Virtual and Augmented Reality gamification technology on reinventing the F1 sponsorship model not purely focused on the team's and car's performance.

Evangelos Markopoulos[1], Panagiotis Markopoulos[2], Mika Liumila[3], Ya Chi Chang[1], Vasu Aggarwal [1], Jumoke Ademola[1]

[1] HULT International Business School, 35 Commercial Road, Whitechapel, E1 1LD London United Kingdom.
[2] University of the Arts London, Elephant and Castle, SE1 6SB, London, United Kingdom.
[3] Turku University of Applied Science, Joukahaisenkatu 3, 20520, Turku, Finnland.

evangelos.markopoulos@faculty.hult.edu, p.markopoulos1@arts.ac.uk, mika.luimula@turkuamk.fi, ychang2014@student.hult.edu, vaggarwal2016@student.hult.edu, ademola.jumoke@yahoo.com

Abstract. Formula 1 economics is highly related with the investments on the F1 cars and their performance. Winning teams have multidimensional benefits that can assure sustainability, development, reputation and profitability. On the other hand, not everyone can be a winner and this reality generates high risk for F1 the F1 investors, the teams, and the F1 itself. This research work aims to identify new sponsorship methods for F1 which are not purely focused solely on the car's and team's performance. The paper presents a gamification approach on which an innovative and disruptive Virtual Reality game can be developed to contribute on gaining new fans from all financial and social levels globally. This new fan base can be transformed into the new target group for sponsorships not only on the physical F1ccars but also on the digital ones that can be owned and driven by anyone, anywhere at any time.

Keywords: Gaming · Gamification · Serious Games · esports · Entertainment Games · Monetization · Sponsorship · F1 · Formula 1 · Virtual Reality · Augmented Reality · Blue Ocean Strategy

1 Introduction

The winner takes it idea applied in any business and Formula 1 could not be an exception. The economics of this highly expensive sport are significantly related with the investments made on the F1 cars based on their performance. The winners, either in team or individual victories, have multidimensional benefits that can assure sustainability, development, reputation and profitability to the manufacture and the sport. However, this is not the case for the teams that follow, which have also invested tremendous amounts of funds to be part of Formula 1 and race at such level.

The fact that not everyone can be a winner generates a very big risk for F1 investors, the teams and the F1 itself. This research work attempts to identify a new sponsorship model for Formula 1 which is not based only on the car's or team's performance. The suggested approach aims to achieve creative re-engagement of the F1 followers with the sport and the manufacturers. This gamification approach is based on an innovative and disruptive operations framework to contribute on gaining new customers (fans), recapture essential markets and targets groups, but also establish the base for effective strategy development. This approach is based on the development of a Virtual Reality brand-exclusive Formula 1 game addressing two key concepts which are the players experience on playing within an exclusive F1 manufacturer environment, and the utilization of the data collected from the players performance and behavior, in order to develop more effective sponsorship strategies through data analytics.

The proposed manufacturer brand exclusivity can be adjusted to any F1 manufacturer such as Ferrari, McLaren, Williams, Sauber, etc., and for any role of the F1 racing teams such as the driver, the mechanics, etc. The data collection can be used for marketing purposes, sponsor engagement, fans engagement, and other initiatives that can contribute to the financial and reputational development of the F1 manufacturer. Data gathering and management can be based on brands, advertisements, colours selection, preferences, logos, demographics, user behavior, and other options given to the player to customize its paying environment, game elements and gameplay.

The proposed approach integrates the innovative concepts and technologies of virtual and augmented reality and gamification with the data science. This technology integration is based on user activities that can generate knowledge-oriented business intelligence which can lead into strategy development for sponsors engagement.

The way VAR, cognitive science and data science are integrated in this approach results into a multidisciplinary combination of systemic thinking that can effectively create blue ocean strategy out of a very conservative market and industry, reducing on the other hand, blue ocean risks via the multidimensionality of operations and multiple revenue streams.

The Virtual Reality phenomenon.

Virtual reality cannot actually be considered a new idea as it has its roots many decades in the past. It is a concept imagined years ago, with many artists trying to envision what such a concept could be like through sci-fi movies, books and other types of media. However, in recent years, the advancements of technology together with the the accessibility and affordability of VR reality headsets, makes it no longer thoughts of fiction. Today there is a tremendous increase of the people fully interested in the future of Virtual Reality either by observing the progress of this new technology eagerly or by contributing in its development by investing and designing projects in virtual worlds.

According to the World Economic Forum with data from the Goldman Sachs, virtual reality is a market of nearly 25 billion$ in 2018, expected to reach 100 billion$ in the next seven years (2025), driven by the creative sectors with games to be dominant among them, at 27% of the creative sectors [1]. Figure 1 presents the growth of VAR until 2025 indicating the share of the creative sector, while figure 2 indicates the share of games in it [1].
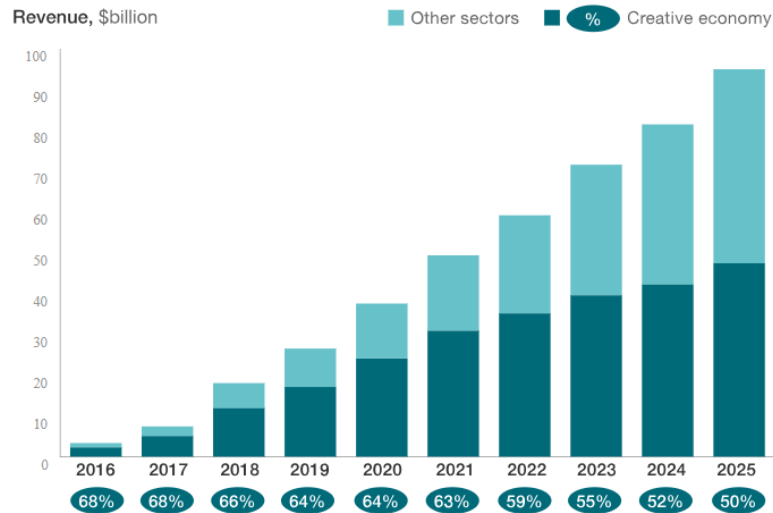
Fig. 1. Projected VA and AR growth 2016-2025

Virtual reality starts to gain blue ocean characteristics as more people and organizations try to adapt their work and function in a virtual world, hoping to be the first ones to do this successfully, efficiently and effectively.
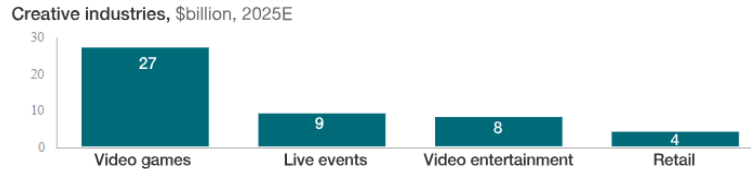

Fig. 2. Breakdown of creative industries.

The Virtual and Augmented Reality.

Virtual reality, as known today, is the computer-generated simulation of a 3D environment that can be accessed via the use of a headset. Within this environment, commonly, the player can perform physical interactions using extra hardware such as body tracking sensors or controllers. Due to the VR interactivity, the market that popularised Virtual Reality is the gaming industry since video games are the most interactive form of media. However, this does not limit interactive VR experiences to just games as there are quite successful interactive VR movies in the making such as the Beat Saber and the Moss.

Augmented reality, unlike Virtual Reality, takes place in the real world and simulates the addition of 3D computer-generated elements within reality. For that reason, it is also referred to as Mixed Reality since it combines both worlds, digital and physical.

As of today, augmented reality applications are a much less interactive than Virtual Reality since they cannot use any advanced sensory hardware. Due to that, most Augmented Reality experiences are portable, affordable and very easily accessible by using smartphones as their preferred platform. Two very successful AR experiences are Pokemon Go and Ingress with significant contribution to the AR popularity.

Even that most of the success of Virtual and Augmented reality has been in the entertainment industry, the application of these technologies can extend to any field. In the medical field for example, Hermes Pardini Laboratories and Vaccination Centers are using Virtual Reality to make the process of vaccination a pleasant experience for the children partaking it. By immersing the children into a fictional environment, the nurse can mask the needle injection as something much more fun and interesting such as a fire fruit used for an energy shield [2]. In the field of education, Discovery VR is trying to bring a new form of documentaries in the classroom. By needing only smartphones and cardboard VR headsets, it aims for affordability and accessibility while retaining the quality expected from an educational documentary experience [3].

2   VR a Blue Ocean Strategy

The concept of Blue Ocean as defined by Kim & Mauborgne is premised on the quote "help my ocean is turning red" where businesses find themselves in a highly competitive market space, needing a new strategy to survive and grow [4]. This challenge of high competitiveness is addressed by the blue ocean strategy which practically reflects to the name itself as Blue Oceans are new markets while Red Oceans are the saturated ones [5].

The ideology behind blue ocean strategy is that industry player can restructure the industry and the market in order to create new untapped markets. This can create new endless opportunities that business can enjoy in form of profit maximization and risk minimization. These restructures can also occur with the introduction or adaptation of disruptive technologies like the VR which can open room for untapped markets and give businesses competitive edges. Most of the blue ocean strategy emerges from within red oceans by expanding existing industries [4]. The key characteristics of the blue ocean can be summarized in table 1.

Table 1. Blue and Red Ocean strategy characteristics.

Blue Ocean Strategy	Red Ocean Strategy
Compete in existing market space	Create uncontested market space
Beat the competition	Make the competition irrelevant
Exploit existing demand	Create and capture new demand
Make the value-cost trade-off	Brake the value-cost trade-off
Align the whole system of a firm's activities with its strategic choice of differentiation or low cost.	Align the whole system of a firm's activities in pursuit of differentiation and low cost.

The threats and opportunities on going blue can be considered quite similar in any industry even in the most innovative and fast-growing ones such as the gaming.

The innovation of the VR technology and its areas of application can create experiences with significant success, audiences and impact in the economy and the society and form blue oceans generated. Today's VR early stage, in corporate and serious games, can impact existing markets and generate new ones. In existing markets, VR can be a disruptive technology that puts existing companies in the famous Disruption Innovation Model, also known as the Innovator's Dilemma [6]. The model indicates (fig. 3) when the enhancement of a product performance trajectory leaves room at the lower spectrum, for smaller companies and disruptive technologies to enter the market.

Overtime, VR being a disruptive technology through incremental improvements can compete with existing (also known as incumbent) technologies available in the market. Therefore, the incumbents would be forced to cater to a higher end of the market and move up the product performance threshold.
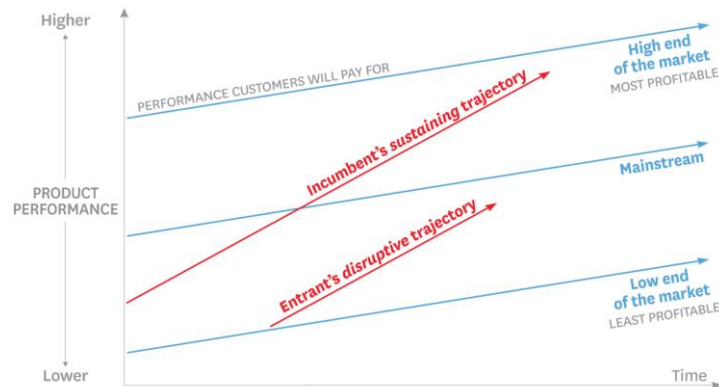

Fig. 3. Product performance varies as the time period increases and the incumbents are forced to move to a higher end of the market.

With VR being such a recent phenomenon and its adaptability to any field of work or entertainment, it does generate blue oceans. Today more companies are racing to be the first ones to set the pace for VR and take advantage of the minimum competition due to the limitation of the created VR content. Taking also into consideration the staggering growth of VR hardware, ideas that are impossible this year can be possible the next. However, going blue on VR needs serious thought and strategy. It is wise to take careful steps in a rapidly evolving field. The way a VR experience can survive the test of time is to be made easy, be updatable and designed with the future as its target.

Overly ambitious projects can turn against the designers and be replicated better and cheaper within the next years due to the staggering evolutionary pace of VR and AR technologies. The goal for a company/project on going blue in VR is to set the VR pace of its field, but if the pace can't be kept, others will take the lead.

3 The F1 economics.

Formula One (F1) is probably the most impressive automotive sport today. It has its roots in the early 1930 in Europe but not realized due to the second world war. In 1946

discussions for the idea started again and the first races began towards the establishment of a drivers' championship and on May 1950 the first world championship race was held at Silverstone. The 'formula' in the name refers to a set of rules all participants and cars must comply. Prior Formula 1, the sport was originally known as Formula A. Since then Formula One demonstrated amazing development, success and growth.

Today the global sport of F1 is valued at $10 billion. It is the most watched annual sporting series in the world with more that 425 million TV viewers. The revenue of F1 in the past 18 years reach $18 billion, even outstepping its closest rival, the FIFA World Cup. On 2014 the revenue of F1 was $1.765 billion and the net profit $520 million. However, this is not the case for the F1 teams where most of them don't make any profit. A mid-range F1 team is expected to spend around $243 million per season from which $55 million in operations, $63 in salaries, $61 in research and development, and $60 in manufacturing. In 2014 Mercedes spend $375 million, McLaren $334, Red Bull $317, Williams $318, Williams $208, Lotus $186, Toro Rosso $170, Force India $133 and Manor $130 million. Ferrari and Sauber did not file public accounts [7]. Figure 4 indicates the 2014 average cost of a formula one car which is $9.765 million with the engine to costs cost $5.3million on average but can go up to $7 million.
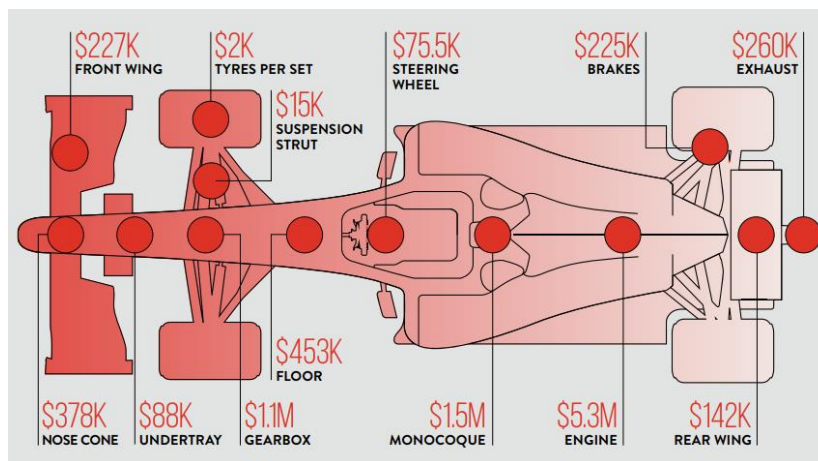

Fig. 4. Component cost and total cost of a Formula One car

The main revenue stream of an F1 team, around 40% comes from sponsorship. The total revenue that can be generated from sponsorships on a car can be $74 million on an average (shown in fig. 5), with the cost for a sponsor on the rear wing and the sidepod rear to be at £25 million on each. This is 7.5 times the cost of the car, but it is not enough to cover the overall operations of an F1 team [7].

In 2014 more than 300 brands sponsored F1, spending close to $1.5 billion annually. The biggest sponsor was Marlboro ($2.023 million), Vodafone (692 million), Petronas (690 million), Shell (564 million) and Mobil1 (496 million) [7].

The revenue of F1 teams is related to the wins they have each season but also to the wins they had at the last four years. Ferrari finished 4th, in the championship of 2014 with net profit of $71.8 million ($12.4 million less than the 2014 champion, McLaren).

However, due to the premium (historic) payment of $92,2 million, the total profit for Ferrari was 164 million, when the champions McLaren netted only 100.7 (4th place in profit). F1 is a winner takes it all industry and sponsorships are heavily related with the performance or the car, the team and the driver.
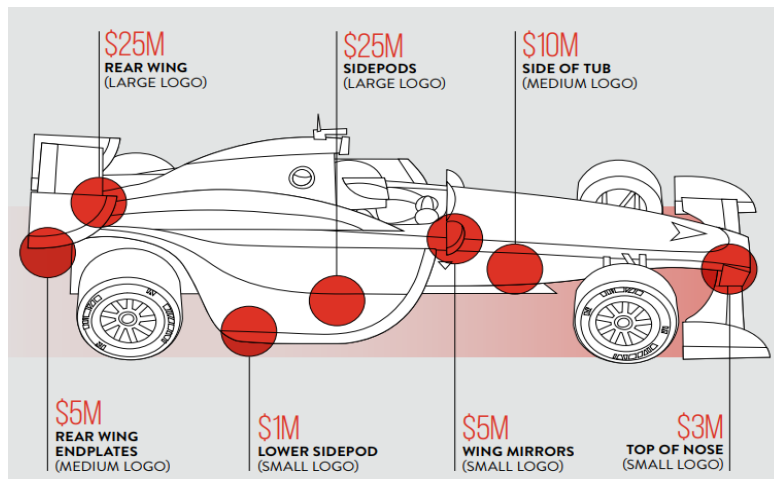

Fig. 5. Sponsorship costs per area on a Formula One car

4 The F1 VR Blue Ocean.

Based on the Formula One economics, the impressive Formula One industry needs significant support to sustain its operations and continue to offer its innovation to the automobile industry and the excitement to its fans. An increase on the sponsorship revenue can contribute but this has to be with an increase of the F1 followers who seem to be dropping every year (fig. 5). The sport lost 40 million TV viewers in 2017 dropping down to 352 million viewers [8].

It is an imperative need for F1 to seek blue oceans in order to sustain and increase the sponsors for all if its teams and not only for its winners, despite the decline of the industry. Games through immersive technologies like VR can help on attracting new age target groups to the F1 world creating new generations of fans.

F1 can find in the VR gaming business a Blue Ocean if consumers can receive advanced services to enrich the F1 experience. VR as an immersive technology offers special tools to increase the F1 end user experience. While players are into the game, they can be able to feel the power and the speed of the car, they can measure their driving skills against the driver of the physical car, and also measure their on-game driving capabilities and senses such as perception, attention and strategy. The game Lab of the Turku University of Applied Sciences in Finland developed the prototype of the NeuroCar VR evaluation toolkit for driving inspection which is a step towards this direction (fig. 6.).
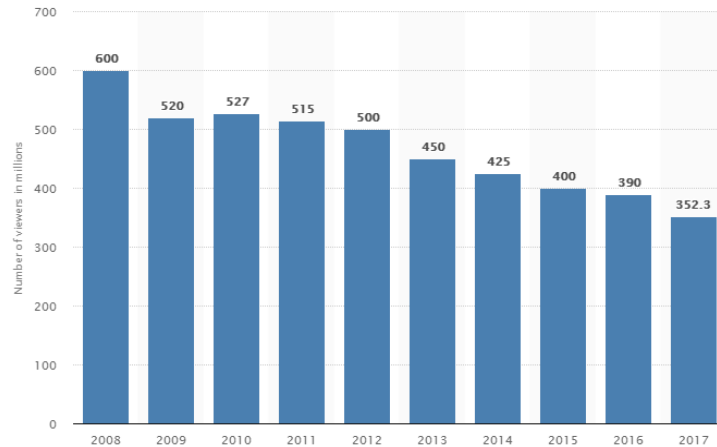
Fig. 5. Number of TV viewers of F1 racing worldwide from 2008 to 2017 (in millions)

NeuroCar can be used to detect the right-side perceptual bias in aging in a laboratory setting during a virtual driving task [9]. This toolkit combines cognitive neuroscience and game technology for efficient and objective screening of driving performance and spatial perception, supporting medical professional's estimations on driving ability.
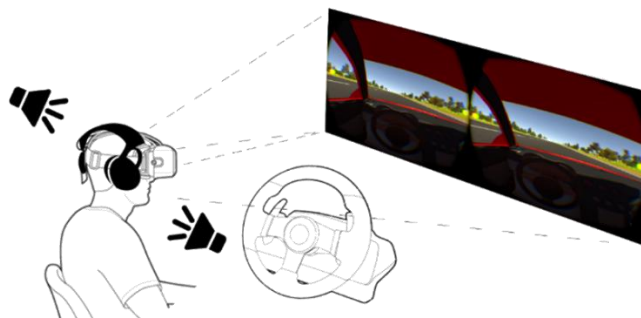

Fig. 6. NeuroCar system description of portable evaluation tool [10]

A VR Gamification Approach for reinventing the F1 sponsorship model.

A solution to the F1 sponsorship challenge can be the creation of an online VR multiplayer F1 game which can and expose the sport to younger age groups. Creating a popular game is the most efficient way to reach millennials and generate a strong brand connection with this new target group. The game designed for this research enables any Formula One team to create a large portfolio of virtual sponsorships. It includes various areas allocated for sponsorships which increase the overall revenue streams and the awareness of a given F1 team to the younger generations. The proposed approach

supports a sponsorship model in a consistent manner the same way it is done in the actual sport. Furthermore the user gains benefits and rewards from entering tournaments while enjoying a competitive experience monitored by the F1 Team itself.

The selected approach is expected to spur existing gamers to use this advanced technology with sponsors tapping into the technology's marketing potential. Sponsors can also be small start-up organizations or corporate organizations aiming to use F1 VR for product/service placement or brand awareness. The game has virtual adverts, colors and logos that can customize the appearance of the player's virtual F1 car, offering this way more opportunities for the sponsors to swift from the traditional advertisement methods to new and modern ones [11].

The proposed approach also provides benefits for the F1 VR users by offering the ability to race with the actual, but virtual, F1 cars, on the actual tracks, and monitored by the actual F1 teams. The racing competitions are local, regional and international and can be set by either by the gamers themselves or by the F1 team. The link between gamers and the actual F1 world merges the virtual reality (gameplay) with the actual reality (viewing), offering a unique feeling and challenge for achievement and success for everyone and anywhere regardless their age, race, sex, financial or social status.

The overall approach works under the concept of a global F1 'try-out' for the digital racing platforms for projects that already exist in various car manufacturers such as McLaren and Ginnetta [12], [13]. The significant difference in this case is the gamers are ordinary people instead of professional ones. Furthermore, the international dimension of the game can lead F1 VR to enter the e-sports word with international teams composed from amateur gamers using the minimum VR equipment. This affordable VR F1 esport can be considered as a shared value global social innovation that provides opportunities to existing and new F1 followers for personal development and recognition, but also to the sponsors who can experience the invention and exponential growth of non-existed target groups within F1.

Managing F1 VR gamification sustainability.

The proposed F1 VR game contains two main features which are the player mode and the spectator mode. Each mode has the ability to provide marketing and advertisement opportunities to sponsors and additional revenue to the F1 teams. The game also provides revenues from tournament registrations, and from elements that can be purchased during the game, such as car skins, boosters, extra time on the track, etc., that can be of high demand due to the desire gamers have for victories. Other monetization practices that can increase the revenue of the F1 teams are the access modes and the microrotations that can be applied before or during the preparation of the car, before the competition or during the gameplay at the pit-stops for car improvements or driver tips. Another revenue stream can be the pricing mode of the game which can change from fermium to premium.

Dynamic and localized advertisement is also another source of income that can be applied during the virtual game. Under this concept and according to the location of the competition or the nationality of the gamer, the brands presented to the gamer's eyes can be either from the location of the competition or from the driver's country. In the first case sponsors from the tournament location can be advertised in the game

promoting their brand or their products to international gamers (drivers) and spectators. On the other hand, the gamer (driver) can be viewing brands and products from his/her country which are easy for him/her to get associated.

This dynamic advertisement can increase the number of sponsors not only in volumes but in also in types. F1 advertisement have been a privilege for the very established organizations due to the massive costs required for a spot on the physical car. Therefore, companies operating at national or regional level without being multinational organizations, had no chance to enter the F1 world. The proposed approach provides the opportunity for any organization to be promoted by an F1 team regardless their size, financial or international activity.

The success and sustainability of the proposed approach relies also on the data collection during the game from the gamers and the spectators. Such data can be the demographics related to the gamers from all over the world, but also the preferences gamers have in the customization of their cars, selection of tracks and other activities they do before or during the game. Colors specifically selected during a customization activity can indicate the likeness of the gamers to pay attention to brands or products with the colors they like. Clothing options and dress styles can provide similar information. Such data, non-related with the game but with the psychology of the gamer, is analyzed in the ranking of the sponsored brands or products to be viewed more.

The sustainability of the proposed approach, and not only, is based on understanding the gamer in the first place, and not the industry needs. In order to achieve such a key principle, a number of science disciples need to be integrated with the VR technology and the F1 industry. Access modes, dynamic localization, and data management can certainly support a successful monetization strategy, but more than that they can support a successful sustainability strategy in order for the game to last for long.

7. Risks and considerations. SWOT and BCG Matrix analysis.

Innovation can be considered as a gambling practices as no secure and safe path can be predicted with certainly. However, it is a required gamble on the search for blue oceans where development and prosperity can take place. A SWOT analysis has been performed on the proposed approach in order to identify its sustainability characteristics. Two key strengths the proposed approach possess are related with the popularity of the industry and the technology. Formula 1 VR, as presented, provides physical and social engagement to all type of gamers from any social status while at the same time can be adjusted to various gaming platforms such as the X-box, PlayStation, and PCs. Due to this flexibility, more game users can be attracted, hence, lucrative to sponsors

Despite the technology being associated with these strengths, there are weaknesses as well with the most important one to be the domination of the VR industry by models that do not support head-mounted displays. Another weakness is the high cost of the more advanced VR tools and equipment which impacts the game development and use.

The opportunities, on the other hand, provided in the proposed approach can be summarised in four points. 1). Users can experience racing with Formula 1 tracks and cars and enjoy the customisation features offered. 2) There is an increasing market share for head-mounted displays (HMD) such as the Oculus Rift and the Sony PlayStation VR which are more favourable for the Formula 1 VR at affordable prices. 3). The data

collection and analysis provided by the game can benefit sponsors is various ways, with each way to be a new source of income for the F1 team. 4) The social impact of the game can increase the number of gamers globally.

One of the key threats of the proposed approach is related with the perception of the people on the VR technology as it still sounds expensive, remains a new concept for many applications, and can be considered an investment risk.

Placing the characteristics presented in the SWOT analysis into a Boston Consulting Group growth-share matrix, the proposed approach would be considered as a Question mark. With a high market growth in the fast-growing VR market, but low market share in the interest of F1 in VR, the proposed approach is capable for the best which can be the fast adaptation, and the worse which is low adaptation. However, the market does exist and the opportunities flow.

8. Areas of further research. Wearable Computing.

Virtual reality games allow gamers to immerse into the gaming world and control their characters by moving their bodies in the real world. Scientific research indicates that virtual reality can provide motivational physical activities [14] which can increases enjoyment while decreasing tiredness [15]. When it comes to gaming in VR, the VR-glasses are not enough to fully immerse the player in the virtual reality, as they also need to feel and touch the objects the see. [16] This can be achieved with wearable computing which becomes a trend in gaming and of course in VR gaming further more.

Wearable VR technology provides the opportunity to measure brain waves, heart rate, eye movements etc. This paper will extend on the integration of wearable technology in F1 VR games. Even that this technology is not directly related with sponsorship, it is capable to bring the whole IT industry in F1 by offering a unique experience on a target group that can utilized by the F1 sponsors. We believe that that the IT companies behind F1 data analytics doesn't reach visibility as much as they could. VR games and wearable computing could open new possibilities to visualize car performance, driver performance, and achieve significant engagement with a whole new world of F1 fans.

9. Conclusions.

The magnificent world of F1 can be by itself an attraction and source of inspiration for a number of products and services from which F1 can benefit. However, despite the many products and services already being developed under this thinking, F1 still struggles to assure descent profitability to the teams that composed it. Event that the F1 brand name is capable to sell by itself, the reality indicates that this does not seem to the case. The same thinking can also be applied on the VR technology. The impressive experience that can be achieved with VR requires a normalization of the equipment standards and costs for the technology to blossom.

Combining F1 and VR for the generation of innovative and immersive games that can help F1 teams increase sponsorships is a challenge that goes beyond understanding the technology or identifying the potential target groups. The challenge relies on the way new target groups can be identified, continuously engage and grow exponentially.

In order to achieve such goals a deeper understanding of the games is required in a wholistic scientific approach, not restricted to the technology and marketing sciences.

The proposed approach integrated data science, cognitive science, management science and behavioural science in an attempt to better understand the needs and drives of the massive user groups that can race within the VR F1 game around the clock globally. This work attempted to create a chain of relations from the problem to the solution. The increase of the F1 industry revenue is related with the increase of the sponsors, which is related with the increase of the gamers, which is related with the understanding the gamers phycology, needs and drives in order to generate incentives to follow a sport not in their prime interest. F1 and VR, if applied within the context of understanding the human first, can then create the momentum needed to identify blue oceans and achieve the desired results. The paper presented the sponsorship challenge of F1, the opportunity of VR, and their integration though a social shared-value oriented game.

References

1. Augmented and virtual reality: The promise and peril of immersive technologies, https://www.mckinsey.com/industries/media-and-entertainment/our-insights/augmented-and-virtual-reality-the-promise-and-peril-of-immersive-technologies
2. Ogilvy Brazil, VR Vaccine. http://lobo.cx/vaccine/
3. Discover Education.Virtual Reality in the classroom, https://www.discoveryeducation.co.uk/discoveryvr
4. Kim, W.C., and Mauborgne, R.: Blue Ocean Strategy, Expanded Edition How to Create Uncontested Market Space and Make the Competition Irrelevant. Harvard Business Review Press, Boston (2014).
5. Kim, W.C., and Mauborgne Renée: Blue Ocean Shift: Beyond Competing – Proven Steps to Inspire Confidence and Seize New Growth. New York (2017).
6. Harvard Business Review. What Is Disruptive Innovation?, https://hbr.org/2015/12/what-is-disruptive-innovation.
7. Raconteur. The Business of Formula 1. https://www.raconteur.net/infographics/the-business-of-formula-1
8. Forbes, F1 https://www.forbes.com/sites/csylt/2018/01/06/f1-tv-audience-reverses-by-40-million-under-revised-measurement-system/#26a66c2d3a52
9. Hämäläinen, H., Izullah, F.R., Koivisto, M., Takio, F., and Luimula, M.: The Right-side Perceptual Bias in Aging Determined in a Laboratory and during a Virtual Driving Task, Scandinavian Journal of Psychology, Vol. 59, , pp. 32--40. (2018)
10. Luimula, M., Besz, A., Pitkäkangas, P., Suominen, T., Smed, J., Izullah, F.R., and Hämäläinen, H. Virtual Evaluation Tool in Driving Inspection and Training, In: Proceedings of the 5th IEEE Conference on Cognitive Infocommunications, Gyor, Hungary, pp. 57-60. (2015)
11. Nichols, G. and Savage, M.: A social analysis of an elite constellation: The case of Formula 1. Theory, Culture & Society, 34(5-6), 201--225 (2017).
12. Project CARS X Ginetta: https://www.projectcarsesports.com/ginetta.html
13. Project CARS X McLaren, https://www.mclaren.com/formula1/2018/mclaren-shadow-project/
14. [14] Harris, K., Reid, D.. The influence of virtual reality play on children's motivation. Can J Occup Ther, 72(1), 21-29. (2005)
15. [15] Plante, T., Aldridge, A., Bogden, R., Hanelin, C. Might virtual reality promote the mood benefits of exercise? Computers in Human Behavior, 19, 495-509. (2003).
16. Wearable VR Gaming Devices To Increase Physical Activity. https://www.wearable-technologies.com/2017/09/wearable-vr-gaming-devices-to-increase-physical-activity/