Placeless Store or Ubiquitous Stores?
New Technological Frontiers in Retailing

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Abstract: Retailing is subject to a continuous innovation triggered by the constant progresses in technology. The new technologies are dramatically changing the way for searching, comparing, choosing and buying products, by providing new exciting and more effective shopping experience. Among the available technology-based innovations for retailing, especially advancements in networking systems and ubiquitous computing provide a totally new scenario where competing. In particular, these ones develop new shopping environment not limited to the traditional physical points of sale, by becoming a promising area for research. This paper aims at investigating the new competitive scenario, by emphasizing the shift from e- to m- to u-store, and outlining possible future directions in a placeless shopping scenario.

1 INTRODUCTION

Retailing is currently subjected to a continuous innovation triggered by the constant progresses in technology. In the one hand, these are dramatically changing the way for searching, comparing, choosing and buying products, by providing new exciting and more effective shopping experience; in the other one, they provide retailers with new tools for market seizing and sensing, and service delivery. (Bennet and Savani, 2011; Ngo and O' Cass, 2013; Demirkan and Sphorer, 2014; Pantano and Timmermans, 2014; Pantano, 2014).

These technological innovations further modify role and function of physical store in retail settings, which is no longer the one contact point between firm and client. As a consequence, the innovative force in retailing increases the competitive pressure, while the complexity and the risks in the emerging scenario growth (Pantano, 2014).

For instance, the proliferation of e-stores introduces the electronic market for competing, by enlarging the traditional offer of a physical point of sale through internet (Bourlakis et al., 2009). Similarly, the diffusion of smartphone offers another channel for shopping based on mobile networks and applications, designed for an easier faster, and funnier access to products (Lai, and Chuah, 2010).

Moreover, mobile technologies can be integrated with additional tools, ad Quick Response codes (QR), Near Field Communication (NFC), image recognition, augmented reality, 3D functionalities, contactless systems for increasing the functions and services. The ubiquitous retailing emerges as an evolution of mobile stores based on the adoption of ubiquitous computing, by creating a new ubiquitous scenario for shopping from mobiles (Pantano, 2013).

Therefore, from a strategic point of view, new markets and customer can be interrelated while integrating new services satisfying also the tacit consumers' needs, which can be addressed (Zawslak and al., 2012; Pantano and Timmermans, 2014).

Therefore, a new question arises in the emerging technology-enriched scenario: which will the future retail scenario be?

The aim of this paper is to shed lights on the actual innovative competitive scenario, by evaluating the shift from e- to m- to u-store, and outlining possible future directions in a placeless shopping scenario.

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2 TECHNOLOGY-ENHANCED SHOPPING EXPERIENCE

Currently, research on retail solutions for enhancing shopping experience are grown fast, reflecting consumer increasing consciousness of their power. In fact, the actual sense of consumer value is shifting from product to service to experience and interaction (Prahalad and Ramaswamy, 2004; Heinonen et al., 2013; Ngo and O'Cass, 2013). Hence, the actual trend is to develop new technologies able to provide immersive and engaging experiences, which consumer access through high interactive and realistic interfaces.

As a consequence, retailers try to differentiate their offer by providing smart consumer solutions than stand-alone services or new products (Biggemann et al., 2013; Pantano, 2014; Pantano and Timmermans, 2014). Since the introduction of advanced systems within the stores provides new self- services able to eliminate or drastically reduce the human assistance by moving some tasks traditionally executed by sellers to an automatic machine or allowing consumers to perform by themselves (Tang et al., 2001; Vesel and Zakbar, 2010; Lee et al., 2013), their experiences in the new environment is mediated by the technology and changes dramatically.

Due to the advancements in virtual reality and 3D graphics, new virtual environments and products displays have increased the appeal of online services. In fact, the quality of 3D graphics enhances the realism of the experience and the feeling of interacting within the real environment, while the high level of interactivity allows consumers to view products from different perspectives, as well as to explore the different functions and features of products on sale like in a real environment (Algharabat and Dennis, 2010; Cheng et al., 2014).

This paper focuses on the changes in consumers shopping experience in the case of e-store (online store) and m-store (mobile store based on the usage of smart devices such as smart phones).

2.1 E-store

The rapid diffusion of Internet technologies among potential consumers provides new online platforms where clients could purchase directly at home 24/7 (recognized as I-commerce, e-commerce, e-tailing, or e-store), by offering the online easy access to shopping environment (e-store) also to that part of population with limited mobility. Prior studies on e-stores highlighted their high level of perceived convenience by consumers (Hsiao, 2009; Pantano and Servidio, 2012). In fact, these retail settings provide a superior shopping experience according to several factors (Katerattanakul and Siau, 2003; Pantano and Servidio, 2012):

- physical facilities, because e-stores provides flexible architecture and layout (they can be updated more frequently than a physical store, with a limited investment in software and programming), while offering a fast response time (the response time does not depend on the number of the clients in the store, in opposite with the physical store that can be very crowd with negative consequence on the speed of service delivery);
- product presentation, because 3D graphics enhances products displaying and the interaction with the available products. Resolution and interactivity are related to the computer interface employed for the connection;
- service, because the e-store offers a wider range of services, such as recommended systems for supporting consumer's purchase decision, enhanced information on the product (i.e. video explaining the manufacturing process), home delivery polices, etc.;
- convenience in terms of location, parking, opening hours and access, because it consist of store, accessible anytime (24/7) and anywhere when an desktop internet connection is available;
- visual appearance in terms of store atmosphere and attractiveness, because e-store provides new engaging and entertaining experiences based on the use of 3D graphics, user-friendly interfaces, high realistic environments, advanced input devices, etc..

To date, the substitution of physical stores for online ones is considered still unrealistic, while they are considered a strong supporting tool for shopping (Rotem-Mindali, 2009).

2.2 M-store

Similarly to the rapid spread of e-stores, another trend emerges from the improvements in the connectivity (i.e. wireless, cloud computing, ubiquitous access, etc.) that might reduce the physical spatial dimension of a store, while enlarging the store offer, and can be considered as an evolution of the e-store (Wu and Hisa, 2008; Bennet and Savani, 2011). This consists of the use of mobile devices for shopping (if connected to internet), moving the web-based functionalities from desktop applications (e-store) to all environments equipped with a network connection. The large diffusion of mobile computing, based on the portable accessing technologies always connected to

internet for accessing to multimedia contents repositories (e.g. location based services) (Lin et al., 2011), pushes retailers to provide mobile applications for consumers, with the aim to influence them to buy anytime and everywhere. These apps show products through mobile interfaces supporting mobile purchase. In this way, the mobiles became a kind of interactive guide in the new retail settings. A meaningful example is the IKEA app, which consists of a digital version of the catalogue allowing users to view 360 room sets, to access more information on products, and simulate the placement of selected furniture from the catalogues in their own room with the 3D augmented reality tool (based on the usage of user mobile camera).

Similarly to the case of e-store, m-store offers a large convenience if compared to the traditional physical points of sale, in terms of:

- physical facilities, because m-store contents might be customized on users' requests and be constantly updated;
- product presentation, because m-store offers a large variety of products and enhanced related information and the interaction with the available products (i.e. access to video, audio, 3D virtual manipulation, etc.). Resolution and interactivity are related to the mobile interface employed for the connection;
- service, m-store offers mobile payment systems (for fast self-check out), access to personalized contents and recommendation systems, etc.;
- convenience, by offering a store accessible anytime and anywhere;
- visual appearance, m-store provides 3D graphics, user-friendly interfaces, high interactive and realistic environments, which could be integrated within a real shopping environment as a supporting shopping guide (see the case of Ikea mobile catalogue), etc..

3 UBIQUITOUS STORE

Similarly to e-store and m-store, another trend based on the diffusion of high connectivity is related to the integration of ubiquitous computing in retail settings for creating a new ubiquitous scenario for shopping: the u-store.

In particular, ubiquitous computing enables (i) the automatic identification and communication among objects and mobiles, (ii) the ubiquitous access to the data available within the network, and (iii) the secure transfer of information (i.e. for contactless payments).

Main limits of m-store are related to the mobile technical characteristics such as memorization and computing capacity (Hejazinia and Razzazi, 2010; Yang and Kim, 2012). In opposite, in a u-store, the integration between consumer own mobile and the technological environment makes possible to overcome these limits by shifting the computing capacity to the ubiquitous system (Hejazinia and Razzazi, 2010; Yang and Kim, 2012).

The functioning of this system is as follows:

- each product is associated with a QR code (a sort of bidimensional barcode that memorizes information to be read by a mobile camera);
- consumer accesses the product by focusing mobile camera on the QR code and visualize the related information;
- consumer might choose to buy and create his virtual basket;
- if consumer want to buy, the system transmits the information to the center that calls consumers to proceed with the order and the payment;
- all the purchases are delivered directly at home.

Since u-store is based on the virtual reconstruction of the products (the product displayed are virtual), it can be easily adapted for a wide range of products, by changing the code, modifying the image of each product and updating the data repositories.

Therefore, an u-store merges the advantages of e-store and m-store (i.e. a wider amount of products, fast response to consumers' requests, open 24/7, possibility to fast visualize and compare a huge number of items, etc.) and the ones of the physical store (i.e. the possibility to visualize the products with the real size, and have a more realistic experience), by offering an alternative to the both shopping environments.

For these reasons, u-store is increasing diffusion around the world, especially for groceries, by meeting the needs of that part of population whit limited time for shopping food and beverage. The idea to place these stores at the bus/metro stops, support shopping of daily food that consumers need to buy frequently but have not time to do. For instance, Homeplus app developed by Tesco supermarket allows buying through the "Tesco virtual stores", virtually located on walls of metro stations and bus stops. Similarly, Sorli Virtual proposed a u-store at the metro stop Sarrià in Barcellona (Spain) (Figure 1).

From a managerial point of view, due to the low costs of information sharing, ubiquitous computing is able to increase the number of transactions by supporting the delivery of customized services and complementary products (Pantano, 2013), and to

Figure 1. An example of ubiquitous store: Sorli Virtual in Barcelona (Spain).

further provide updated data on each consumer accessing the service, which can be exploited for the development of marketing strategies.

From a customer point of view, ubiquitous computing modifies the purchasing process, in terms of product searching, product displaying, information accessing, payment modalities, and vendor-client relationships (Pantano 2013; Pantano and Timmermans, 2014).

4 DISCUSSIONS

Our paper investigated the extent to which advanced technologies create 3 new shopping environments that represent a breakthrough with the traditional points of sale: e-, m- and u-store.

Table 1 summarizes the main features of the e-, m- and u-store to emphasize the effects of new technologies within retail settings.

As emerging from table 1, the main differences among the new stores based on the advanced technology rely on the product presentation and on the convenience.

Concerning product displaying, it is accessed by a desktop computer, while the m-store is accessed by a mobile device that usually has a small interface. In opposite, u-store provides a larger surface for visualizing the products, i.e. walls of metro stops.

Concerning the convenience, all the stores require an internet connection. While e-store is accessed through a desktop computer and m-store from mobile, u-store can be accessed only from the specific area where the new point of sale is located, thus it overcomes the boundaries related to the traditional stores opening hours, but not the physical boundaries (even if it enlarges these margins).

Table 1: Comparison among e-, m- and u-store.

	e-store	**m-store**	**u-store**
Physical facilities	Flexible	flexible	flexible
Product presentation	3D graphics and interaction with products related to the quality of computer interface	3D graphics and interaction with products related to the quality of mobile interface and usage of augmented reality tools for a more realistic display (i.e. Ikea virtual catalogue)	3D graphics, large surface for displaying (i.e. walls of metro stops)
Service	Enhanced services	Enhanced services,	Enhanced services, integration with real scenario
Convenience	accessible anytime (24/7) and anywhere when an desktop internet connection is available	accessible anytime (24/7) and anywhere when an internet connection is available	accessible anytime (24/7) within the specific areas offering the service (usually metro/bus stops)

As anticipated, the particular location of u-store is able to stimulate consumers' interest towards the purchase of those products that are often purchased but require time. It is especially evident in the groceries, where this kind of store allow easily and fast buy milk, breads, fruits, etc..

Although the current examples of u-store are mainly devoted to the food and beverage industry, its flexibility allows adapting to other sectors such as the fashion industry, which would achieve benefits from the integration of ubiquitous technologies and virtual fit systems.

Our paper underlines the current trend in retailing towards a new kind of store more based on the technology. Figure 2 summarizes these findings,

by put emphasis on the extent to which the higher integration with the technology implies the lower store spatial dimensions.

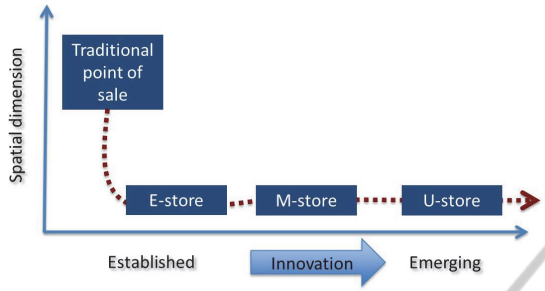

Figure 2: Current trend in retailing: from (large) traditional points of sale to placeless stores.

Summarizing, the emerging trend consists on a decreasing of required store spatial dimension with the progresses in technology. In fact, the current actual studies emphasize an exploitation of mobile and high connectivity technology for innovating in retailing, while excluding the usage of large fixed technologies for supporting shopping (Pantano, 2014; Pantano and Timmermans, 2014).

5 CONCLUSIONS

Our paper provides an overview of the current trend in retailing, which is characterized by the innovation force pushing to a new concept of store, where technology is more integrated and the boundaries of physical stores are overcome, a sort of "placeless" or ubiquitous store: a store distributed though the technologies and not limited to a physical limited environment. Although the substitution of traditional store with the technological ones actually seems quite unrealistic, in the future retailers will need to compete also with this force, and redesign the shopping experience within the physical store for maintaining existing consumers. Moreover, this study is explorative in nature, thus it would solicit new researches providing quantitative data on the both consumers and retailers standpoints.

Finally, some considerations can be outlined concerning in-store consumers behaviour. Although consumers require new shopping experiences (Pantano, 2014), retailers preparedness towards the innovative force in terms of practices for managing the innovations, technology absorptive capacity, development of ah-hoc capabilities is still under investigated. Future researches may investigate this trend, by focusing on the technological innovation among retailers, and the development of new frameworks for supporting retailers in successfully competing in the innovative scenario.

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