Augmented Reality (AR) Generated Value-in-Use Experiences: Literature Review and Analysis

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Abstract

Augmented Reality (AR) research has sparked both academia and practice interest. However, despite the increasing interest to study this emergent topic, till now the growing body of knowledge is mainly from engineering and computer science disciplines. The aim of this study is to conduct a systematic literature review to identify, evaluate and synthesize (AR) emergent themes from business management publications in the last years. Hence, contribute to the literature with evidence-based results about the existing research progress, and classify into clusters with multidimensional interrelationships to help researchers build up on these findings and expand (AR) research from business standpoint. The study is exploratory and qualitative in nature; a structured hybrid- narrative review method is used to extract unstructured data within articles. Thus, discover relevant patterns, uncover hidden thematic clusters, relationships, and identify multidimensionality of dominant concepts from the existing (AR) business literature. It was evident from the stream of research, that most of researchers' have a clear interest in exploring the interactive nature of Augmented Reality (AR) as new digital technology and defining its experiential characteristics with a hierarchical set of dimensions that will affect customers' perceptions of service operations. Hence, in line with these findings, and grounded on the service literature body of knowledge, Augmented Reality can be defined as: "smart service based technology that generate value-in-use experiences".

Keywords: *Augmented Reality (AR); Smart Service; Value-in-use; Experience.*

Introduction

Disruptive technologies evolving in recent years have showed instant implications in service industries. Yet in the newly digitalised era, service innovations are advancing towards smartness, whereas interactions are more intelligent, thus improving the potentials of value co-creation which is considered the central tenet of service-dominant (S-D) logic.

S-D logic initially focuses on the active role of customers' engagement in co-creation throughout integrating their personal resources (i.e. operant resources) with those of the firm (i.e. operand resources) to generate value-in-use, which is consequently determined by the customer's evaluation of experience during consumption. Furthermore, it is discussed that S-D logic can be complemented with virtual-based logic that is enabled by new technologies to create value from simple information sharing to big data analytics, thus support service network actors in recognising value (Lindhult et al., 2018; Bani-Hani et al., 2018; Buhalis et al., 2019).

Obviously the rapid technological progressions have given organisations numerous opportunities to re-think new alternatives for interacting and engaging with customers. Shankar et al. (2021) refer to technologies (i.e. internet of things; artificial intelligence; virtual and augmented reality; smart mirrors; face recognition; chatbots...etc.) by "Customer-Facing Technologies".

Such technologies enhance the value creation and radically transform consumers' experience throughout facilitating engagement during customers' decision making journey. It is acknowledged that these technological transformations have an impact in almost all industries, shifting organisations' attention towards smart operations that are characterised by real-time, instant interactive connectivity with value-chain actors. Consequently, enhance information communication flow, digitalised solutions, and personalization of offerings to create an experiential value consisting of cognitive, emotional, and social dimensions (Hoyer et al., 2020).

Augmented Reality (AR) is viewed as one of the cutting-edge technological innovations, representing Mixed Reality (MR) that can be categorised into two types marker-based and marker less. AR is a blend between virtual and real environments, combining elements from both settings that interact simultaneously in real-time. AR technologies can be utilised through devices such as laptops, smartphones, head-mounted display, and smart glasses to display layered information (i.e. rich media content that is communicated assimilating real-time telepresence) resulting from users' interaction with their current surroundings, thus immerse them into virtual and pleasurable experiences (Roxo and Brito, 2018; Yussof et al., 2019).

AR popularity grew due to its ability to virtually visualize objects/contexts throughout augmentation, thus expand the possibilities offered to industries by combining the physical and virtual worlds effectively, whereas traditional and digital environments co-exist to enable virtual real-time information display, products' demonstrations, pre-purchase assessments to facilitate customers' decision making and give them feelings of entertainment (Rese, Baier, Geyer-schulz, et al., 2017).

The more users' expectations and interactions in AR environment are congruent, the higher users are immersed in AR experiences. Therefore, chances are high that AR experience is perceived realistic when users have higher perceptions and feelings of physical presence inside the AR environment. It is argued that the three main features respectively (1) feelings of presence; (2) realism level; and (3) reality degree can be considered the main indicators of AR quality experiences (Cipresso et al., 2018).

AR technologies have been applied widely in many fields including industrial, medical, tourism, retail, education, media and entertainment (Watson et al., 2020). The pervasive use of such revolutionary technologies pave the way for companies to shift from traditional services into smart ones. Leading companies are increasingly embracing the use of AR technologies that offer a dynamic way to interact with consumers. Services are co-created with customers to provide them with interactive and novel experience simulation beyond physical environment (Caboni and Hagberg, 2019). Hence, it is expected an increase of $85 billion in AR market size by 2025 (Kowalczuk et al., 2021).

Despite the fact that AR offers customers with more informative and enjoyable consumption experiences throughout setting a frontline interface that displays virtual content which is customised based on each user's personal information. Yet, it is argued that augmentation quality is indispensable to the establishment of positive users' experience which is measured by the perceived value gained from using AR. On the other hand, several researchers have stressed the importance of users' privacy control. They assert that the extent of information users is willing to share is dependent on the value they expect to achieve. Accordingly, it is claimed that AR technologies enabling users to have control over the access to their personal information will generate more engaging experiences, lower their levels of anxiety and perceived risks which enhance the customers' quality of experience at time of the purchase. Consequently, it is determined that positive AR experiences will lead to customers' satisfaction and willingness to purchase (Hilken et al., 2017; Poushneh and Vasquez-parraga, 2017; Watson et al., 2018; Poushneh, 2018; Perannagari and Chakrabarti, 2019).

Therefore, AR should be observed from a quality-experience driven lens, rather than technology-driven one. AR quality of experience is influenced by virtual content that is perceived by the users who directly experience augmentation within a particular setting or application (Scholz and Smith, 2016). Thus, AR creates digital affordance that drives consumers' experiences, and maximizes consumers' engagement by involving them into quality interactive media experiences. These experiences of situated cognition can be classified into: (1) embedded which is defined in terms of information integration within personal context in real-time to evaluate products/services; (2) embodied which refers to simulated physical interactions with products/services which improve customers' ability to evaluate an offering; (3) distributive which is an extended experience where customers share their experiences with peers to support them in products/service evaluation. It is noted that AR supplements reality with an enhanced view of physical environment by providing customers with embedded, embodied, and extended consumption experiences that are adaptive with their needs and tastes. Accordingly, it can be concluded that AR value propositions consist of digital content vividness, interaction, personalisation and connectivity (Hilken et al., 2018; Chylinski et al., 2020).

Although AR is the latest emergent technology mostly investigated in academia in the last few years, but it is still considered in its nascent stages. Most of the existing AR publications are dominated by computer science research studying technological and engineering aspects disregarding business perspective and service operations aspects. Furthermore, it was noted that the current AR body of knowledge lacks integration between different disciplines which can help in developing more generalised models and measurement scales. Whilst, several studies are available to explain AR technologies' acceptance and behaviors adoption models, but still there is an absence of academic research on how AR technology can transform service operations. Therefore, further review is required to get a better understanding of AR value-in-use related aspects and new experiences resulting from using AR technologies (Rese et al., 2017; Scholz and Du, 2018; Roxo and Brito, 2018; Caboni and Hagberg, 2019; Perannagari and Chakrabarti, 2019; Park and Stangl, 2020; Wedel et al., 2020; Hoyer et al., 2020).

Accordingly, the purpose of this paper is to review the progress of business literature in Augmented Reality (AR) to examine the main research streams discussed to date. Furthermore, discuss its effect on service operations' transformation. The remainder of the paper is structured as follows: the next sections are presenting, First the systematic literature review methods. Second, elaborating findings with respect to three main characteristics that distinguish Augmented Reality (AR) including: smart service technology, value-in-use, and generated experiences. Third, examining how Augmented Reality (AR) is transforming of service operations. The final section discusses the theoretical and practical implications of the study, with recommendations for future research to be conducted.

Systematic Literature Review

The aim of this section is to pinpoint the research progress related to the emergent topic Augmented Reality (AR) within business research area. A structured hybrid-narrative review is used to give an in-depth insight on existing body of knowledge. Therefore, it is essential to search and select the relevant studies for a comprehensive synthesis of literature (Cavalinhos et al., 2021).

This study was conducted in May 2021 using Scopus and Web of Science Core Collection databases. Scopus and WoS are acknowledged to be principal academic search systems that provide access to multiple databases simultaneously. Both databases meet systematic review quality requirements such as broad scope, multidisciplinary coverage, available record types and effective query-based search that promote support for Boolean searching with different options for filtering content (Gusenbauer and Haddaway, 2020).

Searching and Screening Procedure

An initial search to scope peer-reviewed articles from high-impact journals with title and topics using the Boolean operators (AND); (OR) to identify articles addressing the concept of augmented reality experience

quality. The papers were searched using the following title "Augmented Reality Quality" (OR) "Augmented Reality Experience" (OR) "Augmented Reality Value-in-Use". Then linking with the search strings keywords for topics including "virtual quality" (AND) "service quality" (AND) "virtual experience" (AND) "experience quality" (OR) "quality of experience" (AND) "service dominant logic" (OR) "co-creation".

The preliminary search results from WoS returned 8,686 titles and 466 titles from Scopus. Yet, the results were refined to include only English, peer-reviewed full-text articles published in academic journals in business and management research area across all years (See Table 1). Guided by the inclusion criteria, the final search results displayed 27 titles from WoS and 23 titles from Scopus published from 2012 to 2021.

Table 1 Search Results Inclusion Criteria

Databases Topic	Web of Science (WoS) Core Collection; Scopus Augmented Reality
Search Strings (title, keywords)	"Augmented Reality Quality"; "Augmented Reality Experience"; "Augmented Reality Value-in-Use"; "virtual quality" (AND) "service quality"; "virtual experience"; "experience quality"; "quality of experience"; "service dominant logic"; "co-creation".
Indexes	SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI.
Timespan	All years
Language	English
Document Type	Peer-Reviewed, Full Text Articles
Research Area	Business, Management, Economics
Source	Academic Journals

First, the 50 articles retrieved from Scopus and WoS were scanned for duplicated titles using Mendeley which resulted in retaining 45 after removing 5 similar articles from both databases. Second, to ensure the quality of the articles included in the study, only articles from journals listed in the academic journal guide for Chartered Association of Business Schools (ABS) are included in the study (Paul & Benito, 2018). Subsequently, 34 titles were identified eligible papers to be included in the systematic literature review. Finally, cross-referencing was used to identify additional papers relevant to the study, 9 new papers are identified and added after checking the scope of the topic, the inclusion and quality criteria. As a result, the refined final list consists of only 42 articles as illustrated below in Table 2.

Table 2 Distribution of Papers Selected from ABS Journals, Authors and Date of Publication

Journal Title	Articles	Authors, Year
Journal of Retailing and Consumer Services	7	(Hollebeek et al., 2020; Huang, 2021; Javornik, 2016; Li and Fang, 2020; Poncin and Ben Mimoun, 2014; Poushneh, 2018b; Poushneh and Vasquez-Parraga, 2017)
Journal of Business Research	5	(Brannon Barhorst et al., 2021a; Flavián et al., 2019a; Hudson et al., 2019; Matarazzo et al., 2021; Sung, 2021)
Tourism Management	2	(He et al., 2018; Park and Stangl, 2020b)
Tourism Management Perspectives	2	(Cranmer et al., 2020; Hsu, 2018)
Business Horizons	2	(de Regt et al., 2020a; Scholz and Smith, 2016)
Journal of Interactive Marketing	2	(Kim and Forsythe, 2008; Yim et al., 2017)
Internet Research	2	(Huang and Liao, 2017; Huang and Liu, 2014)
Personal and Ubiquitous Computing	2	(Litvak and Kuflik, 2020; Olsson et al., 2013)
Journal of Travel Research	2	(Chung et al., 2018; Tussyadiah et al., 2018)
International Journal of Retail Distribution Management	2	(Pantano et al., 2018; Perannagari and Chakrabarti, 2019)
International Journal of Contemporary Hospitality Management	1	(Milman et al., 2020)
International Journal of Engineering Business Management	1	(Kounavis et al., 2012)
Journal of Business Economics and Management	1	(Davidavičienė et al., 2021)
Journal of Business & Industrial Marketing	1	(Nussipova et al., 2019)
Journal of Destination Marketing Management	1	(Marasco et al., 2018)
Journal of Service Management	1	(Buhalis et al., 2019)
Journal of Services Marketing	1	(Huang et al., 2019)
Journal of Place Management and Development	1	(Jung and tom Dieck, 2017)
Journal of the Academy of Marketing Science	1	(Hilken et al., 2017)
Futures	1	(Kymäläinen, 2013)
Qualitative Market Research	1	(Cuomo et al., 2020)
Psychology and Marketing	1	(Rauschnabel, 2018)

Journal Title	Articles	Authors, Year
Technological Forecasting & Social Change	1	(Rese, Baier, Geyer-Schulz, et al., 2017)
ACM Transactions on Internet Technology	1	(Pascoal et al., 2020)
	42	

It was depicted that few papers in the management & business research area were published before 2017, an increase in the publications from 2017 to 2021 was noted. Yet, it can be concluded that the amount of research from business discipline is not comparable to the research published from both engineering and computer science disciplines. However, as it can be seen in Table 2, both the journal of retailing and consumer services, and the journal of business research contribute with the highest number of published papers (n = 12) addressing Augmented Reality issue to date.

Data Extraction and Content Analysis

Document analysis is qualitative and analytical procedure that focuses on synthesizing data contained in research articles to extract rich information, discover relevant patterns and relationships from the existing body of knowledge. Further, set direction for additional research questions and new conditions to be observed and investigated (Bowen, 2009). As result, this approach is useful in studies designed to explore and explain a concepts throughout recognizing emerging words, patterns and themes within the data that are selected and organized into codes and categories used for content analysis (Fereday and Muir-Cochrane, 2006).

The textual information in the articles screened and selected for the study purpose was examined using "WordStat 8", a content analysis software that includes numerous text mining and graphical tools that help exploring and extracting the content of articles. Accordingly, discover relationships between keywords, identification of the most recurring phrases, and clustering similar segments across articles. The process of content analysis involves conceptual analysis to quantify the frequency of concepts occurrence within sample cases analysed (i.e. peer-reviewed articles). Consequently, coding into a set of categories to examine and evaluate the relationships between concepts identified in the text to draw meaningful results and interpretations.

The visual word cloud (See Figure 1) gives a quick graphical representation of words frequencies depicted within the documents analysed, whereas the size of each word indicate the occurrence level in the text. Thus, providing a good starting point to highlight the concepts that appear frequently in the unstructured data.

Consequently, start analysing the data in order to extract meaningful information that uncover the hidden thematic structure of the text. Then, creating a categorization dictionary to group words or phrases, and exclude low frequency items prior to using topic modelling procedure (See Table 3). To differentiate documents and extract more precise results about the various topics they contain, an analysis at the documents level is conducted to segment the dominant issues contained across the 42 cases. The emergent themes were categorized into 6 broad topics as illustrated in Table 3.

Figure 1 Visual Representation of Words Frequencies Using Cloud Graph

Table 3 Topics Extracted from the Document Analysis

Topics	Keywords	Coherence	Frequency	No. Cases	%Cases
Immersive Experience	mental imagery; virtual presence; visual cues; verbal cues; dynamic cues; imagery process; design elements; information type; aesthetic appreciation; imagery vividness; information processing; augmenting immersive scenes; immersive experience; visitors willingness to pay.	0.471	1681	42	100.00%
Interactive Technology	augmented reality (AR); virtual reality; smart glasses; robotic functions; robotic qualities; technology-human interactions; safety; service experience; playfulness feelings; positive influence; customer responses.	0.449	1275	42	100.00%
Customer Experience	customer experience; online shopping; digital technologies; social media; shared social experience; brand experience; shopping experience; social interaction; customer satisfaction; positive effect; service quality; purchase intentions; customer behaviour.	0.436	1227	41	97.67%
Ownership Control & Surveillance	physiological state; sense of ownership control; body surveillance; consciousness; haptic imagery; explorative engagement; flow experience; rapport experience; online service experience; decision making; utilitarian and hedonic value perceptions.	0.418	1050	40	95.35%
Virtual Real Environment	virtual world; virtual objects; physical world; mixed reality; real world; real time; augmented reality (AR) technology; smart glasses; smart retailing; smartphones; mobile AR applications.	0.372	1064	41	97.67%
User Acceptance	technology acceptance; perceived usefulness; perceived ease of use; perceived enjoyment; user acceptance of information technology; technology anxiety; attitude towards augmented reality.	0.364	933	40	95.35%

To further explore the connections between concepts, an average-linkage hierarchical cluster analysis and multidimensional scaling mapping methods are used to create clusters from a similarity matrix. Keywords that tend to appear together are combined into categories, the results are visually presented in the form tree diagram called Dendrogram (See Figure 2) and multidimensional concept map (See Figure 3) to depict a group of interrelated co-occurring concepts representing the overall meaning of the explicit concepts extracted from the unstructured data and its relationships.

Findings and Discussion

The digitalization wave has given birth to "Smart Technologies" and draws attention towards exploring related issues to this concept rather than merely focusing on the technical aspects of these technologies. Smart technologies enabled intelligent use of data to deliver pro-active, personalised, adaptable services whereas customers are always the co-creators of value.

It is recognised that AR is a smart technology that creates value for customers (Dacko, 2017). In contrast to other smart technologies (i.e. RFID; self-services; mobile wallets;) that help customers to save time and effort during task performance, AR is an interactive offline-online technology that empowers customers to actively co-create their individualised smart service experience. The customer interacts with smart technology and participates in service co-creation which is a typical example of smart service encounter (Huang, 2018).

It was evident from the stream of research, that most of researchers' have a clear interest in exploring the interactive nature of Augmented Reality (AR) as new digital technology and defining its experiential characteristics that will affect customers' perceptions of service operations. Hence, in line with these findings, and grounded on the service literature body of knowledge, Augmented Reality can be defined as: "smart service based technology that generate value-in-use experiences".
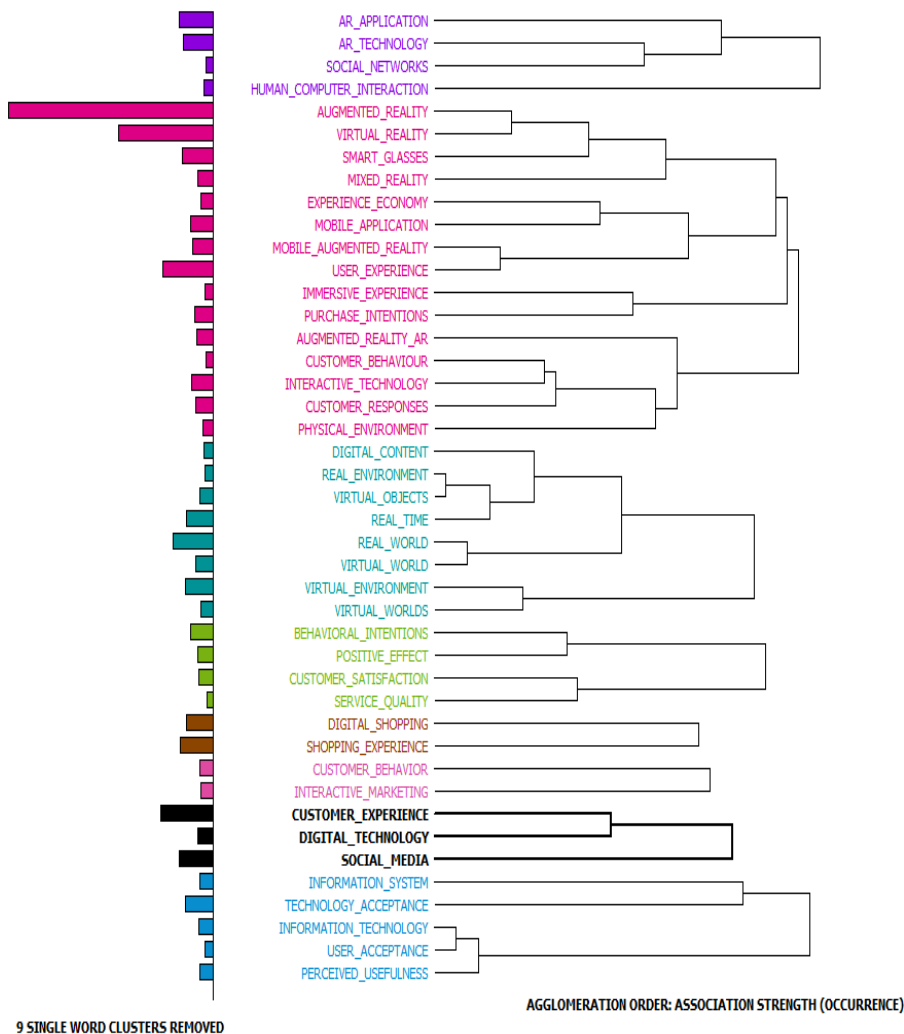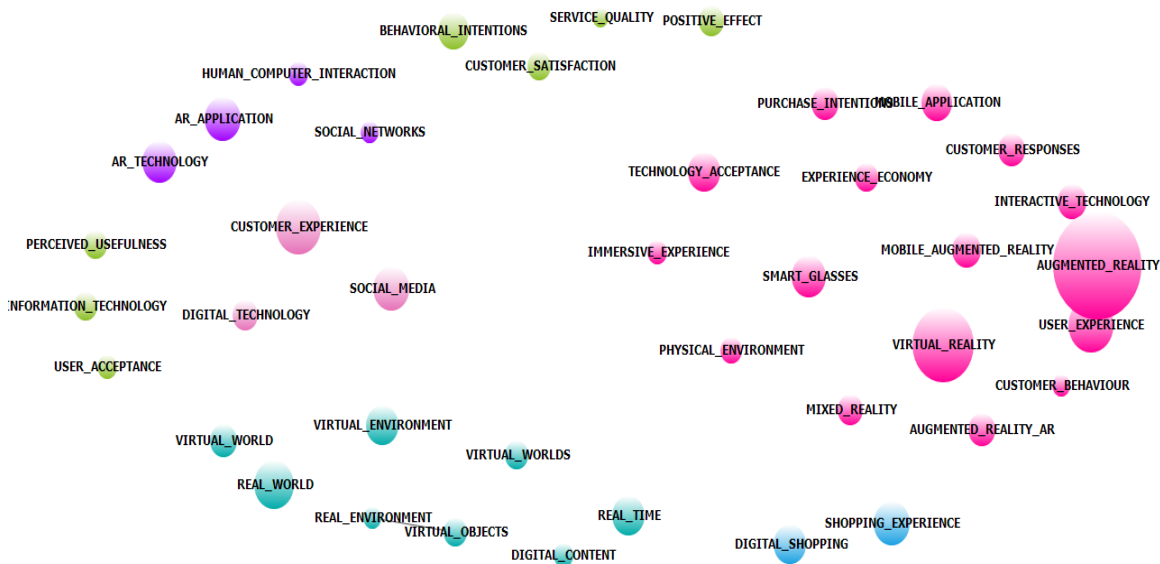
Figure 2 Cluster Analysis - Dendrogram

Figure 3 Multidimensional Concept Map

Augmented Reality (AR): Smart Service Based Technology

AR is a human-computer interaction technology that combines reality with virtual reality by applying computer-generated virtual information into physical world. AR is an intelligent display technology using either video-through or see-through devices, with accurate tracking 3D registration and variety of intelligent interactions in real-time between users and virtual objects within real contexts (Brannon Barhorst et al., 2021b).

AR-based technologies consist of two categories with recognition features that enable the reproduction of augmented information without restrictions of place and time. The first, image-based which is a marker-based AR that recognizes artificial labels and visual tags. The second, location-based which is marker-less AR that uses position data through GPS or wireless network as recognition method (Tsai, 2013).

AR uses digital devices to overlay virtual elements on the real world which stimulates users' multi-sensory involvement, permits three-dimensional and social interactions experience, as well as enabling users to have dynamic adjustments while viewing, trying and using objects. (Wedel et al., 2020). Accordingly, these AR features can allow customers to get access to real-time and adaptable virtual information that is integrated into their actual surroundings to create a complete sense of real presence experience (Park and Stangl, 2020a).

It is denoted that AR main characteristics are categorised into: (1) degree of interaction with virtual and physical contexts, thus stimulates multisensory effects, called "immersion" which creates highly vivid experience that affect the degree of realism perceived within AR environment; (2) processing quality refers to the reliability, promptness, responsiveness of requested services that allow users to edit and modify transmitted digital content within AR context quickly, efficiently and effectively; (3) visualisation quality is concerned with the quality of media content combined with the quality of digital devices presenting content; (4) information quality relates to the amount of information provided and information quality, in terms of its accuracy, completeness, availability, retrievablity, accessibility and relevance to the context in which it is intended to be used in; (5) personal information handling that derives users' concerns about security assurance, privacy protection and control (Kowalczuk et al., 2021).

It is confirmed that customers will cognitively, affectively and behaviourally respond to AR service encounters that have key features aligned with AR characteristics and that gratify value-in-use experiences. Therefore, it can be concluded that AR is considered a smart service based technology characterized by offering customers with real vivid stimulation experiences that allow them to control and modify sensory stimulations (Huang, 2018).

Augmented Reality (AR) Technology Value-in-Use

Drawing on S-D logic approach, organisations recognize that value is created in use and specific to a context, thus varies for each customer. The key characteristics of value-in-use consist of the customers' active role in value creation, aligned with their context-specific goals' achievement. This means that value can only be determined by the customers. Therefore, it is suggested that value-in-use can be understood by the perceived consequences arising from AR usage process. Accordingly, it is noted that value-in-use is defined by customers' evaluation of AR consumption experiences that evolve over time and can be positive or negative. (Schwipper et al., 2020; Font et al., 2021).

Holbrook (2006), states that value resides only in experience, which implies that AR value-in-use has experience-based characteristics that can be refined based on value typologies (Gallarza et al., 2017). Expee riential value can be viewed with respect to Holbrook's typology of consumer's value encompassing three continuous dimensions (1) intrinsic and extrinsic benefits; (2) reactive and active activities; (3) self and oth-

ers orientation, that were used to categorise value into four main groups including: economic, hedonic, social and altruistic. Yet, Holbrook value typology is not exhaustive, instead it can be used as guidance to explore new additional value types (Stewart Loane et al., 2015). The experiential values are gratifications resulting from sensory attributes of the overall perceived experience either through direct or indirect interactions with products/services (Tandon et al., 2014). Therefore, seamless sequence of cognitive, affective and physical responses resulting from human-technology interactions facilitated by AR technologies are key components for value-in-use experiences that can occur through direct or indirect participation of users in activities within AR context (Brannon Barhorst et al., 2021b).

Augmented Reality (AR) Technology Generated Experiences

Nowadays, reality-virtual technologies have redefined customer experience, taking into consideration that different technologies can directly or indirectly support "core experiences" by adding value to the customer journey stages, thus creating integral technology-enhanced experiences. On the other hand, "empowered experiences" resulting from the vital role technology plays will also generate new experiences either related or unrelated to customers' core experiences (Flavián et al., 2019b).

Yet to date, it was determined the scarcity of attempts to identify users' experiences with AR. Two main research streams related to users' expectations from AR were acknowledged. The first category was mainly concerned with studying AR experiences characteristics including utility, pragmatic, hedonic and emotional aspects. The second category focused on discussing the design requirements that facilitate the delivery of interactive experiences (Park and Stangl, 2020a).

It was mentioned that AR active experience is created and influenced by several factors including: virtual AR content; users' participation; and targets in the physical world (i.e. objects, ambient conditions) that are augmented. While AR passive experience encompasses non-participative users who just observe other users actions or view generated augmented content, and non-augmented targets (Scholz and Smith, 2016).

Thus, AR provides a combined view of digital and physical world by embedding realistic digital content into users' perceptions. Yet, it is argued that AR is not merely a technology, rather it is self-service quality enabler that achieves customizable value outcomes for customers through interactive, immersive, real-time and multi-sensory experiences induced by virtual media content (Heller et al., 2021; de Regt et al., 2020b) As a result, conventional services' operations are transformed into smart ones, creating an entirely different customer experience concept that can be labelled with "Smart Experience" (Kabadayi et al., 2019).

Future Research Directions

This study responds to calls for research about Augmented Reality (AR) to better understand how it can effectively transform service operations. The study synthesizes existing literature and summarizes the most valuable findings of the discussed topic. This review extracted and analysed the most important AR emerging themes in research to date. Yet, there is still a need for further academic research to investigate these trends, in order to provide academia and practitioners with the information necessary to enhance their service operations. It is evident that Augmented Reality (AR) technologies give users instant access to real-time information compiled with audio-visual media content through numerous sources, thus provide personalised experience and enhance the quality of service operations.

Given the interdisciplinary nature of service operations research, the identified key themes can be discussed from different disciplines (i.e. marketing, human resources, information systems, technology & innovation, psychology, sociology, engineering...etc.) to instil new insights into future business and management research. Acknowledging the fact that AR is an interactive technology, human-technology interac-

tions increased and replaced human interactions within a service encounter as well as workplace. Involving people in the production and delivery of services is a distinguishing feature of Augmented Reality (AR), Thus, it is crucial to further study the role of customers and employees in co-production and co-creation of operations and its effect on service performance. Moreover, to date, most of the research is focusing on technology acceptance theories that study people behaviours and attitudes, no clear framework or approach has been yet developed to study how technology-based interactive service operations are designed, managed and controlled to measure service operations performance.

It is clear that technology advances have driven the creation of service ecosystems where, customers are key actors in value co-creation throughout integrating required resources. Thus, it is essential to further investigate the uncertainty and variability emerging the actors' roles in new service ecosystems. Thus, requires studies about appropriate network structures and configuration to create value from information exchanged in real time to deliver customisable service operations and create new experiences. Consequently, rethinking the quality characteristics of interactive service operations and experiences generated has become a fertile research area, whereas a review and update of the existing service quality body of knowledge is necessary to accommodate the developments of new technology-based operations.

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