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"Do you see what I see?": A Bibliometric Analysis on Augmented Reality (AR) in Marketing and Persuasion of Customers using Scopus Database and VOSviewer

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Research Article	ABSTRACT

This paper aims to serve as an initial attempt to explore the different facets of Augmented Reality (AR) and persuasion, as well as the possible link between the two concepts. It serves as a starting point to gain a more profound insight into the current research gaps and lays the groundwork for future research. Through bibliometric analysis (utilizing the Scopus Database) and visualization (using VOSviewer), the authors aspire to provide an overview of the presence of AR and persuasion, tracing their evolution over the years, identifying leading countries, prolific authors, and subject areas that remain relatively ''unexplored''. It is important to note that this paper serves as a starting point for analyzing the link between the implementation of AR and its possible impact on the degree to which customers might be persuaded.

"Benim gördüğümü görüyor musun?": Pazarlamada Artırılmış Gerçeklik (AR) ve Scopus Veritabanı ve VosViewer kullanarak müşterilerin ikna edilmesi üzerine Bibliyometrik Bir Analiz

	ÖZ

Bu makale, Artırılmış Gerçeklik (AR) ve ikna arasındaki farklı yönleri keşfetme amacını taşımaktadır. Aynı zamanda bu iki kavram arasındaki olası bağlantıyı anlamanın daha iyi bir başlangıcı olarak hizmet etmekte ve gelecekteki araştırmalar için temel oluşturmaktadır. Bu çalışmada AR ile müşterileri ikna etme temasını araştırmak üzere Scopus veritabanından elde edilen çalışmalara bibliyometrik analiz uygulanmıştır. Çalışmadaki analiz sonuçlarının görselleştirilmesinde VosViewer yazılımından faydalanılmıştır. Böylelikle çalışma; AR ve müşteri iknasının yıllar içindeki evrimi, bu evrime dair makalelerin yazılmasında önde gelen ülkeleri, üretken yazarları ve görece keşfedilmemiş konu alanlarını belirleyerek bir genel bakış sunmayı amaçlamaktadır. Çalışmanın dijital tüketici bağlamındaki literatürü geliştirirken aynı zamanda bu literatürün AR ile ilgili kısmına ışık tutmaktadır. Çalışmanın dijital pazarlama ve tüketici davranışı çalışan akademisyenlere de teorik katkı sağlayacağı düşünülmektedir.

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Introduction

Given the substantial progress that Information and Communication Technologies (ICTs) have undergone in the contemporary era, they have significantly transformed consumer-brand interactions (El Ouahabi et al., 2023). Consequently, they have provided marketing managers with crucial tools to enhance the client experience before, during, and after purchase through involvement and intelligence. Augmented reality (AR) is a technology that enables consumers to interact with brands in innovative new manners (Yim *et al.*, 2017).

As Augmented Reality (AR) undergoes continuous evolution, it is poised to bring about a revolutionary impact on our lives. In a report published by Deloitte Digital in 2021, Allan Cook stated that AR is anticipated to stand alongside major technological shifts, such as the advent of the web or the proliferation of mobile technology, reshaping not only how we perceive but also how we engage with the surrounding world.

The exponential growth of augmented reality (AR) is evident in the escalating count of active AR user devices annually. As reported by Artillery Intelligence, the number of active AR user devices surged from around 0.44 billion in 2019 to nearly 0.81 billion in 2021. Projections anticipate a further increase to 1.4 billion active AR user devices in 2023, with a remarkable surge to an estimated 17.3 billion in 2024.

Moreover, according to the Snap Consumer AR Global Report (2021), it is projected that 75% of the global population will be regular users of augmented reality (AR) by 2025. In concurrence with this, Tim Cook remarked, "I do think that a substantial portion of the population in developed nations, and eventually across all countries, will integrate AR experiences into their daily lives, akin to the routine of having three meals a day. It will become an integral part of one's existence.". In this perspective, El Ouahabi and Belhsen (2023) have concluded in their study that consumer consumption and behaviors align with a trend of acculturation and advanced globalization of the real-world sphere and in consideration of the attained results, the acculturation of behaviors is a phenomenon that has been substantiated. From this, it can be deduced that consumers are fundamentally reshaping the digital experience through the widespread adoption of augmented reality.

Back in the 50s, when augmented reality (AR) had its initial origins, its exposure to the mass audience did not truly gain momentum until the introduction of the Pokémon GO game in 2016. Which guaranteed the social acceptance of the success of this technology (Rauschnabel, Rossmann, and Tom Dieck 2017).

In 2016, when Niantic (the company behind Pokemon GO) launched the game, it only took 7 days for it to be actively used by more than 20 million users per day. All it took was one game to show the world how impactful Augmented Reality can be. This event turned out to be a milestone in the evolution of AR technology and an opportunity that many businesses needed to try new advertising approaches far away from traditional ones (especially because the targeted population was within the 18-24 age bracket).

Although AR can be understood as a technology that adds a digital layer to reality, creating a new "bridge" binding the best of both worlds (physical and digital) appears to be a given (Javornik 2016; Porter and J. E. Heppelmann 2017; Yim, Chu, and Sauer 2017). Fragmenting AR research into diverse theoretical approaches makes it challenging to gain a panoramic view of the true effect that AR has (or might have) on the customer journey, and with the exponential rise of its applications, the need to get a clear overview of AR research becomes more urgent than ever.

Literature Review

Augmented Reality and Persuasion

Previous publications attempted to address and define Augmented Reality (AR). As stated by Pragya and Biswajita (2023) in their article, from a technological standpoint, Azuma (1997), Carmignani and Furht (2011), Sood (2012), Olsson et al. (2013), Hwangbo et al. (2017), Pantano et al. (2017), and Watson et al. (2018) have directed their attention to the technical dimensions of Augmented Reality (AR), characterizing it as a concept rooted in technology. Meanwhile, Scholz and Smith (2016), Javornik (2016a and b), Rese et al. (2017), Yim et al. (2017), Poushneh and Vasquez-Parraga (2017), and Poushneh (2018), Chylinski et al., (2020) have concentrated on "AR Marketing" and provided marketing implications associated with the adoption of Augmented Reality (AR) tools for various and specific research purposes. In doing so, they emphasize the AR-induced enhancement of the user's environment. Thus, it is important to note that Augmented Reality facilitates a more seamless interaction for customers with products and provides additional information to enrich their online shopping experiences.

Drawing from these studies and incorporating insights from various disciplines, while converging towards a common and cohesive foundation, we can present AR as a strategic and interdisciplinary concept. It can be defined as a tool that provides a hybrid experience, seamlessly combining virtual context and the physical environment in real-time for users through devices.

Furthermore, Rauschnabel et al. (2022) specifically contemplated a series of articles that deepen comprehension regarding emerging concepts and advancements in AR Marketing, spanning from AR shopping applications (Smink et al., 2020), virtual reality (VR) games (van Berlo et al., 2021), AR experiences linked to the concept of flow (Barhorst et al., 2021), to customer journeys within the realm of Augmented Reality (Jessen et al., 2021). It is noteworthy that, AR Marketing may employ a more nuanced definition of phases as AR involves a combination of online versus offline touchpoints and hybrid AR touchpoints (Rauschnabel et al. 2022). In this perspective, companies developing AR applications consistently improve user interactions by providing brands and small and medium enterprises (SMEs) with innovative methods to showcase digital content (Devagiri et al., 2022).

Moreover, a conceptual review study investigating the persuasion aspects of Virtual Reality (VR) and Augmented Reality (AR) utilizing The Elaboration Likelihood Model (ELM) has indicated that consumer attitude persuasion can be facilitated by factors within two main routes: central and peripheral. Initially, the study observed that Allison et al. (2017) categorized three fundamental central variables influencing the processes of persuasion, encompassing advertisement quality, demographic distinctions, and the technological context of virtual and augmented reality advertisements. Additionally, Gong (2016) and Mohamad et al. (2021) highlight a set of three variables contributing to peripheral route persuasion: source credibility, social presence, and message content.

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If we take the example of applying AR in retailing, the literature presents us with three (3) different modes of AR: Altering one´s self (e.g., YouCam Makeup; Park and Yoo 2020), augmenting one's surroundings (e.g., IKEA Place; (Rauschnabel, Felix, and Hinsch 2019), and the alteration of an object (e.g., Dessert menu; (Heller et al. 2019)).

However, although recent inventions have shed some light on the revolutionary technology of AR, we are still "confused" as to how we can get a hang of it. This confusion could be explained by the relative recency of the subject and also by how difficult it has become to predict the modern customer`s behavior. The following Table 1 (Alexandra et al. 2020) helps us get a better overview of the literature interested in the customer purchase journey, mostly in the early and late stages. It also opens the door for multiple research questions to which we will try to go on a quest in the hope of understanding how AR impacts decision-making throughout the whole customer journey.

Bibliometric Studies on the AR and Persuasion

To our current knowledge, no bibliometric study has been undertaken to investigate the utilization of AR as a persuasive tool in marketing. Thus, several bibliometric analysis studies have sought to examine the progress of AR across various fields, notably in education, tourism, and marketing.

To begin with, Mauricio H, Christian D, Alejandro V, Manuel C, and David. G (2021) conducted a bibliometric study centered on augmented reality (AR) state-of-the-art within the educational field. The study involved an analysis of AR research content in the field of education, exploring its applications and assessing its impact on learning outcomes.

Furthermore, another bibliometric study was carried out by Min, Wenhe, and Zhonggen Yu (2023) in the field of education, with a specific focus on language learning. The study explored the utilization of augmented reality (AR) as a tool in language learning environments. The findings indicated that users have cultivated a positive attitude toward AR tools, and the immersive learning experiences facilitated by AR have contributed to the improvement of language learning outcomes.

Table 1. Selected AR literature addressing early versus late stages in the customer purchase journey.

Study	Context and method	Theory base	AR variables	Process variables	Dependent variables	Key findings
Early purchase journey stages: Feeling a need/want, getting to know and considering products/services, searching for information and learning'						
Harley, Poitras, Jarrell, Duffy, and Lajoie (2016)	AR as a learning instrument Positive emotions Mobile learning Laboratory and outdoor study	Control-value theory of achievement emotions	Lab-based, virtually-situated location	–	Effectiveness (learn about historical differences) Self-reported enjoyment and boredom	AR users were able to effectively and enjoyably learn about historical differences by contextualizing their visual representations.
Dede (2009)	Engagement and learning; immersive interfaces; Literature review	Egocentric perspective; Immersive presence	Immersive interfaces	–	–	Immersion in an AR-enabled digital environment can potentially advance education in at least three ways: by allowing multiple perspectives, situated learning, and transfer.
This study	AR in the early stages of the purchase journey; Mobile AR Application Controlled Experiment	Customer creativity, mental imagery, regulatory mode	Mobile AR solution (IKEA App); Conventional website	Customer engagement, customer creativity	Anticipated satisfaction	The use of AR (versus a website) for creative purchase decisions sequentially increases customer engagement, customer creativity, and anticipated satisfaction. This effect is stronger for customers with a more pronounced assessment orientation.
Stages: Liking a product/service, willing to pay, choosing, consuming, is satisfied and advocates through word-of-mouth.						
Yaoyuneyong et al. (2016)	AR marketing; handheld and wearable smart devices;	Consumer-brand interaction	Traditional print ad, a quick response (QR) code hypermedia (QRH) print ad & ARH print	–	Attitude (Ad), informativeness, entertainment, advertising value, time-effort, novelty, irritation & effectiveness	ARH print ad was preferred, yielding higher perceptions of informativeness & effectiveness; whereas the QRH print ad resulted in higher irritation; traditional ad resulted in higher time-effort
Heller et al. (2019a)	AR experimental marketing; AR Glasses Experiments between subject -qualitative study	Mental Imagery theory	AR configuration, AR transformation	Processing Fluency Decision Comfort	Choice, spending, WOM	AR-enabled frontline improved decision comfort, motivated positive WOM and facilitated choice of higher value products.
Smink et al. (2019)	AR Marketing; Persuasion Online Experiment	Equity theory	AR product presentation (web)	Perceived informativeness, perceived enjoyment	Brand attitude, purchase intention, willingness to share personal data	Perceived informativeness was shown to lead to a cognitive process, which enhanced purchase intention and willingness to share personal data with the brand.
Poushneh and Vasquez-Parraga (2017)	Retail user experience User satisfaction User's Willingness to buy	Equity theory	AR level of interactivity	User experience (UX)	Willingness to buy, User satisfaction	AR significantly shaped UX, by impinging on various characteristics of product quality, and that UX subsequently influenced user satisfaction & Willingness to buy.
Hilken et al. (2017)	Enhancing online service experience; Experiment in controlled environment	Situation cognition theory	Simulated physical control Environmental embedding	Spatial presence	Utilitarian and hedonic value perceptions, decision comfort, WOM and purchase intentions	The AR-enabled interaction of simulated physical control and environmental embedding positively affected customer value perceptions of the online service experience. Spatial presence functioned as a mediator and also predicted decision comfort. Customer value perceptions and decision comfort translated into positive behavioral intentions.

On the other hand, Pragya J and Biswajita P (2023) have authored a bibliometric analysis paper examining the past, current, and future of augmented reality in marketing research. The paper offers a holistic and comprehensive understanding of the progression of AR in marketing research. Nevertheless, the thematic review employed does not delve into the persuasive effects of AR.

Additionally, Shafeeque M.H and Azees P. A (2023) have delved into the advancements and applications of AR in research in Tourism utilizing a bibliometric analysis, providing scholars with a systemic review and a holistic overview of AR in Tourism research. The findings of this study have confirmed that in addition to AR and its application in tourism, the predominant keywords frequently utilized in the research encompass virtual reality, cultural heritage, and the adoption of technology.

In this perspective, some bibliometric studies have been identified in the literature that investigate the digital journey of customers. A study conducted by Tuna (2021) on "The Journey of the Consumer in the Digitalization Transformation Process," utilizing bibliometric analysis and referring to a different database (Web of Science), has focused on articles containing the keywords "Customer" and "Consumer," thereby exploring digital transformation.

As previously mentioned, the Scopus Database has been used (in combination with VOSviewer) to get a quantitative overview of the literature related to AR and the possibility of using it as a persuasion tool in terms of the number of documents produced to cover these two subjects (AR and persuasion). To the best of our knowledge, only a few studies have attempted to address whether AR can serve as a tool to influence customer decision-making throughout the entire journey of the customer purchase process or only specific phases.

To better demonstrate the scarcity marking the possibility of using AR as a persuasion tool, we invite you to take a look at

Methods

In the first stage of the bibliometric analysis, we filtered the examined sources to journal articles written in English since they are more likely to have a bigger influence on the academic and business fields (Podsakoff et al. 2005).

Bibliometric analysis is a method that relies on analyzing the published papers – and more precisely their citations – to get a closer understanding of their impact within a given field. It also objectively shows the connections between papers in a particular research topic or field by identifying important papers and analyzing how often they are co-cited by other published papers (Fetscherin and Usunier 2012). By analyzing the data collected, it helps us get insights into the growth of literature over a period of time in a given field.

Data source

Considering that persuasion acts as a tool to influence the purchase decision of customers (from a managerial point of view). The main theme of this paper was a review article in the title and abstract that included "Augmented Reality", "Purchase decision" and "Persuasion" where the time range of articles' recency is 1999-2023. In order to shed some light on the "Purchase decision" alongside with "AR", the search question string used for AR is: TITLE-ABS-KEY ("augmented reality") AND PUBYEAR > 1999 AND PUBYEAR < 2025 AND (LIMIT-TO (DOCTYPE , "ar")) AND (LIMIT-TO (LANGUAGE , "English")) AND (LIMIT-TO (SUBJAREA , "ECON") OR LIMIT-TO (SUBJAREA , "DECI") OR LIMIT-TO (SUBJAREA , "BUSI")) AND (LIMIT-TO (EXACTKEYWORD , "Augmented Reality") OR LIMIT-TO (EXACTKEYWORD , "Augmented Reality (AR)") OR LIMIT-TO (EXACTKEYWORD , "Virtual Reality") OR LIMIT-TO (EXACTKEYWORD , "Industry 4.0")). As for the concept of "Purchase decision", we have limited the time range in 2000 - 2024 with the following 25 keywords to help us narrow down the results from 6,298 documents to 1,870 documents:

Purchase Decision - Decision Making - Sales - Consumer Behavior - Consumer Behavior - Buying Decisions - Buying Decision - Purchase Intention - Buying Behavior - Buying Decision Process - Behavioral Research - Willingness To Pay - Buying Behavior - Consumer Buying Decision - Purchasing Decisions - Buying - Questionnaire Survey - Qualitative Research - Emotions - Decision-making - Consumer Choice - Consumer Buying - Cognition - Decision Process - Consumer Decision-making.

Table 2 . Showing the different results we got using the Scopus Database based on the different requests.

Scopus Request	Filters	Number of documents
TITLE-ABS-KEY ("VR" AND "purchase")	No filters were applied	164 Documents
TITLE-ABS-KEY ("Virtual Reality" AND "Buying decision")	No filters were applied	11 Documents
TITLE-ABS-KEY ("Virtual Reality" AND "Purchase decision")	No filters were applied	49 Documents
TITLE-ABS-KEY ("Virtual Reality" AND "Purchase")	No filters were applied	536 Documents
TITLE-ABS-KEY ("VR" AND "Purchase")	No filters were applied	164 Documents
TITLE-ABS-KEY ("Augmented Reality" AND "Purchase")	No filters were applied	298 Documents
TITLE-ABS-KEY ("AR" AND "Purchase")	No filters were applied	254 Documents
TITLE-ABS-KEY ("AR" AND "Persuasion")	No filters were applied	12 Documents
TITLE-ABS-KEY ("Augmented Reality" AND "Persuasion")	No filters were applied	25 Documents
TITLE-ABS-KEY ("VR" AND "Persuasion")	No filters were applied	28 Documents
TITLE-ABS-KEY ("Virtual Reality" AND "Persuasion")	No filters were applied	88 Documents
TITLE-ABS-KEY ("Persuasion")	English Only	16, 364 Documents

Bibliometric Mapping

Citation, bibliography, and author keywords of 728 publications for "AR" and 25 publications for "AR AND Persuasion" have been exported to VOSviewer (version 1.6.19 of VOSviewer). To use VOSviewer most optimally, the following parameters have been exploited: Network Visualization: By clicking on one concept, the sum of links with other related concepts is shown.

- Overlay Visualization: When observing the transformation (lack or increase of interest) of a given concept over the years.

- Density Visualization: With a color range from Green to yellow for each point, as the number of elements near that point increases and the number of neighboring elements increases, the color of the point approaches yellow.

Co-Authorship and Co-Occurrence Analysis:

The bibliometric analysis we conducted included 3 sub-sections (both for AR and purchase decision):
- Co-authorship for Authors.
- Co-authorship for organizations.
- Co-authorship for countries.

We have also opted for the visualization (VOSviewer) method for co-occurrence by mapping out the keywords that track the different fields related to our studied subjects allowing us to get a global view.

Results & Discussion

As we previously pointed out, there is an obvious lack in terms of scientific research when it comes to the link that there might be between AR and persuasion. That being said, we have decided to be creative and study both "AR" and "Purchase decision" but separately.

When it comes to the leading countries, the United States and the United Kingdom are present in all of the 3 areas, and although the subject areas are not impacted by AR to the same degree, it allows us to identify future research gaps allowing us to understand whether the cultural dimension of each country might play a role in how AR is perceived by customers.

As illustrated by the mapping in Figure 1, since 2022 AR has noticeably reached out to a multitude of fields such as: Consumption behavior, Internet gamification, simulation, Blockchain, Architectural design, and customer experience. But surprisingly, the scarcity in the links between AR and persuasion is intriguing.

Table 3. Summary of bibliometric analysis results obtained by Scopus Database

|	Documents by Year		Leading Countries	Subject Areas
	2015	2023		
Augmented Reality	12	132	United-States United Kingdom India	Business, Management and Accounting (16,5 %) Social Sciences (13,6 %) Computer Science (12,6 %) Decision Science (11,2 %) Engineering (10,4 %)
Persuasion	776	926	United-States United Kingdom Australia	Social Sciences (28,7%) Arts and Humanities (15,1%) Psychology (10,4%) Business, Management and Accounting (9,9 %) Computer Science (9,6 %)
Augmented Reality & Persuasion	4	3	Netherlands United Kingdom United-States	Computer Science (43,5 %) Mathematics (15,2 %) Social Sciences (13 %) Arts and Humanities (6,5 %) Business, Management & Accounting (6,5 %)
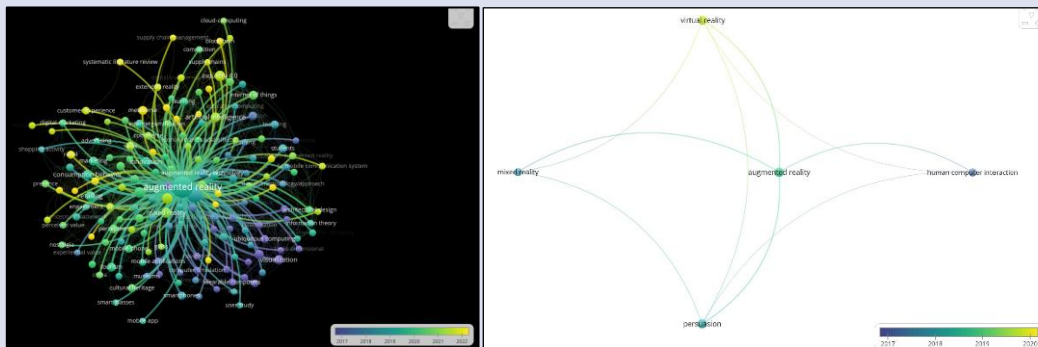
Figure 1. Co-occurrence of both "AR" and "AR AND Persuasion" using VosViewer

A. Most productive journals in Augmented Reality with their most cited article

Journal	Total Publication	Cite Score (2023)	The most cited article (reference)	Times Cited	Publisher
Personal And Ubiquitous Computing	358	5,8	GAN-based imbalanced data intrusion detection system	2076	Springer Nature
Journal Of Retailing And Consumer Services	1444	17,6	Unusual purchasing behavior during the early stages of the COVID-19 pandemic: The stimulus-organism-response approach	25 401	Elsevier
Technological Forecasting And Social Change	2560	18,3	Green innovation and environmental performance: The role of green transformational leadership and green human resource management	46 925	Elsevier
International Journal Of Recent Technology And Engineering	175	0 Citations 2015 - through2018	Optimization of deep learning using various optimizers, loss functions and dropout	0	Blue Eyes Intelligence Engineering and Sciences Publication
TEM Journal	931	1,9	Sustainable Natural Resource Management to Ensure Strategic Environmental Development	1772	UIKTEN - Association for Information Communication Technology Education and Science

B. Top 10 most prolific authors in the Augmented Reality research area

No	Author	Scopus Author ID	Year of 1st Publication	Total Publication	h-index	Times Cited	Current affiliation	Country
1	Rauschnabel, P.A.	56341892200	2014	56	31	4,727	Universität der Bundeswehr München, Neubiberg	Germany
2	Chylinski, M.	35726628700	2010	35	18	1,551	UNSW Business School, Kensington	Australia
3	Keeling, D.I.	16682898400	1996	73	27	2,008	University of Sussex Business School, Brighton	United Kingdom
4	de Ruyter, K.	7004664517	1992	200	67	16,183	King's Business School, London	United Kingdom
5	Heller, J.	57197766360	2018	22	13	905	Universiteit Maastricht, Maastricht	Netherlands
6	Hilken, T.	57189321073	2016	18	12	965	Universiteit Maastricht, Maastricht	Netherlands
7	tom Dieck, M.C.	56764475300	2016	36	23	2914	InfoManchester Metropolitan University, Manchester	United Kingdom
8	Mahr, D.	36727950100	2010	57	27	3,514	Universiteit Maastricht, Maastricht	Netherlands
9	Huang, T.L.	56001266400	2007	21	12	927	National Pingtung University, Pingtung	Taiwan
10	Javornik, A.	55545446500	2012	22	14	975	University of Bristol, Bristol	United Kingdom

Although Bibliometric analysis helps us build a panoramic view on the progress of scientific research in a given field (with the help of visualization software), it also allows us to narrow down our focus to the most prolific journals. This is particularly important for researchers to help them discover the given theme by carefully choosing the articles and the sources based on the appropriate journals

Similarly, to the "The most productive journals", this section allows the researchers to narrow down the list of authors to which they can turn in order to get a better understanding of the augmented reality subject. If the analysis effort is pushed a little further, it could also be considered as a promising research gap (when observing the nationalities of the researchers) that might set the ground for introducing answers to the following question: "How does augmented reality look like from one country to another?"

Augmented Reality has come in a lot of shapes and forms over the years but one thing hasn't changed, and that is its ability to make the purchase journey more enjoyable and less passive for the customer, it is also an opportunity for customers to participate in the making of their own experience. Which brings us to a vital question:" *When does reality end and virtuality start?"* This question alone opens the door to new and exciting horizons where we could dive deeper into the role played by immersive technologies in general.

In a mediated environment, the virtual experience theories presume that controlling content can trigger mental imagery (Choi and Taylor 2014; Collins et al. 1988; Li, Daugherty, and Biocca 2003). That is, two-way communication and the engagement of the consumers are a must for interactive technology to be applied in the online environment (Domina, Lee, and MacGillivray 2012).

When consumers interact with the product in hand it triggers them to recall every possibly stored information about that product, which eventually has an impact on the cognitive elaboration of information (Flavián, Gurrea, and Orus 2017). In the context of online clothing product reviews, virtual trying allows consumers to modify a product image by placing it on their reflection.

This interactivity can trigger active cognitive activities by helping them evaluate product information more critically (Li, Daugherty, and Biocca 2003).

That being said, the goal of this research paper was to help us gain consciousness of the evolution of AR in the academic field by tracking 25 documents in persuasion and 728 documents in AR. Although the final aim was to find the link between the usage of AR technology and the persuasion of customers, the noticeable lack of research made us think more creatively by separating the two keywords: AR and persuasion, which could only be understood by fully grasping the customer journey with all of its stages.

Although we tried our best to be as methodical as possible, we must remain open to admitting that no research is immune to its limitations. And we can identify ours on two levels.

- Limitations related to the bibliometric analysis itself: Given the basis on which Scopus Database works (mainly based on analyzing abstracts and keywords), we know that it did not cover all the studies related to Augmented Reality. Therefore, we remain skeptical on the amount of information that might be revealed if we proceed with other methods such as Meta-analysis, or sociometric analysis.

- Limitations related to the chosen segments: We often observed that most studies made on the impact of Augmented Reality were done on tech-savvy segments; those who already tolerate the interference of technology in their lives. This means they are more likely to "*welcome AR with open arms*". But how about a more challenging segment that isn't necessarily happy with how "*intrusive*" technology has become? Could there be hope to introduce the usage of AR soon? This gives birth to a new research question that we will gladly discuss in our upcoming papers: "*Are all customers created equal?*".

- Limitations related to the research made in analyzing the AR impact on the cognitive functions throughout every step in the customer behavior. We made it our aspiration to conduct such research as rigorously as science allows it to be. While conducting a primary literature review, we came across an interesting concept of "Cognitive elaboration" which is defined as the degree to which consumers think critically about, or process, new information cognitively (Chow, W. C., and Luk 2006).

Augmented reality has allowed us to see the world differently. By adding a digital layer to reality, we have now unlocked new ways to receive and process information and consequently new paradigms for decision making processes may present themselves. And although the bibliometric analysis conducted has provided promising research gaps that still need our attention (as researchers) one can only wonder: *"Are we on the edge of discovering a customer whom we`ve never discovered before?"*

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