AUGMENTED REALITY AS A SALES AND MARKETING STRATEGY IN FASHION RETAILING

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Declaration

I declare that this Dissertation has not already been accepted in substance for any degree and is not concurrently submitted in candidature for any degree. It is the result of my own independent research except where otherwise stated.

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Abstract

**Purpose** – To research how Augmented Reality (AR) technology could be used as a sales and marketing strategy within the fashion retailing industry.

**Design / Methodology** – This project used a mixed method design, this involved the use of quantitative online questionnaires, which used a Likert agreement scale. The qualitative research method involved conducting semi-structured interviews with key informants within the field of AR technology and marketing.

**Findings** - AR does have the potential to be used as a marketing strategy within the fashion retailing industry across multiple channels, as long as the purpose of implementing the technology is to enhance consumer shopping experiences not to solve problems such as the fit of clothing.

**Research Limitations** - In addition to using a convenience sampling strategy there online questionnaires did not collect any demographical data from the participants. This meant that the results had to be generalised and therefore may not be representative of all consumers, which to some extent limits the practical value of this research.

**Keywords** Augmented reality, fashion, retailing, marketing, experience, interactivity

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List of Abbreviations

- 2D – Two Dimensional
- 3D – Three Dimensional
- AR – Augmented Reality
- AREM – Augmented Reality Experiential Marketing
- ARIT- Augmented Reality Interactive technology
- LED - Light Emitting Diode
- MAR – Mobile Augmented Reality
- ROI – Return On Investment
- SET – Sensory Enabling Technology
- TAM – Technology Acceptance Model
- TPB – Theory of Planned Behaviour
- UK - United Kingdom
- VFRs – Virtual Fitting Rooms
- VR- Virtual Reality
- WOM- Word Of Mouth
- ZMOT – Zero Moment Of Truth
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Chapter 1 Introduction

1.1 Chapter Overview
This chapter will introduce the research topic for this project by summarising background research. This will identify any gaps or issues which will highlight the importance of this research project. This chapter will also include an overview of the nature of the research and will inform the reader of the proposed research aim and objectives.

1.2 Background
Fashion retailing consists of the sale of garments, accessories and footwear. According to Keynote (2014) the clothing retail market in the United Kingdom (UK) alone was valued at £50.05 billion; this shows how lucrative the fashion retailing market is. However, fashion is a global market as clothing is not only a basic commodity but fashion also reflects culture and can be used to express individualism. According to Euromonitor (2015) individualism is a key consumer trend because consumers are increasingly basing their consumption and purchasing decisions, upon goods and services that are personalised and unique to them.

Another significant consumer trend that has impacted upon the fashion retailing is Omni-channel retailing. This has caused a blur between virtual and physical stores (Euromonitor, 2015). Omni-channel retailing has occurred as a result of hyper-connectivity among consumers particularly millennials, which has resulted in many fashion retailers being accessible and offering customer service via social media, twenty four hours a day (Diamond et al, 2015). This demonstrates how changing consumer trends and technology is affecting the way in which fashion retailers operate. This is specifically relevant in terms of mobile commerce and e-commerce which has led to the internationalisation of retailers and borderless shopping for consumers.
Varadarajan et al (2010) suggests that technology has reshaped retailing and has changed the way in which retailers compete in the market. Interactive technologies can be used by retailers to gain competitive advantage because interactivity can enable consumers to feel more involved with a brand and it also allow a two way exchange in terms of consumers and brands communicating with each other (Varadarajan et al, 2010). This suggests that retailers can use interactive technologies to engage with consumers and create a personalised shopping experience. This is essential as fashion retailing is not a homogenous market and as suggested by Euromonitor (2015) consumers are more focused on their own individuality. This suggests that retailers would benefit from using interactive technologies to create personalised shopping experiences.

The idea of focusing upon customer experiences to gain competitive advantage within a market is supported by Lusch and Vargo (2014) who states that purchasing decisions are no longer solely based upon products. Consumers are adopting a service-dominant logic, which means that consumers are more focused upon experience as opposed to just products alone (Lusch and Vargo, 2014). This indicates that retailers need to adopt a strategic approach by using technology that enhances customer experience as suggested by Varadarajan et al (2010), in order to retain and attract customers in this competitive industry.

An interactive technology that has the potential to enhance the customer shopping experience is Augmented Reality (AR). AR is a form of human-computer interaction, which overlays computer generated information, images and sounds into the physical world and in real time (Craig, 2013). It is important to highlight that AR should not be confused with the concept of Virtual Reality (VR). VR replaces reality whereas AR enhances it, AR occurs as a result of VR and actual reality merging (Höh, 2009). This indicates that AR is more effective at creating an interactive experience, in comparison to VR as it more engaging due to immersing users within the actual technology, rather than just simply simulating an unfamiliar VR that users cannot interact with.
Using technology such as AR to create memorable experiences could benefit retailers in many different ways, particularly fashion retailers who have shops on the high-street. A keynote (2014) market update report indicates that the growth in online retailing is a threat to high-street clothing retailers. This coincides with a key weakness within the market, which is that many physical stores are becoming vacant (Keynote, 2014). Therefore, this suggests that fashion retailers need to focus upon enhancing in-store experience, in order to maximise success from all channels.

Burberry is a prime example of a fashion retailer that has merged their online site with their physical store, as they have turned their flagship store in London into a technologically advanced digital store (Ryan, 2012). The Digital Burberry store creates a multimedia experience for consumers through the use of AR interactive displays and by using radio frequency identification microchips in the clothing. This means that when consumers try clothing on the mirror turns into a screen so that they can see how the item of clothing would look on the catwalk (Batten, 2015). This example showcases one of the very many possibilities in which AR can be used to enhance in-store customer shopping experiences.

This example is consistent with literature that explores methods of AR application within fashion retailing through the use of Virtual Fitting Rooms (Pachoulakis and Kapetanakis, 2012). Furthermore design expert Bradley Quinn (2012) suggests that AR will have a significant impact upon fashion in the future. This not only includes digital dressing but AR also has the capability of connecting with social media platforms, to transform traditional shopping experiences into social experience as well (Quinn, 2012).

Other literature has also explored other applications of AR such as in mobile and ecommerce. However, there appears to be a gap in previous research in terms of assessing the effectiveness of AR as a multi-channel option for improving experiences by influencing consumer behaviour. This suggests that undertaking further research into the various ways in which AR can be applied in to the fashion retailing industry, could be beneficial for the needs of consumers as well as brands.
Blakeman (2014, p.118) states that AR “is rarely used to sell anything” it is mainly used for promotional and engagement purposes. However, this is challenged by literature that suggests AR has the potential to increase loyalty, improve brand attitudes and encourage positive Word Of Mouth (WOM) (Bulearca and Tamarjan, 2010). Despite this there are gaps in the research in terms of suggesting the best methods for fashion retailers to implement AR.

This topic is particularly interesting as it is based upon an emerging technology, which could significantly impact the future of fashion retailing. The significance of this research project is that it will examine two different viewpoints; consumers and experts, as well as attempting to rectify the gaps in the research as identified above.

1.3 Research Focus
This research project will investigate how Augmented Reality (AR) can be used as a sales and marketing strategy within the fashion retailing industry. The research will explore how AR can affect consumer behaviour and experience. The research will also analyse ways in which fashion retail brands can implement AR by examining multiple channels such as mobile commerce, ecommerce and in-store retailing. This will enable the researcher to draw conclusions on the most effective way to use AR as a strategy to achieve sales and marketing targets. Therefore the scope of this research project will assess the potential benefits and issues of applying AR from both a business and consumer perspective.
1.4 Research Aims and Objectives

1.4.1 Aim: The aim of this research is to explore how AR can be used as a sales and marketing strategy within the fashion retailing industry.

1.4.2 Objectives:

1) To investigate how AR can be used to enhance consumer shopping experiences.
2) Analyse how AR influences consumer behaviour in a retail setting.
3) To evaluate the most effective channels of implementing AR to benefit brands.

1.4.3 Research questions

The objectives above will be met by investigating the following research questions:

- Does AR have any significant effect upon consumer shopping experiences? If so, how?
- How can AR be used within the consumer decision process?
- Are consumers willing to accept AR as technology?
- How can fashion retailers implement AR into business model as part of a sales and marketing strategy?
- What benefits could brands gain as a result of using AR technology in practice?

To meet the aims and objectives of this research project and to effectively explore the research questions, the structure of the research will take place in the following order:

- Review existing literature and then identify any gaps or issues, to ensure that this research project is relevant.
- Propose a research methodology design for the primary research of this project and carry out research.
- Finally the data from the research will be collected, analysed and discussed, so that conclusions can be drawn on whether or not the aims and objectives of this project have been met.
Chapter 2 Literature Review

2.1 Chapter Overview
The literature review will discuss pre-existing theoretical concepts and background research, which relates to the aims and objectives of this research project. The literature will be analysed and used as a platform to develop primary research and to determine the relevance of this research project. The key areas of literature that will be reviewed in this chapter include how shopping experiences can be enhanced, how technology influences consumer behaviour, as well as channels in which AR can be used within the fashion retailing industry.

2.2 Enhancing the customer shopping experience

According to Holbrook (1994, cited in Huang and Hsu Liu, 2014, p.84) experiences are highly dependent upon the actual value of a product. This indicates that consumers evaluate their experience after using a product or service. However a theory developed by Google called the Zero Moment Of Truth (ZMOT), challenges this as it argues that since online shopping has evolved, experience is no longer solely based upon the value of a product or the service received (Lecinski, 2011).

The quality of a customer experience is based upon the ZMOT, which is the point in between the customer’s research into a product and actually making a purchase based on the information that is available (Lecinski, 2011). This suggests that digital media has changed the way in which consumers evaluate their shopping experiences, due to consumers being more empowered through their research as suggested by the ZMOT theory.

Kim and Forsythe (2009) support the ZMOT concept by suggesting that the online shopping experience can also be enhanced before a purchase is made by using sensory enabling technologies (SET) such as AR. This type of advanced technology has the ability to deliver product information online, in the same way as if the consumers were in an actual store. AR has the ability to simulate Three Dimensional (3D) images of products, as well as enabling
consumers to try products on virtually. This allows consumers to have a more realistic interpretation and an authentic view of a product in comparison to traditional Two Dimensional (2D) images. Therefore, this reduces the amount of risk involved which is particularly relevant to online apparel shopping (Kim and Forsythe, 2009). Creating an interactive and sensory enabling online shopping experience provides consumers with more information about the visuals of a product; this reinforces the ZMOT as consumers are empowered with a better quality of knowledge, which will influence consumer behaviour and purchase decisions.

In addition to creating sensory experiences for consumers who shop online, Huang and Hsu Liu (2014) investigated how Augmented Reality Interactive Technology (ARIT) can be used in multiple ways to create experiential value, this includes: aesthetics (sensory), playfulness, using AR for service excellence and finally consumer ROI. Therefore, this shows how ARIT can be used to improve consumer shopping experiences and how such technology could be applied in different contexts within industries such as fashion retailing. The various methods of applying AR to enhance experience, is encompassed within the term Augmented Reality Experiential Marketing (AREM).

AREM is a concept that has received criticism due to their being little evidence and research into the long term perceived experiential value of AR, as opposed to AR being used as a short term promotional tool (Bulearca and Tamarjan, 2010). However, the idea of looking beyond the functional aspects of AR by exploring the experiential value of the technology is supported the experience economy concept by Pine and Gilmore (1999; as cited by Shobeirie). The experience economy suggests that utilitarianism is becoming irrelevant, as there has been a shift in attention away from the functions of products to experiential consumption (Bulearca and Tamarjan, 2010). This indicates that the use of AR in the future is dependent upon consumers and their behaviour.
2.3 Consumer Behaviour

2.3.1 The decision making process and motivation.

For AR to make a significant impact upon customer experience, brands need to understand consumer behaviour because this will influence the future success and sustainability of AR as a marketing strategy. Solomon (2013) states that the consumer decision making process consists of five key stages:

![Figure 1: The decision making process (Solomon, 2013).](image)

These five stages are consistent with the ZMOT theory as it shows that consumers search for information and evaluate alternatives and then make a decision based on what information is available (Lecinski, 2011). Furthermore, Pachoulakis, and Kapetanakis (2012) found that the application of AR in fashion retailing, improved consumer decision making and reduced return rates. This suggests that AR is most likely to impact upon consumer behaviour pre-purchase. Particularly during the ZMOT (stages 2&3) which subsequently influences purchase decisions, as well as having favourable outcomes post purchase, for example reduced rates of returned products and evangelism (Pachoulakis and Kapetanakis, 2012).

The consumer decision making process suggests that purchase decisions are rational and based upon functional purposes (Solomon, 2013). However, contrasting theories such as the service-dominant logic state that there has been a shift in the decision making paradigm, toward consumers valuing experience over products (Lusch and Vargo, 2014). Therefore, not all purchase decisions are rational and so the decision making process is not
applicable for all purchases for example impulse buying and purchases with no utilitarian consideration.

Sproles and Kendall (1986, cited in Kang et al, 2014) state that decisions are formed as a result of shopping motives and cognitive orientations, which can be conceptualised by categorising consumers into eight different decision-making styles. The decision making styles demonstrate two contrasting consumer values, which have a large influence over consumers; utilitarianism and hedonistic consumption (Lyonsiki and Durvasula, 2013). Due to AR primarily focussing upon increasing interactivity and creating sensory experiences, the type of consumers that AR will have most influence upon is consumers that make decisions based upon hedonic motivations. Therefore the typical persona of these consumers, according to Sproles and Kendall’s consumer decision making styles, include recreational shoppers and novelty fashion conscious shoppers (1986; as cited in Lyonsiki and Durvasula, 2013).

According to Holbrook and Hirschman (1982) decisions that are driven by hedonic shopping motives result in experiential consumption. However, many marketers fail to recognise that there is a difference between consumption and consumer experience (Caru and Cova, 2003). This highlights that the term ‘experience’ is ill-defined. Caru and Cova (2003) found that the formation of experiences occur as a result of consumer immersion and relationship marketing. This is supported and demonstrated through the use of ARIT, as commercial relationships can be founded by using AR as a narrative that involves psychological involvement from consumers, by introducing interactivity and creating an immersive experience (Huang and Hsu Liu, 2014).

However, it could be argued using tools such as AR to create an experience, does not solely influence the decision making process in terms of hedonic motivation. Schmitt (1990, p.60) states that consumption is part of a “holistic experience” that is inclusive of both rational and emotional drivers. Rational factors include using AR for dynamic product display and producing authentic product simulations (Shen, 2013). Therefore, AR has the potential to increase convenience and reduce the perceived risks of making a purchase, which
goes hand in hand with the experiential aspects of AR, which contributes to the consumer decision making process.

A key issue in the research that focuses upon using AR to influence the decision making process is that it assumes all consumers will adopt such technology. The diffusion of innovation theory investigates how all forms of innovation can be diffused through a social system and at what rates consumers will adopt new innovations (Vishwanath and Barnett, 2011). This theory suggests that the diffusion of innovation has a technology acceptance lifecycle that occurs depending upon five different types of consumer; "innovators, early adopters, early majority, late majority and laggards" (Egan, 2007, p.40). All consumers will go through communication channels which prompt them to either adopt or reject a technology, as displayed below.

![Figure 2: Communication channels & innovation adoption (Rogers, 1995, p. 163).](image)

The diffusion of innovation theory shows that at the decision making level consumers either adopt or reject innovations. Therefore, in order for AR innovations in fashion retailing to be successful, the underlying factors that cause consumers to reject a technology need to be unveiled. According to the Theory of Planned Behaviour (TPB), factors such as behavioural attitudes and subjective norms may lead consumers to having intentions without taking
action, which ultimately results in rejection (Ajzen, 2005). TPB suggests that consumers taking action (acceptance), is dependent upon perceived behavioural control (Ajzen, 2005).

This directly links to the acceptance of AR in fashion retailing, because perceived behavioural control factors from the perspective of consumers will be based upon the ease of use of AR (Kim and Forythe, 2009). This suggests that consumers are more likely to use AR if they are confident that they can easily use the technology and so brands need to ensure that when integrating AR it needs to be kept simple, so that very little input is required from the consumer into making the technology work.

Innovators and early adopters are technology enthusiasts, creatives and visionaries, whereas the other types of adopters represent the mass market, late majority adopters and laggards are consumers that are most likely to be sceptical about adopting new innovations (Egan, 2007). Therefore, this highlights the importance of understanding the customer journey through various communication channels, which will directly impact upon whether consumers choose to use AR in retail situations, particularly knowledge and persuasion channels as demonstrated in figure 2.

Davis (1989) developed a model based upon technology acceptance, this model summarises the issues that have been discussed concerning consumer behaviour in terms attitudes and behavioural intentions. However, unlike the diffusion of innovation theory the Technology Acceptance Model (TAM) takes into consideration key external variables, which will influence the consumer decision making process when choosing to accept and adopt a new technology. Figure 3 outlines the process of technology acceptance and factors which can affect consumer behaviour.
The TAM shows that the key external variables which impact upon technology acceptance include the perceived usefulness and ease of use of a technology (Davis, 1989). This suggests that when implementing AR into a fashion retailing environment, brands need to ensure that they communicate clearly what benefits consumers will gain from using AR during their shopping activities. In terms of perceived ease of use AR needs to be designed in a way that encourages maximum interactivity, whilst requiring little input from the user, this will help to change consumer behavioural intentions into actual system use.

Despite the theoretical concept of the TAM being developed in 1989, this theory is still applicable as it has been applied to recent research which investigates the acceptance of AR technology in a commercial situation using the TAM framework. Huang and Liao (2014) describe AR as a persuasive technology and the acceptance of AR is dependent upon a consumer’s level of innovativeness, which further supports the diffusion of innovation theory.

Huang and Liao (2014) analysed the acceptance of AR technology with reference to fashion retailing and more specifically the use of AR when purchasing clothing online. This research led to the identification of five key factors, which can be used as a framework to help consumers accept and build sustainable relationships with AR, these factors are as follows:

1) Ease of use
2) Usefulness
3) Service Excellence  
4) Aesthetics  
5) Playfulness  

(Huang and Liao, 2014, no pagination).

These factors support the external variables of the TAM; this framework also validates the connection between using AR to enhance consumer experience and to influence behaviour. This suggests that AR is a technology which is based upon user-centered design. However, this research primarily focuses on online fashion retailing; therefore, it does not give a holistic interpretation of how AR can be used to enhance consumer experience and influence behaviour, in terms of using AR via multiple channels within fashion retailing.

2.4 Channels of application and the potential benefits to brands.

AR has previously been viewed as nothing more than a promotional tool (Blakeman, 2014). However, other literature suggests that AR can be used for multiple purposes within the fashion retailing industry. Similarly, the way in which AR is adopted varies due to how brands implement AR into their business models using multiple channels. In addition to enhancing the consumer shopping experience, brands also need to uncover the potential benefits they would receive as a result of utilizing this form of technology and what different channels of application have to offer.

2.4.1 Online

As Blakeman (2014) suggests AR can be used for promotional purposes, particularly when promoting products online (ecommerce). A key issue that many fashion retailers face when trying to sell products online is that it can often be difficult for consumers to grasp what a product will look like, due to only being able to view a two-dimensional picture and a text description (Shen, 2013). The technology behind AR is continually developing in terms of quality and producing authentic simulations. This enables brands to create a sensory experience due to consumers being able to view fine details such as the texture of a fabric (Shen, 2013). This shows that AR can be used to
showcase product attributes for ecommerce websites, which benefits consumers as this reduces the amount of risk involved when making a purchase decision. Consequently brands could potentially benefit from increased purchases which in turn can improve profitability (Shen, 2013).

Another way of implementing AR online that is specifically related to fashion retailing is through the use of Virtual Fitting Rooms (VFRs). VFRs enable consumers to try items of clothing and accessories on via their webcam or using multi-sensor bars to scan the body such as the Microsoft Kinect (Pachoulakis and Kapetanakis, 2012). VFR’s can be used to help solve problems such as fit, which relates to the first stage of the decision making process, which is problem recognition (Solomon, 2013). A key issue within the online fashion retailing industry is fit, as consumers can only try on garments after they have purchased them.

Fit.me is a London-based company that creates VFRs using AR technology, which enables consumers to input their measurements to find clothes that suit their body type (Preston, 2014). The majority of garments purchased online are returned due to not being the right fit and so VFRs can be used to reduce return rates (Pachoulakis and Kapetanakis, 2012). This suggests that using AR to create online fitting rooms that are accessible from a webcam is convenient for consumers, as well as saving time for brands in terms of having to process returns. This method also could be used as a promotional sales strategy to encourage consumers to make more purchases.

Using AR to create online VFRs provides consumers with a better quality of service and a personalised shopping experience (Shen, 2013). This is advantageous for brands because it reduces the distance between consumers and the brand (Shen, 2013). This suggests that brands could benefit from implementing AR to create online fitting rooms to increase interactivity, which could be used as a marketing strategy to manage customer relationships and to increase engagement.

Please see appendix 1 for a demonstration of how AR can be used to solve problems concerning fit and how it can promote products by informing consumers of different styles and colour variations that are available.
2.4.2 Mobile

AR can also be accessed via mobile devices such as smart phones and tablets. Mobile Augmented Reality (MAR) can be used in ways that are similar to the methods of online application. However, an advantage of using MAR is that it is a form of ubiquitous computing; this means that consumers can access the technology at any time and in any place (Olsson et al, 2013). Smart phones have strong processing power, which enables users to use AR on the go without any external add-ons such as webcams or sensor bars (Shen, 2013). This suggests that MAR is a convenient option for consumers as they would be able to receive an interactive experience ‘on the go’. This could also benefit brand equity, as well as increasing sales as a result of improving consumer experience.

An example of how brands can use MAR to enhance experience and increase customer conversion rates is by using AR to create interactive catalogues and magazines. Converse created a shoe sampler which involved consumers downloading the Converse catalogue app, selecting the desired shoe and then pointing their smart phone at their leg to view how the shoe would look (McKean, 2014, p.182). This enables consumers to view the product in the same way as a VFR, without having to go through the physical buying process. This method also offers many business benefits such gaining an insight into consumer preferences by analysing what products consumers are trying on and purchasing. Therefore, MAR can be used as method of data collection for market research, boosting sales and encouraging app downloads.

2.4.3 In-store (offline)

Kipper and Rampolla (2012) found that the most common ways of implementing AR technology into a physical retail store includes: using static kiosks, digital signage and interactive window displays. Static kiosks can be used in-store to provide consumers with more product information or as in-store VFR feature. Despite AR being used to simulate VFRs across multiple platforms, Pachoulakis and Kapetanakis (2012) suggests that consumers use
AR online to try items on to solve problems such as fit, whereas using AR in-store is primarily to add a fun factor to traditional shopping. Therefore, the strategic goals of a brand will determine which platform is the most appropriate for the application of AR. However, this could be difficult as using AR to solve issues within the market can subsequently lead to an enhanced consumer experience.

Brands can also use AR to inform/educate consumers, as well as using it as a tactic to encourage consumers to enter a store. This is important because a key issue within the clothing retail market is the increasing number of vacant stores on the high-street (Keynote, 2014). Hugo Boss is a brand that has embraced AR, by using it to create media walls that have virtual models which respond to consumers, as well as having AR catwalk shows which consumers can get involved in and finally Hugo Boss also uses AR to create interactive window displays (Britten, 2011).

This example supports Huang and Hsu Liu (2014) research about AR being an interactive technology, which can be used to enhance the consumer shopping experience. In addition to this it also shows how AR can be used within stores for merchandising purposes, for example AR catwalks and window displays. This benefits brands because it provides them with alternative and creative ways to interact with consumers and to promote what the brand has to offer.

2.5 Key issues
The pre-existing literature on and relating to AR, provides a basis for which further research can be carried out, as well as presenting some key issues and gaps which this research project will aim to overcome. First of all despite their being literature on how AR can be used pre-purchase to enhance experience, it does not specifically relate to how consumers would use AR to enhance their own shopping experiences.

This follows on to consumer behaviour and the literature presented a framework which consisted of five key factors which will impact upon whether consumers will accept AR and use it to make purchase decisions (Huang and Liao, 2014). This framework will be adapted by the researcher to relate
specifically to fashion retailing, when forming questions for the primary research to find out how AR influences behaviour and what causes consumers to accept or reject AR.

Finally, an issue that was uncovered in the literature review is that despite there being research and practical examples of how brands can use AR in a retail setting, there was little research that showed how AR could be integrated using multiple channels, rather than working as a silo. The researcher will investigate further how brands can benefit from implementing AR during the primary research process.
Chapter 3 Research Methodology

3.1 Chapter overview
This chapter will include an outline of the research paradigm and the justification of the chosen methodological approaches, followed by a rationale of the intended use of participants and the selected sampling methods.

3.2 Research Paradigm
The framework for this research will be based upon a pragmatic paradigm. Pragmatism focuses upon real world practice (Creswell, 2014) which is essential for this research project as it investigates how technology can be utilized within fashion retailing to benefit consumers and brands. Pragmatism is a problem centred view that examines the consequences of actions (Creswell, 2014). This supports the research objectives which attempt to address issues relating to how fashion retailers can utilize technology.

Using a pragmatic paradigm means that the researcher is not committed to using either a positivism or interpretivism philosophical position (Saunders et al, 2012). Philosophical views such as epistemology and ontology can be viewed as a “multidimensional set of continua” (Saunders et al, 2012, p.130). However, basing research upon one philosophical view is an unrealistic approach, particularly for research that has potential practical value. Therefore, conducting research following a pragmatic philosophical view will enable the researcher to give a holistic interpretation of multiple realities.

Furthermore, this research will use both deductive and inductive approaches. A deductive approach involves testing existing theories, whereas an inductive approach involves using research findings to develop theories (Saunders et al, 2012). The deductive approach will be derived from theories such the TAM and Huang and Liao (2014) framework, which explains what factors affect the acceptance of AR as discussed in the literature review. This will be used to analyse the relationship between the theory and the research findings, in an effort to validate the findings and modify the theoretical concepts, so that they include practical elements. In contrast an inductive approach will also be applied, as the findings from the research will be used to generate theories of how brands could implement AR.
3.3 Research Design

Due to the nature of this research project the chosen research design will consist of mixed methods. A mixed methods design involves the combination/integration of both quantitative and qualitative research methods (Bryman, 2012). This research project will specifically use a convergent parallel mixed method research design. This means that unlike two-tier studies and a sequential mixed method design, both the quantitative and the qualitative research will take place during the same phase of the research process (Creswell and Plano Clark, 2011).

![Diagram of research process]

**Figure 4:** Convergent parallel mixed methods research design (Creswell, 2014, p.220)

Figure 4 above demonstrates the research process for this project. The justification for selecting a convergent parallel mixed method design is that this research aims to explore the views of consumers, brands and industry experts. This suggests that it is necessary to use a mix of both quantitative and qualitative methods. Quantitative questionnaires will be conducted to explore consumer opinions, whereas qualitative semi-structured interviews will be conducted to explore the views and gain ideas from industry experts. Therefore, a mixed methods research design is the most appropriate option due to there being a varied target sample.
3.4 Sample
A sample is “the subset of people from the population who will participate in the current study” (VanderStoep and Johnston, 2009, p.312). However due to using a mixed methods design, there will be two different samples which will require two different strategies for selection.

3.4.1 Quantitative sampling Strategy

The purposed sampling strategy for the quantitative research is convenience sampling; this is a non-probability method which involves using any participants that are available to the researcher (Bryman, 2012). This method has been selected because the sample frame is based upon consumers, which is a very broad specification to target and so convenience sampling will be used to get as many responses as possible.

The main advantage of using a convenience sampling method is that it is efficient for gathering large quantities of data in a short period of time (Bryman, 2012). This is ideal for quantitative research because the more participants the better and so the expected amount of people to complete the questionnaire is approximately 200 – 250.

3.4.2 Qualitative Sampling Strategy

A purposive sampling strategy will be used to select participants, for the qualitative research. This is also a non-probability method which involves using the judgement of the researcher to select participants that meet the requirements of the sampling frame (Saunders et al, 2012). The sampling frame or the qualitative research is brands and industry experts; this can include businesses themselves, key researchers in the field of AR or creative agencies who actually produce the technology for brands. This sampling strategy is known as heterogeneous purposive sampling, which means that although all participants will fit the requirements of the sampling frame, they will all vary from case to case (Saunders et al, 2012), in terms of experience, background and career.
The quantity of participants is not as important as the saturation in this case, due to the sample consisting of key informants/specialists in the field. Therefore the number of anticipated participants for this part of the research is approximately five because the objective is to gain in-depth knowledge to uncover themes.

3.5 Data collection and analysis
3.5.1 Quantitative Data

The quantitative data will be used to measure the likeliness of consumers adopting AR during their shopping activities and to discover how this will impact upon consumer behaviour and experience. The data will be collected via online questionnaires. The questions will be developed by the researcher and the format of the questions will include a Likert scale. A Likert scale can also be referred to as a verbal scale and is often used for questions that are based upon opinions (Crowther and Lancaster, 2008). This method of data collection requires participants to rate their level of agreement for example disagree, neither agree nor disagree and agree (Crowther and Lancaster, 2008). Therefore, the structure and wording of the questionnaire will need to consist of a series of statements, to enable participants to effectively rate their level of agreement.

As a result of using a convenient sampling strategy the online questionnaire will be distributed via social media networks, to encourage as many people as possible to take part. This will be a self-administered questionnaire which means that participants will complete the questionnaire without the researcher being present (Crowther and Lancaster, 2008). This could benefit the research because it means that the questionnaire can be distributed to multiple locations via social media, which could increase the amount of responses received. The chosen method for data analysis is descriptive statistics; this is a simplistic method which will enable the researcher to summarise large amounts of quantitative data (Dawson, 2009).

3.5.2 Qualitative data

The qualitative data will be collected by conducting semi-structured interviews, this will enable to researcher to gain an in-depth understanding of the
participants beliefs, attitudes and opinions (Merriam, 2014). Semi-structured interviews consist of open ended questions and they are more flexible in comparison to standardised interviews as they have no predetermined order. Semi-structured interviews simply follow a guide of questions that need to be explored (Merriam, 2014). This suggests that semi-structured interviews could provide the researcher with additional information, which could significantly benefit the research.

To enable the researcher to effectively analyse the data collected, the interviews will be recorded using a Dictaphone, ethical considerations will be written on the consent form so that participants can give their permission or opt out of being recorded. The recording of the interview will be manually transcribed by the researcher. Despite being a time consuming process, transcription ensures that researchers do not miss any important details from the interview when analysing the collected data (Merriam, 2014).

The data will be analysed by using a manual thematic process which consists of three key stages:

1) The first stage involves descriptive coding this involves highlighting the key material within the transcriptions.

2) Following on from this the research will undertake interpretive coding, this involves putting the descriptive coding together to interpret the meaning of the data.

3) Finally this will enable the researcher to identify any overarching themes.

(King and Horrocks, 2010, p.153)

This suggests that thematic analysis is a systematic way of identifying key themes that can be used to identify relationships between the sets of data so that conclusions can be drawn. This will not only benefit those who work in the fashion retailing industry but also those who are involved within creative industries, marketing and technology.
3.6 Reliability, Validity and Research Limitations

When undertaking research it is vital that the researcher takes steps to ensure that the research is valid and reliable. It is important that any limitations are identified, so that they can be addressed and so that the research is replicable. Reliability refers to whether concepts within a study are stable, consistent and transparent (Saunders et al, 2012). Reliable research ensures that the research techniques are repeatable to enable other researchers to carry out the same study (Bryman, 2012). Reliability is essential for this research, as there is little research that concerns using AR as a sales and marketing strategy within the fashion retailing industry. Therefore, the researcher needs to ensure that the research is reliable, so that is replicable.

The validity of the research is also important as this refers to the accuracy of the research design and how the research findings are measured (Saunders et al, 2012). Validity can be conceptualised as the trustworthiness and true value of research (Benz and Newman, 2008).

The researcher has identified the key limitations of the research methods within this study and what steps will be taken to ensure they have a minimal effect upon the reliability and validity of this research project:

First of all the quantitative questionnaires will be using a convenience sampling strategy and so it could be argued that the sample may not be representative of the population due to be selected based upon convenience. This suggests that this strategy will limit the generalizability of the results (Bryman, 2012). However, the frame for the quantitative sample is based upon consumers and so the only requirement is that the participant has previously purchased a fashion item. This frame is very broad but has been selected because if AR was to be applied to the fashion retailing industry in the future, it would not be gender specific nor limited to a particular location, as it has the potential to become a global phenomenon.

Another potential limitation of the questionnaires in this research project is that they are going to be self-administered. Therefore, variables such as the environment in which the questionnaires are completed cannot be controlled, which could impact upon the validity of the results (Crowther and Lancaster,
2008). However, using a self-administered method ensures that the external validity is not affected by factors such as experimenter effects (Creswell, 2014). This suggests that this research project would benefit from self-administered questionnaires because participants can answer freely and honestly, as opposed to feeling obligated to answering in a way they think that researcher wants them to.

Another possible limitation of using self-administered questionnaires, which is specific to this research project, is that participants may not understand what AR is. The researcher will address this by embedding a short informational video at the beginning of the questionnaire to ensure that the responses received are valid.

A possible limitation in terms of the qualitative research design is that the chosen sampling method is purposive sampling, which means that the selection of participants subjective (Saunders et al, 2012). However, the researcher will ensure that sufficient research is undertaken to guarantee that the participants selected for the interviews are key informants. The interviewees will also be asked about their background and experience at the beginning of the interview, which will be transcribed so if any researchers chose to replicate the study in the future they are aware of this.

3.7 Ethics
This research project has received ethical approval from the Cardiff Metropolitan university ethics committee. The ethical approval process involved the researcher presenting the ethics committee with full details of the proposed methodology including supporting documents, as well demonstrating that ethical issues had been considered. Appendix 2-7 provides evidence of the approved ethics forms and the supporting documentation. The researcher can now proceed with the research process as detailed in this chapter, by following the university protocol in regard to ethical research.
Chapter 4 Findings, Analysis and Discussion

4.1 Chapter Overview
This chapter will present and analyse the key findings from the primary research with the support of visual graphs and tables. This chapter will be subdivided into two sections: the first half will present the findings from the quantitative research and the second half will focus upon the qualitative research.

4.2 Quantitative Research (Questionnaires)
Due to the questionnaires being online they were distributed via multiple social media networks including Facebook, Twitter and LinkedIn. Despite initially aiming to receive 200 responses, the researcher closed the questionnaire once 100 responses had been received due to time restrictions.

4.2.1 Questionnaire Findings and analysis
A large proportion of the pre-existing literature focussed upon the application of AR via online and mobile shopping to enhance experience and to influence behaviour in terms of decision making. Solomon (2013) identified that the first stage within the decision making process is problem recognition. Therefore the first statement that participants had to rate their level of agreement on, aimed to immediately uncover any issues that consumers faced when shopping online or from their mobiles.

Table 1 below displays the findings from participant’s responses when asked if they found it difficult to grasp what a product is actually like when shopping online, due to only being able to view a 2D image.
- Q1: “When shopping online I find it difficult to grasp what a product is actually like due to only being able to view a 2D image”

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<thead>
<tr>
<th># Value</th>
<th>Answer</th>
<th>Q1</th>
<th>%</th>
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<tbody>
<tr>
<td>1</td>
<td>Strongly Disagree</td>
<td></td>
<td>0%</td>
</tr>
<tr>
<td>2</td>
<td>Disagree</td>
<td></td>
<td>10%</td>
</tr>
<tr>
<td>3</td>
<td>Neither Agree nor Disagree</td>
<td></td>
<td>10%</td>
</tr>
<tr>
<td>4</td>
<td>Agree</td>
<td></td>
<td>70%</td>
</tr>
<tr>
<td>5</td>
<td>Strongly Agree</td>
<td></td>
<td>10%</td>
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</table>

Table 1: Difficulty in grasping what a product looks like online due to 2D images.

Table 1 shows that out of the 100 participants that completed the questionnaire, 80% found it difficult to grasp what a product actually looks like when shopping online. This suggests that the decision making process is hindered when shopping from a screen as opposed to being in a physical store. This highlights the need for AR technology in terms of producing product simulations for online shoppers, to enable them to make informed purchase decisions.

To resolve the issues caused by only being able to view 2D images of fashion items when shopping online, the idea of using AR to produce 3D product simulations was explored.

- Q2: “I feel that 3-D images would help my decision making when shopping online and from my mobile.”

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<thead>
<tr>
<th># Value</th>
<th>Answer</th>
<th>Q2</th>
<th>%</th>
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<tbody>
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<td></td>
<td>0%</td>
</tr>
<tr>
<td>2</td>
<td>Disagree</td>
<td></td>
<td>10%</td>
</tr>
<tr>
<td>3</td>
<td>Neither Agree nor Disagree</td>
<td></td>
<td>12%</td>
</tr>
<tr>
<td>4</td>
<td>Agree</td>
<td></td>
<td>53%</td>
</tr>
<tr>
<td>5</td>
<td>Strongly Agree</td>
<td></td>
<td>25%</td>
</tr>
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</table>

Table 2: The impact of 3D images on the decision making process

Table 2 shows that there is a strong correlation between participants who have difficulties grasping what a product is like when viewing traditional 2D images online, in relation to participants that feel 3D images would aid their purchase decisions. This supports the ZMOT concept because it shows that consumers are likely to have a better shopping experience, if they can make
purchase decisions based upon sufficient pre-purchase information (Lecinski, 2011), this case relates specifically to information that is available visually.

In contrast, these findings somewhat challenge Lusch and Vargo’s (2014) concept of consumers adopting more of a service dominant logic, as these findings suggest that products are still at the heart of consumer experience. However, it could be argued that experience is not based around products, as this only focuses upon the use of AR when being applied to online shopping. Furthermore, these findings indicate that perhaps fashion retailing is an industry that puts great emphasis upon products due to the nature of the industry being based upon aesthetics.

Despite there being a positive correlation between consumers struggling with 2D images online and wanting to view 3D images, participants were not certain if AR has the ability to produce authentic product simulations. Figure 5 below displays the findings generated from participants when asked to rate their level of agreement of AR being a trustworthy technology, in terms of producing authentic simulations.

- Q9: “AR is a trustworthy technology in terms of producing authentic visual simulations”

![Figure 5](image)

Figure 5: AR’s ability to produce authentic simulations.

Figure 5 shows that almost half of the respondents neither agreed nor disagreed, that AR was a trustworthy technology. This indicates that the majority of participants have never used AR technology before or have never
seen it used within product simulation contexts. This could impact upon whether consumers choose to accept and adopt AR as a technology during their shopping activities. This also supports Huang and Liao (2014) which investigates the acceptance of AR technology. Figure 3 in the literature review shows the TAM, which was developed by Davis (1989) this shows that one of the external variables that can impact upon technology acceptance is perceived usefulness of a technology. Therefore, these findings indicate that fashion retailers may have difficulties implementing AR because consumers may deem AR not to be useful, due to the perception of it producing low quality product simulations.

Another external variable that affects the adoption of a technology as identified by the TAM model is the perceived ease of use (Davis, 1989). If consumers were using AR in-store they are likely to have assistance. However, if they were to use the technology at home, they would need to be confident in terms of how to operate AR themselves in order to make use of the technology. To investigate the perceived ease of use, participants were asked if they thought that using AR at home would be a difficult process.

- Q.6: “I think that using AR technology at home would be a difficult process.”

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<th># Value</th>
<th>Answer</th>
<th>Q6</th>
<th>%</th>
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<td>24%</td>
</tr>
<tr>
<td>4</td>
<td>Agree</td>
<td></td>
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</tr>
<tr>
<td>5</td>
<td>Strongly Agree</td>
<td></td>
<td>12%</td>
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</table>

*Table 3: The perceived ease of use of AR*

The findings in table 3 shows that out of the 100 responses 45% agreed that AR would be a difficult to use as home and 24% were unsure of the ease of use of AR technology. These findings suggest that if online fashion retailers were to implement AR, they would need to make sure that the process of using the technology is as simplistic as possible and this would need to be communicated to consumers. These findings could have been derived due to
participant’s unfamiliarity of being able to use AR technology at home for shopping purposes such as VFRs.

These findings combined with the findings displayed in figure 5; indicate that the majority of participants do not fully see the benefits of using AR in terms of perceived usefulness, in addition to perceiving the ease of use of AR to be difficult. Which in relation to the research question that explores whether or not consumers are likely to accept AR, these findings suggest that steps need to be taken to ensure that AR technology is of a high quality and easy to use. This could be done by including video demonstrations on the websites of retailers to showcase the technology, in order to encourage acceptance from consumers.

Technology acceptance also relates to the objectives of this research, which seeks to find ways in which AR could be used to influence behaviour and enhance the consumer shopping experience. Pre-existing literature suggests that one of the key motives for using AR technology within the online fashion retailing industry is for the convenience of consumers (Shen, 2013). Subsequently AR has the potential to provide consumers with an in-store shopping experience ‘on the go’.

Table 4 below shows the responses of participants, in relation to whether having an in-store experience whilst in the comfort of their own home or ‘on the go’ would be something they are interested in. These findings also have practical value as it enables the researcher to gain an insight into the needs and lifestyles of consumers.
- Q4: “Being able to have an in-store experience at home or on the go would be convenient for me.”

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<tr>
<th># Value</th>
<th>Answer</th>
<th>Q4</th>
<th>%</th>
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<tbody>
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<td>0%</td>
</tr>
<tr>
<td>2</td>
<td>Disagree</td>
<td></td>
<td>12%</td>
</tr>
<tr>
<td>3</td>
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<td></td>
<td>16%</td>
</tr>
<tr>
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<td></td>
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</tr>
<tr>
<td>5</td>
<td>Strongly Agree</td>
<td></td>
<td>16%</td>
</tr>
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</table>

**Table 4: Recreating in-store experiences via mobiles and online.**

Table 4 displays significant findings, as 72% of participants agreed that being able have an in-store experience without having to be physically present within a store would be a convenient option for them. This supports the Euromonitor trends that were discussed in the background information section of the introduction, in terms of hyper-connected consumers that want to be able to interact with retailers anytime and in anyplace (Euromonitor, 2015). These findings highlight the need for fashion retailers to find solutions which enable consumers to have an in-store experience at home.

One way in which retailers could provide consumers with an in-store experience online or via mobiles is to enable them to try clothing or accessories on via their webcams or smartphone cameras. This would not only be a convenient option for consumers but it could be used to solve fit problems which could benefit retailers that are solely based online, as well as being used for promotional purposes.

To investigate whether AR could be used as a solution in terms of providing consumers with an in-store experience ‘on the go’, participants were asked if they would like to virtually try items on before purchasing them online.
Table 5 shows that there was a mixed response from participants, in terms of their preferences towards using AR for trying on clothing and other fashion items on via their webcam. 47% of participants agreed that they would like to virtually try clothes on before purchasing them, which suggests that AR does have the potential to solve issues that consumers face when shopping online, in regards to visualising what a product will look like at the pre-purchase stage.

However, these findings do not meet the objectives in terms of how AR influences consumer behaviour because 53% of participants were either unsure or did not want to use AR online or via their mobiles to try items on. These findings may have occurred for many different reasons including privacy issues, the rejection of technology or the level of innovativeness of the participants. Despite this it is important to highlight that ‘agree’ was the option that was selected the most in comparison to the other agreement ratings (the mode = 35 agree).

Consumers can also virtually try fashion items on in-store by using static kiosks, which enables them to fit clothes to their body shape and view different colour options without having to get changed (Kipper and Rampolla, 2012). Participants were also asked if they were interested in using VFRs in-store, this enabled the researcher to draw comparisons between the opinions of participants on using AR online and using AR in-store, as shown below in figure 6.
Q7: “I would like to use virtual fitting room’s in-store that fit clothes to my body type and allow me to view different colour options.”

Using AR for online VFRs V.S. In-store VFRs

Figure 6 shows that participants found the idea of using AR in-stores to virtually try on clothes more appealing than using AR online and via mobiles. This suggests that AR does not have the capability to fully replace in-store experiences online. However, it does suggest that consumers still value in-store experiences despite having twenty four hour access to retailers online. Additionally these findings show how AR can be used to enhance consumer experience, as well as giving an insight in to what channels of application are mostly like to be successful within the fashion retailing industry.

Fashion retailers can also use AR in-stores not for trying clothes on but to create a more interactive and sensory experience (Huang and Hsu Liu, 2014). To investigate the most effective ways of applying AR in-stores, participants were also asked if they agreed that virtual catwalks and interactive AR window displays would enable them to have a more enjoyable in-store experience. (Findings are displayed below in table 6).
Q8: “I would have a more enjoyable in-store shopping experience, if there were interactive window displays and virtual catwalks.”

<table>
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<tr>
<th># Value</th>
<th>Answer</th>
<th>Q8</th>
<th>%</th>
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<tbody>
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<td>1</td>
<td>2%</td>
</tr>
<tr>
<td></td>
<td>Disagree</td>
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<td></td>
</tr>
<tr>
<td>2</td>
<td>Disagree</td>
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<td>nor Disagree</td>
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</tr>
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</tr>
<tr>
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<td>5</td>
<td>30%</td>
</tr>
</tbody>
</table>

Table 6: Using AR to enhance in-store shopping experiences.

The findings presented in table 6 shows that two thirds of the respondents agreed that if fashion retailers used AR to create interactive window displays and virtual catwalks, they would have a more enjoyable in-store experience. This indicates that AR is most likely to impact upon consumer behaviour when being used for experiential purposes, as opposed to being used for convenience and fit solutions.

This suggests that when shopping in-stores consumers adopt more of a service dominant logic; whereas the findings in table 2 suggest that when shopping online consumers are more focused up on products themselves. This shows how fashion retailers can use AR in different contexts depending upon what results they hoping to achieve, for example using AR online to increase sales and using AR in-stores to improve consumer experiences and to encourage positive WOM.

Besides investigating how AR could be used to influence behaviour at the pre-purchase stage, the idea of using AR to influence behaviour in terms of consumer's attitudes towards brands was also explored, as shown in table 7.
Q5: “My attitude towards a brand would become more positive if they offered an AR shopping experience.”

![Table](image)

Table 7: The influence of AR on brand attitude

Table 7 shows that participant’s responses in terms of how AR could positively influence their attitudes towards a brand were very sporadic. 47% of participants had some level of agreement that if a brand could provide them with an AR shopping experience, their attitudes towards that brand would become more favourable. These findings reveal two important points: first of all it shows that many of the participants feel that AR does add value to their shopping experiences and secondly it shows that AR can also benefit brands in terms of how their brand image is perceived. This suggests that AR has the potential to encourage consumers to become more brand loyal in exchange for an interactive AR shopping experience.

However, it should be noted that the level of agreement that was selected the most was the ‘neither agree nor disagree’ option. 39% of participants were neutral in terms of the effect of AR on brand attitude. Therefore, it would be a risk for fashion retailers to invest in AR solely to improve brand attitudes. Furthermore, it could be suggested that AR is only effective at improving brand attitudes towards brands that consumers are already fond of, as opposed to transforming brand attitudes from negative to positive.
Q10. “I feel that if given the opportunity I would use AR on a regular basis, when shopping for clothing and other fashion items.”

![Q10 Findings]

Figure 7: Summary of Consumer perceptions towards AR.

Figure 7 shows that a total of 60% of participants agreed that they would use AR on a regular basis during their shopping activities if given the opportunity. Unlike the previous questions in the questionnaire, this question did not focus upon a specific method of application; this was purposely a broad question to reveal how participants felt in general about using AR in a shopping context. These findings suggest that AR does have the capability to make a positive impact upon the fashion retailing industry, as well as having the potential to change the way consumers make decisions and shop in the future.

In terms of using AR as a sales and marketing strategy the findings from the questionnaire reveal that AR is a technology that will be accepted by consumers, especially when concerning creating a positive shopping experience as shown in figure 7 and table 7. This in turn could benefit fashion retailers as they could use AR as strategy to attract consumers. Also using AR as a strategy to enhance experience and increase interactivity could enable retailers to build stronger relationships with consumers, which could benefit sales and ultimately profitability.
4.3 Qualitative Research (Semi-Structured Interviews)

Despite contacting multiple businesses and researchers only three participants responded. However, this was not an issue as all three respondents met the requirements of the sampling frame. To protect the identity of these participants they will be anonymised and referred to as ‘participant A, B and C’. A short description profiling each of the participants will be given below:

**Interview 1 - Participant A:**
- Male
- Co-founder of a creative studio that deals with digital media and creative branding.

**Interview 2 - Participant B:**
- Male
- Co-founder of a creative centre
- Lecturer in product design
- Chartered engineer from the institution of engineering and technology.

**Interview 3 - Participant C:**
- Male
- Lecturer in computer science
- Member of the geometric computing and computer vision research group

The profiles detailed above show that all participants had a high level of expertise and were key informants. Please see *appendices 9 - 12* to view the signed consent forms and to view the full transcripts of the interviews that were carried out.

**4.3.1 Interview Findings and analysis**

As discussed in the methodology chapter the findings will be analysed using a manual thematic process, which aims to uncover the overarching themes within the collected data.
The interpretive coding of the transcripts uncovered three overarching themes, the first theme is based upon technological factors which need to be considered if brands were to implement AR, as shown in figure 8 below.

**Theme 1**

**Figure 8:** Theme 1- Technological Considerations (Created by the author using Mind View 5.0 software)

Figure 8 shows that a reoccurring theme throughout the interviews was technological considerations; this covered three key factors all of which are displayed above in the subcategory of interpretive codes. The first key factor that relates to the theme of technological considerations is knowledge. All of the participants have been aware of AR technology for approximately five – nine years. This immediately highlights a key issue, if AR has been around for this amount of time why has it not taken off yet? Despite having knowledge about the technology for some time, all of the participants described AR as a technology that is still emerging and is still in the infancy stage of
development. This suggests that technology has only just developed to a level where it can fulfil the needs of making AR work.

Following on from this it was clear that 2 of the participants (B&C) had only used AR for research purposes. This indicates that many consumers still have little to no knowledge about what AR is; furthermore this is supported by participant A who explains that many people do not understand what AR is until they see a demonstration. This suggests that in order for consumers to start using AR they must have knowledge of it in the first place. Therefore, in order for AR to be successful, brands need to ensure that they engage with consumers, this reiterates the point made when discussing the quantitative findings (Q6:Table 3) and so it is clear that communication between brands and consumers largely contributes towards the AR technology being accepted.

Another key factor that contributed towards technological considerations becoming a key theme throughout the interview is quality. The findings from the research suggest that the quality of AR varies depending upon what channel it is being used and in what context it is being used for. According to participants if brands were to implement AR into stores using equipment such as projectors and Light Emitting Diode (LED) panels the technology itself would be of a high quality.

However, this does not include using AR in-stores for fit solutions because whilst AR can digitally overlay a piece of clothing on to a person’s body it cannot determine whether or not that garment will fit. This challenges Pachoulakis and Kapetanakis (2012) research who suggests that VFRs can be used to solve fit solutions. Therefore, brands should only implement AR for experiential purposes as opposed to solving problems concerning the fit of a product. This is an interesting point as the findings from the questionnaires indicated that the participants favoured the idea of using AR to enhance their experience over the idea of using AR as a solution to the improve fit of clothing.

Despite already establishing that AR can be used via multiple channels such as online, mobiles and in-store, the data from the interviews suggested that
accessibility is another technological consideration that can play an important role in the success of AR when being used for commercial purposes, particularly when being used via mobile applications. In theory implementing AR via mobile applications should enable brands to reach more consumers. However, AR applications can either be produced in house or by third party developers.

This means that consumers can either access AR applications directly from brands themselves or they will have to download a generic AR developer app such as Blippar, as described by participant A the co-founder of a creative agency. Therefore, if brands implement AR using third party developer platforms there is a risk that consumers will be distracted by the content of others, which could then result in fewer amount of downloads and low engagement. This highlights how accessibility can impact upon the success of AR technology.

**Theme 2:**

![Overarching Theme: User Design](image)

**Figure 9:** Theme 2 – User Design (Created by the author using Mind View 5.0 software)

Figure 9 above presents another overarching theme that reoccurred throughout interviews. Despite there being a slight variation in the expertise of
all of the participants, they all expressed that user design is one of the most important aspects which contribute toward the success of technology. This is particularly relevant because as discussed in the literature review Huang and Hsu Liu (2014) refers to AR as an interactive technology. This means that AR will not work unless users engage with it.

Throughout the interviews it became clear that a significant limitation of using AR is that it can be disorientating because of a disconnection between augmented and actual reality. This suggests that consumers may not trust AR and may disregard the level of quality it has to offer. This also to the overarching theme of technological considerations as well as corresponding with the findings from the questionnaire, which found that almost half of the respondents were unsure if AR had the ability to produce authentic simulations.

In contrast participant ‘A’ explained that AR is unique because it has the ability to transport people. This suggests that if retailers were to implement AR there is a slight risk that consumers would feel disorientated. However, if they ensured that the design of AR was used to create a short experience momentarily, it could be used as a method to give retailers a creative and competitive advantage because few fashion retailers have the ability to engage and transport consumers to multiple realities.

Whether or not users will find AR disorientating, depends upon consumer perception. The data collected indicated that a factor which can impact upon user design is the perceived benefits that the user will gain from using AR, for example better decisions, improved experience and efficiency. This supports the TAM because according to Davies (1989) consumers are likely use a technology if they perceive it to be useful. This suggests that the advantage of using AR is that you can see immediate results and that the design of AR technology is based upon consumer needs.

However, two interviewees were concerned that using AR in-store to virtually try items on in a public setting would have adverse effects psychologically in terms of users feeling embarrassed. This suggests that virtually trying products on public is not yet accepted as social norm and it could be difficult
for retailers to break these barriers. This indicates that implementing AR in-store via VFRs may not be the best option for fashion retailers.

The findings also show that if brands are going to introduce AR to consumers it needs to be based upon a good idea/ have purpose. In addition to being useful it needs to be easy to use, which could otherwise lead to the rejection of AR technology. This supports the framework for technology acceptance in fashion retailing, which suggests that ease of use is essential in the design of AR (Huang and Liao, 2014) as discussed in the literature review.

According to participant ‘A’ the co-founder of a creative studio, if AR is accepted by consumers, a design feature that could enhance the success of the technology is a social feature which enables consumers to share their experience via social media. This will not only encourage more consumers to engage with the brand but organic growth amongst consumers is likely to encourage consumers to trust AR technology. These findings are important in terms of the research aim as it shows how AR can be used as part of a social media marketing strategy.

Theme 3:

Figure 10: Theme 3 – Commercialisation

Figure 10 shows that a reoccurring theme from the data collected is how AR could be used within a commercial context. The first factor relates to how brands could implement AR. Despite participant ‘B’ expressing some concerns of AR being viewed as a fad, all participants said that if brands were to implement AR it should be used apart of a long term strategy as opposed to a short term strategy. This suggests that AR has the potential to work as part
of a sustainable marketing strategy; therefore it would be worth the investment. The findings indicate that brands can implement AR for a few thousand pounds; this varies depending upon on the chosen channel of application and the level of quality. For example third party app platforms such as Blippar are very expensive whereas hiring a developer to create web and mobile applications for in house use is fairly low cost. This suggests that implementing AR would be difficult for small or independent fashion retailers; however it would be an easy option and a small investment for big brand names.

The data collected also indicated that one of the most important aspects to consider when commercialising a technology like AR is purpose. In order for fashion retailers to make a return on their investment, they must ensure that the technology serves a specific purpose that will benefit the consumer, as well as benefiting the sales and marketing goals of that particular brand.

A significant finding from the interviews is that AR could be successfully applied and integrated using all channels particularly mobile and in-store application. However, the data collected indicated that AR is less likely to work in a commercial context if it is used to solve problems regarding the fit of clothing, in comparison to implementing AR to enhance experience. This is also supported by the findings from the questionnaires which found that two thirds of respondents agreed that they would have a more enjoyable shopping experience if AR was used to increase interactivity such as interactive product displays. Therefore, it can be concluded from the research findings that AR can be used as a sales and marketing strategy within the fashion retailing industry if it implemented by a brand to directly enhance consumer experience by creating an interactive shopping environment.
Chapter 5 Conclusions and Recommendations

5.1 Chapter Overview
This chapter will draw conclusions based upon the secondary research (literature review) and the key primary research findings. This will enable the researcher to assess whether or not the aims and objectives of the research have been met. An evaluation of the research will be used to form recommendations for the further research in the future.

5.2 Conclusions
The aim of this study was to investigate whether AR could be used as a sales and marketing strategy within the fashion retailing industry. The research was segmented into three sections: consumer experience, consumer behaviour and how brands can apply AR in a way which benefits them, all of these areas corresponded with the research objectives.

5.2.1 Objective 1 - Investigating how AR can be used to enhance consumer shopping experiences.

The secondary research suggested that AR is most likely to have the greatest impact upon consumer experience during the ZMOT which occurs during the pre-purchase stage (Lecinski, 2011). The literature also suggests that the main ways AR could enhance experience is by creating an interactive and sensory experience (Kim and Forsythe, 2009). This was supported by the quantitative primary research that found that participants agreed that they would have a more enjoyable shopping experience if retailers used AR to create interactive window displays and virtual catwalks. Therefore, the research objective has been met and it can be concluded that brands could use AR in their marketing activities to improve experience, which subsequently could have a favourable impact upon sales, due to higher engagement levels.
5.2.2 Objective 2 - Analyse how AR influence consumer behaviour in a retail setting

This objective was partially met because the literature and the primary research only analysed two aspects of consumer behaviour, this includes: The decision making process and technology acceptance. The findings from the research suggest that 3-D images would help the decision making process. The quantitative and qualitative findings also validated the technology acceptance framework that relates specifically to using AR in a fashion retail setting (Huang and Liao, 2014). Therefore, AR does affect consumer behaviour in terms of influencing consumers to adopt technology into their shopping activities and by allowing technology to influence their purchase decisions. However, it should be noted that if brands were to implement AR it would only be successful at influencing behaviour if the following design requirements are met:

- Consumers are made aware of the technology
- AR is easily accessed
- AR is simple to use
- The technology is of a high quality

These design requirements are supported by the overarching themes found in the qualitative research which include technological considerations such as quality, accessibility and factors relating to user design. However, the research failed to uncover what psychological impacts AR could have on consumers in comparison to other type of digital media or technologies. Particularly as the qualitative research raised issues such as AR having disorientating effects and causing some consumers to feel embarrassed. Therefore, this research rejects the concept of using VFRs this issue will be addressed further in the recommendations part of this chapter.

The research findings reveal that despite fashion retailing being primarily centred upon aesthetics, consumers are adopting more of a service dominant logic as the value of having a positive shopping experience is evidently important. This suggests that perhaps consumers are more likely
to adopt emerging technologies like AR if they feel that it would benefit their shopping experience.

5.2.3 Objective 3 - To evaluate the most effective channels of implementing AR to benefit brands.

After carrying out the research process it became very clear that whilst it is very important to understand the advantages and disadvantages of the various channels in which AR can be used. The underlying issue that would impact upon a brand benefiting from implementing AR is how they chose to use the technology. Therefore, AR can be integrated across multiple channels and as established previously it is most effective when being used to enhance experience, this gives the technology purpose within the fashion retailing industry.

In addition to benefiting consumers by creating an interactive experience, the research findings suggest that fashion retailers will benefit from implementing AR. First of all the findings suggest that AR is more effective when being used as a marketing strategy as opposed to a sales strategy because it focuses upon customer experience management. The research findings indicate that if fashion retailers were to implement AR in theory they could receive the following benefits; improved brand image, positive WOM, customer engagement via social media and increased footfall of customer’s in-store, which could improve profitability. This suggests that if fashion retailers were to implement AR they would receive a good return on investment, therefore the research aim for this project has been met.

5.3 Recommendations
Despite the aims and objectives of this research project being met, there were particular aspects which could be improved upon for future research. One aspect that should be improved is the sampling method and the questionnaires. Convenience sampling was used in this study as method of gaining as many responses as possible; however a limitation of this research project is that it did not collect demographical data such as the respondents
age, gender or location, which meant that the result were generalised and may not be representative of all consumers.

To improve the accuracy and increase the practical value of this research, the sampling frame for the questionnaires should be more specific for example British females between the ages of 18-30, because consumers are not homogenous and therefore this study would benefit from gaining an understanding of what types of consumers AR would appeal to most. This would also solve the issue surrounding the psychological behaviour of consumers. Segmenting consumers would enable the researcher to uncover which consumers are most likely to feel embarrassed/ disorientated and which consumers would embrace AR in their shopping activities. Furthermore future research should also segment the market for example high street fashion retailers and luxury fashion retailers; this would help retailers decide whether implementing AR is appropriate for where they are positioned within the market.

In terms of how brands will benefit from implementing AR as a strategy in fashion retailing the conclusion is derived from the literature review and the research findings. However, this is based upon hypothetical interpretations, future research would benefit if a brand trialled AR in the ways suggested in this research and then recorded the outcome to increase the overall practical value of this research.
Chapter 6 Appendices

Appendix 1 - The use of AR technology at home, when shopping for clothing online:

This diagram demonstrates how consumers would make use of AR technology at home, when shopping for clothing online. It also shows how consumers can benefit from having an in-store experience in the comfort of their own home.

Appendix 1: Online AR fitting room example (Huang and Hsu Liu, 2014, p.93)
## Appendix 2 - Approved ethics form

### DEVOLVED ETHICS APPROVAL APPLICATION SUMMARY

<table>
<thead>
<tr>
<th>To be completed by student and supervisor before submission to Ethics Approval Panel</th>
<th>Student Signature</th>
<th>Supervisor Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application for ethics approval</td>
<td>[X]</td>
<td>-</td>
</tr>
<tr>
<td>Participant information sheet</td>
<td>[X]</td>
<td>[ ]</td>
</tr>
<tr>
<td>Participant consent form</td>
<td>[X]</td>
<td>[ ]</td>
</tr>
<tr>
<td>Pilot interview/s</td>
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<td>[ ]</td>
</tr>
<tr>
<td>Pilot questionnaire/s</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>Letter/s to participating organisation/s</td>
<td>[X]</td>
<td>[ ]</td>
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</tbody>
</table>

First Submission: [X] Resubmission: [ ]

Date: 10/1/2015

For use by the devolved ethics approval panel:

<table>
<thead>
<tr>
<th>Panel Members</th>
<th>Name</th>
<th>Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module leader:</td>
<td>Barbara Kennedy</td>
<td>[Signature]</td>
</tr>
<tr>
<td>Supervisor:</td>
<td>Kath Mutter</td>
<td>[Signature]</td>
</tr>
<tr>
<td>CSM Ethics Committee Representative:</td>
<td>[Signature]</td>
<td></td>
</tr>
</tbody>
</table>

Date: February 2015

Outcomes:

- Project Approved: [X]
- Project Approved in Principle: [ ]
- Application not ready/ incomplete: [ ] (Decision deferred)

Comments for projects not fully approved:

The original to be retained by the module leader and a copy given to the student.
**Appendix 3- Ethics application**

**CARDIFF METROPOLITAN UNIVERSITY APPLICATION FOR ETHICS APPROVAL**

When undertaking a research or enterprise project, Cardiff Met staff and students are obliged to complete this form in order that the ethics implications of that project may be considered.

If the project requires ethics approval from an external agency such as the NHS or MoD, you will not need to seek additional ethics approval from Cardiff Met. You should however complete Part One of this form and attach a copy of your NHS application in order that your School is aware of the project.

The document *Guidelines for obtaining ethics approval* will help you complete this form. It is available from the [Cardiff Met website](#).

Once you have completed the form, sign the declaration and forward to your School Research Ethics Committee.

**PLEASE NOTE:**
Participant recruitment or data collection must not commence until ethics approval has been obtained.

**PART ONE**

<table>
<thead>
<tr>
<th>Name of applicant:</th>
<th>Megan Johnson</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supervisor (if student project):</td>
<td>Kath Mutter</td>
</tr>
<tr>
<td>School:</td>
<td>School of management</td>
</tr>
<tr>
<td>Student number (if applicable):</td>
<td>ST20020975</td>
</tr>
<tr>
<td>Programme enrolled on (if applicable):</td>
<td>BA Hons Marketing Management</td>
</tr>
<tr>
<td>Project Title:</td>
<td>Augmented reality as a sales and marketing strategy in fashion retailing.</td>
</tr>
<tr>
<td>Expected Start Date:</td>
<td>9th February</td>
</tr>
<tr>
<td>Approximate Duration:</td>
<td>1 month</td>
</tr>
<tr>
<td>Funding Body (if applicable):</td>
<td>N/A</td>
</tr>
<tr>
<td>Other researcher(s) working on the project:</td>
<td>N/A</td>
</tr>
<tr>
<td>Will the study involve NHS patients or staff?</td>
<td>No</td>
</tr>
<tr>
<td>Will the study involve taking samples of human origin from participants?</td>
<td>No</td>
</tr>
</tbody>
</table>

In no more than 150 words, give a non-technical summary of the project:

This project is to investigate how the emerging technology Augmented Reality (AR) technology can be used a sales and marketing strategy in fashion retailing. AR has previously been identified as promotional tool; however recent studies have found other uses for AR for example Pachoulakis and Kapetanakis investigated the idea of developing virtual fitting rooms. This project aims to research how AR can be applied to in-store sales, e-commerce and m-commerce, to enhance the
customer shopping experience as well as increasing sales and customer conversion rates. The benefits of this research is that it focuses on an emerging technology, that could be used to benefit both consumers and organisations, this research could also be applied to a host of industries not just fashion retailing.

Does your project fall entirely within one of the following categories:

<table>
<thead>
<tr>
<th>Category</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper based, involving only documents in the public domain</td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>Laboratory based, not involving human participants or human tissue samples</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Practice based not involving human participants (eg curatorial, practice audit)</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Compulsory projects in professional practice (eg Initial Teacher Education)</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

If you have answered YES to any of these questions, no further information regarding your project is required.
If you have answered NO to all of these questions, you must complete Part 2 of this form.

DECLARATION:
I confirm that this project conforms with the Cardiff Met Research Governance Framework

<table>
<thead>
<tr>
<th>Signature of the applicant:</th>
<th>Date: 19th January 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>M. Johnson</td>
<td></td>
</tr>
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</table>

FOR STUDENT PROJECTS ONLY

<table>
<thead>
<tr>
<th>Name of supervisor:</th>
<th>Date:</th>
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<tbody>
<tr>
<td>Kath Mutter</td>
<td></td>
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</tbody>
</table>

Signature of supervisor:

Research Ethics Committee use only

<table>
<thead>
<tr>
<th>Decision reached:</th>
<th>Project approved</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Project approved in principle</td>
</tr>
<tr>
<td></td>
<td>Decision deferred</td>
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<tr>
<td></td>
<td>Project not approved</td>
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<tr>
<td></td>
<td>Project rejected</td>
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Project reference number: 201501800

<table>
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<tr>
<th>Name: J. Jollet</th>
<th>Date: 2015</th>
</tr>
</thead>
</table>

Signature:
PART TWO

A RESEARCH DESIGN

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1 Will you be using an approved protocol in your project?</td>
<td>No</td>
</tr>
<tr>
<td>A2 If yes, please state the name and code of the approved protocol to be used</td>
<td>N/A</td>
</tr>
<tr>
<td>A3 Describe the research design to be used in your project</td>
<td></td>
</tr>
</tbody>
</table>

Research Methods:
The research design for this project will involve using a mixed-methods approach. The first research method will be a quantitative online questionnaire that will use Likert scales, and will be self-administered. The second research approach will be qualitative semi-structured interviews; the initial questions asked in the interview may be subject to change dependent on the results from the questionnaire.

Sample & Sampling:
The online questionnaire sample will consist of both females and males aged 18 over, as the aim of the questionnaires is to understand the perspective of consumers of AR and if it something they would be interested in when shopping specifically for fashion items. The sampling strategy for the questionnaires will be a convenience sample, due to the time available and the anticipated size of the sample being approximately 100 participants, as the more participants the better for quantitative research.

A purposive sampling strategy will be used for the interviews due to the selected sample being industry experts and organisations that offer AR services. This sample has been selected because the aim of the interview is to gain knowledge and different perspectives from individuals and organisations that have experience and expertise in this field. Due to the selected sample, and the amount of qualitative data that can be drawn from an interview, the anticipated sample size will be of around 5-10 participants.

Recruitment of participants:
As a result of using a convenience sampling strategy the participants for the online questionnaires will be recruited via social media platforms including Facebook, Twitter and LinkedIn, where if they would like to participate they can follow a link to fill out the relevant forms, and be given a brief, before they complete the questionnaire, the estimated time for the completion of the questionnaire is approximately 5-10 minutes.

The participants for the interviews will be sent a formal letter via email (using my student email address), inviting them to participate, should they respond confirming that they would like to take part, then all the necessary details, and consent forms will be sent to them. If possible all interviews will take place over a seven day period, and the estimated time for each interview will be approximately 30 minutes.

Analytical techniques:
The data from the questionnaires will be analysed using a descriptive statistics approach, this technique has been selected based upon the use of Likert scales within the questionnaire for example 50% said that they strongly agree...

---

1 An Approved Protocol is one which has been approved by Cardiff Met to be used under supervision of designated members of staff; a list of approved protocols can be found on the Cardiff Met website here
CARDIFF METROPOLITAN UNIVERSITY
APPLICATION FOR ETHICS APPROVAL

The qualitative data drawn from the interviews will be analysed by manually using emerging themes/thematic analysis techniques. This technique has been selected so that the overall themes that have been generated from experts in the field can be discussed and used to draw conclusions.

<table>
<thead>
<tr>
<th>A4 Will the project involve deceptive or covert research?</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>A5 If yes, give a rationale for the use of deceptive or covert research</td>
<td>N/A</td>
</tr>
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</table>

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<thead>
<tr>
<th>B PREVIOUS EXPERIENCE</th>
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<tr>
<td>B1 What previous experience of research involving human participants relevant to this project do you have?</td>
</tr>
<tr>
<td>No relevant experience.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>B2 Student project only</th>
</tr>
</thead>
<tbody>
<tr>
<td>What previous experience of research involving human participants relevant to this project does your supervisor have?</td>
</tr>
<tr>
<td>My supervisor is a member of Academic faculty within Cardiff Metropolitan University. In this role they meet University requirements and standards for undergraduate dissertation supervision including research involving human participants.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>C POTENTIAL RISKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1 What potential risks do you foresee?</td>
</tr>
<tr>
<td>The participants who complete the questionnaire may not understand what augmented reality technology is, which could make them feel uncomfortable when completing the questionnaire, and it could affect the outcome of the overall project.</td>
</tr>
<tr>
<td>If businesses allow me (the researcher) to interview them on their premises they may feel uncomfortable discussing projects that they have worked that may concern their clients, therefore there is a risk that the interviewees drop out.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>C2 How will you deal with the potential risks?</th>
</tr>
</thead>
<tbody>
<tr>
<td>As the questionnaire is an online questionnaire, before participants can begin the answering the questions, an informational video explaining what augmented reality is will be embedded into the questionnaire (or participants will be given a link to the video).</td>
</tr>
<tr>
<td>To lower the risk of businesses and experts feeling anxious about sharing information, there will be the interviewees will be given the option no name policy, this means that when discussing the themes that were found in the interview, participants names will not be referred to for example both participant A and C said that ..., this will also include discussing names of their clients within the interview, no direct names will be referred to, all interviewees will receive an information sheet explaining this, so they can state their preferences.</td>
</tr>
</tbody>
</table>

When submitting your application you **MUST** attach a copy of the following:

- All information sheets
- Consent/assent form(s)
Appendix 4 - Pilot questionnaire

School of Management, Cardiff Metropolitan University

Augmented Reality (AR) as a sales and marketing strategy in fashion retailing

This project has received the approval of Cardiff School of Managements’ Ethics Committee, Cardiff Metropolitan University

I understand that my participation in this project will involve completing a questionnaire about short description of the project aim which will take approximately 10 minutes of my time.

I understand that participation in this study is entirely voluntary and that I can withdraw from the study at any time without giving a reason or I can discuss my concerns with Megan Johnson (st20020975@cardiffmet.ac.uk).

I understand that any identifying information provided by me will be held confidentially, such that only the PI (Megan Johnson) can trace this information back to me individually.

I understand that my data will be stored on password protected computers, anonymised after completion of the survey and that no one will be able to trace my information back to me. The raw data will be retained for up to three years when it will be deleted/destroyed.

If you are 18 years of age or over, understand the statement above and freely consent to participate in this study please tick the consent box to proceed.

☐ Consent box

Thank you very much for helping us with this project and participating in the research.
N.B Before beginning this questionnaire you will need to understand what Augmented Reality (AR) is. Please click the link below to view an informational video. <Link/ embedded video will made by the research and embedded here>

*Clothing and other fashion accessories includes; shoes, jewellery, handbags, sunglasses*

To complete the questionnaire please click on the box that applies:

1. When shopping online I find it difficult to grasp what a product is actually like due to only being able to view a 2D image.

   - [ ] Strongly Disagree
   - [ ] Disagree
   - [ ] Neutral
   - [ ] Agree
   - [ ] Strongly Agree

2. I feel that 3-D images would help my decision making when shopping online and from my mobile.

   - [ ] Strongly Disagree
   - [ ] Disagree
   - [ ] Neutral
   - [ ] Agree
   - [ ] Strongly Agree

3. I would like to be able to try Clothes and other fashion accessories on via my webcam / phone camera before purchasing them.

   - [ ] Strongly Disagree
   - [ ] Disagree
   - [ ] Neutral
   - [ ] Agree
   - [ ] Strongly Agree

4. Being able to have an in-store experience at home or on the go would be convenient for me.

   - [ ] Strongly Disagree
   - [ ] Disagree
   - [ ] Neutral
   - [ ] Agree
   - [ ] Strongly Agree

5. My attitude towards a brand would become more positive if they offered an AR shopping experience.

   - [ ] Strongly Disagree
   - [ ] Disagree
   - [ ] Neutral
   - [ ] Agree
   - [ ] Strongly Agree

6. I think that using AR technology at home would be a difficult process.

   - [ ] Strongly Disagree
   - [ ] Disagree
   - [ ] Neutral
   - [ ] Agree
   - [ ] Strongly Agree
7. I would like to use virtual fitting room's in-store that fit clothes to my body type and allow me to view different colour options.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

8. I would have a more enjoyable in-store shopping experience, if there were interactive window displays and virtual catwalks.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

9. AR is a trustworthy technology in terms of producing authentic visual simulations.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

10. I feel that if AR shopping experiences (from multiple channels) I would use them on a regular basis, when shopping for clothing and other fashion items.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

To access the informational video that was embedding into the online questionnaire please visit: [https://www.youtube.com/watch?v=du1zYh4_BOU](https://www.youtube.com/watch?v=du1zYh4_BOU)
Appendix 5 - Letter to an organisation

Dear Director,

I am an undergraduate student at Cardiff Metropolitan University. The title of my research is Augmented Reality (AR) as a sales and marketing strategy in fashion retailing. Its aim is to see how AR technology could be implemented to this industry, and how this could enhance consumers shopping experience in addition to benefitting organisations. As part of my research I would like to undertake research with people who are employed in the marketing industry or people who have experience with augmented reality, whether that be in the digital marketing industry or through advanced research. I am writing to you because Sugar Creative studio fits the profile of this type of organisation and also employs a sufficient number of employees so as to provide a large enough number of potential participants. Before any primary data is collected this project will have been approved by Cardiff Metropolitan University and all data collection will be in accordance with the university’s ethics code of practice.

My purpose in writing is to ask if you would permit me to interview your employees. Their participation would be entirely voluntary, neither they nor the company would be identified in the research and it would approximately 30 minutes for each employee to complete the interview. There is not a minimum number of interviews that I would like to conduct, I would be extremely grateful if I could even interview just one employee.

The areas which would be covered by the interview include:
- Your experience with using / developing AR technology
- The implementation of AR technology in the retail industry
- AR and the customer shopping experience
- AR and the benefits / barriers to organisations

I shall be very happy to make the results of my research available to you as a participant in the research when it is complete. If you would like to participate in this project and or are interested in discussing it further please contact me.

Thank you in anticipation.

Yours sincerely,

Megan Johnson

Cardiff Metropolitan St20020975@cardiffmet.ac.uk
Appendix 6 - Participant information sheet (Interviews)

Participant information Sheet

Augmented reality as a sales and marketing strategy in fashion retailing.

Project summary
The purpose of this research project is to establish how Augmented Reality (AR) technology can be integrated into the fashion industry as an Omni-channel retailing option, as well as investigating how AR can be used to enhance the consumer's shopping experience, in addition to being used as a strategy to increase Return On Investment (ROI) and customer conversion rates.

Why have you been asked to participate?
You have been asked to participate as you have been identified as an expert / have experience that is related to an area that is being researched, which fits the profile of the population being studied.

The interview in which you have been invited to participate in, will be approximately 30 minutes long, and the aim of the interview is to share your thoughts on how AR can be implemented in the retailing industry as a sales and marketing strategy, and what the key benefits are, and equally what issues there may be.

Your participation is entirely voluntary and you may withdraw at any time.

Project Risks
The research involves an interview which will be recorded for later analysis. We are not seeking to collect any sensitive data on you nor your clients, this research is based on your opinions and experiences in the area that is being researched. During the analysis and reporting of the results no names will be referred to, so that your identity is kept confidential. We do not think that there are any significant risks associated with this study. However, if you do feel that any of the questions are inappropriate then you can stop at any time. Furthermore, you can change your mind and withdraw from the study at any time – we will completely respect your decision.
How we protect your Privacy

All the information you provide will be held in confidence. We have taken careful steps to make sure that you cannot be directly identified from the interview form; there is no information in these interviews that will identify you. Your personal details (e.g. signature on the consent form) will be kept in secure locations by the research team. When we have finished the study and analysed all the information, all the documentation used to gather the data will be destroyed. The recordings of the interview will also be held in a secure and confidential environment during the study and destroyed when it is complete.

YOU WILL BE OFFERED A COPY OF THIS INFORMATION SHEET TO KEEP

If you require any further information about this project then please contact:

Megan Johnson, Email: st20020975@cardiffmet.ac.uk

Cardiff Metropolitan University Tel: +44(0)29 2041
Appendix 7 – Participant consent form (Interviews)

Participant Consent Form

Cardiff Metropolitan University Ethics Reference Number:  
Participant name or Study ID Number:  
Title of Project: Augmented Reality (AR) as a sales and marketing strategy in the fashion retailing industry  
Name of Researcher: Megan Johnson

Participant to complete this section: Please initial each box.

1. I confirm that I have read and understand the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason.

3. I agree to take part in the above study.

4. I agree to the interview / focus group / consultation being audio recorded.

5. I agree to the use of anonymised quotes in publications

__________________________  Date
Signature of Participant

__________________________
Name of person taking consent  Date

__________________________
Signature of person taking consent
## Appendix 8 – Pilot Semi-Structured interview

<table>
<thead>
<tr>
<th>Order of Semi-Structured interview</th>
<th>Discussed</th>
<th>Related to question</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Ask respondent approval to use recording systems</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ask respondent to sign and acknowledge consent form</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2) Ask Background questions</td>
<td></td>
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<tr>
<td>Confirm information about;</td>
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<td></td>
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<tr>
<td>• Name of the organisation</td>
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<tr>
<td>• Respondent’s position</td>
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<tr>
<td>• Years working for the organisation</td>
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<tr>
<td>• Level of study</td>
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<tr>
<td>3) Discuss about Experience</td>
<td></td>
<td></td>
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<tr>
<td>Probes:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• When did you first learn about augmented reality?</td>
<td></td>
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<tr>
<td>• Have you ever used/experienced augmented reality yourself? If so in what context.</td>
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<tr>
<td>• Have you ever produced your own augmented reality model? If so in wanted context, and what was your experience?</td>
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<tr>
<td>• How many of your clients have enquired about augmented reality/ asked you to produce something using this technology? If so what were they hoping to achieve by using this technology?</td>
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<tr>
<td>4) Discuss using Augmented reality in isolation vs Omni-channel retailing</td>
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<tr>
<td>• What are the most popular channels for using augmented reality technology?</td>
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<tr>
<td>• In your opinion what would be the best way to</td>
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</table>
implement augmented reality into a retail situation.

- How can companies integrate augmented reality into their business?

- In terms of sales and marketing strategies, is augmented reality something that is generally used in isolation / as a short term strategy? Or in contrast is augmented reality invested in as a long term strategy.

- Hypothetically if you were going to apply augmented reality to fashion retailing, which out of the following channels would you consider: e-commerce, m-commerce or in-store use? And why?

5) Identify ways in which Augmented reality technology can be used to enhance consumer shopping experiences

- In what ways do you feel the use of augmented reality affects consumers' behaviour? Does this vary in comparison to traditional methods?

- In terms of fashion retailing do you think augmented reality would be an effective tool for communicating to customers? ... And solving customer problems for example fit, and product descriptions?

- Do you think augmented reality is a technology that will be accepted by consumers?

- What are the potential benefits and issues of using augmenting reality as a sales and marketing strategy?

6) Discussion on how augmented reality can benefit companies.

- Is augmented reality generally an expensive
<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
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<tbody>
<tr>
<td>Is there any cases in which augmented reality has significantly increased the return on investment for a business?</td>
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<tr>
<td>&amp; in contrast without stating the name of the business / client is there any cases where businesses who have tried to implement augmented reality failed?</td>
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<tr>
<td>Are there any tips that you would suggest in terms of increasing the chances of businesses making a good return on investment, when implementing augmented reality in to their sales and marketing strategy?</td>
<td></td>
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<tr>
<td>With fashion retailing in mind, do you think there are any ways in which augmented reality could be used to increase customer conversion rates?</td>
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Ask the participant if there is any additional information that would like to add
Thank Participants for their time, and debrief them by reminding them that they contact me with any questions regarding the research.
Appendix 9 – Signed Consent forms
(Print name covered to protect identity)
Participant Consent Form

Cardiff Metropolitan University Ethics Reference Number: 201501800

Participant name or Study ID Number:

Title of Project: Augmented Reality (AR) as a sales and marketing strategy in the fashion retailing industry

Name of Researcher: Megan Johnson

Participant to complete this section: Please tick each box.

1. I confirm that I have read and understand the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason.

3. I agree to take part in the above study.

4. I agree to the interview / focus group / consultation being audio recorded.

5. I agree to the use of anonymised quotes in publications

Signature of Participant

Date 18/3/2015

Name of person taking consent

Date 18/3/2015

Signature of person taking consent
Participant Consent Form

Cardiff Metropolitan University Ethics Reference Number: 201501800

Participant name or Study ID Number:

Title of Project: Augmented Reality (AR) as a sales and marketing strategy in the fashion retailing industry

Name of Researcher: Megan Johnson

Participant to complete this section: Please tick each box.

1. I confirm that I have read and understand the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily. [ ]

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason. [ ]

3. I agree to take part in the above study. [ ]

4. I agree to the interview / focus group / consultation being audio recorded. [ ]

5. I agree to the use of anonymised quotes in publications. [ ]

-------------------------------------------------------------

Signature of Participant: ________________________________ Date: 30/01/15

Name of person taking consent: ___________________________ Date: 30/01/12/12

Signature of person taking consent: _______________________
Appendix 10 – Interview transcript 1 – Participant A:

Interview 1 – Participant A - 16/03/2015

{Participant has read the information sheet & signed the consent form}

Introduction to recording:

Today is the 16th March I name is Megan Johnson and I will be interviewing [X] from [X] creative studio. First of all I would like to thank you for your time, going to begin by explaining a little bit about myself, I am a final year marketing management student, my research project is on Augmented Reality (AR) and how it can be used as a sales and marketing strategy within the fashion retailing industry.

1. So I am going to begin by asking you a few questions about yourself: how long have you been working in this organisation, what your position is and what is your level of study or if you studied at all?

Well this is my business with my business partner [X], and we are completing our sixth year now, but we are going into our seventh year in April. It all began with my background in design and print, and [X] background is in web development and producing 3-D images. We worked in the same agency for about four or five years together and we left independently, but we kept in touch and one day started talking about work and whether he could take some of my projects on and if I could take some of his projects on which led to us thinking start something new and so it was all a bit of a risk. We started just in an office just down the road, it was a tiny little place and so we’ve now got five people altogether, and we still offer web design print and development and then we started doing video, mobile apps and augmented reality. We offer quite a lot and often find that we are picking up a lot of jobs which keeps everything interesting.

2. So your experience and work is really varied?

Exactly, we concentrate a lot on design, make sure that it looks really good and then it doesn’t matter what media it goes across on. Augmented reality is still in its infancy and it has its limitations but we know that, that is just a teething problem.

3. So do you feel that AR has not taken off yet?

Well once people see it they get it, but trying to explain it to somebody in a seminar I normally get a load of blank faces until I get the demo out and then people are like ‘ah right’, they understand, it is just because augmented reality is quite a weird word.

So my background then; I didn’t go to college, I was going to but I got a job in a photo retouching place and thought that is kind of what I want to do anyway and so sort of pursued that and then that job led to handling designers files in a printers again I was seeing lots of designs being done so it was really good experience. I learnt how the print trade works and the technical side of things as well, such as how the ink sits on the paper, how long it needs to sink and about paper stocks, which was good knowledge to have. I then tried my own hand at it and made mistakes but I then got taken on by a graphic design firm at the very bottom of ladder and then I worked my way up.
The last time I was employed by a company I left as senior designer and then I came here and set this up. I think that design is something you need experience in, getting that first rung on the ladder is something that is really important. Two of the guys we have here we have taken straight out of university, we try to give them jobs when they are ready.

4. That’s really good, because my background is marketing and I have undertaken internships in blogging and PR, I would say that my knowledge is fairly good but I am starting to notice that I don’t quite have the technical skills that many creative studios require so that is something I am looking to develop myself.

Well that is good because there are jobs that I would give those guys now that I wouldn’t have been able to give them about a year or so ago, you just need to be given the opportunity to build up to it slowly.

5. Okay, when did you first year about AR?

A couple of years ago, maybe even in our first year… so about five or six years ago. It was really in its infancy then, where you could use your webcam to shine something in front of it and something would appear and it helped that (X) is good with 3-D models but it has come a long way since then.

6. I understand if you cannot tell me information about clients as it may be sensitive, but do you have many clients ask for AR? Or is it still something they don’t really know about?

No that is not a problem I can definitely tell you about my clients. Not many of them know about AR and it something that they have to see a need for. The latest ones we have done are for Monmouthshire county council and the priory at Abergavenny. In Abergavenny they have these tombs but they can’t run a tour guide and so they wanted to have augmented reality videos. So went in there and 3-D scanned a couple of tombs and artefacts, which we then created a 3-D model and above the model is a video that played with a presenter, basically telling you about why this artefact is here and its significance. We used a third party app for that because we wanted to keep it lightweight and it is both IOS and android friendly. So people could come in pick up a couple of cards scan it and a 3-D model would appear, they wanted that wow factor.

Another one we have done is for Bridgend county councils; there are lots of councils because they all have budgets to spend. That was based upon information on destinations, so they have six hubs in Bridgend on place to go and see like from Porthcawl to a mountain to walks and things like that and they wanted a 3-D map that would animate up by allowing users to have a 360 view and zoom in and out. We created it as if you were in a sphere and could see around the destination my
tilting the camera up or down, they loved this because it was if you be teleported to that place.

I will show demos of the work we have done... That would be great thank you.

{... The demos consisted of explanations of how the technology worked}

7. If a business did not really understand the technology behind AR, would it be easy for them to still implement it? Is AR a technology that is becoming more accessible?

Yeah I think so more and more because there is a lot of help out there to help you create it and it is very easy to use, it manly about having the right idea. We were talking a couple of months ago to a company that makes sunglasses and you can get the software now that recognises eyes, so you could easily make an app that allows users to try the glasses on using a front facing camera.

8. That is really interesting because Ray ban have recently produced something very similar.

There you go; the technology is there it is the matter of having the right idea, so for clothes it is obviously you do a similar thing.

9. When looking at using AR as a sales or marketing strategy, do you think is a short or long term option that people should invest in?

Definitely long term, there is currently a battle between augmented reality and virtual reality. I personally think that AR will win because you are already seeing something you recognise in front of you, whereas with virtual reality there is a disconnect. It remains to be seen, but I think AR will win therefore why wouldn’t you invest it in long term?

10. If you were a fashion retailer how would you incorporate AR? What channels of application would you use?

To begin with I would make a spectacle of it by dedicating an area of the store to AR, rather than relying on people downloading apps on their phone. It would need to be sold as a service and I would have a big screen so that people can see it because if people can see it they invest in it straight away. Whereas asking consumers to download an AR app it is likely they won’t know what it is.

11. Do you think that AR will impact upon consumer’s behaviour?

Of course because there is still that wow factor at the moment, so it is easy to thrill people with what they see. But the challenge will be when people get used to, what
will you do next? The evolution of technology will carry on developing so there will be new things that we can do, but right now it still has that wow factor therefore it not yet saturated.

12. Do you think AR is at a place where it is of good quality to be used for commercial purposes?

Yes and no because different platforms have different qualities. We are affiliated with Metaio and that does have its limitations but it is one of the better platforms and it is an open platform so we can create whatever we want to, whereas some other platforms are more locked down they control what happens and they can be expensive yet you don’t really get a say.

For example with Blippar you have to send them all of your assets with a wish list and they charge about £10,000 to start off with yearly. So for bigger brands they could implement it but for smaller retailers there is no way that AR is going to be viable, particularly as it really a guess in terms of whether it will work or not.

Metaio is only a few hundred pounds to download for the creator version plus any assets that the company would like to create. The quality is getting better, they released an update last year and the 360 AR view that I showed you earlier in the demo, used to be really pixelated and now they are of a much better quality.

13. So would you say that AR is generally expensive for businesses to implement?

Again yes and no because it depends on the platform that they chose to use and if you think about if you are going to ask somebody to download your app, why would you direct them to a platform such as Blippar where they can access apps from other brand. This gives the user the opportunity to ignore your stuff and go off with someone else’s. As a company you want people to stay in your own environment.

14. Can you think of anyone where you your clients have had really good returns from implementing AR, or where AR has been successful?

Yes, it has been successful with the priory one; they have showcased it within visit wales and all around. It is difficult for us to know whether people in the public are engaging with it as we make the technology.

New technology I being embraced in Wales, there is a big buzz about it, a lot of people have go to the priory and used it and thankfully it worked, so that is a successful case we have heard about, because as I said we do not own them we simply produce them. However we can put things in place such as tokens which count how many times the app has been used.
15. Are there any cases where AR has failed/ not worked?

The technology hasn’t failed, we have delivered it to a high quality so it always works but the main issues are not just user engagement but client engagement. Not all of our clients have pushed it, so many people don’t know that it exists, also many people don’t what they have / how to use it they have simply bought it because they have had a budget there to spend.

16. When businesses take AR on, what do you think they are hoping to achieve?

It is mainly to increase footfall, to get people through the door and it is an added bonus to the user’s experience. Most of our clients use it to attract people to their business.

Businesses want share-ability, they want people to tweet it about and then if there business is mentioned they receive more exposure - which is essentially free advertising.

17. Is there any tips you would give a business who wanted to implement AR?

It is about having the right idea, bringing things to life, being creative and letting people know that it is there. Get consumers to share amongst themselves, as they may not trust a business who is trying to share it – organic growth as AR is still a new market; it is not quite mainstream yet so consumers may still be stand offish.

AR can transport people for a single moment and if consumers can associate that experience with your brand then it can give your brand an edge.

18. That is all off my questions, thank you so much for your time, is there anything you would like to add? Or any questions you would like to ask me?

Not particularly, your questions have been great you have covered everything, good luck with your project.
Appendix 11 – Interview 2 transcript – Participant B

Interview 2 – Participant B 18/03/2015

(The participant has read the information sheet and has given consent – this includes consent to be recorded).

Recording introduction:

My name is Megan Johnson from Cardiff Metropolitan University, today is the 18th of March 2015 and I am interviewing [X].

I will begin by introducing myself and what it is that I am researching. First of all I would like to thank you for your time, I am a final year marketing management student and for my dissertation I have chosen to research how Augmented Reality (AR) can use within the fashion retailing industry, please do not worry if you are not interested in fashion retailing, the purpose of this interview is to hear about your expertise and views on AR as a technology, as I have recently read the paper you wrote relating to AR.

1. Would you be able to tell me about yourself, what you do and what your experience is?

I am a part-time lecturer and I also do my own work in the area of creativity and innovation. I teach product design; however I am an engineer by training not a designer, which is why I have a mixed technical background which is where the augmented reality comes in. The two main areas that I have looked at in regards to AR, is how to help develop rapid prototypes, with mainly computer embedded type products. One of the challenges I have faced when looking AR in relation to product develop is how can you embed a screen on to an early stage prototype. We also do a lot of user testing and so we augment the environment to simulate specific set ups is also something that we do. I also have carried out my own research in to AR technology and how it is used, particularly in a mobile space.

2. That’s interesting because user testing is really important to ensure people get the best experience possible. So when did you first hear about AR?

I can’t remember exactly but it was around six or seven years ago.

3. See to me it is something very new, so it is interesting others have known about it for that long. Have you ever used AR yourself and if so in what context?

I have used it for research purposes but I have never used it as a consumer really. Partly because even though I have known about it for a few years, only know has it become robust enough to start using for commercial purposes. Which is why I think
that smartphones are really good devices for AR and is really well suited for AR, so now we are only now starting to see AR emerge.

4. Do you think AR is something that other people know about?

I think it is well known amongst ‘techies’ and has been known for a while. Also people who are interested in gadgets, but I don’t think it is something that is widely used.

5. Despite thinking that AR is not something that is widely used, what do you think are the most popular channels for using AR?

I think that the most interesting and popular channels for using AR, is mainly information based AR services things that you cannot get from looking around and so I would say AR is at its best when being used via a mobile.

One of my key areas of expertise is user design and I do not like the idea of using AR within a store because I personally would be somewhat uncomfortable with people looking at me using AR in a store. However I think everyone was doing it, it would become more norms but to break that social culture would be difficult.

Another channel that I think is interesting is using AR online particularly for retailers, there is a disconnect between will it suit me, people want to go into shops to see what thing are really like and so this puts people off online shopping. Plus using AR in this way would be in a more private setting and so it would work better.

6. You just mentioned about breaking social culture, how do you think AR could impact upon behaviour?

At the moment AR could be viewed as a bit of a fad because it is still really ‘techie’, however I really think there is something in there particularly online where there is a disconnect there is an advantage. I think the main impact will be from ARs interactive elements.

7. In commercial terms, do you think AR could be used as part of a long term strategy?

Well even though AR is very cool, it is still very technically driven, so it may be difficult to get it to take off , apart from pioneers who are interested in gadgets it will be difficult to get the mass market onside to use the technology. For AR to work as a strategy at all it really needs to engage people, it can simply be cool there needs to be a real need for it, that gives people a clear social benefit and AR has not quite achieved that.

I think in terms of retailers using AR they need to think of the fun element, for example if people were to walk past they could see variations of products on
models, so rather me trying on clothes because I would be embarrassed, it would be more fun to see all the possible styles through interactive displays.

From the view of user design social context and psychology is really important factors, it’s about getting this right, because the technology is there and as we said it has been around for a few years now but it just hasn’t delivered yet.

8. Do you think that AR is at a place where it is of good quality for use?

Yes, especially mobile devices have relatively low processing power so they can be used to overlay digital information in a simple way. But if more powerful PCs are being used of static equipment in-stores then quite fancy things can be produced.

9. Would it be expensive for businesses to implement AR?

No, not particularly because the tools are getting more and more available for developers, whereas in the past I you wanted something you had something yourself, whereas now you can get a developer and there are platforms designed especially for creating AR models.

So rather than starting from scratch, you can pay a developer and essentially you are paying for that software development and the hardware to install it, so you are looking thousands but not tens of thousands necessarily.

10. Are there any tips that you could suggest to businesses that are maybe thinking of implementing AR, to ensure it is successful?

That is a difficult question, but technically that one of the problems when looking through a screen is that you lose the sense of depth and so you lose the sense of something being 3-D, this can be disorientating or make people think that it is still not as good as reality which is a difficult problem to solve, so this is a major challenge that businesses need to be aware of, as this can negatively impact upon interactivity.

A friend of my had a music shop and had to close down because he could not compete with the online stores. But what was worse is that people was coming in to his store to look at the instruments before going away and purchasing them online. So effectively he was doing all the marketing or these online stores and so online stores could use AR as way of still keeping their costs low and having a differentiation from a business, but I think using AR in-store could be perceived as a bit of a gimmick.

Thank you so much for your time and sharing that information with me that was all of my questions is there anything you would like to add?

No apart from it may be an idea to consider looking at user design and psychological aspects in your project. It was nice meeting you good luck.
Interview 3 – Participant 3 – 30/03/2015

(introduction has read the information sheet and signed the consent form)

Introduction to the recording:

My name is Megan Johnson, today’s date in the 30th of March and I am interviewing (X) from (X) university. Thank you for taking the time to allow me to interview you today, my name is Megan Johnson, I am a marketing management student from Cardiff Metropolitan University, as you know my dissertation project is based upon Augmented Reality (AR) as I want to find out how it can be used as a sales and marketing strategy within the fashion retailing industry, please do not worry if you are not interested in fashion, I am keen to hear about your knowledge and experience concerning AR.

1. I am going to begin just by asking you tell me about yourself, what you do and what is your level of experience?

I am a lecturer of computer science, I have a widespread background in terms of research but it essentially based upon modelling and control, computational as well as geometrical modelling, which link in to graphics and visualisation so a lot of my work is focused upon engineering application, mainly engineering in quantum technologies. I also work a lot on the side of geometrical modelling, so more of what you would understand as CAD, I also do a lot of general simulations works.

This links in with AR because we also look at human perceptions, so in terms of visuals and computer graphics we are trying to generate photo realistic images. People could argue that your eyes are a camera but they are not a camera in the sense of how you process the information. So we are trying to uncover if trying to reproduce the world in a photo realistic way is really the right approach or should we be looking different types of rendering or graphics to make it easier for humans to understand what it is they are actually seeing on the screen. There are few pieces of evidence that suggest that what you see on a screen you see differently than the real world, this links in to a lot of things but it hasn’t been studied or discussed in quite a lot of detail.

Your peripheral vision really isn’t photo realistic, which relates to AR because with AR you keep most things the same but only change parts and so then you only get
part of the story. It is like when you see yourself in a photograph and you think is that really me because you see yourself differently.

Thank you that is really interesting it is interesting that you say about human perceptions and about how your peripheral vision isn’t photo realistic because I have come across in my research others saying that AR can be disorientating because things do not look the same through a screen.

Yes this is the exact issue that we have been researching.

2. When did you first hear or learn about AR?

Well virtual reality has been around an awfully long time probably since the beginning of the 90’s but virtual reality died off because it didn’t work and then it came back in a variety of ways. Virtual reality is too complicated so people started looking at ways to augment reality instead. I would certainly say it has been around since about 2003 / 2004; the basic idea has probably been around even longer but before the 90’s you really couldn’t do it.

3. So do you think that the technology is now at place where it can simulate authentic visuals? Does it now operate to produce quality visuals?

This is a very difficult question actually because for certain things it may be absolutely sufficient. When you are working on computer models and visualisation I think it is the wrong idea to come in and say we want to create a perfect copy of reality because we can’t we simply can’t. It often isn’t needed you can get away with a simpler version of it, you can get away with simulating the aspect you are interested in and so you can simulate that very accurately. Something that relates to your topic is fabric simulation and that in actual fact is getting there, there are some models that make fabric look fairly realistic.

With AR it can sometime be pixelated but technology is catching up with that, but the difficult question is whether we can overcome the issues of disorientation in terms of people’s perceptions that is the difficult part. People should not be trying to create perfect copies but AR is good enough to give a close impression. Another aspect which links to fashion and what you need to consider is how
people view themselves and what impact will this have on how they perceive the
good of AR in terms of using AR to try clothing on. Using AR for fit purposes
could also be challenging because you may see your head and two arms sticking
out of a jumper that doesn’t mean that it fits, so it is more about the visual
representation.

That is an interesting point because I have looked at how AR could be used
regarding problems concerning the fit of a product and some companies
have started using magic mirrors / virtual fitting rooms.

From a mirror they can use the silhouette to get a reasonable good idea of the fit
because it will be programmed with sizes that are based upon averages and
statistical data but an issue is that sizes vary from shop to shop, in terms of using
virtual fittings rooms for a 3-d view it would be way off, particularly when you go in
to more complicated cuts. So in terms of overlaying outfits on to people the
technology is there but in terms of using AR for fittings there is a lot more
development required.

Another thing to consider is if one company makes everything from production
that it can use the technology their selves but as soon as loads of shops start
trying to do the same thing then standards for sizing, colours etc. will need to be
established, which will be a very long process.

4. In terms of behaviour, do you think AR is a technology that will be
accepted?

It depends on how simple you make it but you can make it acceptable so that
people would use it. It is how you roll things out, however horrible the company
but one thing Apple got right is getting people to use things even though they
have no idea how it works. If you use it in a shop the good thing is that the
technology will be there for people and you can direct them so for example stand
here, do this...

For me I don’t like shopping so I want to spend as little time in the shop, I
normally go in with an idea of what I want, so if it speeded up the process and I
come out with what I wanted then I would use it and if I could use it online and it
was even faster that would be even better. However there may be people that
want the whole experience and the interactivity, it reminds me of one of my friends who goes to shops tries things on then reserves it, then goes to other shops to try things on and then ends up going back to buy what she originally tired on. So ultimately it depends on the results, do you get a better product? One that fits better can you do it faster and more efficiently?

An interesting idea would be if you could browse the various warehouses of shops from one location using AR in this way. I certainly think that if it is rolled out in the way particularly not in too much of a geeky complicated technical way, then using AR for shopping could really work but you would need to have the people that know how to set that up. However even though I don’t care one thing to be wary of is people may be concerned about privacy issues, although I suppose your body measurements are not top secret data, it could still be an issue.

5. What would you say would be the easiest or cheapest way implement AR?

From a consumer perspective it would probably be good to have it home, if you could also use the technology for other things and it would save time as you could efficiently browse website without having to go to shops to look at the product but it depends on the customer.

In principle I would roll it out across all platforms, so that consumers can access it everywhere to decide what the best method of application is. I think it would best to implement AR for shopping purposes via mobile phones because it would enable consumers to take their measurements and the other data around with them.

In terms of costs for implementing it in-store, projectors are not that expensive anymore, it is virtually what resolution you are going for and how colour accurate you want to be and yeah that is a quality issue, that is a bit like the high end store V.S the low end store, in principle it is the exactly the same. Stores could use LED panels, this is an easier option and can be equally as a good and cheaper than projectors. Projectors have loads of issues of properly setting them up it is actually easier to put some panels up, it could be £2000 / 3000 for a 4k display.
with a reasonable size, it may be more expensive but it is coming down and for a larger store that is not a huge investment. I think that it needs to be integrating and standardized across stores because if each different store uses different models it could be annoying having to input your measurements in each time, unless you have one favourite store. Standardizing would also reduce costs in the long run because everyone would be using the same model.

6. Thank you so much you have given me lots of ideas and raised some issues that I hadn’t thought of, that is all my questions is there anything else you would like to add?

Well I am to of helped you, there is nothing else I would like to add, thank you made me look at AR from a different angle also.


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