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AUGMENTED REALITY AS A MARKETING RESEARCH TOOL

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ABSTRACT

Augmented Reality (AR) is a promising and emerging technology in marketing. Nevertheless, little is known about its application in marketing research. The following study aims to evidence AR potential in this field through three different approaches: a previous literature revision about AR, a systematic literature review in the form of bibliometric analysis about AR in marketing and an empirical study based on an exhaustive website content analysis about AR in marketing research. Literature revision explains AR features and proves its increasing adoption. The bibliometric analysis has revealed that this topic lacks a cohesive academic framework while there are numerous publications about AR in other marketing areas all over the world. Furthermore, website content analysis exposes generalized interest in this technology by the market research industry but not a widespread usage. These results show the opportunity for innovative market research companies of all sizes to differentiate from their competitors applying this technology to their solutions. Future directions of AR as a marketing research tool are also explored.

KEYWORDS

Augmented Reality, Virtual Environments, Marketing Research, Immersive Research

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INTRODUCTION

Global pandemic has completely changed buying habits and selling options. 30% of consumers in Spain are willing to buy more often online since Covid-19 (EAE, 2020). With not only more consumers relying on the web to source their goods but also upcoming restrictions and inconveniences at stores, such as the impossibility to try or touch the same product as the previous customer, Augmented Reality (AR) will shift to necessity. Already developed AR applications —such as virtual mirrors (consumers can see themselves wearing virtual apparel), furniture demos (apps that allow buyers to see how furniture would look in their surroundings) or virtual makeup try-on—-, and new AR applications, will boost purchase confidence both online and at the physical point of sale benefiting retailers value propositions in challenging situations as the one we are currently experiencing.

This are only examples of the possibilities of AR in retail marketing, nonetheless this technology is being exploited in numerous sectors and steps of the marketing process. For instance, consumers' interactions with virtual products (such as clothes, furniture and makeup) will enable business-to-consumer market researchers to gain insights about consumer preferences and to design a customer-driven marketing strategy. In fact, given the advantages of AR to predict real world behaviour and the ease to reproduce alternative realistic scenarios, this technology could disrupt traditional research techniques like surveys, lab experiments or focus groups, and become a marketing research tool.

This kind of promising opportunities justify the selected spotlight of this project that focuses on the potential of AR in the first step of the marketing process: understanding consumers and the marketplace.

This project is structured as follows. The first chapter focuses on explaining what AR is, what types of AR exist, how it can be enjoyed and what is its expected outlook. Second chapter presents an empirical study based on the use of AR as a marketing research tool. First of all, it delineates the research problem, research questions and the research design. Then, it analyses and discusses where the academic interest is going regarding AR and marketing in general through a bibliometric analysis. Finally, it includes an exploratory research which consists of an analysis of the web content of the most innovative companies in marketing research. The results of the study allow conclusions to be drawn about what type of companies are using this technology, for what purposes and how widespread its application is. These conclusions, as well as their respective implications, limitations and future avenues of research, are set out in the last chapter of this final dissertation.

1   AUGMENTED REALITY DEFINITION

The key advantage that accurately defines Augmented Reality (AR) is its capacity of directly linking the physical real-world and the virtual information about that reality (Schmalstieg and Hollerer, 2016). Apart from the link real world-virtual world, another crucial characteristic of AR is that it is interactive in real-time. Additionally, it is registered in 3D (Carmigniani *et al.*, 2011). This 3D instant combination of the real and virtual world in just one experience opens a whole world of possibilities and applications in fields such as medicine, education, engineering, retail experiences, marketing or gaming, among others.

An accurate definition of AR could be the following one:

> AR is an interactive technology that modifies physical surroundings with superimposed virtual elements. This virtual layer, placed between the physical environments and the user, can add textual information, images, videos or other virtual items to the person's viewing of the physical environment. The devices that enable such superimposition can be smartphones or tablets, wearables[...], fixed interactive screens or projectors (Javornik, 2016, p. 4).

Once that AR concept and the three basic features that are present in every form of AR are clear, it is required to have a look at the variations within this technology. The following section introduces a common division resulted from those variations.

1.1   TYPES OF AUGMENTED REALITY

The most common classification of AR is based on markers (Katiyar *et al.*, 2015), which can be paper-based or physical objects that exist in the real world that trigger the virtual experience. We can differentiate between two types of AR (Cheng *et al.*, 2017): Marker AR and Markerless AR

1.1.1   Marker Augmented Reality

Marker-based AR consists of an image where the virtual asset is placed after being scanned with a camera. In other words, a marker is any distinctive printed picture that can be recognized by a device. While they are typically logos or black and white images similar to QR codes (see Figure 1), they may include a wide range of different pictures. In this regard, it should be noticed that these markers may affect the naturalness of the experience which distinguishes the AR itself.

Figure 1: Examples of Augmented Reality markers

Source: Dorribo-Camba and Contero (2013)

1.1.2   Markerless Augmented Reality

Markerless AR, like the one used in Figure 2, relies on technology systems that track feature points among its 3D physical surroundings through the camera and enrich them by superimposing virtual information (Young *et al.*, 2017). Markerless AR usually uses some types of localization technology like GPS, Radio Frequency Identification (RFID) and sensors to know the relative position between virtual objects and the real world (Cheng *et al.*, 2017). This means that Markerless AR does not need prior information about the environment where it is going to be implemented and, consequently, users are able to scan any room or environment that surrounds them in that moment and virtually place any object wherever they desire.

Even though the classification according to markers is the most common one, other divisions are also frequent. One type of AR recurrently mentioned is Location-based (Geroimenko, 2012; Edwards-Stewart *et al.*, 2016), which can be considered within this Markerless category due to it does not require markers to be triggered but GPS or position features such as latitude, altitude and longitude.

While this distinction might be more valuable for developers or IT scholars, at a user level, what really sets the difference in the consumers experience is the device where AR is played. Thus, the marketing research strategic implications vary according to them. This issue will be further approached in section 1.2.

Figure 2: Example of a mapping app that uses Markerless Augmented Reality

Source: medium.com

1.2   AUGMENTED REALITY PLATFORMS

This section pretends to set the background about the different devices that exist that enable AR usage as well as give a clue about their current uses for marketing. The following subsections are presented in the same order they were developed over time and intend to show how at the beginning AR could only be used with the aid of special devices, while now everybody with access to the web and a camera can enjoy this technology with the positive consequences that this fact implies, a wider target for the AR marketing strategies.

Before going into this section, it is convenient to clarify the difference between virtual reality and augmented reality. Despite the fact that both AR and VR pursue to provide an immersive, interactive and innovative experience to the user; the former and the latter differ greatly. While AR augments the value of the physic world, VR replaces the real world by a fully computer-generated environment. As a result, users live a less realistic but more immersive experience. Platforms are different from the ones to be explained in the following paragraph, VR can only be experienced with Head-Mounted Displays (HMD) like virtual reality goggles or via CAVE (Cave Automatic Virtual Environment) facilities (Loureiro *et al.*, 2019).

1.2.1   Dedicated Augmented Reality Devices

The first Head Mounted Display (HMD) that enabled AR use was invented in the 60s (Fuchs and Ackerman, 1999). Nowadays, these HMD are as small and simple as normal glasses. These products, such as The Google Glass (see Figure 3), include lens where images are projected directly over the eye of the user who is able to take pictures,

record videos, instantly know the latest news, read his/her email, check the weather forecasting or revise his/her most recent messages, among other utilities.

These kinds of glasses are more commonly used in the B2B sector, however, as it will be further developed in the section 1.3, the usage among consumers is expected to grow which could be translated into a great source of data and, therefore, a useful marketing research tool. If the use of these types of glasses were generalized, these devices would become an excellent way of capturing unconscious natural behaviour at the right moment. Powered by state of art artificial intelligence and object recognition, data could be captured from the outward camera, eye tracking, pupillometric camera, retina tracking and electromagnetic field tracking. (Zakariaie, 2014)

Figure 3: Google Glass Enterprise Edition 2

Source: google.com

1.2.2 Augmented Reality Apps

Thanks to smartphones and apps development, the user base of this technology was significantly expanded. Two of the most used social media, Snapchat and Instagram, use AR (see figure 4). Only considering these two social media, App-based AR has already millions of users. According to Snapchat financial results of 2019 third quarter, it has 210 million of active users (Snap, 2019). This app includes AR filters, also known as lens, that you can use to take pictures or record videos. Instagram has later incorporated the same function on its Instagram Stories that are daily used by not less than 500 million people.

Figure 4: Snapchat and Instagram Augmented Reality filters

Source: Snapchat and Xakata

Moreover, Google and Apple have launched AR Core and AR Kit, which are platforms that enable app developers to include AR experiences on the apps they create.

As a result, many brands have included AR in their marketing campaigns. Some companies have implemented them throw existing successful apps, like Snapchat, while others have incorporated AR to their own apps. The first case is the one that can be seen in Figure 5, where one of the Snapchat lenses created on the occasion of the launch of the "Oreo people: show your playful side" campaign is shown. The campaign consisted in placing a QR code also known as "Snapcode" into 134 million product packets of Oreos so consumers could unlock exclusive lenses as the one shown in the picture and share pictures or videos with their real face and a superimposed Oreo's virtual layout.

Figure 5: One of the Snapchat lenses of Oreo's campaign

Source: Campaign.com

On the contrary, in the image on Figure 6 it can be seen an example of a well-known brand, Gucci, which has introduced augmented reality into its own application in the form of a sneakers try-on function. Thanks to AR, potential buyers can see how the different sneakers collections and designs look in their feet before buying them and without needing to be in a physical store.

Figure 6: Gucci's Sneakers Ace tried on their app
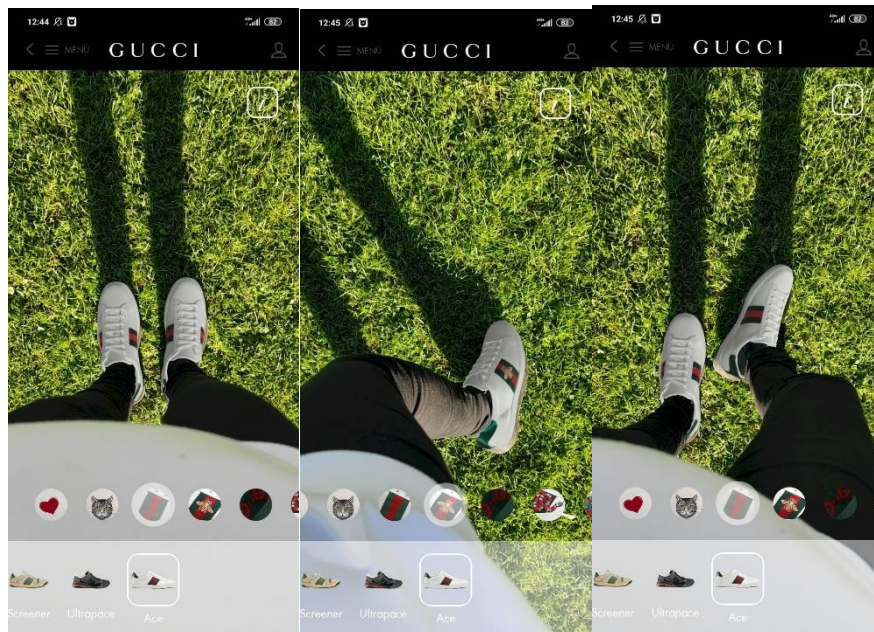
Source: Own elaboration

1.2.3 Web Augmented Reality

Web AR is a currently developing technology that enables users to enjoy AR experiences without needing to download any special app or use any specific browser.

On January 2018 Google posted an article that confirmed their intentions to invest on Web AR: "In the next few months, there will be hundreds of millions of Android and iOS devices that are able to provide augmented reality experiences - meaning you will be able to look at the world through your phone, and place digital objects wherever you look. To help bring this to as many users as possible, we've been exploring how to bring augmented reality to the web platform, so someday anyone with a browser can access this new technology." (Google, 2018)

In the same post they also declared that there was vast potential for Web AR: "It could be used in shopping, education, entertainment, and more. […] There's so much left to explore—from using light estimation to more seamlessly blend 3D objects with the real world, to adding diegetic UI annotations to specific positions on the model. Mobile AR on the web is incredibly fun right now because there's a lot to be discovered."

At this moment, this enterprise is gradually introducing Web AR. In fact, Google Maps currently offers an AR guidance option and Google Chrome browser itself offers an AR life-sized viewer service for some searches (see Figure 7).

Figure 7: Google Chrome search of a great white shark
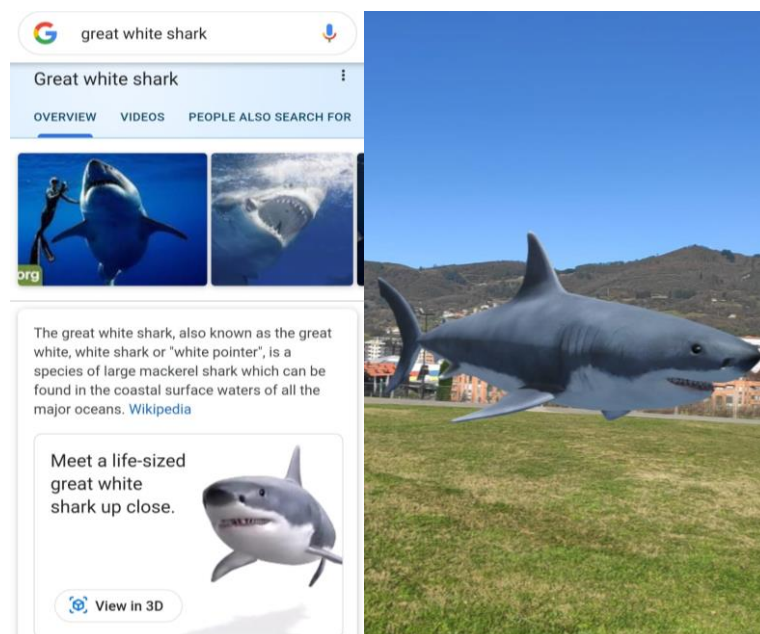
Source: Own elaboration

One of the most common Web AR applications is for previewing products before purchasing them. Web AR considerably eases this function and, therefore, has a promising future for e-commerce. Google's biggest competitor, Apple, is also taking

advantage of AR and it has already used it to attract online sales. Thus, potential consumers can see Mac Pro and Pro Display XDR computers at scale before buying them on Apple website (see Figure 8).

Figure 8: Preview Pro Display XDR from Apple.com
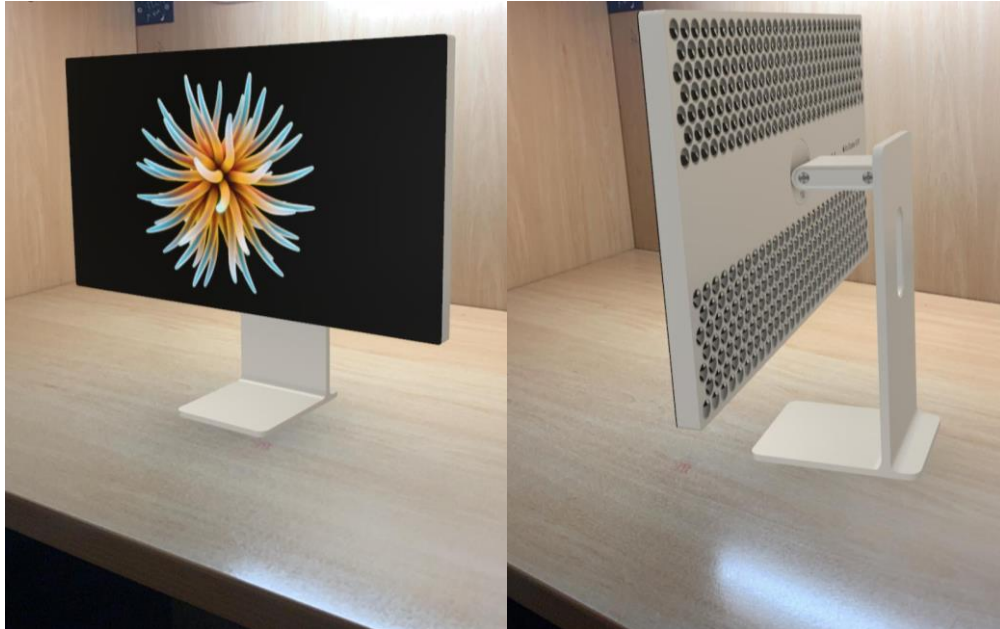
Innovation in this technology over the last few years has gone hand in hand with an increase in potential consumers of the technology and consequently in the size of the market. The potential of this technology in any sector cannot be discussed without first confirming the permanence of this increase over time.

1.3   AUGMENTED REALITY IN FIGURES

The main purpose of this section is to provide data to show the prosperous outlook expected for AR.

As it can be seen in Figure 9, according to Statista sources, the global AR market is presumed to increase until reaching 198 billion U.S. dollars by 2025.

Figure 9: Augmented Reality market size worldwide in 2017, 2018 and 2025 (in billion $)
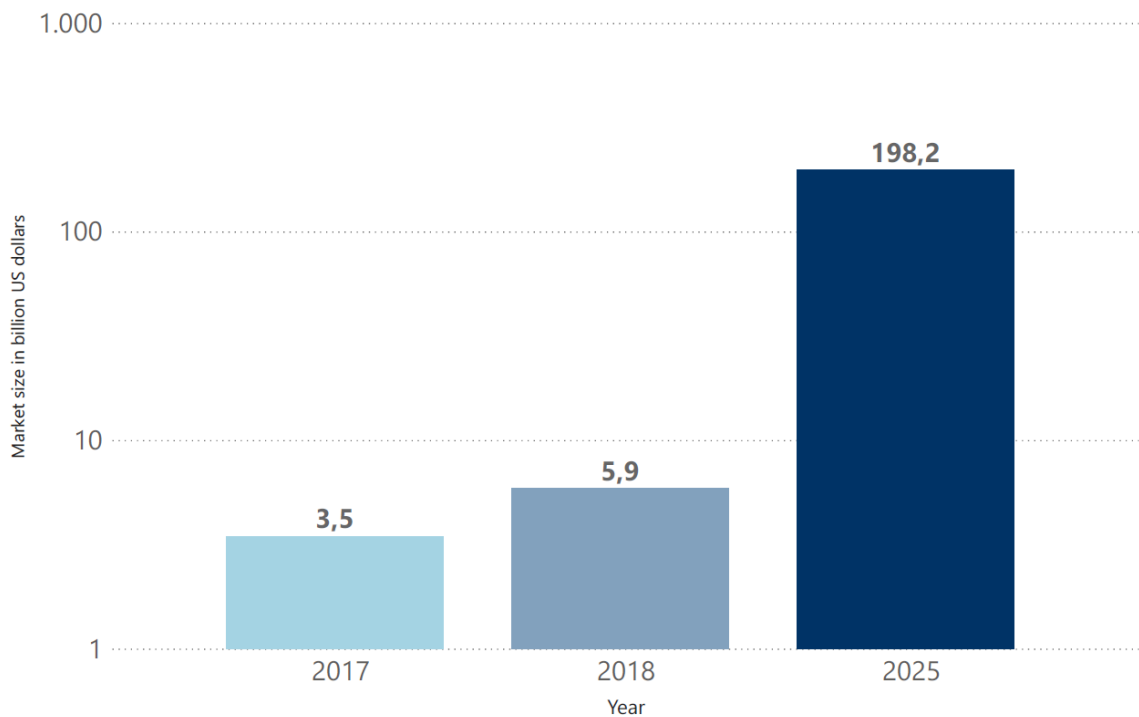
Taking a closer look at user downloads of mobile augmented reality apps, we can observe that they have been growing globally since 2016. In this year, the total number of installed applications with AR held at 340.8 million globally, whereas the consumer downloads worldwide in 2022 is foretold at over 5.5 billion.

In addition to these numbers, worldwide smart glasses purchase units are predicted at over 22 million by 2022. This represents a huge increase in only 6 years, taking into consideration that, as can be seen in Figure 10, the number of augmented reality glasses purchased was 150 thousand in 2016.

Figure 10: Smart Augmented Reality glasses unit shipments worldwide from 2016 to 2022 (in 1000s)
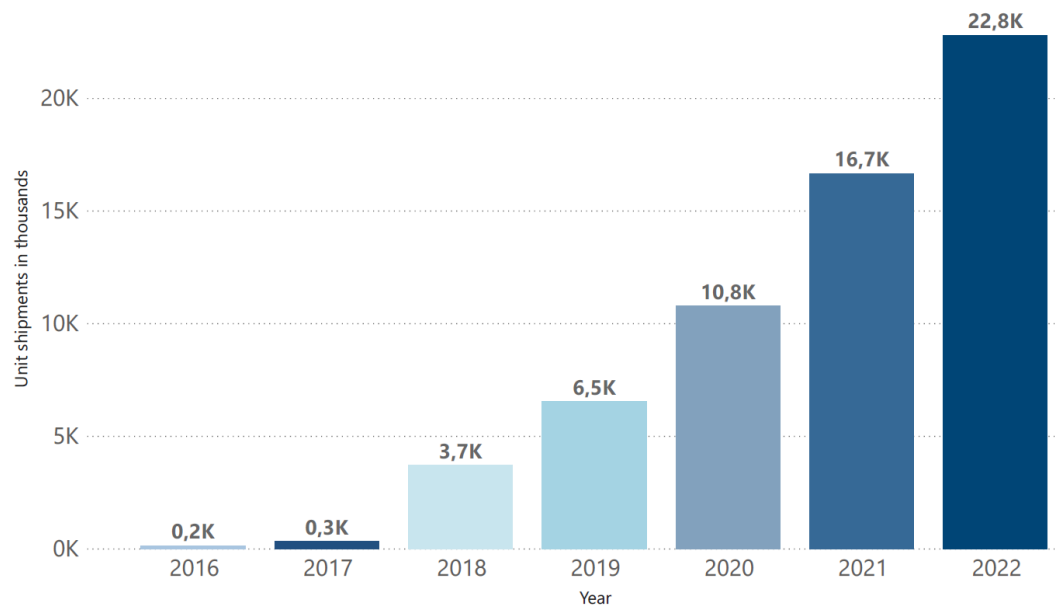
The Augmented, Virtual and Mixed Reality adviser Digi-Capital claims that "AR (mobile AR, smart glasses) could top two and a half billion installed base and $70 billion to $75 billion revenue by 2023" (Digi Capital, 2019).

This company also states that eCommerce seems to be the largest revenue stream of the mobile augmented reality. According to their data, this sector, plus the advertising business, could represent the third part of total AR revenue in the long term.

After setting the theoretical framework concerning this technology and proving its potential in figures, the next chapter of this project discusses the main purpose of this research work: to study the opportunity of using AR in the market research process.

2 AUGMENTED REALITY AND MARKETING RESEARCH

Taking into account the three AR basic features (link real-virtual world, real-time interaction and 3D registration) as well as its increasing usage, this chapter focuses on showing its possible benefit to gather market insights from consumer behaviour.

2.1 OBJECTIVES AND RESEARCH QUESTIONS

Market Research (MR) gives marketers insights about their customers and help them to know whether a price, product, distribution, or promotion strategy is effective or not. As a matter of principle, AR may help this marketing area on the data collection process since it is immersive but realistic at the same time which can facilitate observational or ethnographic research to watch and interact with consumers at their

natural environments. However, it is necessary to study its current application to confirm its benefits for the sector.

Hereby, it can be stated that the research problem raised in this project is: What is the potential of AR in marketing research?

More specifically, it will try to solve the two following Research Questions (RQ):

- RQ1: Which are the most used applications of AR in MR?
- RQ2: Which type of companies are using AR in MR?

To put this issue in context and solve the problem raised, it is necessary to first examine the literature written so far on the utilization of AR in marketing. With this purpose, a systematic literature review will be conducted (Section 2.2). In addition, and in order to provide a more practical perspective, a review of web content will be conducted to show how companies are benefiting from this upcoming technology (Section 2.3).

2.2 BIBLIOMETRIC ANALYSIS

This section describes a framework for research in AR that highlights the touchpoints in the marketing process where AR is having and will have a significant impact among other insights. A systematic review is used to create a concept matrix that focuses on key areas of investigation on AR and related topics that are ripe for development within marketing.

Systematic reviews are an established research approach that reproduces methods and procedures to recognize, select, and critically evaluate a given field of study to set a future agenda and practice in that area. Types of systematic reviews can be: theory-based, theme-based, framework-based, theory-context characteristics-methodology (TCCM)-based, framework and theory development reviews, hybrid-narrative reviews, meta-analysis, morphological analysis and bibliometric analysis (Paul *et al.*, 2020). The last one is the one followed in this section.

To build the initial pool of studies, a search in the Web of Science databases was conducted. An expansive list of search terms was used, such as "Marketing" and "Augment* Reality". They were separated by the Boolean operator "AND". The * has been included to cover not only the word "Augmented" but also its possible variations. The construction of the query as shown in Figure 11 means that the resulting publications might include both the terms "Marketing" and "Augmented Reality" or any other word from the family of "Augmentation" within its abstract, title or keywords.

Regarding the Citation Indexes included in the Web of Science, only the Social Sciences Citation Index (SSCI) has been considered relevant and therefore selected.

The type of documents has been limited to Articles and Reviews while the results have not been restricted neither by languages nor timespan. After this filtering procedure, 49 studies were selected.

Figure 11: Total results and query

Search History:

Set	Results		
		Save History / Create Alert	Open
#1	49	(TS=("Marketing" and "Augment* Reality")) *AND* **DOCUMENT TYPES:** (Article OR Review) *Indexes=SSCI Timespan=All years*	

The terms used allowed to search across literature in several disciplines (Figure 12). Thus, out of these publications the 44.8% are into the Business category, the 24.4% belong to the Hospitality Leisure Sport Tourism, the 14.2% are categorized as Management. 10.2% and 8.1% of the publications account for the Environmental Studies and Psychology Multidisciplinary, respectively. The rest of categories have 3 publications or less. Some of these fields are: Computer Science Information Systems (6.1%), Communication (4.0%) and Education Educational Research (2.0%).

Figure 12: Number of publications per Web of Science category
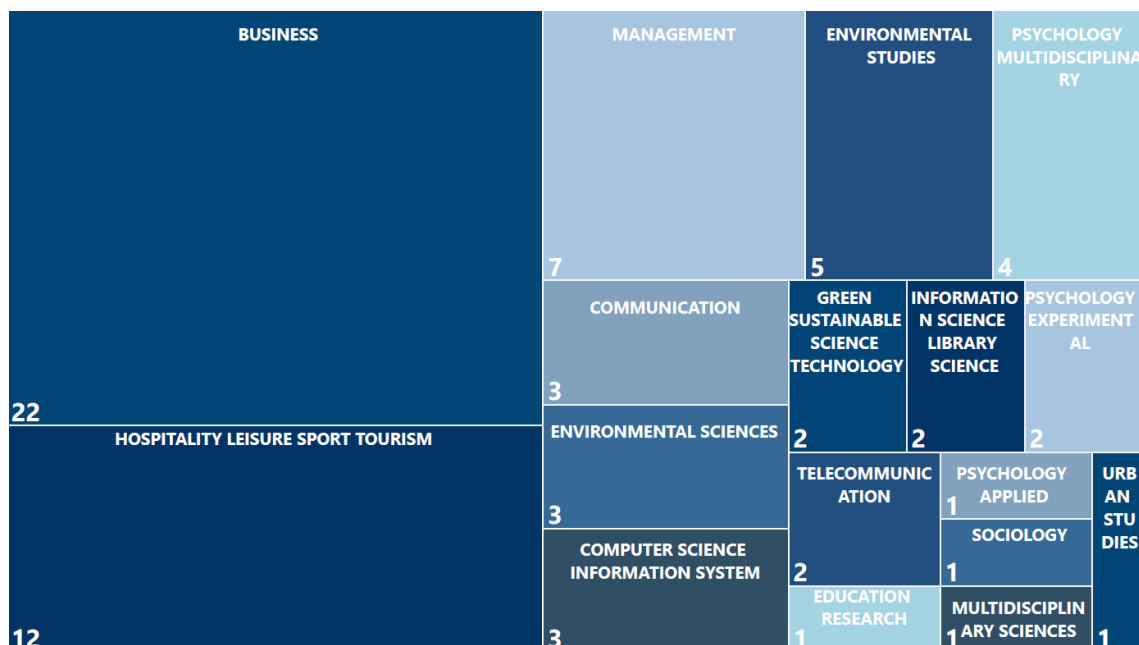
Nevertheless, as it can be observed, several Web of Science categories are rather similar, which is why it is interesting to take a closer look at the source titles gathered in Table 1.

Table 1: Number of publications per source title

Source Title	Records	% of 49
JOURNAL OF RETAILING AND CONSUMER SERVICES	5	10,20 %
BUSINESS HORIZONS	3	6,12 %
CURRENT ISSUES IN TOURISM	3	6,12 %
JOURNAL OF INTERACTIVE MARKETING	3	6,12 %
JOURNAL OF THE ACADEMY OF MARKETING SCIENCE	3	6,12 %
SUSTAINABILITY	3	6,12 %
COMPUTERS IN HUMAN BEHAVIOR	2	4,08 %
FRONTIERS IN PSYCHOLOGY	2	4,08 %
JOURNAL OF DESTINATION MARKETING MANAGEMENT	2	4,08 %
JOURNAL OF HOSPITALITY AND TOURISM TECHNOLOGY	2	4,08 %
JOURNAL OF RESEARCH IN INTERACTIVE MARKETING	2	4,08 %
TOURISM MANAGEMENT	2	4,08 %
TOURISM REVIEW	2	4,08 %
AUSTRALASIAN JOURNAL OF EDUCATIONAL TECHNOLOGY	1	2,04 %
INFORMATION COMMUNICATION SOCIETY	1	2,04 %
INTERNATIONAL JOURNAL OF CONTEMPORARY HOSPITALITY MANAGEMENT	1	2,04 %
INTERNATIONAL JOURNAL OF RETAIL DISTRIBUTION MANAGEMENT	1	2,04 %
INTERNET RESEARCH	1	2,04 %
JOURNAL OF BUSINESS RESEARCH	1	2,04 %
JOURNAL OF INFORMATION SCIENCE	1	2,04 %
JOURNAL OF MARKETING MANAGEMENT	1	2,04 %
JOURNAL OF RETAILING	1	2,04 %
JOURNAL OF URBAN TECHNOLOGY	1	2,04 %
MOBILE INFORMATION SYSTEMS	1	2,04 %
MOBILE MEDIA COMMUNICATION	1	2,04 %
PSYCHOLOGY MARKETING	1	2,04 %
SYMMETRY BASEL	1	2,04 %
TELEMATICS AND INFORMATICS	1	2,04 %
Total	**49**	**100,00 %**

Source: Own elaboration departing from Web of Science

As it is shown in Table 2, all the above titles could be grouped into five categories: Business, Tourism, Information and Communication Technologies (ICTs), Psychology and Environmental Issues. Only two results do not fit in these fields, which are two articles about education by the Australasian Journal of Educational Technology and about cultural heritage by the Journal of Urban Technology. It has been necessary to read the abstract of some publications in order to place them properly in one of the sections mentioned. This is the case of the article with the source title "Symmetry Basel" that has been allocated to the tourism area.

The most significant field is Business with more than 40% of the total publications. Mainly about Marketing and Retailing. Business is followed by Tourism with thirteen articles and reviews out of the total of 49. ICTs including Information, Mobile or Internet topics. Finally, five publications have to do with psychology or consumer behaviour and three deal with environmental issues.

Table 2: Number and percentage of publications per research area

Research Areas	Records	% of 49
BUSINESS	20	41%
TOURISM	13	27%
ICTs	6	12%
PSYCHOLOGY	5	10%
ENVIRONMENTAL	3	6%
OTHERS	2	4%
Total	**49**	**100%**

Source: Own elaboration departing from Web of Science

Even though no filter for timespan has been applied, the earliest publication dates from 2010, which clearly signals the novelty of the topic AR. Figure 13 shows the evolution of the studies published in a peer-reviewed journal during the last decade.

Figure 13: Number of publications per year
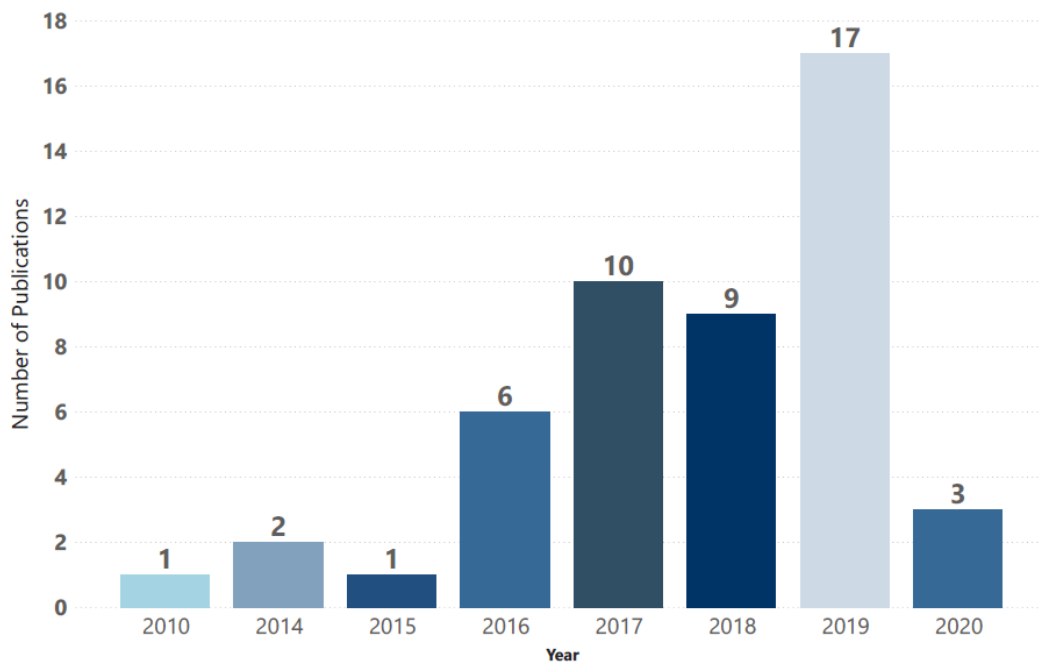
The first publication was 'Virtual Reality: Applications and Implications for Tourism' (Guttentag, 2010). Despite its title, the author of the publication states within the publication that he considers AR as a part of VR. In its abstract he affirms that Marketing is one area among another five where VR may well be especially valuable.

From that time on, at least one article or review was written every year and generally increased their number reaching its maximum with seventeen publications last year (2019).

To faithfully interpret the graph, it must be taken into account that this analysis was carried out on March 2020, which is why the number of publications in 2020 is that low.

It is similarly interesting to mention that this subject is being discussed in the five continents. The forty-nine publications were written in twenty-five different countries (marked with a circle in Figure 14). The top three with more publications were USA (34.6%), England (16.3%) and Australia (14.2%).

Figure 14: Publications per country

● 1 ● 2 ● 3 ● 4 ● 7 ● 10 ● 17
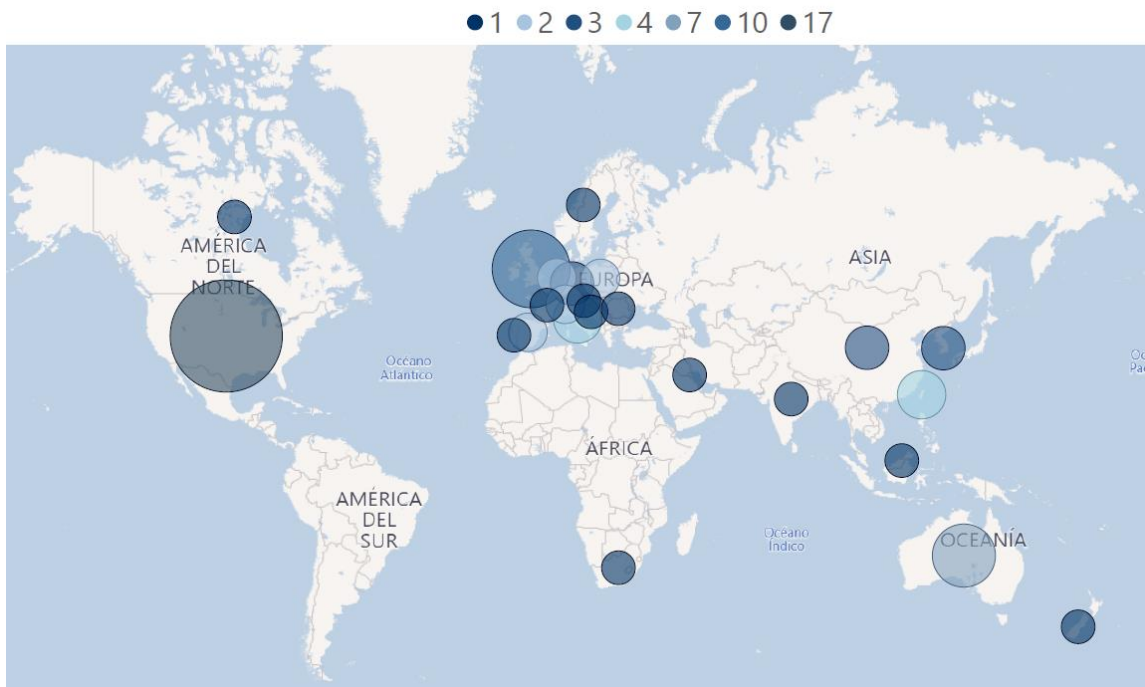
This thorough analysis of AR in Marketing publications indicates that the interest in this topic is growing and varied. It is spread across many countries and across many fields, such as tourism marketing or ICTs marketing.

Nevertheless, the bibliometric study exposed that there is no publication ranked in the Web of Science about the specific topic of AR and its possible uses in MR. To confirm this assertion, a specific search (see Figure 15) was conducted with the same previous methodology aiming to prove this point and few results were obtained indeed. Furthermore, all of them rather talk of research about the market of AR and not AR in MR.

Figure 15: Total results of the query: "Augment* Reality" AND "Market Research"

#1	3	(ALL=("Augment* Reality" AND "Market* Research")) *AND* **TIPOS DE DOCUMENTOS:** (Article OR Review) *Índices=SSCI Período de tiempo=Todos los años*

This fact does not mean that companies do not use AR with this purpose, but the novelty of this topic justifies the scarcity of published articles or reviews. For this reason, it seemed necessary to carry out a research in a practical context to complement the previous academic one. The analysis of AR and MR from a practical point of view was based on a web content review that will be presented in the next section.

2.3 CONTENT ANALYSIS

Having analysed the relationship between AR and marketing in a theoretical context, this chapter introduces AR current implementation in MR before embarking on an exhaustive review of web content that aims to detail which and how companies are benefiting from this upcoming technology.

2.3.1 Background

An interesting point when analysing the connection between augmented reality and marketing research from an applied point of view concerns terminology.

While, as it was already explained, from a theoretical point of view VR and AR differ, companies do not distinguish between virtual and augmented reality. Usually, they encompass the two realities under the name of "Virtual Reality".

In fact, the enormous difference of Google results between "Augmented Reality in Market Research" (8 results) and "Virtual Reality in Market Research" (8,630 results) evidences this reality (Figure 16).

Figure 16: Google results of the advanced search
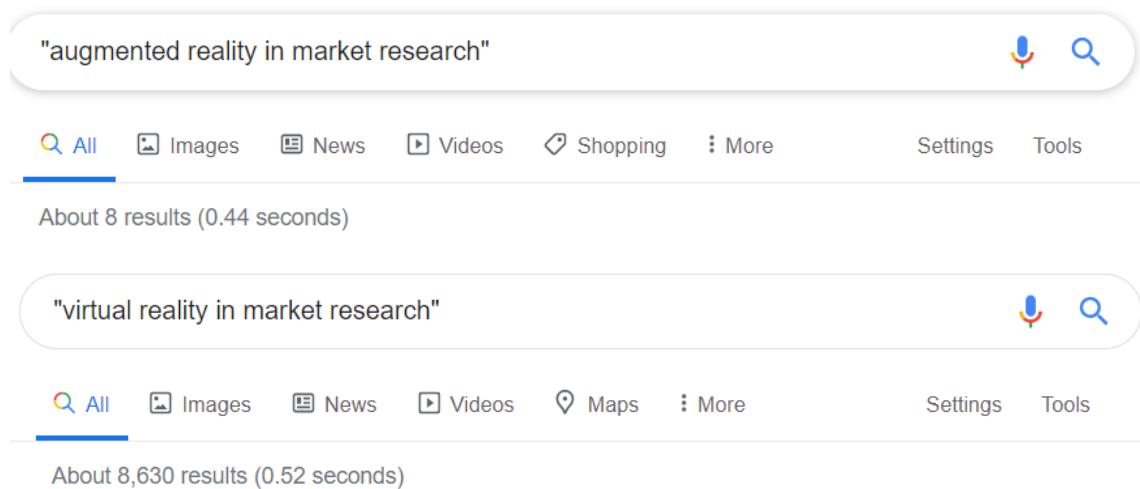
Source: Google

Some marketing research companies give a specific name to the services they carry out with these technologies, for example the biggest company in the sector, Nielsen, calls its platform incorporating these realities "Smartstore" and the company Ipsos calls its services "Virtual Solutions".

Due to the immersive nature of both VR and AR, these two are also named sometimes as "Immersive Technologies". Because of the same reasoning, MR research practices with these technologies are sometimes considered to be "Immersive research". Immersive research is defined as the set of techniques that enables researchers to catch

behaviours, emotions and cognitive perceptions where and when the individual is experiencing them (Macdonald and Wilson, 2011). Others give more importance to the virtual feature and give an alternative name related to it such as "Virtual "Environments".

Lastly, the two are also frequently encompassed in the concept of Extended Reality (XR) which refers to all real-and-virtual combined environments (Fast-Berglund *et al.*, 2018).

Once this matter has been clarified, the AR usage by MR companies at the moment is introduced.

In 2019, 17% of market research organizations declared using virtual environments/ VR (Murphy, 2019). As can be seen in Figure 17, and according to an annual US survey of market research trends (Greenbook Research Industry Trends Report 2019), this percentage has been more or less steady since 2014.

Figure 17: Percentage of companies using Augmented or Virtual Reality
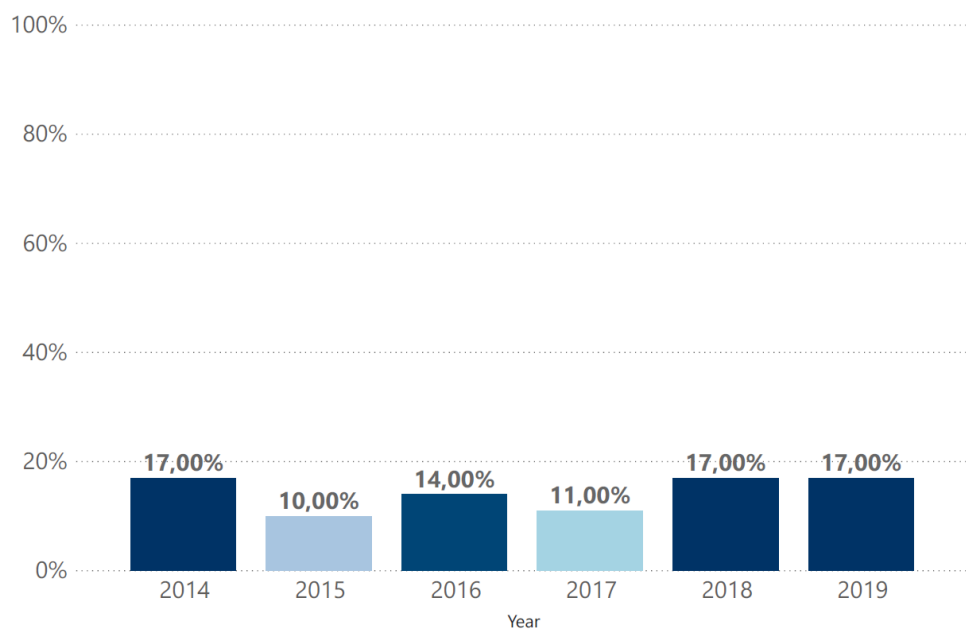
Source: Murphy (2019)

However, 25% and 42% of the participants in the report previously mentioned declared that they were considering implementing this technology and interested in it, respectively.

Figure 18 reflects that this figure is low compared with the percentage of companies within the market research industry that uses other emerging techniques such as Big Data (50%) or Eye Tracking (35%) (Murphy, 2019).

Figure 18: Use percentage of emerging methods by suppliers

Emerging Methods	Suppliers Usage (%)
Mobile First Surveys	58,00 %
Mobile Qualitative	49,00 %
Text Analysis	49,00 %
Mobile Ethnography	43,00 %
Social Media Analytics	43,00 %
Big Data Analytics	39,00 %
Micro Survey	35,00 %
Eye Tracking	34,00 %
Behavioural Economics Models	32,00 %
Causal Analysis	29,00 %
Applied Neuroscience	28,00 %
Research Gamification	27,00 %
Passive Data Measurement	21,00 %
Facial Analysis	19,00 %
Crowdsourcing	18,00 %
Prediction Markets	17,00 %
Virtual Environments	17,00 %
Biometric Response	12,00 %
Chatbots	12,00 %

Source: Greenbook Research Industry Trends Report (2019)

Talking about AR applications, the main areas are the design of Point of Sale and New Products (WHU Inside Business, 2019). However, these technologies can be applied to other uses. Best virtual research applications according to a whitepaper published by the technological research agency FlexMR are prototyping, special experience testing, projective tasks, meaning those which involve the participant having to imagine him or herself in a specific scenario; focus groups and interviews and stakeholders presentations (FlexMR, 2017). Surveys have been also proved to be found significantly more enjoyable by respondents when they were exposed to virtual reality (Bramley *et al.*, 2018).

A good example that can serve as a point of reference for the possible applications of AR as MR tool is Gorilla in the room ltd. Gorilla in the room is a small company founded in Brighton, England in 2016. They define themselves in LinkedIn as "An award-winning augmented reality and virtual reality technology company which develops and supplies immersive research products to the market research industry". (*LinkedIn*). Despite its reduced size, they offer numerous solutions that use both AR and VR. These are:

- Product concepts: To know what new product ideas people like.
- Shelf tests: To see which products perform better on shelf.
- Pack tests: To know about what packaging shoppers will buy.
- Shopper Diaries: To be aware of what clients think at point of purchase.
- Point of sales tests: To observe which messages drive sales in the store.
- Customer decisions: To understand what decisions customers make.
- Retail behaviour: To comprehend how and why do clients buy.
- Car clinics: To see which car designs customers will like.
- Brands positioning: To tell what consumers think about brands.

With the aim of having a closer look at which MR companies are implementing these technologies and for what purposes, a website content analysis was carried out.

2.3.2 Methodology

This empirical study involved gathering primary data by observing MR enterprises activities. A database was created as a result of the structured observation process.

2.3.2.1 Population

The population under study included the most innovative MR companies. The GRIT Top 50 Most Innovative Suppliers List, that was published in the Business & Innovation Edition 2019 of the Greenbook Research Industry Trends Report, was taken as sample frame. More specifically, the GRIT's Ranking of the Top 50 Most Innovative Full/Field Service Suppliers was considered, as is the subcategory within more companies (21%) have declared using AR. Taking into account the population and sample size (N=50, n=30), the sampling error under a simple random distribution would be 11%, which can be considered acceptable for an exploratory study.

2.3.2.2 Variables Under Study

The observed variables were selected taking as reference the previously explained information as well as the Gorilla in the room offered solutions. As a result, the content

analysis studied if the selected enterprises have used, are using or will use soon AR with any of the purposes gathered in Table 3.

Table 3: Research purposes studied and given names

Name	Research Purpose
Product Concept Test	To discover if costumers like and would be willing to buy a new product or service before launching it to the market.
Shelf Tests	To test the different effect that may have the position of a product in a shelf.
Packaging Design	To try out packaging that can attract buyers.
Shopper Diaries	To observe the participants in a specific environment while asking questions or collecting data with the final goal of understanding the decisions they take.
Point of Sale Design	To tests the different layouts of the points of purchases to know which one will better suit clients.
Car Clinics	To test changes in the features, colours and designs of cars before implementing them.
Brand Positioning	To investigate what do consumers think about a brand and its positioning in the mind of the consumers.
Surveys	To ask a set of questions to be answered by a sample.
Other Purpose	Any other research purpose identified.

Source: Own elaboration

Table 4 lists the rest of variables under study with its respective source.

Table 4: Other variables under study

Name	Source
Ranking Position	LinkedIn
Size	LinkedIn
Sector	LinkedIn
Used AR	Companies website
Access from Home Page	Companies website
News about AR	Companies website

Source: Own elaboration

2.3.2.3 Data Collection

In order to understand whether the companies analysed have ever used these innovative techniques or not, an exhaustive search of their official websites was done.

Aiming to make the procedure as rigorous and structured as possible, three steps were followed for each web (see Figure 19).

Figure 19: Data collection process
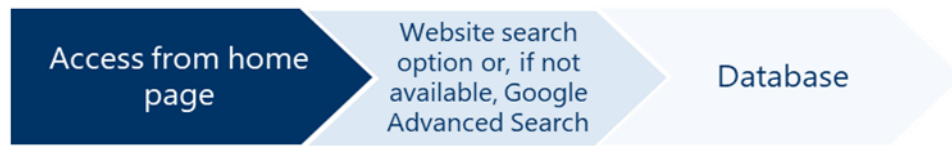
First, I accessed to the home page of each enterprise and I tried to find any evidence of AR or VR being used. I looked for both pictures and text that lead to these technologies. Once I examined the home page, I accessed to other URLs with direct access that could include the company's solutions, methodologies or technologies. In other words, I explored common MR website sections such as "Our Solutions", "Our capabilities", "How we do it", "Our technologies" or "Our platforms", among others. I noted down when I could know whether they were using these immersive technologies in this first step, as it reflects the significance that they allocate to this technology.

Secondly, if the website included a search option, I introduced the words: "virtual", "augmented" or "immersive". If there was not such a possibility, I used the Google's advanced search option of finding specific words within a site. Again, I introduced the words "virtual", "augmented" and "immersive".

Finally, once I had all the available results, I completed the data base gathering whether the company was using AR techniques, their research purposes and if there was any article, blog post, report or news available about this topic.

Data was gathered in a data base that can be consulted in the Appendix I.

2.3.3 Results

Results hereunder were obtained after doing a SPSS analysis and they can be seen at the appendix II.

The fact that the sample was taken out from the previously mentioned ranking does not mean that all the companies are large companies. As can be seen in Figure 20, 40% of the sample is formed by enterprises with less than 500 employees and only 13% of the companies were larger than 10,000 employees. These figures prove that innovation ranking position is not linked with size.

Figure 20: Companies per size
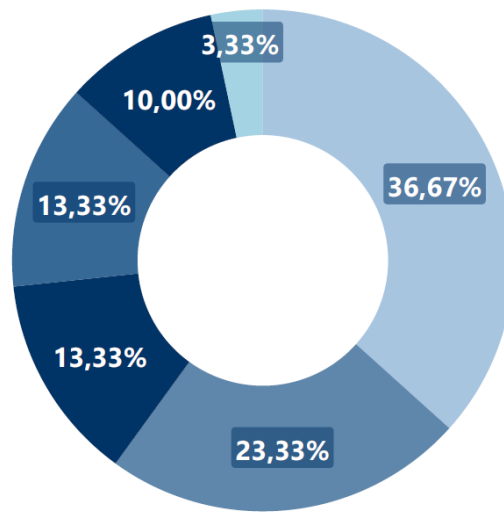
Number of employees ● 51-200 ● 201-500 ● >10000 ● 501-1000 ● 1001-5000 ● 11-50

Source: Own elaboration

Even though every company innovates in market research, some of them include themselves within another sector (see Figure 21). A total of four companies consider Software to be its core sector, one can be found in the Marketing and Advertising segment and another one is in the IT area.

Figure 21: Companies per sector
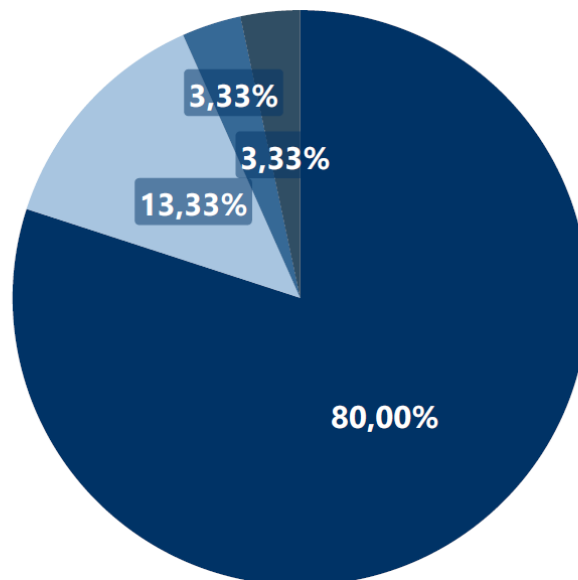
Sector ● Market Research ● Software ● It and Services ● Marketing and Advertising

Source: Own elaboration

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As can be seen in Table 5, 40% of the companies have used AR. According to this content analysis, the most common techniques where companies have applied these technologies are packaging design, point of sale design and shopper diaries (23.3%). They are followed by shelf tests, that are used by 20% of the market research enterprises. Immersive technologies are accompanied or combined with surveys in the 13.3% of the companies and 10% or less use these technologies to test product ideas or concepts, to know the positioning of a brand and to do car clinics. Nevertheless, the frequency of this last application (10%) is quite high to be such a sector-specific service.

Table 5: Studied variables frequencies in percentage

Studied Variable	Frequency (%)
Used AR/VR	40,00
Packaging Design	23,30
Point of Sale Design	23,30
Shopper Diaries	23,30
Shelf Tests	20,00
Survey	13,30
Product Concept Test	10,00
Brand Positioning	3,30
Car Clinics	3,30

Source: Own elaboration

While 60% of MR enterprises do not use AR, 70% of them have posted news, reports or similar about them in their websites (see Table 6). However, only 3 companies (13.3% of the total sample) that have ever used AR or VR have accessible evidence of being using these technologies in their sites. In other words, in the 86.7% of the cases a further search was needed in order to find their virtual solutions.

Table 6: Percentage of Companies that have access from Home Page and Contain news

Studied Variable	Frequency (%)
Acess from Home Page	13,30
Contain News	70,00

Source: Own elaboration

Other observed purposes were pricing and e-commerce. The latter consisted on using AR to carry out Netnography, which is the observation of consumers in natural online environments (Kozinets, 2007).

Besides the previous descriptive analysis, chi square test and independent sample t test were carried out to measure the association between two categorical variables and to compare means, respectively.

An association between using AR and the innovation degree of the companies (based on its ranking position) was observed (Chi-square= 5, p< 0.05). Moreover, companies within top 15 position in the innovation ranking scored higher on number of virtual services offered that those at lower positions (t= 2.42, sig< 0.05). Thus, it can be said that there is a relationship between companies using or not AR and their innovation degree.

Nevertheless, it is not possible to affirm that size and using AR are related. Distinguishing between large companies (those with more than 500 employees) and small companies, 45.5% of the large companies had used AR but it was also the case for the 36.8% of the companies with less than 501 employees. Therefore, it is not possible to reject their independence (Chi-square= 0.21, p= 0.64). Furthermore, there is no statistical difference between the mean of virtual solutions offered by the 11 large companies (Mean of virtual solutions $_{large\ companies}$= 1.45) and the mean of the companies with less than 501 employees (Mean of virtual solutions $_{small\ companies}$= 1.05) (t= 0.51, p= 0.54).

Regarding the relationship between the number of different virtual research services that companies provide and their sector, the number of virtual services is greater in the companies that include themselves in the Market Research sector than within the rest of companies (t= 2.69, p< 0.05).

To measure the general interest among the companies, they were divided into those that have published news, reports or similar posts and those who have not. Like previous analysis, the innovation degree was assessed based on ranking position, specifically distinguishing between the most innovative 10 companies and the rest. The Chi-Square Test (Chi-square= 2.85, p= 0.09) showed that both the most innovative and the rest have published news about AR and, therefore, there is no relationship between being in the top ten of innovation and showing interest in this upcoming technology.

Finally, it was noticed that companies that used AR to test packaging, shelf performing or point of sale design also benefited from this technology to do shopper diaries. In fact, only four companies used packaging design and not shopper diaries or vice versa, two designed point of sale and did not shopper diaries or vice versa, and one did not test shelf performing but used shopper diaries. As a result, considering the values

of the chi square statistics that crossed the different applications (Chi-square$_{packaging\ design-shopper\ diaries}$= 11.80; Chi-square$_{point\ of\ sale-shopper\ diaries}$= 19.86; Chi-square$_{shelf\ performing-shopper\ diaries}$= 24.64) and its significance level ($p< 0.05$ in the three cases), it can be said that the most frequently used virtual solutions are related.

3 CONCLUSIONS

This project has shown since its very first chapter the potential of AR in marketing revising the extant literature. After explaining AR definition and types, AR platforms section has evidenced the development of this technology with two direct consequences. On the one hand, the different experiences that each device provides and, therefore, the possibility of designing different marketing strategies. On the other hand, the expansion of AR user base that results in a wider target for that strategies. AR numbers confirm that this expansion will endure over time since market size, AR apps downloads and AR HMD sales are expected to grow enormously.

At that point, assuming that AR reviewed features may be advantageous for marketing research techniques, research problem arose. What is the potential of AR in MR? Which are the most frequent AR applications in MR? What type of companies are using AR in MR? To try to solve these questions a bibliometric analysis was conducted. It could be concluded that the academic interest in AR in marketing is growing globally. Not only growing but also diversifying. Scholars have been writing about AR marketing in marketing and retailing papers but also in tourism, technology, psychology or even environmental journals. The lack of articles and reviews about AR in MR found in the systematic review, proved that this topic is yet academically unexplored. It was decided then to carry out more in-depth investigation about AR for MR in practice through a content analysis of the websites of the most innovative MR companies. The analysis of this practical research provided the following answers. AR usage was related to innovation and sector of the MR companies, although not to their size. The most frequent AR application aimed to help packaging design, point of sale design and shopper diaries and they were also related with each other. Furthermore, even though less than the half of the enterprises used AR, the great majority, with no regard of their innovation degree, already knew the technology potential, as they informed their website visitors about it.

Both analyses -theoretic-based and practice-based- provide implications. Given the character of each one we can discern theoretical and practical implications.

3.1 IMPLICATIONS

The most meaningful theoretical contribution deals with the fact that, while plenty of publications have been written about AR in marketing, little is studied about AR in MR.

This project suggests that further research need to address this gap in the extant literature. Researchers should then take into account the terminology differences between the practical and theoretical context that this project has discovered.

On the other hand, by conducting a bibliometric analysis, it could also be concluded that the academic interest in this topic is growing globally. Not only growing but also diversifying. Scholars have been writing about AR marketing in marketing and retailing papers but also in tourism, technology, psychology or even environmental journals.

Regarding practical implications, the results of the exhaustive web content analysis provide MR suppliers with useful information to assess whether to invest in this technology or not. This study evidences the opportunity for the small companies to specialize in this technology, since size is not an entry barrier in this market. In fact, the results suggest that innovation degree is the actual common feature within the AR research providers. Market saturation is neither an entry barrier given that less than half of the sample has used AR. New entrants can consider to carry out packaging design, point of sale design and shopper diaries as they resulted to be the most common services. As the analysis shows, these services can be offered together. This means that the initial investment costs can be lowered offering not a punctual service but a whole set of AR research. Talking about reducing cost, car clinic usage frequency has exposed that MR companies can have a competitive advantage offering AR product design research to sectors with high prototype production costs. For instance, real state or robotic industries.

This analysis that sought to know what is currently being done confirms that the immersive feature of AR helps to overcome the observational and ethnographic research barrier of unnaturalness consumer behaviours. Literature revision in this project has additionally proved that a fast-growing number of consumers use AR in all its platforms. The generalized used of these devices, specially AR glasses, would become an excellent way of capturing unconscious natural behaviour at the right moment. Research about this opportunity is sparse. Future studies should aim to develop an effective way of benefiting from this large data source, may be with the help of other emerging technologies such as big data or artificial intelligence, before the forecast commented within this project come to fruition.

3.2   LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

While this current study provides many significant findings, it is not immune to limitations. Content analysis results should be carefully interpreted as the information is limited to what companies were willing to share in their websites. Furthermore, it is important to keep in mind the non-distinction of AR and VR in practice.

Although web page review has proved its utility in the context of this project, future studies could consider a direct approach to companies' behaviours and attitudes through a quantitative study. Besides, it would be very interesting to take into account the consumers' perspective, both in the industrial and consumer markets. Qualitative studies, in the form of focus groups, could be valuable for this purpose. Lastly, the analysis of social media posts by text-mining tools could shed light on the use of the terms AR and VR.

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APPENDIX I : WEB CONTENT DATABASE

Company	Ranking Position	Size	Sector	Used AR	Product Concep Tests	Shelf Tests	Packaging Design	Shopper diaries	Point of Sale Design	Car Clinics	Brand Positions	Surveys	Other Purposes	Access from home page	News about AR
Ipsos	1	>10000	Market Research	Yes	Yes	Yes	Yes	Yes	Yes				Pricing and E-commerce	Yes	Yes
Kantar	2	>10000	Market Research	Yes	Yes	Yes	Yes	Yes	Yes					Yes	Yes
Nielsen	3	>10000	Market Research	Yes		Yes		Yes	Yes			Yes		Yes	Yes
Hotspex	4	51-200	Market Research	Yes		Yes	Yes	Yes	Yes				E-commerce		Yes
LRW	5	201-500	Market Research	Yes					Yes					Yes	Yes
System 1 Group	6	201-500	Market Research	Yes		Yes	Yes	Yes	Yes			Yes			Yes
Insites	7	501-1000	Market Research												Yes
Dynata	8	501-10000	Market Research												
PRS Invivo	9	201-500	Market Research	Yes				Yes							Yes
Dig Insights	10	51-200	Market Research												Yes
SKIM	11	51-200	Market Research												
Metrixlab	12	1001-5000	Market Research	Yes			Yes								
Zappi	13	51-200	Software												Yes
Lucid	14	201-500	Software												
GfK	15	>10000	IT and Services	Yes						Yes					Yes
Shapiro & Raj	16	51-200	Market Research												
Delvinia	17	51-200	Marketing and	Yes											Yes
Toluna	18	1001-5000	Market Research												Yes
Join the Dots	19	51-200	Market Research												
AYTM	20	51-200	Market Research												Yes
TRC Market	21	11-50	Market Research												
20/20 Research	22	51-200	Market Research	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Pricing		Yes
Hall & Partners	23	201-500	Market Research												Yes
Maru/Matchbox	24	201-500	Market Research	Yes			Yes					Yes			Yes
Schlesinger	25	501-1000	Market Research												
YouGov	26	501-1000	Market Research												Yes
Fuel Cycle	27	51-200	Software												Yes
MMR Research	28	201-500	Market Research												Yes
Qualtrics	29	1001-5000	Software												Yes
Streetbees	30	51-200	Market Research												

APPENDIX II: SSPS RESULTS

Number of Employees

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	11-50	1	3,3	3,3	3,3
	51-200	11	36,7	36,7	40,0
	201-500	7	23,3	23,3	63,3
	501-1000	4	13,3	13,3	76,7
	1001-5000	3	10,0	10,0	86,7
	>10000	4	13,3	13,3	100,0
	Total	30	100,0	100,0	

Sector

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Market Research	24	80,0	80,0	80,0
	Marketing and Advertising	1	3,3	3,3	83,3
	It and Services	1	3,3	3,3	86,7
	Software	4	13,3	13,3	100,0
	Total	30	100,0	100,0	

Used AR

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	18	60,0	60,0	60,0
	Yes	12	40,0	40,0	100,0
	Total	30	100,0	100,0	

Product Concept Test

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	27	90,0	90,0	90,0
	Yes	3	10,0	10,0	100,0
	Total	30	100,0	100,0	

Shelf Tests

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	24	80,0	80,0	80,0
	Yes	6	20,0	20,0	100,0
	Total	30	100,0	100,0	

Packaging Design

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	23	76,7	76,7	76,7
	Yes	7	23,3	23,3	100,0
	Total	30	100,0	100,0	

Shopper Diaries

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	23	76,7	76,7	76,7
	Yes	7	23,3	23,3	100,0
	Total	30	100,0	100,0	

Point of Sale Design

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	23	76,7	76,7	76,7
	Yes	7	23,3	23,3	100,0
	Total	30	100,0	100,0	

Car Clinics

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	29	96,7	96,7	96,7
	Yes	1	3,3	3,3	100,0
	Total	30	100,0	100,0	

Brand Positioning

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	29	96,7	96,7	96,7
	Yes	1	3,3	3,3	100,0
	Total	30	100,0	100,0	

Surveys

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	26	86,7	86,7	86,7
	Yes	4	13,3	13,3	100,0
	Total	30	100,0	100,0	

Access from Home Page

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	26	86,7	86,7	86,7
	Yes	4	13,3	13,3	100,0
	Total	30	100,0	100,0	

News about AR

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	9	30,0	30,0	30,0
	Yes	21	70,0	70,0	100,0
	Total	30	100,0	100,0	

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Use of AR/VR * Ranking Position	30	100,0%	0	0,0%	30	100,0%

Use of AR/VR * Ranking Position Crosstabulation

			Ranking Position		
			Within 16-30	Within Top 15	Total
Use of AR/VR	No	Count	12	6	18
		% within Ranking Position	80,0%	40,0%	60,0%
	Yes	Count	3	9	12
		% within Ranking Position	20,0%	60,0%	40,0%
Total		Count	15	15	30
		% within Ranking Position	100,0%	100,0%	100,0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	5,000[a]	1	,025		
Continuity Correction[b]	3,472	1	,062		
Likelihood Ratio	5,178	1	,023		
Fisher's Exact Test				,060	,030
Linear-by-Linear Association	4,833	1	,028		
N of Valid Cases	30				

a. 0 cells (0,0%) have expected count less than 5. The minimum expected count is 6,00.

b. Computed only for a 2x2 table

Group Statistics

	Within Top 10	N	Mean	Std. Deviation	Std. Error Mean
Number of services offered	Yes	10	2,5000	2,27303	,71880
	No	20	,5500	1,60509	,35891

Independent Samples Test

		Levene's Test for Equality of Variances				t-test for Equality of Means			95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig (2-tailed)	Mean Difference	Std Error Difference	Lower	Upper
Number of services offered	Equal variances assumed	7,747	,010	2,727	28	,011	1,95000	0,71508	,48523	3,41477
	Equal variances not assumed			2,427	13,645	,030	1,95000	0,80342	,22263	3,67737

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Use of AR/VR * Company Size	30	100,0%	0	0,0%	30	100,0%

Use of AR/VR * Company Size Crosstabulation

			Company Size		
			Less than 500 employees	More than 500 employees	Total
Use of AR/VR	No	Count	12	6	18
		% within Company Size	63,2%	54,5%	60,0%
	Yes	Count	7	5	12
		% within Company Size	36,8%	45,5%	40,0%
Total		Count	19	11	30
		% within Company Size	100,0%	100,0%	100,0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	,215[a]	1	,643		
Continuity Correction[b]	,006	1	,938		
Likelihood Ratio	,214	1	,643		
Fisher's Exact Test				,712	,466
Linear-by-Linear Association	,208	1	,648		
N of Valid Cases	30				

a. 1 cells (25,0%) have expected count less than 5. The minimum expected count is 4,40.

b. Computed only for a 2x2 table

Group Statistics

	Large Enterprise	N	Mean	Std. Deviation	Std. Error Mean
Number of services offered	Yes	11	1,4545	2,11488	,63766
	No	19	1,0526	2,04053	,46813

Independent Samples Test

		Levene's Test for Equality of Variances				t-test for Equality of Means			95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig (2-tailed)	Mean Difference	Std Error Difference	Lower	Upper
Number of services offered	Equal variances assumed	,384	,540	,513	28	0,612	0,40191	,78327	-1.20253	2,00636
	Equal variances not assumed			,508	20,393	0,617	0,40191	,79105	-1.24615	2,04997

Group Statistics

	Market Research Sector or Other	N	Mean	Std. Deviation	Std. Error Mean
Number of services offered	Yes	24	1,4583	2,20630	,45036
	No	6	,1667	,40825	,16667

Independent Samples Test

		Levene's Test for Equality of Variances				t-test for Equality of Means			95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig (2-tailed)	Mean Difference	Std Error Difference	Lower	Upper
Number of services offered	Equal variances assumed	9,853	,004	1,410	28	,170	1,29167	0,91609	-,58486	3,1682
	Equal variances not assumed			2,690	27,37	,012	1,29167	,48021	,30698	2,27635

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Contains news about AR/VR * Ranking position	30	100,0%	0	0,0%	30	100,0%

Contains news about AR/VR * Ranking position Crosstabulation

			Ranking position		Total
			Within 11-30 position	Within Top 10	
Contains news about AR/VR	No	Count	8	1	9
		% within Ranking position	40,0%	10,0%	30,0%
	Yes	Count	12	9	21
		% within Ranking position	60,0%	90,0%	70,0%
Total		Count	20	10	30
		% within Ranking position	100,0%	100,0%	100,0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	2,857[a]	1	,091		
Continuity Correction[b]	1,607	1	,205		
Likelihood Ratio	3,230	1	,072		
Fisher's Exact Test				,204	,100
Linear-by-Linear Association	2,762	1	,097		
N of Valid Cases	30				

a. 1 cells (25,0%) have expected count less than 5. The minimum expected count is 3,00.

b. Computed only for a 2x2 table

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Shelf Tests * Shopper Diaries	30	100,0%	0	0,0%	30	100,0%

Shelf Tests * Shopper Diaries Crosstabulation

			Shopper Diaries No	Shopper Diaries Yes	Total
Shelf Tests	No	Count	23	1	24
		% within Shopper Diaries	100,0%	14,3%	80,0%
	Yes	Count	0	6	6
		% within Shopper Diaries	0,0%	85,7%	20,0%
Total		Count	23	7	30
		% within Shopper Diaries	100,0%	100,0%	100,0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	24,643[a]	1	,000		
Continuity Correction[b]	19,577	1	,000		
Likelihood Ratio	24,283	1	,000		
Fisher's Exact Test				,000	,000
Linear-by-Linear Association	23,821	1	,000		
N of Valid Cases	30				

a. 2 cells (50,0%) have expected count less than 5. The minimum expected count is 1,40.

b. Computed only for a 2x2 table

Case Processing Summary

	Cases Valid N	Valid Percent	Missing N	Missing Percent	Total N	Total Percent
Shopper Diaries * Packaging Design	30	100,0%	0	0,0%	30	100,0%
Shopper Diaries * Point of Sale Design	30	100,0%	0	0,0%	30	100,0%
Shopper Diaries * Shelf Tests	30	100,0%	0	0,0%	30	100,0%

Shopper Diaries * Packaging Design Crosstab

| | | | Packaging Design | | |
			No	Yes	Total
Shopper Diaries	No	Count	21	2	23
		% within Packaging Design	91,3%	28,6%	76,7%
	Yes	Count	2	5	7
		% within Packaging Design	8,7%	71,4%	23,3%
Total		Count	23	7	30
		% within Packaging Design	100,0%	100,0%	100,0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	11,806[a]	1	,001		
Continuity Correction[b]	8,560	1	,003		
Likelihood Ratio	10,630	1	,001		
Fisher's Exact Test				,003	,003
Linear-by-Linear Association	11,413	1	,001		
N of Valid Cases	30				

a. 1 cells (25,0%) have expected count less than 5. The minimum expected count is 1,63.

b. Computed only for a 2x2 table

Shopper Diaries * Point of Sale Design Crosstab

| | | | Point of Sale Design | | |
			No	Yes	Total
Shopper Diaries	No	Count	22	1	23
		% within Point of Sale Design	95,7%	14,3%	76,7%
	Yes	Count	1	6	7
		% within Point of Sale Design	4,3%	85,7%	23,3%
Total		Count	23	7	30
		% within Point of Sale Design	100,0%	100,0%	100,0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	19,862ᵃ	1	,000		
Continuity Correctionᵇ	15,573	1	,000		
Likelihood Ratio	18,628	1	,000		
Fisher's Exact Test				,000	,000
Linear-by-Linear Association	19,199	1	,000		
N of Valid Cases	30				

a. 1 cells (25,0%) have expected count less than 5. The minimum expected count is 1,63.

b. Computed only for a 2x2 table

Shopper Diaries * Shelf Tests Crosstab

			Shelf Tests No	Shelf Tests Yes	Total
Shopper Diaries	No	Count	23	0	23
		% within Shelf Tests	95,8%	0,0%	76,7%
	Yes	Count	1	6	7
		% within Shelf Tests	4,2%	100,0%	23,3%
Total		Count	24	6	30
		% within Shelf Tests	100,0%	100,0%	100,0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	24,643ᵃ	1	,000		
Continuity Correctionᵇ	19,577	1	,000		
Likelihood Ratio	24,283	1	,000		
Fisher's Exact Test				,000	,000
Linear-by-Linear Association	23,821	1	,000		
N of Valid Cases	30				

a. 2 cells (50,0%) have expected count less than 5. The minimum expected count is 1,40.

b. Computed only for a 2x2 table