In Store Augmented Reality: Retailing Strategies for Smart Communities

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Abstract. *The multi-channel strategy becomes crucial for the competitiveness of retail system; it is based on open trustworthy relationships, on the support of new communication tools (e.g. social media), and on innovative devices (24/7 connections), which extend possibilities, process and moment of purchasing. Thanks to the support of innovative information technologies, the store constitutes a privileged area of integration between real and digital, where brand management strategies confront with new social spaces. Augmented reality add different degrees of information to the consumers' sense. So as the augmented reality reshapes the commercial area, providing it for contextual information and activable by potential customers when needed; at the same time, the integration with the mobility reconfigures the mode of use, organizing new opportunities of connections with the user. In addition, the generation of contents both bottom-up and top-down makes the individual from tryer into buyer into advertiser, through social networking, generating greater value experiences and, therefore, additional sales.*

Keywords: Open Data, Smart Disclosure, OAuth.

1. Introduction

The capacity for "contextualizing" – purchase offers, consumer goods, content value of brands and interactions between individuals/consumers and the product – is a distinguishing trait of the pervasive retailing *formula;* 'pervasive' - no longer invasive - in the sense that it is activated by the consumer. Consumers use augmented reality to identify and define new opportunities of interaction. In other words, they find advertising or commercial activity (or are contacted by other users) through geo-localized information, multimedia content or indications from websites and social networks (Riva, 2010; Cuomo et al., 2011), from instructions relative to the product displayed in the store, from tweets, tagging objects, noting news in and on places that particularly impact on consumer perceptions, within a new system of social sense making. Moreover, by fully comprehending the strategic capacity of such changes and potential evolution – where trust relationships based on open mode relations, new communication tools (e.g. social media), innovative devices and 24/7 connections (the mobiles

user is by definition always on), extending possibilities, processes and time of purchase, making multi-channeling a fundamental factor for competitiveness in the *retail* context – can be fully understood only in the light of re-thinking the store as socially constructed context, capable of creating innovative consumer relations. The retail scenario is thus transformed from a space, or an area in which place elements prevail to a place designated by the practices and experience that defines it (Accoto e Mandelli, 2012).

2. Augmented reality and new marketing scenarios

A billion smartphones predisposed for augmented reality by 2016, compared to the 150 million currently in use (Editoriale, 2013a) in the retail commerce sector, already constitute devices capable of governing enabling mechanisms, destined to create/stimulate stories about the products, excite interest and generate shelf emotions/experiences, creating new modes of interaction between individuals and the surrounding reality in terms of consumer experience. At the same time, the technological evolution (Fig. 1) – both as concerns the introduction of analogical elements (sound recognition, computer vision) within the digital world and the creation of inter-connecting reality in the digital world, semantic analysis and concision of available information in the real world – and the proliferating of applications with easily adaptable interfaces, signify and services ever more specialized and customized (Frà et al., 2011).

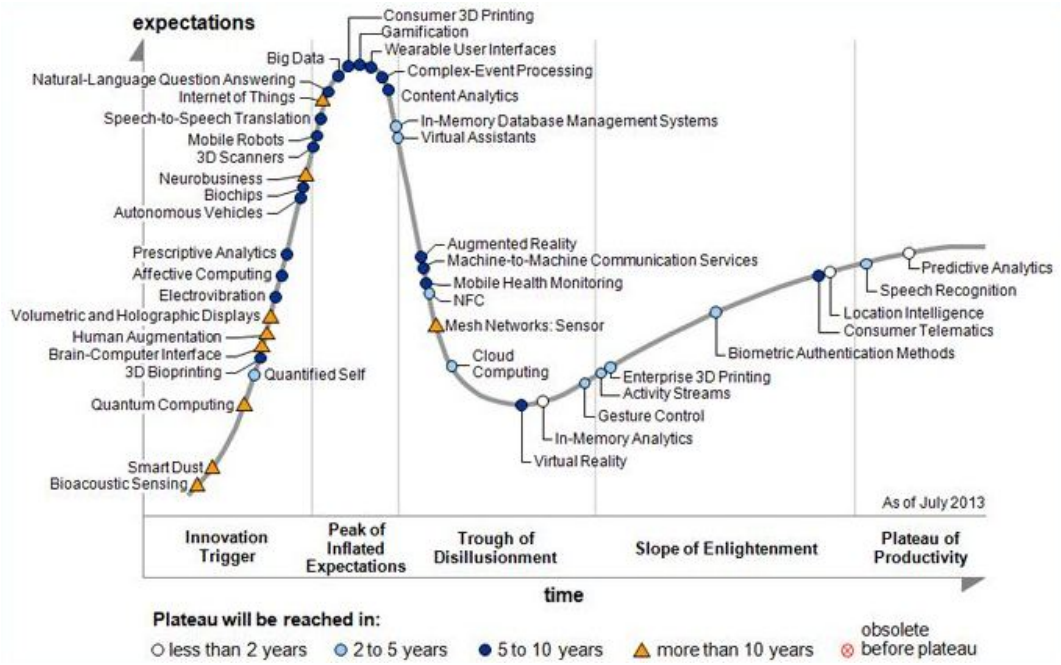

Figure 1
Gartner's technology hype-cycle

In fact, thanks to the support of such innovative information technologies (since the 1990s, Quick Response Codes have conveyed quantities of information on the goods present in the retail area, with direct links to the manufacturer's website – Editoriale, 2013b) the retail store has become a privileged context of integration between real and digital, generating narrative levels to which brand management strategies are applied and where new relational spaces and sociality (Mandelli, 2011) are created.

First appearing in the literature in the 1940s but becoming widespread only in the late 1980s, the term augmented reality (AR – used in 1992 by the researcher Thomas Preston Caudell, a Boeing engineer, to describe a system of new generation technology for assembling and installing electric cables in airplanes – Caudell e Mizell, 1992) indicated «a term for a camera enhanced view of a physical real-world environment, where virtual elements are merged with the real-life scenes creating a "mixed reality" of virtual elements and the real world. The "virtual elements", given their nature, can consist of anything: 3D models, video, web information…anything. The point here is that your mind is the only boundary» (Trubow, 2011a, p. 4). In other words, a monitor and a video are sufficient to integrate real life into a virtual context.

In any event, although seen as the extreme end of a *continuum*, compared to virtual reality (VR), in which information added or removed electronically is predominant and the consumer is led towards a "cancelling" perception of his emotional exploring of the context or situation, in AR, purchaser perceptions are solicited by the addition of information and emotional levels (through multimedia content, i.e. video, audio and animations), enjoyed "unrestrictedly", and at the same time, transferable to other users – once modified by the former, who has meanwhile in his turn, added virtual content. Such content in transit towards social media platforms, generates links with the brand – adding "self produced" value to a shopping experience of a full immersion type (Pine e Gilmore, 2000; Tortora, 2007).

Evident output defines this model of interactive marketing – based on the contribution of the community of reference, decreeing obsolete the centrality of mass media in communications of product/brand – and redesigning the strategic interest surrounding the creation of interactive and social experience thus conferring on the product greater value (Mardegan et al., 2012; Arvidsson e Giordano, 2013). The product in other words is deflected from its strictly economic value as it is «created within a personal experience that is shared and which embraces the dimensions of identity, the feeling for and belonging to a community» (Riva, 2012, p. 214). Brand equity is thus redefined (Cuomo et. al, 2009). As a result, in order to survive in this "new age of marketing" businesses have to identify strategies of (digital) engagement, i.e. change their interaction tactics with consumers within a graded scale of persuasion, relations, experience and sharing (Scatena e Mardegan, 2012). Nowadays, brand knowledge, reliability, communication and widespread diffusion are no longer sufficient to guarantee a brand's success. Consumers require total involvement in the consumption experience, and the governance of brand interaction has to be redefined ad hoc in the specific socio-constructed spaces of the environment, technology, service and sociality mix (Fig. 2).

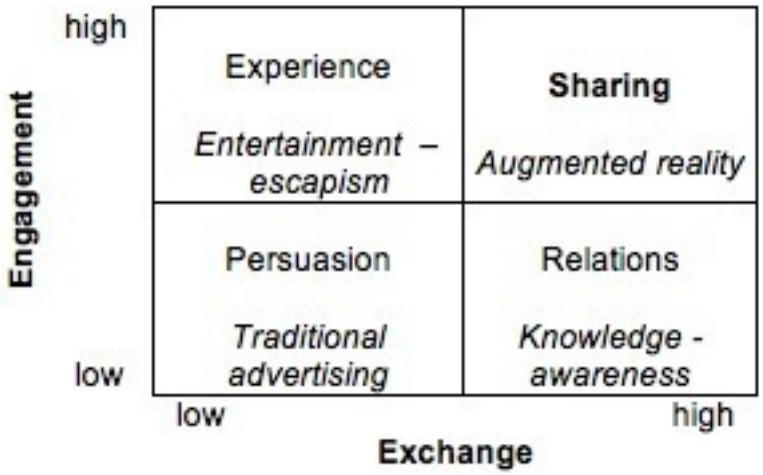

Figure 2
Tools for promoting consumer involvement

On the other hand, recent research (Scatena e Mardegan, 2012) indicates a positive and significant correlation between the levels of *engagement* promoted by a brand and annual turnover and profits achieved by the firm, especially during a recession. Consequently, AR offers marketers new opportunities of approaching and involving clients particularly in branding terms. Customization and exclusivity of the message and the timeliness, placing and contextualizing of the user experience are already becoming essential elements of the media platforms for repositioning products in the sense and value making process.

The opportunity to benefit from augmented reality applications using the standard Internet browser suggests a series of new scenarios in corporate-client relations (Trubow, 2011b, p. 5 – Fig.3).

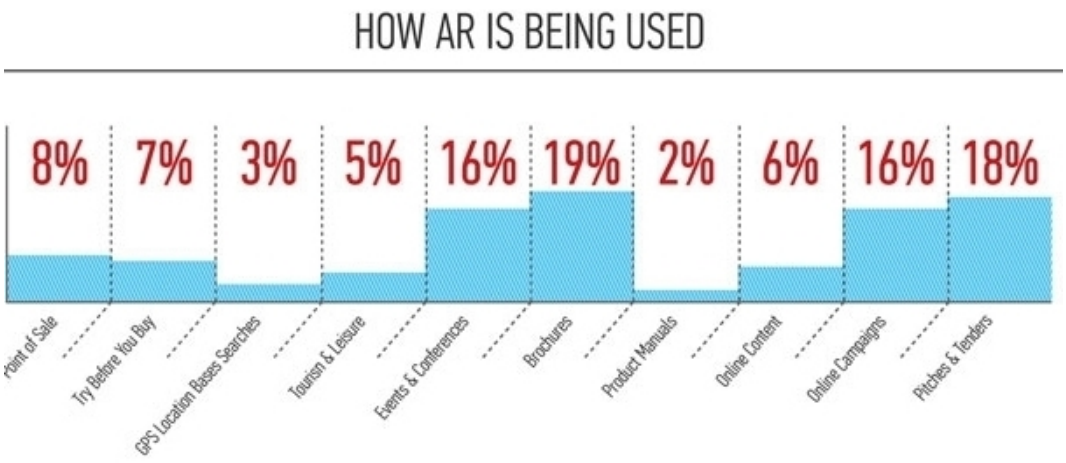

Figure 3
Uses based on current adoption by major brands

Emblematic in this sense is the development recorded of augmented advertising i.e. AR advertising and promoting of the main corporate brands. Reference – in order to fully comprehend the difference in terms of participation and the cognitive and emotional impact of the message, is to the recent application of AR Aurasma (relative to the app economy, Kim et al., 2011) where real world images are recognized and overlapped into real time by means of a virtual layer reproducing multimedia content relative to the captured images: thus when a registered user for instance, frames and snaps a poster of a film with his smartphone, Aurasma recognizes the image (which has to be included the database of the tags Super Anywhere of the application) and reproduces the trailer of the film. Users can create personal *anywheres,* associating to the photo of a place or object, multimedia content on the theme to share it with other users (Filardo et al., 2012).

Retailers are now resorting frequently to AR "to bring to life the retail store". In effect, AR technology finds varied application in the selling process (Trubow, 2011a – Fig.4).

Figure 4
Augmented reality and sales strategy

Providing new impulse to the interpretation of the AIDA model, as concerns attracting consumer interest for the product by means of a selling proposition which shows its "real" problem solving capacity, the consumer is supported in the buying and consumption process. One of the most relevant advantages of AR lies in its capacity for "direct interaction" with the product, an aspect traditionally linked to the presence both of consumer and product in a real life context i.e. the store, and such interaction satisfied by contact with the same. Many studies point out that by touching an object, customer intention to buy is increased as well as their willingness to pay a higher price (Trubow, 2011a). By means of AR it is possible within the retailing area, to increase product-consumer interaction even more as opposed to mere physical contact, where full immersion in the experience is facilitated (Addis, 2005) thanks to the support of additional information, movement, details on the assembling of the parts,

indications of what the product is made of, how it works and, the contextualization or preview of the product, whereby the potential purchaser becomes interpreter and co-designer and not merely the beneficiary of the end product (Tab.1).

LEGO	Lego uses various terminals of augmented reality – Lego Digital Box – which enable customers to see all the elements of toy in detail in 3D, merely by placing the box in front of a video camera (www.korus.fr).
BRAUN	To launch the new models of its Series 5 razors, Braun used AR for the first time to explore the product virtually by means of gestures. The application, available on their native website, captures hand movements with a webcam and uses them to control a 3D model of the razor without the aid of a mouse. The user can also set in motion content for individual parts of the new models with access to a virtual shopping trolley (www.realta-aumentata.it/home.asp)
Mercatone Uno	By downloading the free application Aurasma Lite and framing the cover of the 2012 catalogue and the other pages marked with the logo "A", the catalogue comes to life, with video and images narrating the Mercatone Uno world. News, details and extra content are provided by means of direct interactive consultation by smartphone (www.realta-aumentata.it/home.asp).
i'm lovin' it®	To resolve the problem of criticism relative to the quality labeling and tracking of food used by the Australian multinational, an AR application has been devised called "Track My Mac", which shows customers by means of creative features in movement relative to basic ingredients, information on the farmers. Well known images and GPS are exploited for this purpose (www.realta-aumentata.it/home.asp).
kinder®	To enrich consumer experience both as concerns the retail store and to enhance the range of surprises, Kinder devised supplementary toys for children for Easter 2013, exclusively for some particular supermarkets. Near the Kinder GranSorpresa Easter stand, a panel and monitor were installed. One of the Kinder GranSorpresa eggs was put in front of the webcam and surprise, surprise, was transformed into one of the surprises the egg itself contained, to emphasize Kinder excellence in terms of quality and value. Each Kinder GS is a world of surprises: a real opportunity for children to "lose themselves" in play (www.saporinews.com).
Galeries Lafayette	During the event "fashion 24h/24, 9-12.10.2012, Galeries Lafayette, Lille, installed interactive changing rooms near their counters for customers to try on in real time, a number of outfits virtually. The virtual mirror in the changing rooms recomposed the image of the client standing in front of it, automatically detecting movement. By means of a simple gesture, the customer could change outfits, colours or styles, while the clothes themselves changed or adapted according to the customer's size, shape and gestures (www.korus.fr).

Table 1
Augmented in-store experience: some examples

Utilized as a part of an advertising strategy or to stimulate customers to come to a store, or even to increase brand awareness and customer loyalty, dilating the purchasing experience into environments of mixed reality, AR tends to redesign retail space by promoting a different mode of customer perceptions and sense making, influenced closely by cultural and social processes, including elements of an anthropological or semiotic nature. Stand alone installations in a retail store for example, are stands where customers and other subjects not present on the scene, interact virtually and exchange information (value exchange). In this sense reality is socially augmented and the shopping experience itself also becomes a social experience.

The retail arena as the context in which a shopping experience is made, is part of a dual category: situational, in which signals in an analogical form (e.g. recognized images or sounds) become the input for subsequent elaborations that tell us what is happening, what elements are present in reality and what information corresponds to the virtual reality surrounding the consumer i.e. inbound movement and what is conversational, where information comes from the social media, concentrating on communication surrounding reality, i.e. outbound movement (Frà et al., 2011). In any event, while in inbound mobility(towards the subject) firms continue to hold a pre-eminent role, predisposing and guiding the subject-context interaction process, as concerns the outbound transfer, the control of mass media communication content by an ever growing number of actors widespread in spatial terms and/or close knit in virtual communities has become the norm – human broadcasters (Riva, 2012). Thus the confines of customer experience are redefined and extended. Links (mobility), creation of multimedia content (above all photos and videos) by sharing opinions on the product, reviews and comments on specific content) the use of technology to reinforce the sense of belonging to the community of reference, characterizing the consumer-product relation for the "C Generation" (De Felice, 2011). Notwithstanding, above all with reference to mobile marketing, but applicable to the shopping experience promoted by full immersion technologies generally, numerous studies highlight how convenience – linked to the hedonistic value that can be derived – is still a fundamental factor in using "augmented" services and as concerns mobility (Fig. 5).

The co-existing of functional and emotional factors is acknowledged in the studies on the mobile internet, mobile data service, mobile multimedia service and location-based mobile service (Varnali e Toker, 2010).

Furthermore, precise components defining customer experience in full immersion stores can also be classified (see Table 2 – Pantano e Servidio, 2012, p. 283).

In short, the creative force of both bottom-up (governed by firm or brand) and top-down (creation and sharing of multimedia content) thanks to a digital grammatical basis that guarantees interaction between the parties, transforms the subject-consumer:

- from *Trier,* using AR to test the augmented product before buying in augmented contexts in terms of quality, problem solving capacity and promise,
- to *buyer*, relying on the initial value proposition, contextualized experience, aggregation dynamics and at the same time, privacy and safety of transactions,
- to *advertiser*, thanks to human broadcasting communication which via social networking, participates in the creating and spreading of the brand story, spontaneously motivating and supporting (if results are satisfactory) other potential *triers-buyers-advertisers*, thus generating on the whole, added value experience and as a consequence, more sales for the firm.

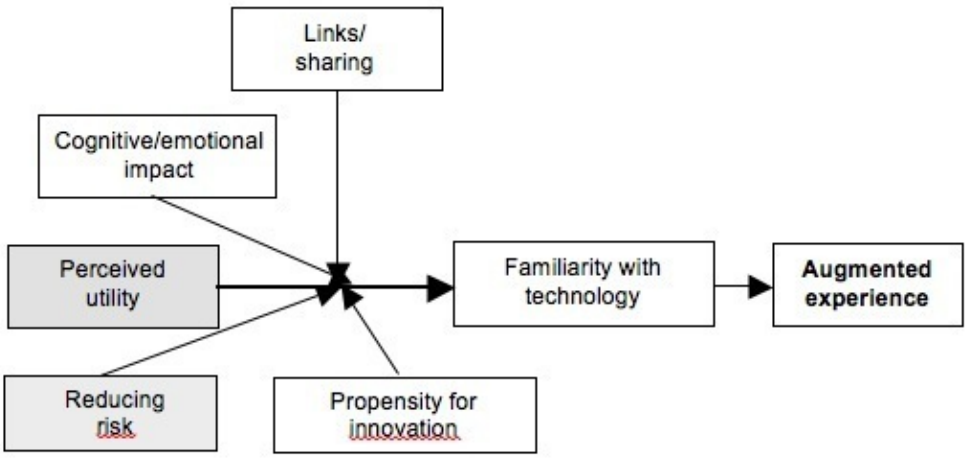

Figure 5
A conceptual model for using AR

Facilities	Fast response, secure transaction, system flexibility, entertainment
Product information	Product variety, detailed product information, personalized information
Service	Product selection assistance, virtual sales person, online support
Convenience	Details about the firm, navigational efficiency, more realistic navigation and interaction
Appearance	Pleasant, attractive, more realistic appearance
Institutional factor	Requirements related to consumer's profile, firm's information, consumer's position tracer while in the immersive store

Table 2
Full immersion stores

3. Critical reflections and implications for future research

As we have said, full immersion technologies and digital tools especially those which are always on, have become an "exciting" opportunity for promoting retail stores, for tracing or tracking purposes and for increasing customer attendance. AR, above all by virtue of the widespread diffusion of mobile devices, represents an ever greater means (multiplying factor) of access both to brands and to or for consumers (Rohm et al., 2012). It should be noted however, that their use could conceal negative impacts that it might be worthwhile to indicate at this stage.

Above all, additional information, animations, detail, technical analysis etc., characterizing contexts of augmented reality could easily generate informational entropy (chaos) for the consumer, impacting negatively on his/her decision-making processes, thus distorting to a certain extent, the brand/consumer link. In this context, the fundamental role of the brand as a mark of guarantee or reliability capable of simplifying the buying process, should not be ignored. On the contrary in a context of AR where the amount of information hinges on the excessive, together with the incapacity or difficulty in selecting pertinent information, could have deviating or even counter-productive effects. It might therefore, be opportune to structure "augmented reality stores" articulated on a series of factors effectively capable of attracting clients and supplying them with relevant informational content, necessary and efficacious for an extremely positive shopping experience. In short, AR cannot be considered a vital tool to be used at any cost!

Furthermore, the limits of using AR that could derive from the self-production of information on the part of consumers should be highlighted, taking into account the concomitant risk of "manipulations/alterations" of such information in *social* environments, the effect of the generating force of content created and shared *(*top-down logic*)*. For AR to add impulse to a value experience, it has to (i) concern themes which are relevant for the buyer, (ii) provide immediately recognizable incentives-benefits, (iii) be simple to use regardless of the technological limits typical of mobile devices (Prunesti e Lalli, 2011), and (iv) promote cooperation and synergies relative to all the actors involved in the value chain with the focus remaining on firm/customer interaction.

However it is fundamental for organizations to have a solid theoretical basis underpinning their defining of a model of augmented (in store) customer experience, linked to an efficient monitoring system of the additional data selected on the basis of the consumer context (situation, event, etc).

At the same time, the applicability of AR to the diverse types of purchasing generally should be weighed up. Intuitively, it can be stated that AR is more effective in scenarios of problematic or complex purchasing, while for the other kinds- e.g. spur of the moment purchases- "Diminished Reality" (DR) might be preferable

Furthermore, the implications should be considered of putting in place augmented/diminished scenarios for identifying market segments/targets when selecting high/low levels of informational content (Fig. 6):

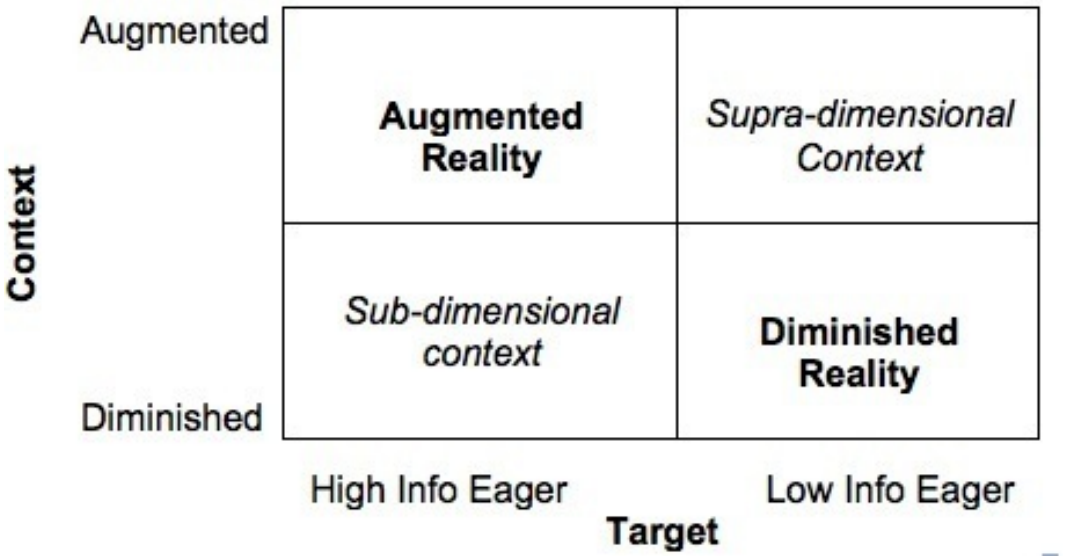

Figure 6
Market segments in AR/DR contexts

In conclusion, AR is in any event "a tool" within a wider and a more complex brand's overall customer communication ecosystem, in which creativity, technology and content have to combine traditional and innovative forms and relative tools to generate efficacious customer engagement (Schultz e Block, 2011). In this context, consequently, scientific research should proceed to addressing the empirical validation of the conceptual models proposed (outlined in this as in other studies) in order to offer a valid theoretical foundation for augmented marketing planning and processes.

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