a code that would allow them to use the application fully. Full technical support will be provided for any of our products after payment in order to follow up the whole installation process. The support will be remote via Teamviewer and Skype and will stay at disposition of the client in case of issues or questions anytime in the future.

Marketing

Our first approach with the marketing strategy is to hire a salesperson who'd take care of the studying the marketing plan and proceed with one-to-one meetings with our potential clients, during those meetings this person's role is to represent the product and listen to the clients' demands and try to sell them the product.

In the next plan, I plan on using online platforms to promote and project an image to our company, using the most up-to-date and popular social media and networks like Facebook, Instagram, LinkedIn and Twitter among others. A future approach to the marketing plan is to collaborate with popular Youtubers and streamers with a high online influence (number of views and subscriptions), propose to them a sponsorship in order to advertise the project.

6.4. Ownership and Management Plan

Ownership

Sole Proprietorship but open for a partnership.

Management Plan

The company will be owned and managed by myself and will be working with a small employee base remotely.

The employees will be selected with a high profile with a short-term contract that will cover each project the company will be working on. Their services will be done remotely giving the personnel a freedom and a stress-free working environment since they will have the choice to choose the workspace they work the best at.

Project Planner

Select a period to highlight at right. A legend describing the charting follows.

Period Highlight: 1

-  Plan Duration
-  Actual Start
-  % Complete
-  Actual (beyond plan)
-  % Complete (beyond plan)

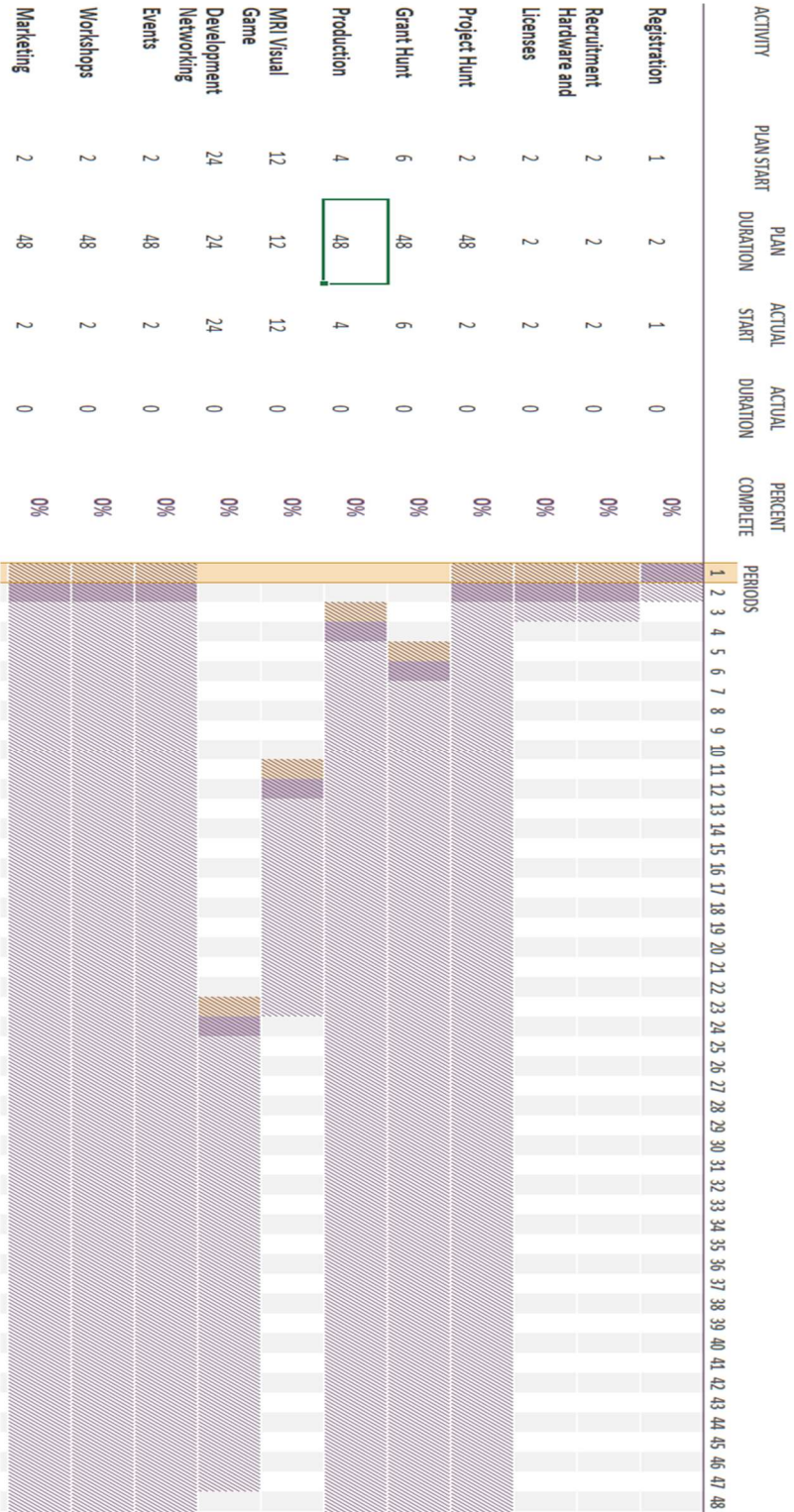


Figure 19. Operation Plan

In the previous table I explain how I will start my company by registering it, recruiting employees, buying the necessary hardware, acquiring the licenses I will need in our production process and an indefinite project hunt.

After 2 months I expect the production to start on projects with the focus on interactive applications, after the 4th month the company will go after the grant hunt which, represents all the funding related to MRI Visualization, on the 10th month I expect starting on it and work on it over a year long.

If everything goes well and the company becomes stable, I will start game development in 2 years.

These plans will be accompanied with a constant networking activity along with workshops, events and of course marketing.

6.6. Financial Plan

Give and take system

The company's strategy is to take the less risk possible, with that spirit, the company would concentrate on each project contract at a time and propose to its employees a payment after the finalization of said project.

Grants

The company can benefit from many different startup grants sponsored by big corporations or international associations, I can cite the Tunisian American Enterprise Fund or the TAAN (Tunisian American Alumni Network) grant which, is a perk only offered to the Department of State exchange program alumni.

Alumni Engagement Innovation Fund

Being a Department of State exchange program alumni I possess a set of perks between which, is the possibility to apply for an Alumni Engagement Innovation Fund which, is a grant of 25,000\$ sponsored by the department of state. This opportunity can create a great financial support to this project.

TechCamp Tunisia Challenge

Previously in Tunisia 2016, I worked as a professional trainer in TechCamp Tunisia and TechCamp Libya to help those two communities, teaching them how to use cutting edge technology applications and tools in order to improve employability and enhance global awareness.

Those two experiences were always followed by a challenge that allowed the participants to use what they learned and connect it to their business for an ongoing project or idea and get funded by the US department of state.

I am confident that I know perfectly how to do it, now that Josephine elDorado the head of the Fulbright Chapter in New York taught me how to submit for this kind of grant.

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