

An Examination of Millennials Perceptions of Virtual Reality and Augmented Reality Effects in Marketing

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Abstract

The purpose of this paper is to understand the effects of augmented and virtual reality in a business to consumer context when it comes to targeting millennial consumers. As well to understand how AR and VR enhance the consumer experience for millennials when interacting with a business. The topic was chosen due to an interest in these new eye catching technologies that specifically engage younger consumers in a more effective way compared to traditional forms of engagement.

The methodology which was used was done by looking into secondary research within reliable literature and industry trends. Primary research was then conducted in the form of surveys and in-depth interviews in order to gain insight into augmented and virtual reality when it comes to millennial users. This involved sending surveys to the business marketing students within IT Carlow since they are millennial consumers that use AR and VR technologies. As well interviews conducted with 5 random students that completed the surveys at IT Carlow in order to get an in-depth understanding of those millennial consumers.

The key themes that emerged from conducting Primary research and collecting secondary research were millennial trends when it comes to using AR and VR as well benefits to businesses using AR and VR to target younger demographics.

A key finding which came from primary and secondary research was that millennials use AR and VR on a regular basis but there are not much businesses within Ireland incorporating AR and VR technologies. Making it a major loss for these businesses since they can engage and interact with younger demographics much more effectively if they had some sort of AR or VR in the organization.

Another key finding which was noticed fairly often was that businesses that used AR and VR technologies had a greater millennial engagement compared to businesses that did not. Out those businesses the consumers that interacted with them felt more engaged with the brand as well they understood the product or service much better when AR and VR was used. Showing that there is major benefits for implementing these technologies into an organization.

It is recommended that more research should be done on businesses specifically using AR and VR technologies when targeting millennial consumers. To further understand and support trends when it comes to businesses using implementing these technologies.

1 Introduction

The use of augmented and virtual reality has been transforming the way we engage and market ourselves in many different industries. The reasoning behind this research is to determine “In what ways do millennial consumers believe AR and VR technology will improve their customer experience in Ireland, in any business-to-consumer context, and what are the opportunities and benefits to implementing these technologies”. In-depth interviews and surveys will be carried out with millennials or generations Y consumers to get a full understating of the affects and benefits of these technologies. On completion of primary research, the trends and stats found will be highlighted and recommendations on the implantation will be given to businesses on AR and VR technologies.

1.1 The aim of the research question

The aim of this research is to determine if augmented and virtual reality can enhance consumer experiences for businesses when targeting millennial consumers across many different industries.

This is done using the following two research objectives:

1. To determine how AR and VR technology attracts millennial consumers in order to improves the costumer experience
2. To identify benefits business-to-consumer organizations gain that use AR and VR technology currently to better target younger consumers such as millennials or generation Y

1.2 Context and research rational

The rational for the research is to further understand AR and VR implantations into businesses and how it can be done within Ireland. There are industries in other countries and markets that are using this technology that you would not expect such as IKEA a furniture retailer. The research will break down how companies can use AR and VR to better engage millennial consumers across many different sectors and businesses. In order to achieve an enhanced user experience like IKEA has through early adaption of AR and VR into their company. IKEA is transforming the way they do business and is expanding on the development of their ecommerce plat form for sales. They in the process of developing and launching an app that allows consumers and business to design their properties using AR/VR and purchasing products directly through the app after (Alumni, 2019).

This is due to the fact Ikea is trying to make the user experience even more simple and convenient for millennials and young adults by implementing VR headsets that will allow consumers to walk around their potential new furnished rooms and properties picking out all their furniture and finishes in VR (The Financial Times 2018). This technology also allows people to design and test the furnishing through virtual reality for example if a company designed a kitchen for their business they can make a virtual meal such as eggs and toast to see if the layout of this new kitchen would work for them or needs to be improved (The Financial Times 2018). Like IKEA has done this research will expand on why the user experience will grow by implementing AR and VR technologies into businesses. As well engaging and making the consumer experience more convenient and memorable for younger demographic consumers.

2 Literature Review

2.1 Introduction

Augmented and Virtual reality are more recent forms of reality technology that have been implemented and used by consumers and businesses within the last few years. Throughout the literature review, many topics began to appear under the AR and VR technologies. The main topics that are discussed are the implementation of AR and VR technologies into new industries or sectors and the engagement with AR and VR technology when it comes to millennial consumers. The research mainly revolves around millennial's perceptions of these technologies since they are the number one users and early adopters to AR and VR.

Augmented reality is when "AR adds a digital element to a live view often by using the camera on a smartphone," whereas virtual reality "VR implies a complete immersion experience that shuts out the physical world (Gupton, 2020). Making it so consumers have an option depending on if they want a platform that can transform the surroundings around them, such as AR or consumers who want to go to a completely different environment all together can use VR. There is also a version of these technologies that combine the two aspects to make mixed reality technology that combines features of AR and VR all into one cohesive platform (Gupton, 2020). Even though there have been significant strides in the development and implementation of these technologies, many industries still have not looked into adequately integrating Augmented and Virtual Reality other than the leading IT and gaming industries.

Millennials are the early adopters of this technology and generally spend the most time on platforms such as social Media that incorporate AR and VR technologies (Harrison, 2020). The younger generations, such as millennials are the first generation that is more interested in the delivery and experience provide to them from the business other than just looking at the product or service they provide (Harrison, 2020)—making these new reality technology platforms the perfect tool for businesses to target and evolve the costumer experience with millennials properly.

2.2 AR and VR implementation in different industries

Overall there is a consensus that the integration of AR and VR technologies are optimal in several different markets found within the literature. The cause of this is due to the fact this technology engages and communicates with consumers in a more immersive way that appeals to younger tech-savvy consumers, especially in this technological day and age.

When it comes to businesses, especially within retail, AR and VR can be implemented into many different aspects of the business when it comes to observing or interacting with consumers. The module used in the literature by Grewal et al., (2019) demonstrated the perceived usefulness and ease of AR and VR technology when it portrays to influences and attitudes (Grewal et al., 2019). The social presence being talked about in the article states that the human connection supported by technology causes consumers to sense that they are in the presence of another (Grewal et al., 2019). This is significant due to the fact right now, consumers like mentioned before striving for that sense of engagements when it comes to interacting with a business they do not want just to purchase a product or service they almost want to be connected with the brand itself. Being able to simulate that feeling of having engagement using AR and VR technology will enhance businesses when it comes to consumer interactions.

Furthermore the literature goes into talking about how retail can implement these technologies in many different sectors of their business to improve performance. Grewal et al., states that AR and VR can help a business by providing consumers with a platform that can allow them to experience "involvement, imagery, and elaboration for retailer and service providers" (Grewal et al., 2019). This highlights the features AR and VR can provide retailers or service businesses if they decide to implement some sort of AR or VR technology into the business in order to maximize consumer experiences.

Another business sector that can gain from incorporating some sort of AR or VR technology in the educational sector. The literature written by Leanne et al., specific focusses on the implementation of VR in pharmacy education and how it can transform the way schools or individuals teach consumers of educational products. Currently, pharmaceutical education in the literature used VR technologies to teach individuals and showed improvement in learning by engaging the learning experiences through Virtual reality (Leanne Coyne, 2020). In the literature, it also talked about how technology has been developed so much over the past few years. It can be implemented in many different facets now when it comes to education. The primary new

forms were immersive education and active real-world demonstrations that break down teaching content and virtual simulations that would take place during the teaching processes, especially when it comes to demos on things like labs (Leanne Coyne, 2020). This would allow for educational online businesses and organizations to provide the same experience one could receive by coming to school at the comfort of the user's own home and making the user experience much more immersive and realistic compared to traditional online teaching formats already in use across the world.

The next piece of literature focuses on the tourism industry and how the industry players can implement gamification through the use of the mixed reality that incorporates AR and VR technologies cohesively in one platform. The paper discusses how the old way of engaging and doing tourism is changing and how individual organizations and the tourism industry has to change from the traditional to more new-age technology platforms (Skinner, 2020). It illustrates if they implement these AR and VR technologies into a business in this sector, it will allow the organization to reap the benefits associated with smart tourism when it comes to the new generation (Skinner, 2020). This is because younger users in the market are looking for more user-focused experiences that engage with them, making the experience more interactive than transactional. The way Skinner, the author of the paper, describes it is that consumers want a "richer digital and gamified tourism experience" that can only be provided through new forms of AR and VR implementation (Skinner, 2020).

When it comes to AR and VR technologies, they can be implemented into many different businesses across many fields. The implementation will help the growth of the businesses user communications when interacting with consumers. As well as help the business gain more profits as a whole due to the better sense of engagement created regardless of industry or form of business.

2.3 AR and VR technology engaging millennial consumers

Throughout the literature and the research that has been reviewed there is a major consensus that millennial consumers are the ones that use AR and VR technology the most out of the population. Millennial consumers are also the consumers that strive and long for user engagement when purchasing a product or service from a company. Millennials do not want a product or service. They want the experience that comes with purchasing those things in an immersive experience.

The first piece of literature that was looked at describes the post-digital age we are currently in and how technological advances will change over the next few years. The article goes into talking about how VR puts users in a virtual world that allows "artificial intelligence to respond, anticipate and react to each audience member's choices" in order to adequately meet consumer needs and perceptions (Accenture, 2020). The importance of this is that AR and VR technology will allow businesses to monitor and interact with consumers, unlike before giving them the ultimate consumer experience while collecting more data than ever. The collection of data will also allow businesses to learn more about millennial consumers so they can continuously use that information to tailor services to meet the consumer's wants or needs. Overall the article talked about how these developments with AR and VR will need to be implemented into businesses on top of their current digital tools to stay competitive when targeting millennial consumers (Accenture, 2020).

The next piece of literature that was looked at was a paper written by Raška and Richter that breaks down the influence of augmented reality on purchase intentions when it comes to millennials and generation Y. The paper discusses how millennials are targeted using these technologies by businesses using the enrichment of physical worlds by adding virtual computer-generated digital information (Raška and Richter, 2020). Then further went into depth about how AR and VR provide sectors with previously low amounts of engagement new opportunity to engage and interact with consumers. They do that by allowing businesses the power to put virtual products in the hands of the consumer in the comfort of their own home without having to go to a physical location (Raška and Richter, 2020). This is especially important when millennials and younger consumers in this digital age are glued to their phones and always on the go—giving businesses the technology to market to them virtually through their phones, making the full experience more immersive and convenient. The paper also goes into the growth of the technology and how there is significant expected growth for the following years when it comes to developing the technology to fit in many different industries (Raška and Richter, 2020). One of the leading industries talked about in the paper is IKEA and how they started investing in AR and VR technology reasonably early to help boost engagement and consumer interactions. The paper illustrates how Ikea implemented an app that allows consumers to virtual shop and design any space they desire while engaging with them and collecting data throughout the entire process (Raška and Richter, 2020). This, in return, transformed the consumer experience for IKEA and skyrocketed their millennial engagement in the past few years. The main points that improved in

the consumer's eyes are "product knowledge, positive attitudes, and higher purchase retention" overall (Raška and Richter, 2020). These advantages are key metrics that can be improved in the majority of businesses or sectors regardless of how different they may be to each other. Lastly, the main point the paper discussed is that the use of AR and VR makes the experience fun to consumers while also communicating information as precise and useful as possible (Raška and Richter, 2020). This will allow consumers to continuously return to a business due to the precise, concise info they give to the customer while keeping them engaged.

This next article will discuss how AR can be implemented and put into consumer's daily lives and how it can be seen or used every day. The author discusses how consumers perceive that AR makes the experience more "fun and interesting, especially with youth audiences" by adding a level of engagement and customization for costumers (Wallace, 2020). This will get millennials more involved with businesses and brands when it comes to loyalty due to the interactions between consumer and business. The second main point this literature covered is the amount of engagement a business can gain from implementing augmented reality technologies. The author stated how it "gives the ability to provide much more information that would normally be possible" in traditional forms of media (Wallace, 2020). This also leads further into discussing how they found that "interactive techniques allow for deeper conversation," which is what companies want from the consumer (Wallace, 2020). The reasoning behind that is that a business wants consumers to continuously be engaging with their brand and be a part of the community, not just one time purchases or interactions. So building some sort of interactive platform that monitors, communicates, and engages consumers through AR can potentially be revolutionary for specific industries. The importance of using AR when doing these things is that "for most people seeing something work is much better than reading [about] how something works" (Wallace, 2020).

The last piece of literature that was looked at broke down the millennial behaviour when it comes to virtual and augmented reality. The author Loureiro feels that millennials are currently the most connected to technology when it comes to a consumer base (Loureiro, 2018). She also discusses how "millennial consumers at the for front of virtual reality (VR) and augmented reality (AR), particularly in using virtual shopping experiences to fulfill their expectations" (Loureiro, 2018). This is significant in the fact that consumers are trying to meet their needs, so businesses need to tailor their product or service to meet those needs and provide it as effectively as possible. So if businesses do not start implementing more AR into the company, it can lead them to ineffectively

targeting and engaging consumers, especially when it comes to the younger millennial demographic. Another example the author wrote about is a tourism company that implemented AR and VR so consumers could experience a deep, immersive experience of travelling to their potential destination before even leaving their home or planning their vacation (Loureiro, 2018). The company did this by creating immersive environments that allow people to travel to destinations they prefer by using virtual reality to experience all possible sensations in hopes of consumers booking a trip from the VR experience. This shows that millennials prefer to interact with products or services that allow for discovery and experiential environments to be incorporated into the purchasing process (Loureiro, 2018). Illustrating that businesses need to implement AR and VR technologies to help appropriately target millennial consumers.

2.4 Conclusion

In conclusion, the points discussed above have joint issues that Augmented, and Virtual reality should be implemented into businesses across many sectors or industries. Especially when targeting younger individuals such as millennials and generation Y to better engage and communicate with that demographic of consumers for the future.

3 Key Issues

It was discovered by the industry and academic research that AR and VR technologies have not been completely incorporated into businesses yet. The technology has a lot of information when it comes to the breakdown of the software and the use of it in gaming or IT sectors. But does not have extensive information when it comes to the technology being used in different sectors that don't revolve around technologies. Such as fashion, retail, educational, tourism and many more sectors that can incorporate and utilize AR and VR to enhance their company.

Also when looking at businesses with AR and VR technologies already incorporated in their companies, are somewhat early adopters to the technology. A lot of these businesses are not looking into to millennial focused targeting when it comes to this technology. Which is a shame due to the fact these forms of technology specifically do a good job of engaging and targeting those younger demographics.

Lastly there is not much information when regarding to Irish businesses using AR and VR technologies. The market in Ireland is massively understating the usefulness of using and implanting this technology especial due to the fact it's not being used nearly as often as other industries like the US and Canada. Giving major gaps in industry info when it portrays to AR and VR uses within Ireland.

4 Research Methodology

4.1 Research Question

In what ways do millennial consumers believe AR and VR technology will improve their customer experience in Ireland, in any business-to-consumer context, and what are the opportunities and benefits to implementing these technologies?

4.2 Research Objectives

3. To determine how AR and VR technology attracts millennial consumers in order to improves the costumer experience
4. To identify benefits business-to-consumer organizations gain that use AR and VR technology currently to better target younger consumers such as millennials or generation Y

4.3 Secondary Research

Secondary research involves collecting, re-analysing, interpreting, and reviewing data that was collected by somebody else in the past for a different purpose (Oxbridge Essays, 2019).

4.4 Industry Reports and Statistics

Statistics and reports from credible Irish markets that are currently using AR and VR technologies within the industry. Information collected from the following reports Board Bia and Ulster Bank for information regarding trends and factors within the market. Identifying consumer habits and buying behavior from Cisco and Hubspot when it comes to AR and VR in business-to-consumer aspects.

4.5 Academic Journals and Cases

Searched for academic cases and journals on the It Carlow data bases and google scholar for examples of organizations currently using AR and VR technology. In order to identifying the opportunities and draw backs the companies faced by implementing this technology. Found articles from many different industries that are in the process of using AR and VR technologies in their businesses but many have not completely finished integrating them. Those industries reports are on the furniture, tourism and education industries. As well how AR and VR attracts millennial consumers by improving the costumer experience within those industries.

4.6 Articles and News reports

Gathered articles and news reports from reliable sources such as Forbes and local newspaper companies such as Irish times. These resources will break down how millennial consumers are attracted to AR and VR as well how business can incorporate this technologies affectively into their company.

4.7 Financial Statements and Reports

Looked at financial statements and reports of companies such as IKEA to see how the use of AR and VR in Ireland helped improve the organization profits and customer interactions.

4.8 Primary Research

Primary data is original data generated and collected for the specific purpose of a research project (Gorman and Macintosh, 2015). There are many different options when conducting primary research such as questionnaires, surveys, interview, focus groups, and observations. For this specific research project triangulation of evidence will be used, which research is being done that uses a minimum of two evidences to collect data (Gorman and Macintosh, 2015). The evidences that will be used are surveys and interviews. The survey will be used in order to determine how AR and VR technology attracts millennials whereas the interview will focus on recommendations on the use of AR and VR. Lastly the survey will be created online via survey monkey whereas the interview will be created on Survey monkey.

4.9 Definition of population of interest

For the purpose of this research the survey and interview being conducted will target IT Carlow students living in Ireland. The reasoning for this is due to the fact that the research being conducted is to determine how Irish millennials feel AR and VR tech will improve their consumer experience. So using IT Carlow students would be a perfect opportunity since the students fall into the main demographic of millennials that the research is targeting.

4.10 Sampling method

The sampling method that will be used falls under non-probability sampling which is a technique that is more reliant on the researcher's ability to select elements for the sample (Singh, 2018). Furthermore purposive sampling will be used since it only uses elements from the population which suits the purpose of the study (Singh, 2018). This would be ideal in this research project

since the data being collected is focused on a specific age group and would be counterproductive to use probability sampling.

4.11 Sample size

The sample size will be based on IT Carlow students living within Ireland currently. Out of the IT Carlow student population it will be further broken down into the 270 Bachelor of Business Honours Marketing students in the program for the survey and interview (Itcarlow.ie, 2019). After entering the 270 population size through survey monkey sample calculator with an 80 percent confidence level and a 5 percent margin of error the sample size generated is 103 (Survey Monkey, 2019). Refer to Appendix 1 figure 1.4 for survey monkey sample size generator. The in-depth interview will also be done using the business marketing students within IT Carlow with an approximate sample size of 5-8 interviews.

4.12 Contact method

The database that will be used is the IT Carlow email data base when it comes to delivering the survey and getting interviews. It will be done through email with the permission of the business marketing professors and faculty to send these emails out to the marketing students. The same will be done for the interview, emails will be sent out to business marketing students to take part in the interview first 5-8 to respond to accept will take part in the interview.

4.13 Ethical Considerations

When it comes to ethical considerations within primary research being conducted it will be predominately done using survey monkey that provides all survey users with a consent form that can be seen in appendix 2 figure 2.1. This consent form and research being done will be gender neutral, confidential, anonymous, have consent, stored correctly and explain the reasoning behind the research. The interview being done will be similar in the sense the consent form will be provided before the interview and that it is in accordance to the It Carlow Ethics guide. The ethics form can be found in appendix 2 figure 2.2. When it comes to the observations being done in the Dublin IKEA retail location the manger will be approached for permission to observe the interactions with their AR and VR technology within the store and millennial consumers.

5 Research Limitation

5.1 Respondent size

Even though the researcher sent out emails to schedule and collect in-depth interviews from completed surveyed respondents, there was much reluctance from respondents to meet in order to take part in the interviews. After three weeks of the researcher sending out several emails a day and setting up scheduled times in order to meet in person to conduct interviews, seven were scheduled. However, only five respondents ended up making out to the scheduled times setup due to unforeseen events. This also led the interview respondents to be all-male since the two respondents for the interview that could not make it were the only two female interviews scheduled. This may lead to bias since the millennial population is not being adequately represented with just male respondents versus a mixture of male and female respondents.

5.2 Access to Data

There is plenty of resources and academic information on Augmented and Virtual Reality when it comes to the breakdown of technology and software. Despite all the resources available, a significant amount of this information is generalized and does not focus on any industries other than gaming and high IT technology incorporated sectors when it comes to published articles. This, in return, makes it difficult to understand the effects of this technology in several different industries due to limited amount of info in other fields. Most of the research is talking about how industries are incorporating AR and VR but does not talk about companies that have already implemented it when it comes to targeting millennials. Also, when the researcher was looked into AR and VR technologies and the interactions millennials had with the technology, there were a limited number of resources that had millennial perceptions when it came to the interactions with businesses. Therefore, the majority of the resources used by the researcher were based on organizations that used AR and VR technology with a high millennial engagement. As well as trends of millennials using AR and VR technologies in general versus companies that specifically use these technologies to target younger consumers.

6 Findings

6.1 Introduction

The insights and data were collected using a non-probability sampling approach for both mixed-method approaches used that are online surveys and interviews with IT Carlow BBA Marketing students. Charts and statistics were created based on information collected by the researcher to meet each specific objective. Findings were organized to reflect each objective directly correlating with objective one with survey findings and objective two with interview findings.

Survey questions were provided to respondents on how AR and VR technology attracts millennial consumers in order to improve customer experiences in Ireland—providing qualitative and quantitative data and statistics on millennial attitudes and perceptions on these technologies. Interview questions were structured so respondents could identify the benefits business-to-consumer organizations gain from targeting AR and VR technology on millennials.

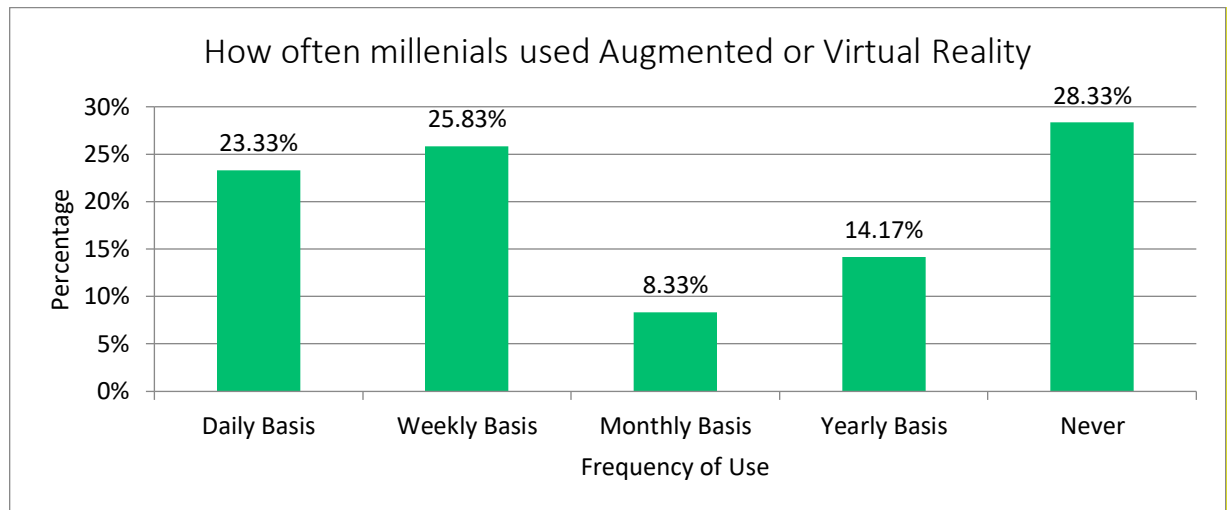
Research instruments used can be found in the appendix listed under figure 1 for interview and figure 1.6 for the survey as well as all responses following accordingly.

6.2 Respondent Profile & Sample

The group of respondents that this research focused on are millennial business marketing students that attend IT Carlow. The purpose behind choosing that specific group is due to the fact the research is trying to determine how the millennial demographic uses and interacts with businesses using AR and VR technologies. Out of the 270 surveys sent out through survey monkey to IT Carlow Business students, 120 respondents completed the survey successfully over three weeks. The survey was sent out by the researcher once and followed by two reminders, one for each following week. The researcher reached the ideal 103 respondent sample size that can be seen in the appendix as a sample size calculator under figure (1.7). Out of the respondents that completed the survey, emails were sent out at random till a minimum of five interviews agreed to meet up in order to take part in an in-depth interview. Five students agreed to take part in the interviews which took part in the IT Carlow library or residence. The minimum sample size and requirements were met for both surveys and in-depth interviews.

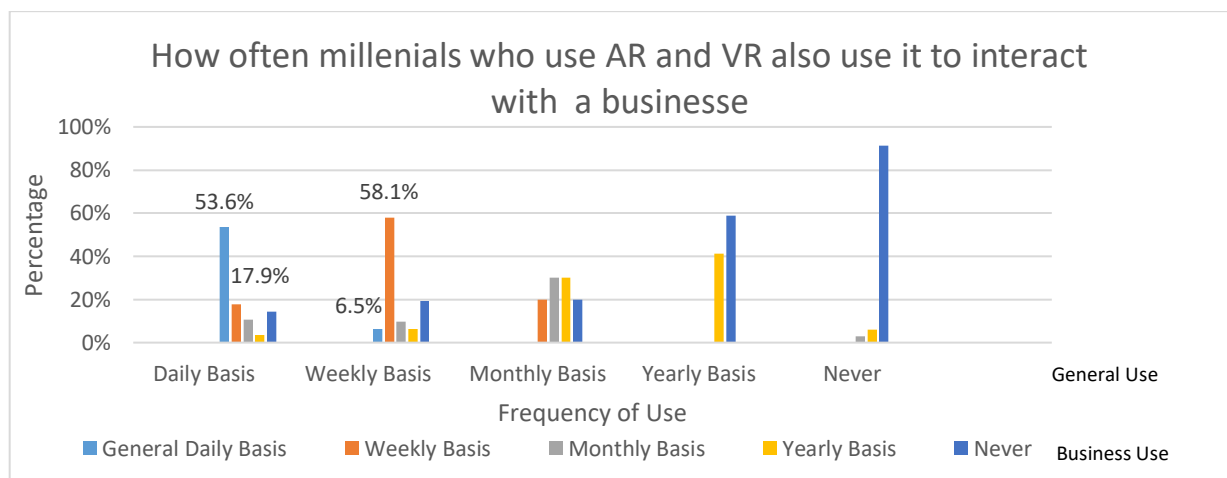
6.3 Survey Results Research Objective 1: To determine how AR and VR technology attracts millennial consumers in order to improve the customer experience

Figure 2- Use of AR and VR



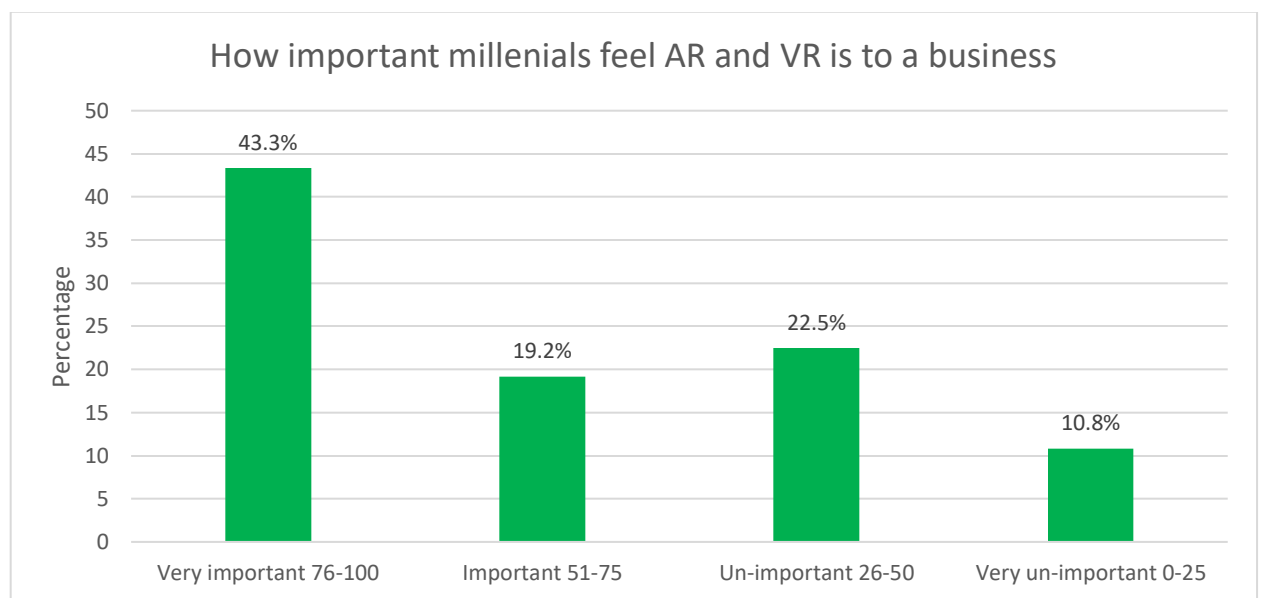
To address research objective, one survey respondents were first asked how often they use AR and VR technology. This will allow the researcher to break down how often millennials use the technology overall and see if it correlates with how often they do when interacting with a business in the following question. Out of the surveyed IT Carlow business students, 49% of them use AR and VR on a daily to weekly basis. Interestingly only 28% have never used AR or VR technologies before. Illustrating that the majority of the respondents almost half know how to use the technology on a fairly regular basis.

Figure 2.1- AR and VR general use in comparison to a businesses



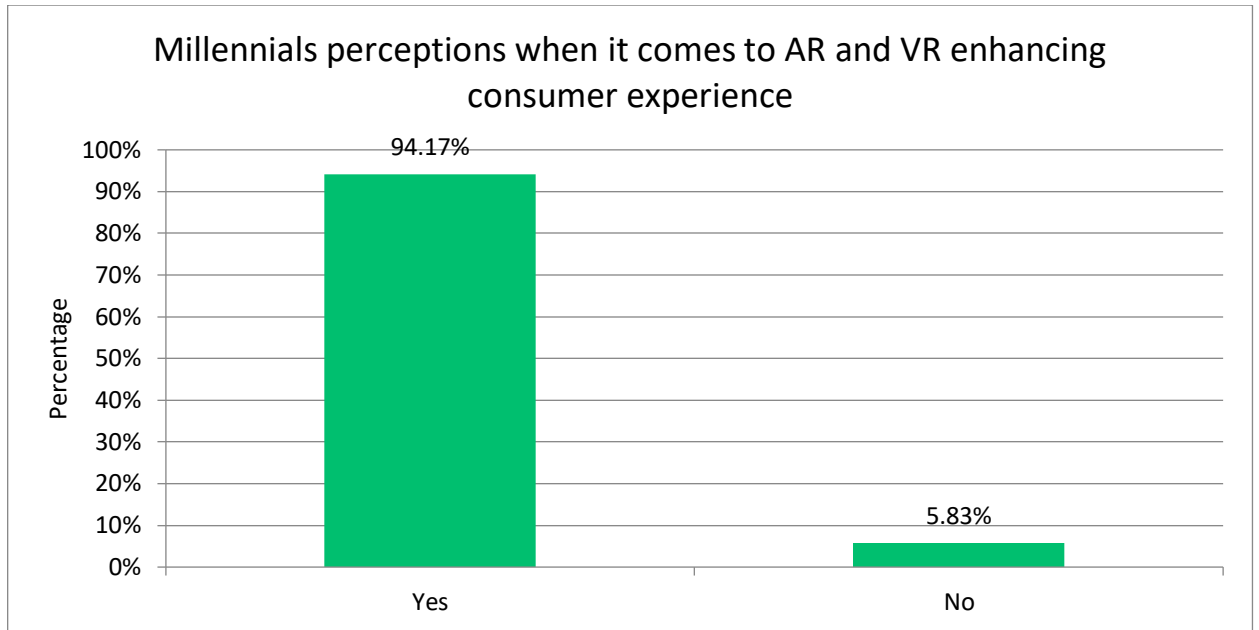
It was discovered that when respondents that generally use AR and VR technologies are compared with respondents that use it when interacting with a business, there are some definite similarities. Out of the IT Carlow respondents that completed the survey saying they use AR and VR technology on a daily basis also use it on a daily basis, 54% of the time when interacting with a business. Interestingly enough, those who use this technology on a weekly basis would also do so 58% of the time when interacting with a business on the same basis. The significance of this is that at least half the time, regular users of Augmented and virtual reality would also use it when interacting with a business. Showing that there is a significant amount of influence on millennials if businesses use AR or VR when it comes to consumer interactions.

Figure 2.2- Importance of AR and VR technologies



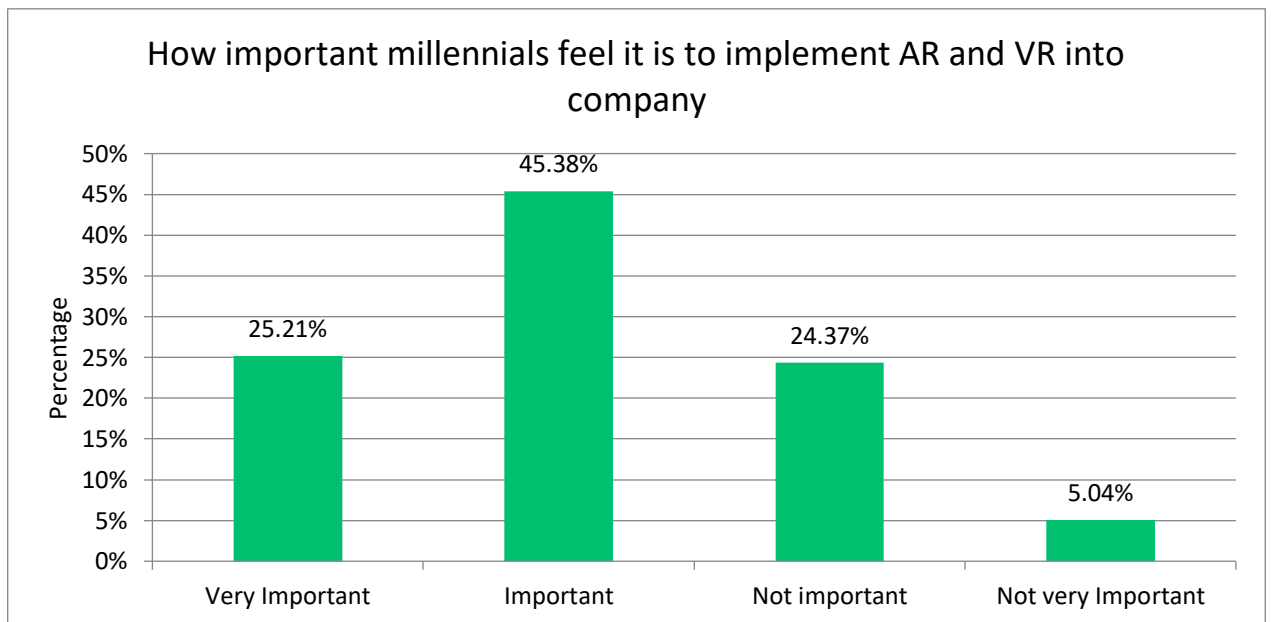
To see if millennial consumers are attracted by AR and VR technologies, the survey asked how important it is a businesses use these two tech platforms using a rating scale from zero to one hundred. To further break down the information, the rating scale was broken up into four sections very important, important, unimportant and very un-important that are defined by numeric variables on the scale. Interestingly out of the IT Carlow surveyed respondents, 63% feel that it is very important or essential businesses use this technology versus only 37% feel it is not essential or very unimportant. Therefore, millennial consumers feel that the use of AR and VR is vital to a business that is trying to attract younger consumers and that it can be a crucial factor to attract more of that demographic.

Figure 2.3- AR and VR enhance consumer experience



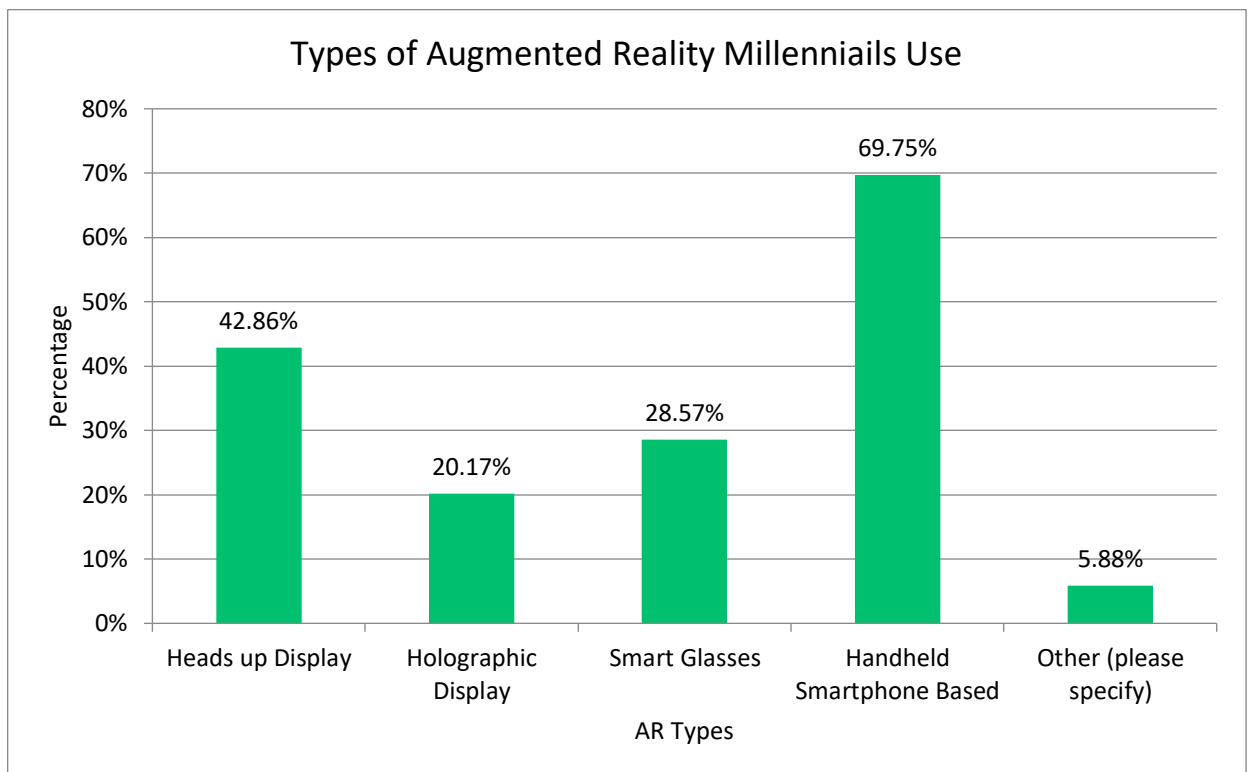
A 94% significant majority of Surveyed IT Carlow business students felt that AR and VR would enhance their consumer experiences. This demonstrates that AR and VR technology would enhance the consumer experience when interacting with millennial consumers in Ireland.

Figure 2.4- Importance of implementing AR and VR into a company



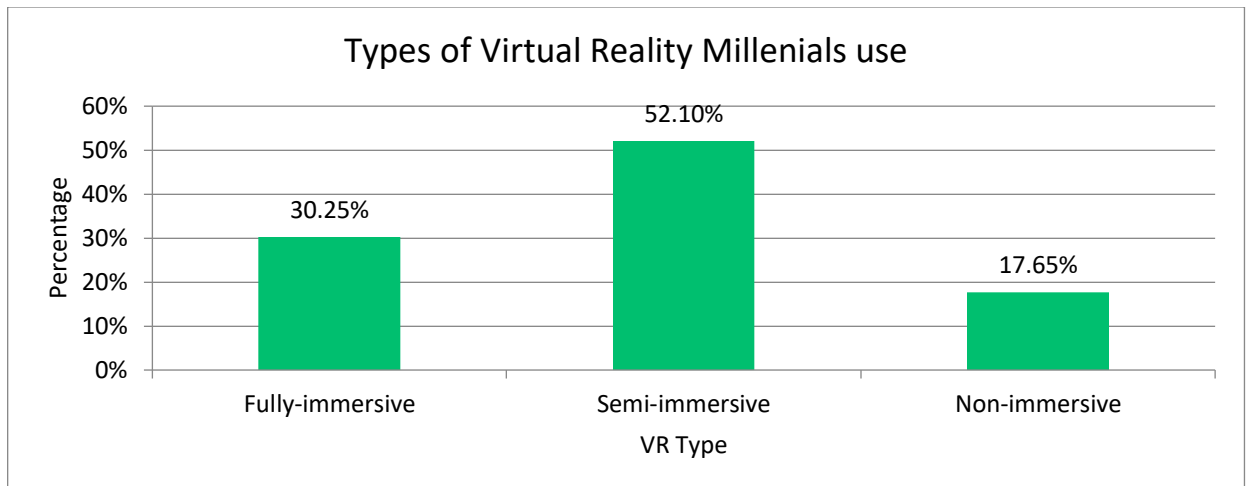
It Carlow respondents were asked how important it is that AR and VR tech is implemented into a business to see how important the implementation of this tech platforms are to millennial consumers. Interestingly approximately 71% of IT Carlow business students feel that it is essential or imperative to implement AR and VR technology into a business. Demonstrating that the incorporation of these technologies is vital to millennial consumers and it lets businesses more effectively target that age group.

Figure 2.5- Types of Augmented reality used



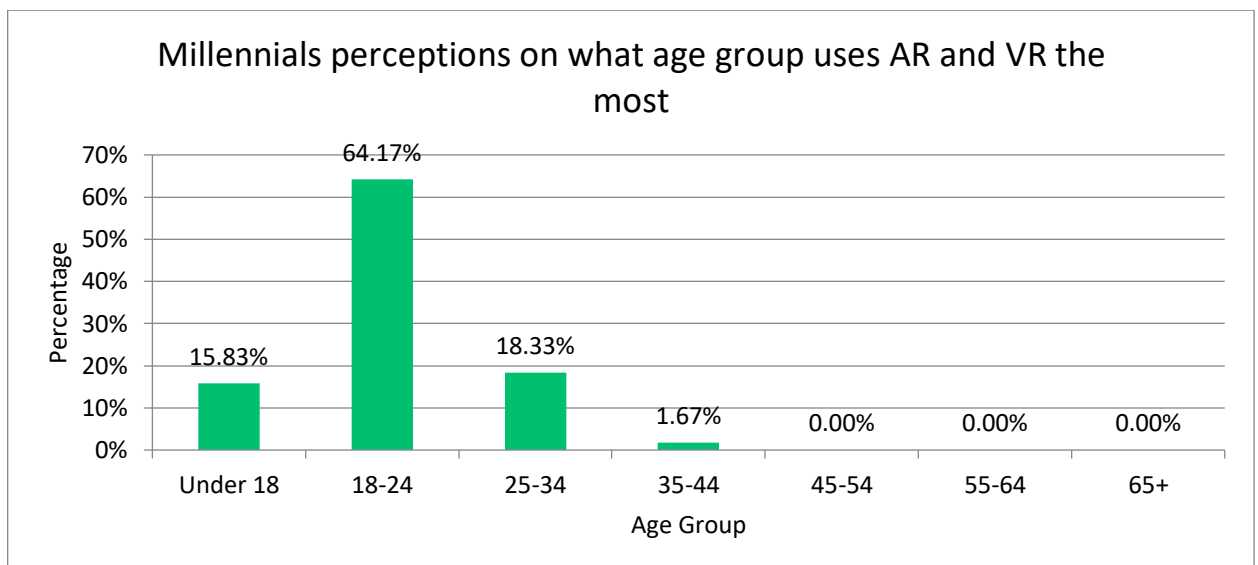
In order to better understand the millennial users, the survey asked respondents what platforms they used most when it comes to Augmented Reality. The respondents used Handheld Smartphone Display (67%), Heads up Display (43%), Smart Glasses (29%), Holographic Display (20%), and other (6%) all respondents listed a form of gaming system which were Xbox, PS4, and Oculus Rift. Demonstrating that smartphone displays and heads up displays are by far the most effective way to interact with millennial consumers when using Augmented Reality.

Figure 2.6- Types of Virtual Reality used



In order to better understand the millennial users, the survey asked respondents what platforms they used most when it comes to Virtual Reality. Out of the IT Carlow business students, the majority would use Semi-immersive at 52%, followed by fully-immersive at 30%, and lastly Non-immersive 18% when using Virtual Reality. Illustrating that semi-immersive virtual technology would be the most preferred mode to interact with consumers as a business.

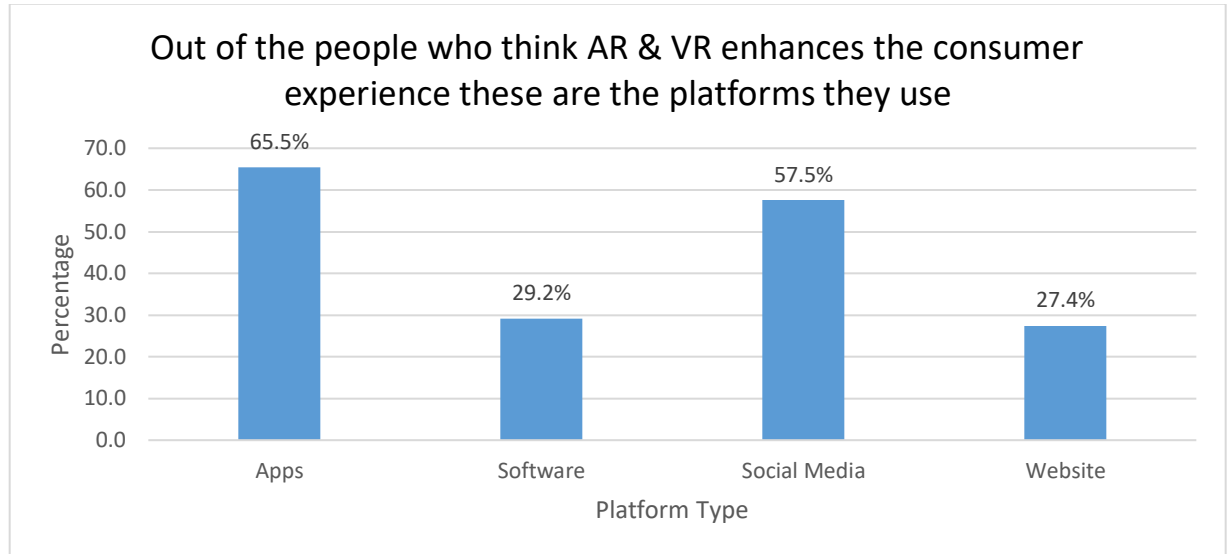
Figure 2.7- Perceived age group that uses the technology the most



Surveyed respondents were asked what age group they perceived to be the number one users of this technology to see if millennials think they are the number one users of AR and VR technology in the industry. The results indicated that 18-24 years were number one users at 64%, followed by

25-34 at 18%, and lastly, under 18 sitting at 16%. Demonstrating that 18-24-year-olds are by far the most significant users of these technologies in the eyes of millennial respondents.

Figure 2.8- Platforms used by respondents that think AR and VR enhance the consumer experience



Out of the surveyed respondents who think AR and VR enhances the consumer experiences the top platforms they use are Apps at 66%, social media at 58%, software at 29%, and lastly websites at 27%. Indicating that businesses should target consumers using Social media and apps since AR and VR are used most by those platforms.

6.4 Interview Results Research Objective 2: To identify benefits, business-to-consumer organizations gain that use AR and VR technology currently better to target younger consumers such as millennials or generation Y

Interviewees: The millennials that took part in the interviews are IT Carlow business students that also took part in the survey previously sent out on AR and VR technology. The respondents are five male students from the business Marketing Bachelors of Honors program.

Section 1: Use of AR technology

When the interviews were conducted, it was noticed that the majority of the respondents had similar experiences when talking about their interactions with AR in the past. The majority of the five respondents had the most interactions with these technologies on mobile gaming platforms such as angry birds AR and Pokémon Go. Followed by social media platforms that incorporate AR such as Snapchat and Instagram filters or lenses. Respondent 3 that can be seen in figure 1.3 in the appendix mentioned how he had used augmented reality when interacting with a business promotion by Chevy. The company used an interactive advertisement that incorporates a semi-immersive holographic card to display their new line of vehicles. This really stuck out when the respondent first saw the campaign and drew his attention to the business. The campaign gave the individual an experience he has never had before making him curious to find out more about the business and promotion. Increasing retention and interactions with consumers for the company Chevy.

Section 2: Use of VR technology

When it comes to Virtual reality interaction, the interview respondents all have had some sort of interaction with a virtual gaming system or company in the past. Most of the respondents either have a system themselves that allows them to use VR capabilities, or they went to a VR arcade where the experience was already set up for them. The main at-home VR gaming platforms are Oculus Rift, Google VR and PS4 VR. One of the respondents during interview five mentioned how he had seen organizations in the past use VR games to get consumers involved with the brand. They increased their engagement by promoting the local brewery using a VR game that visualized the organization's mission and brand. Demonstrating that businesses can use VR games and platforms to promote their company and increase engagement even if the industry has nothing to do with gaming. It is another way for businesses to get involved and engaged with the consumer, especially millennials that use these platforms the most.

Section 3: Pros of AR and VR technology

Interviews felt that the VR/AR technology had many different benefits, and each one varied dependent on the interview. Respondent one, four, and five felt that VR especially made him feel immersed with the brand since companies that usefully used immersive technologies can take someone sitting at home and take them to a completely different world by the use of a VR headset. He specifically mentioned how it makes him feel as if he has left reality and entered

another, allowing businesses to engage with consumers unlike any other way before. The second respondent felt that these technologies make his interactions with companies more entertaining compared to traditional forms of engagement. The new concepts that can be created using AR and VR are uncommon and really grab the eye of consumers giving businesses new opportunities to stand out in the market and engage with consumers more effectively. The third respondent felt that the technologies promoted innovations among businesses, which is what he wanted to see since he is so used to seeing generic forms of engagement businesses use to interact with millennials.

Section 4: Use of AR and VR when interacting with a B2C business

Respondent two and four used AR and VR app designed by IKEA to create a virtually simulated room that they got to design themselves using IKEA furnishings and products. The one respondent used it to design a bedroom and garage while the other used it to design a game room. Both respondents were amazed with the ability the technology gave them to interact with a products and how much more immersed they were versus looking at it online or visualizing the products in their homes. Respondent two also used a VR technology when getting his tires changed by the Tire rack company. The company uses VR to allow the consumer to pick whatever style or tire they want on their vehicle, then also allows them to virtually test the tires on the car and see if it visual appeals to them. This demonstrates that AR and VR can be used by many companies to better engage and target millennial consumers other than using traditional forms of engagement when targeting millennials.

Section 5: Benefits of businesses that use AR and VR

The respondents felt that businesses that used AR and VR gave consumers a more interactive in-depth approach to the product or service. It also said that it allows consumers to engage with products in ways they have not been able to in the past, making it a new experience for costumers. Allowing companies to engage with people in a new immersive way.

Section 6: Ways business attract millennials using AR and VR

Respondent one feels that the AR and VR technologies are still evolving and that eventually, it will be at a level where every business can incorporate some sort of reality technology so they can better serve or engage millennial consumers. Respondent two feels the technology already makes it so that his experience is more convenient and quick. In return, saving his time and money

compared to a company that does not use these technologies. The third respondent felt that the campaigns created using these technologies for marketing were the best way to attract more consumers to a business. The campaigns attract millennials, unlike the traditional form of marketing and give consumers better retention rates. The fourth respondent felt the development of apps that have AR and VR is an excellent way to give consumers a better in-depth look at a product and service.

Section 7: Business Using AR and VR within Ireland

The majority of respondents feel that businesses within Ireland are not utilizing AR and VR technology to the best of their ability, like other foreign markets such as Canada. Companies are not creating marketing campaigns that catch the consumer's eyes using this technology or even incorporating it into their business when they can. One of the respondents suggested that the Irish tourism industry should incorporate AR and VR into their marketing or even tours to communicate and engage with millennials more effectively. Also, two other respondents suggested that regular retail businesses in Ireland can use AR and VR to better showcase their products, especially in the clothing industry. Illustrating that Ireland has the potential for significant AR and VR implementation across many sectors or industries.

Section 8: Problems when it comes to AR and VR technologies

The majority of respondents have not faced any major problems when using AR and VR technologies in the past. Some of the minor problems they found were depending on the platform the AR or VR is being used on there can be lag times when using the technology. Lastly, when using this form, a technology for long periods can give consumers headaches or eye irritation depending on the amount of screen time.

6.5 Conclusion

This section looks at the critical metrics derived from the primary research conducted in order to investigate the benefits of Augment and Virtual reality when it comes to millennials consumers when used by businesses in order to improve the consumer experiences. The findings will be broken down further in the discussion section when concluding research.

7 Discussion

7.1 Introduction

The purpose of this research paper is to “discover in what ways millennial consumers believe AR and VR technology will improve their customer experience in Ireland, in any business-to-consumer context, and what are the opportunities and benefits to implementing these technologies”. The objectives of the research was to discover how AR and VR technology benefits consumers when engaging with businesses as well as how businesses currently using the technology attract millennial consumers. The first step in the research process was discovering current literature surrounding AR and VR technology when interacting with millennials followed by literature on different industries that are currently using the technology to attract millennials. It was found early in the research process that there is not much academic research on businesses that currently use the technology within their organization to specifically attract millennials. So the majority of research found when it came to organizations that use these technologies don’t specifically look at metrics when it comes to interacting with millennial consumers. So the literature found looks at businesses that use AR and VR technology that may have a high millennial engagement. Also since there was not much research pertaining to millennial interactions that was specific to industries or businesses the research looked at millennial trends when it comes to AR and VR in general. As well how certain companies have used it in the past and gained millennial consumer interactions even though they may not have specifically targeted or implemented it for that reason. When it came to primary research conducted by the researcher the first objective was researched by conducting a survey that revolved around how AR and VR technology attracts millennial consumers. Whereas the second objective revolved around businesses currently using AR and VR technologies to target younger consumers like generation Y. This chapter will discuss and compare the primary and secondary research collected on AR and VR technologies when it comes to businesses and millennial consumers.

7.2 Objective 1: To determine how AR and VR technology attracts millennial consumers in order to improve the customer experience

The key points of research that were found when looking at AR and VR technologies revolved around key trends that shows how millennials are attracted to these technologies. The primary research was done through a survey that used questions to discover key trends when it comes to millennial interactions. The first question that was asked is How often people use AR and VR

technology and the Responses were significant in the sense that almost half of the surveyed sample was consistently using it on a daily to weekly basis. This can be due to many different benefits these technological platforms provides to consumers with such as allowing them to experience a virtual experience at the convenience of their own home or any location that they can access their phone in (Raška and Richter, 2020). These technologies also have a way to go in the senses that the majority of applications are in high technology incorporated fields right now such as IT and gaming (Raška and Richter, 2020). This technology can be implemented into many businesses by adapting the platforms to fit any business that does not specifically have to do with technology (Raška and Richter, 2020). This can be proven when IT Carlow respondents that took part in the survey showed that out of the respondents that use AR and VR technology on a regular basis also use it on a regular basis when interacting with a business 54 percent of the time. Showing that consumers are enjoying the experience AR and VR gives them and are using it when it comes to interacting with businesses on a regular basis. Also throughout the literature one of the articles discussed how a non-technological company IKEA used AR and VR to boost customer engagement and transform their business using these technology platforms. This in return gave consumer more “product knowledge, positive attitudes, and higher purchase retention” overall (Raška and Richter, 2020). I found this piece of literature directly correlated with one of the questions discussed in my survey that asked millennial respondents how important they feel AR and VR is to a business. The majority of respondents felt that it was very important at 63 percent or essential to a business where as only 37 percent felt that it was not essential or important. This, showing that consumers feel businesses should implement this technology and it will help consumers experience and engagement process for a number of listed reasons as stated above.

The next piece of key literature talked about how consumers perceived AR and VR technologies especial younger demographics such as millennials and younger. The article started with the author talking about the actually experience consumer would have if businesses implement AR or VR technologies. The author illustrated how it makes the interactions with consumers “fun and interesting especially with youth audiences” such as millennials and generation Y (Wallace, 2020). Making the user experience better for consumers lead me to ask respondents within my survey if they felt AR and VR technology enhanced the consumer experience for them. The responses were almost anonymous in the fact that a vast majority 94 percent of respondents felt that AR and VR enhances the consumer experience and only 6 percent felt it did not. Showing that the use of these technologies definitely do attract millennial consumers to businesses by improving

consumer interactions and engagement. The author in the literature also mentioned how AR and VR “interactive techniques allow for deeper conversation” with consumers when interacting with a business. As well how consumers prefer “seeing something work is much better than reading [about] how something works” which is the main fundamental benefit of using AR or VR technology (Wallace, 2020). That in return lead the researcher to ask surveyed respondents if implementing AR and VR into a company important or not. The respondents felt by approximately 71 percent that it is imperative to implement AR and VR into companies or business. Supporting the fact that consumers want AR and VR in companies due to the fact it enhances their experience through the use of interactive techniques and demonstration capabilities.

7.3 Research Objective 2: To identify benefits, business-to-consumer organizations gain that use AR and VR technology currently better to target younger consumers such as millennials or generation Y

The key literature looked at when portraying business to consumer companies currently using AR and VR technologies are companies that use the technology but not ones that use it to attract millennial or younger consumers specifically. This was due to the fact there was a lack of information on organization that use these technologies that specifically target millennials leaving no real metrics and stats on millennial when it comes to these business to consumer interactions. That is why the primary research conducted revolved around millennial interactions with businesses specifically and how businesses gain from targeting and interacting with that demographic of consumer. In the hopes of bridging the gaps in literature when it comes to businesses using AR and VR technology interacting with millennial consumers.

The first piece of literature when I comes to secondary research talked about AR and VR being implemented into businesses in order observe and interact with consumers. The article went on to talk about how AR and VR gives consumers the feeling that they are in the presence of another when using the technology to interact with a business (Grewal et al., 2019). Making the engagement between consumer and business more meaning full and significant. Similar findings were seen when the researcher asked Interview respondents what they perceived befits of AR and VR technologies to be. The respondents had similar responses between the 5 interviews stating that they enjoyed how it gave them a fully immersive experience while being at home and not having to leave home to experience it. One respondent in specific felt that the technology really helped him feel engaged by using eye catching feature and innovations. Showing that there is a

similarity between literature and primary research when it portrays to consumers feeling more engaged when using AR and VR technologies. The same piece of literature goes on to talk about how AR and VR gives consumers the ability to feel more “involvement, imagery, and elaboration for retailer and service providers” (Grewal et al., 2019). This was also seen in interview findings when the researcher asked millennial students about their perceptions on business to consumer organizations using AR and VR to interact with millennials. Two respondents felt amazed by AR and VR technology especially when the respondents first used the virtual IKEA app when it released to design rooms within their homes. They felt like mentioned in literature it got them feeling more involved with the product and gave them very high levels of imagery when being able to design the rooms. Just like mentioned in the literature these technologies can transform the way organizations can showcase products and engage consumers to benefit their individual businesses. Another question asked by the researcher broke down what the interviews felt the benefits are to AR and VR were when individual businesses used them. Like mentioned in the literature above the respondents also felt that the technology allowed them to feel engaged with products or services as well as giving them a new experience like none other. This is significant due to the fact imagery that AR and VR is able to provide consumers with is what really sets those businesses apart in the servicing and engagement of millennials.

The last piece of literature that was looked at when it came to businesses using AR and VR technologies was a tourism industry that uses AR and VR gamification to better engage and interact with consumers. The literature stated how the old ways of traditionally engaging consumers is not enough anymore in this day and age and how organizations need to implement technologies to stay relevant within the industry (Skinner, 2020). The author even went far enough to say consumers want “richer digital and gamified tourism experience” versus a traditional one when in tourism (Skinner, 2020). Similarly in the interview respondents also felt that unlike traditional marketing AR and VR attracts millennials better due to the higher retention rates you can get from seeing a new type of campaign or new form technology versus traditional counterparts. The next question focused on interviews perception of AR and VR technologies within Ireland and what they feel should be done about it. The majority of the respondents felt that Ireland was not really utilizing the technology at all especially not in sectors across different industries and how it definitely should be implemented into more Irish businesses. They went on to say how Irish companies are not really making eye catching ways of engaging consumers especially millennial demographic. Interestingly enough one of the respondents even suggested to

implement some sort of AR or VR into the Irish tourism industry that was discussed in the above literature as being an optimal industry to implement AR and VR into. The respondent suggested that they could incorporate AR and VR in virtual tours so they are able to engage consumers better and cut down on costs. This would be optimal for a tourism business in Ireland because it will allow them to differentiate themselves from competition while also engaging the consumer more effectively in an eye catching way that will attract millennial consumers.

7.4 Conclusion

In conclusion the research found during the process of completing this dissertation uncovered gaps that were seen in industry literature and similarities with content found through literature. This chapter discussed the main finding between the primary research conducted and secondary research found.

8 Conclusion

8.1 Introductions

The title of this project was “An Examination of Millennials Perceptions of Virtual Reality and Augmented Reality Effects in Marketing”. This was accomplished by breaking down relevant literature and trends before conducting primary research in the form of a survey and in-depth interviews. Through the research processes two main factors were apparent within the industry one was to determine how AR and VR attracts millennial consumers and two was how businesses used AR and VR currently to better attract millennial consumers. These two factors will be concluded below as objective one and two for this research project.

8.2 Objective 1: To determine how AR and VR technology attracts millennial consumers in order to improve the customer experience

From both secondary and primary research conducted it was discovered that AR and VR technologies attract millennial consumers through new innovations and eye catching campaigns. AR and VR also is widely used by these younger demographics giving them the ability to easily use the technology when seeing it incorporated into a business or organization. Showing that companies should implement these technologies if they are trying to attract younger consumers more effectively than they did in the past with traditional forms of engagement.

8.3 Research Objective 2: To identify benefits, business-to-consumer organizations gain that use AR and VR technology currently better to target younger consumers such as millennials or generation Y

It can be determined through primary and secondary research that businesses using AR and VR technologies currently are benefiting from higher rates of millennial engagement. Even if these organizations may not have implemented the technology to specifically target younger consumers such as millennials or generation Y. This is due to the fact the technology is already widely used by that demographic and they are the consumers that are generally going to be attracted by features and campaigns that incorporate AR and VR technology the most. Moreover the level of engagement and sense of communication AR and VR technologies provide consumers can

definitely be applied to many different industries in order to improve their millennial experience overall.

8.4 Conclusions

To conclude, the primary and secondary research has answered the research question of “Examining the Millennials Perceptions of Virtual Reality and Augmented Reality Effects in Marketing”. By using relevant literature and trends found currently as well by conducting a survey and in depth interviews in order to fill gaps found within literature. It can be concluded that AR and VR technologies do attract younger millennial consumers by interacting with them in new innovative ways as well giving businesses the opportunity to use the technologies to engage and communicate with younger demographics more effectively than traditional forms used currently within many industries.

9 Recommendations

The findings from the research recommend the following:

1. Although there is not a heavy use of AR and VR within Ireland when it comes to businesses and companies using these technologies. Consumers and millennials in general are using the technology on a fairly regular basis illustrating the use of the technology is their just not the availability. Their needs to be more implantation of it since it has been seen to engage and transform the user experience for consumers. Especially when organizations are trying to keep up with this high technologically influenced society that is always evolving with time.
2. Organizations that are trying to target younger consumer such as millennials and generation Y need to start implementing Augmented and Virtual reality. This is due to the fact AR and VR has been seen and proven to engages consumers in these demographics better. By providing people in this demographic better retention and understanding of product and services.
3. Lastly recommend that companies should invest in targeting millennials and younger consumers specifically when using these technologies and researching stats and trends on these consumers. Since there is gaps in research when it comes to companies implementing these technologies specifically when targeting younger consumers that better engage with augmented and virtual reality in general.

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11 Appendices

11.1 Figure 1-Interview Questions

Have you ever used any AR so Augmented Reality? State Example such as Snapchat lances, company apps, game apps Pokémon GO etc.

1. Have you ever used any VR so Virtual Reality? State Examples such as gaming headsets, Oculus Rift, Google Cardboard etc.
2. What do you like about AR and VR technologies?
3. Have you used any of these technologies when it comes to a B2C business to interact with a product or brand?
4. Have you ever used any of Ikeas AR or VR options when interacting with their brand or products?
5. Do you feel AR or VR helps businesses better interact with their consumers?
6. If so how do you feel they do, and if not, what do you think business can do to better attract consumers using AR and VR tech?
7. What would you like to see when it comes to businesses using AR and VR technologies in Ireland?
8. Have you had any problems with AR and VR technology in the past when using it in general or with a business?

11.2 Figure 1.1- Interview 1

Date & Time: February 2nd, 2020 Started at 5:45 pm

Venue: IT Carlow Library

Duration: 28 min

Respondent: Male 23 year old

Interviewer: Sriramanan

Method: In-person interview

1. Most interaction with AR technology was made when gaming through phone app platforms or when using filters on social media. Gaming apps on the phone like angry birds 3D and Pokémon go are the most used gaming apps by the respondent. When it comes to social media, Instagram and Snapchat filters are the most used AR.
2. He has not used too much VR, but he had visited a virtual reality game room in Canada ON waterloo before he came to study in Ireland that allows customers to come in and play virtually simulated games like an arcade. He found it really fascinating, and thought it would be an excellent new concept when going out with his friends and that he would try it if there were one in Carlow Ireland.
3. Respondent found that he liked the fact when you are using these technologies, it made him feel more connected with the companies or brands since it almost takes him to a different world or atmosphere that he can fully immersive himself in. The exact words he used were it like "Escaping Reality."
4. Respondent has used Pokémon GO that is designed by a gaming company. Also, the Game room Company from waterloo and filters on social media.
5. No has not had the chance to use the IKEA App
6. Yeah, he feels it allows to the consumer to get involved with a brand or business in a more immersive and creative way that catches consumer's eye compared to the traditional forms he is used too.
7. Yes, he feels the technology is not entirely there yet but will be soon, so every business, regardless of the sector, can implement AR or VR to better interact with shoppers.
8. Wants to see more AR and VR in the tourism and travel industry. Specially, when looking at travel companies that plan exertions and trips. Also, in tourism spots in Ireland like museums, Irish heritage and cultural spots to better interact with travellers.

9. Not really, he stated the only problem was sometimes depending on the platform or company the software being used could have been slow or glitch.

11.3 Figure 1.2- Interview 2

Date & Time: February 1st, 2020 Started at 2:18 pm

Venue: Home

Duration: 32 min

Respondent: Male 22 year old

Interviewer: Sriramanan

Method: In-person interview

1. Yes, he is a heavy user of social media lenses and filters, especially on Snapchat followed by Instagram.
2. Has been to a virtual reality arcade in the past in Canada.
3. He feels it make interaction with people and companies more entertaining and allows him to retain attention on it longer due to that.
4. Yes, Respondents has used the Ikea VR and AR app that allows him to design rooms in his house for fun to see how he may be able to transform his house if he wants too in the future. He also did so with a company called Tirerack that virtual simulates the process of putting tires on your car from their product line, so it makes sure that the tire looks exactly how you the consumer wants while still being able to fit on your vehicle through virtual simulation. He said the track company was the most useful AR and VR application he has seen and would only use them moving forward due to the consumer experience features the tech provides.
5. Yes, he used it to redesign his garage to meet his car need and room when redesigning it. He still has the renderings he made on the app for the garage while actually using the design he made when redesigning his room when renovating the last few years at his house.
6. He said yes, especially when using the IKEA app because respondent actually went through and purchased all the items he had designed, and it worked out just as he imagined in his design renderings. He said the process saved him much time looking for things that would fit as well and pricing by being able to compare all products and see how it would look virtually before purchase.
7. Yes, respondent feels that most of all, it made his consumer experience more convenient and quick in return saving his time and money. While also enhancing is consumer experience by making it more realistic, interactive and fun.

8. He wants to see more implementation within Ireland since he has not seen any thus far as he has back home in Canada. He suggested a virtual tour or direction app or service.
9. None thus far with the platform and companies he used them with.

11.4 Figure 1.3- Interview 3

Date & Time: February 1st, 2020 Started at 8:05 pm

Venue: IT Carlow Library

Duration: 25 min

Respondent: Male 23 year old

Interviewer: Sriramanan

Method: In-person interview

1. Respondent has used this technology when interacting with games, so Pokémon go and advertising created by companies. The advertisement that used it that stuck out the most was a Chevy interactive advertisement that used semi-immersive AR and VR tech.
2. Respondent has used it when it comes to gaming with devices like Oculus Rift and VR arcades in Toronto and waterloo Canada.
3. He likes that AR and VR technology almost promotes innovation in a sense because whenever he sees a company using it or implementing this tech, it never really the same concept. It is usually always a new fresh innovated concept that others are not doing that generally unique to the business like the Ikea app and ford advertising campaign.
4. The one that he recalls the most clearly is the Chevy campaign that uses mostly AR by scanning a card with a mobile device and a car hologram appears according to which card he possesses.
5. Not used the Ikea app but has heard of it and had relatives use it in their home renovations in the past to design the layout and furniture.
6. Yes, since it gives a consumer a more interactive in-depth approach into a business and their services. Especially when it comes to engaging with consumers.
7. Respondent feels businesses should use it more to gain feedback from the consumer and interact with them. As well as fresh, innovative marketing tactics and campaigns that catch people's eye retaining info longer versus the traditional forms.
8. Respondent has not seen much in Ireland and feels it would be essential to develop and experiment with AR and VR in Irish business.
9. Has not had any problems with the technology.

11.5 Figure 1.4- Interview 4

Date & Time: February 3rd 2020 Started at 6:40 pm

Venue: IT Carlow Library

Duration: 23 min

Respondent: Men 24-year-old

Interviewer: Sriramanan

Method: In-person interview

1. Yes respondent has used when gaming and with apps
2. Has tried out many different gaming headsets on the market around 4-5. Respondent uses these headsets regularly when gaming weekly.
3. Respondent likes how it allows him to be fully immersed in a completely different environment using technology and how fun it is to use.
4. Yeah he has used it in the virtual reality game arcade in Waterloo CA
5. No, but he has seen friends and family use it and has read articles and news reports on the integration of AR and VR with IKEA and how heavily they are trying to incorporate it into the business
6. He said yes, it makes the experience more interactive and make consumers have a better experience.
7. He said it could be used in the majority of business, especially if they try to focus on app development with AR and VR or just sales and PR; it can implement into any business, according to the respondent.
8. Respondent feels they should use it in sales more to give the consumer a better look at your product and being able to use the tech to sell company products or services further.
9. Not much just that AR can be slow and lag on some phone apps.

11.6 Figure 1.5- Interview 5

Date & Time: February 4th, 2020 Started at 5:30 pm

Venue: IT Carlow Library

Duration: 39 min

Respondent: Male 24 year old

Interviewer: Sriramanan

Method: In-person interview

1. Yeah, he said the most recent one was a new mobile phone game called angry birds AR and Pokémon GO.
2. Yeah, on the gaming platforms and mobile VR apps. They are Oculus Rift, Google VR and PS4 VR. He mentioned how companies that do not have anything to do with gaming used VR games to get consumers involved with their brand and campaigns. An example was a local brewery in Canada used a VR game to get consumer interacting with them.
3. Respondent liked how it could bring the real experience to your front door and feel as if you aren't even home when you are. Being able to feel like you having a crazy realistic experience for example NFL VR.
4. Respondent has used the Ikea app to build a room in his home (Game room), and he loved the way it enhanced his experience and allowed him to engage with the products in a completely immersive way.
5. Yes, he used it to see how specific game room furniture would fit in his space, especially because the shape of the room was somewhat different, not regular rectangle shape like most rooms. It helps him visually see how his room will come together without having to purchase anything yet.
6. Yes, respondent said it gives the consumer a new sense almost that they do not usually get when shopping.
7. Respondent feels that not everyone in the market and world are using VR and AR yet, so it still needs to grow to its full potential wear every household has one or close as you can get, so advertising campaigns and integrated apps get used more when the tech is in place.
8. Respondent thinks more companies like clothing companies should use it so you can use an app AR to scan yourself, then you can try on clothing on your phone as if you're the module in the online shop.

9. When he uses the VR headset for hours or a long time in a row, it gives him a headache.

11.7 Figure 1.6 Survey Questions

Millennial Perceptions of AR and VR Technology

Background on Augmented Reality and Virtual Reality

Augmented reality (AR) adds digital elements to a live view often by using the camera on a smartphone. Examples of augmented reality experiences include Snapchat lenses, IKEA app, and the game Pokémon Go. Virtual reality (VR) implies a complete immersion experience that shuts out the physical world. Using VR devices such as HTC Vive, Real-estate apps, Oculus Rift or Google Cardboard users can be transported into several real-world and imagined environments.

1. How often do you use Augmented or Virtual Reality?

Daily Basis

Weekly Basis

Monthly Basis

Yearly Basis

Never

2. How often do you use AR or VR when interacting with a business?

Daily Basis

Weekly Basis

Monthly Basis

Yearly Basis

Never

3. On a scale from 0 to 100, 0 being not very important and 100 being very important, how important do you think it is that businesses use AR and VR?

0 ←-----→ 100

4. Do you think AR and VR enhance the consumer experience?

Yes

No

5. How important is it that businesses implement AR and VR into the company?

Very Important

Important

Not important

Not very important

6. What platform types do you use AR and VR tech on?

Apps

Software

Social media

Web sites

7. What Augmented reality technology have you used?

Heads up Display

Holographic Display

Smart Glasses

Handheld Smartphone Based

Other (please specify)

8. What Virtual reality technology have you used?

Fully-immersive

Semi-immersive

Non-immersive

9. What age group do you think uses AR and VR tech the most?


Under 18	45-54
18-24	55-64
25-34	65+
35-44	

10. Do you think the majority of businesses should implement some sort of AR or VR?

Yes

No

11.8 Figure 1.7 Sample size calculator



Calculate your sample size

Population Size ⓘ

270

Confidence Level (%) ⓘ

80 ▼

Margin of Error (%) ⓘ

5

Sample size

103

11.9 Figure 2.1 Survey Consent Form

The purpose of this research project on AR and VR technology. This is a research project being conducted by Sriramanan kalirajah. At Survey Monkey for IT Carlow University. You are invited to participate in this research project because you are the ideal survey respondent.

Your participation in this research study is voluntary. You may choose not to participate. If you decide to participate in this research survey, you may withdraw at any time. If you decide not to participate in this study or if you withdraw from participating at any time, you will not be penalized.

The procedure involves filling an online survey that will take approximately 5 minutes. Your responses will be confidential and we do not collect identifying information such as your name, email address or IP address. The survey questions will be about AR and VR technologies.

We will do our best to keep your information confidential. All data is stored in a password protected electronic format. To help protect your confidentiality, the surveys will not contain information that will personally identify you. The results of this study will be used for scholarly purposes only and may be shared with Survey Monkey University representatives.

If you have any questions about the research study, please contact.....This research has been reviewed according to Survey Monkey University IRB procedures for research involving human subjects.

Top of Form

Question Title

ELECTRONIC CONSENT: Please select your choice below.

Clicking on the "agree" button below indicates that:

- you have read the above information
- you voluntarily agree to participate
- you are at least 18 years of age

If you do not wish to participate in the research study, please decline participation by clicking on the "disagree" button.

- ☐ agree
- ☐ disagree

11.10 Figure 2.2 Interview Consent Form



Millennials Perceptions of Virtual Reality and Augmented Reality

December 12th 2019

You are being invited to participate in a research study about Virtual and Augmented reality. This research project is being conducted by Sriramanan Kalirajah of Institute of Technology Carlow. The objective of this research project is to attempt to understand why millennials feel AR and VR technology will enhance the consumer experience. It is being conducted in IT Carlow Ireland and the interview is being given to business students attending IT Carlow currently.

There are no known risks if you decide to participate in this research study, nor are there any costs for participating in the study. The information you provide will help in understanding how business can implement AR and VR to help improve the consumer experience for millennials. The information collected may not benefit you directly, but what will be learned from this study should provide general benefits to business, companies, and researchers.

This interview is anonymous. If you choose to participate, do not write your name on the interview sheet. No one will be able to identify you, nor will anyone be able to determine which company you work for. No one will know whether you participated in this study. Nothing you say on the questionnaire will in any way influence your present or future employment with your company.

Your participation in this study is voluntary. If you choose to participate, please email to C00253505@itcarlow.ie stating that you are willing to participate in the interview.

If you have any questions or concerns about completing the interview or about being in this study, you may contact me, Sriramanan Kalirajah at (085) 285 4616 or at C00253505@itcarlow.ie

IT Carlow's Research Ethics Committee has reviewed and approved my request to conduct this project. If you have any concerns about your rights in this study, please contact the Chair of Research Ethics Committee at chairofethicscommitte@itcarlow.ie

11.11 Figure 2.3 Consent Forms (Signed)



Millennials Perceptions of Virtual Reality and Augmented Reality

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Date 02/01/2020

Signature 

11.12 Figure 2.4 Consent Forms (Signed)



Millennials Perceptions of Virtual Reality and Augmented Reality

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Date 01/07/2020

Signature Jake Elliot

11.13 Figure 2.5 Consent Forms (Signed)



Millennials Perceptions of Virtual Reality and Augmented Reality

December 12th 2019

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Date 01/02/2020

Signature 

11.14 Figure 2.6 Consent Forms (Signed)



Millennials Perceptions of Virtual Reality and Augmented Reality

December 12th 2019

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Date 03/01/2020

Signature

11.15 Figure 2.7 Consent Forms (Signed)



Millennials Perceptions of Virtual Reality and Augmented Reality

December 12th 2019

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Date 07/03/2020

Signature 