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What is smart for retailing?

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Abstract

While the last decade has seen increasing interest in the smart city phenomenon from both scholars and practitioners, little attention has been paid to what extent retailing might be considered as part of smart cities, with benefits for all the actors involved in the process. In fact, retailing is subject to a radical innovation force that makes available several technologies that can be successfully applied. The extensive use of advanced systems gives rise to new questions concerning the smart use of technologies. Moreover, the application of advanced technologies is part of a trend towards the creation of smart cities for a better urban society. In this scenario, the idea of smartness goes beyond the concept of application of new technologies by also including more important dimensions, such as organizational structure. Hence, our work aims at identifying what can be considered smart for retailing, in terms of features of smart technology for retailing, and the challenges emerging from the adoption of such smart technologies.

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Keywords: Smart city, smart retailing, retailing, innovation management, technology management

1. Introduction

Continuous progress in Information and Communications technologies has led to the development of new tools for improving the quality of several processes and consequently users' perceived utility and satisfaction. Although the last decade has seen increasing interest in the smart city phenomenon attracting attention of scholars and

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practitioners¹ who identified the features that make a city “smart” in terms of governance and policies, health, services, etc., less attention has been paid to the possibility to also include smart retailing into the broader concept of “smart city”. In fact, in the past years a large number of innovations has been introduced at traditional points of sale by dramatically modifying traditional retail practices. For instance, several stores have introduced self-service technologies, equipped with Radio Frequency IDentification (RFID) systems, such as self-cash desks, informative touch points, interactive displays equipped with touch screens, digital signage and applications for mobile phones. Some firms even created completely virtual stores that are based on ubiquitous computing, such as the Spanish Pickbe, which allows consumers accessing stores and products directly from their mobile phones (when this is located in a certain area)². In addition to the availability of technologies, able to support market analysis, the increasing demand of enjoyable experiences and enriched services^{3,4} pushes retailers to consider the introduction of advanced systems at their traditional points of sale.

The extensive use of advanced systems gives rise to new questions concerning the smart use of technologies. In fact, the smart use of the technology can be seen as an organizational issue and as a driver that changes traditional selling and purchasing activities. In particular, the application of advanced technologies is part of a trend towards the creation of smart cities for a better urban society. The emerging idea of smart retailing would reflect a particular idea of retailing, where firms and consumers use technology to reinvent and reinforce their role in the new service economy, by improving the quality of their shopping experiences.

Since the idea of smartness goes beyond the concept of application of new technologies by including more important dimensions such as the organizational one⁵, our work aims at identifying what can be considered smart for retailing. The key question is what are the features that characterize a technology as smart for retailing.

The paper is organized as follows: the next part analyses to what extent smart retailing is part of the broader concept of smart cities; then, we focus on the features characterizing a smart technology for retailing, and the last section identifies possible future developments and discusses some implications for scholars and practitioners.

2. Smart retailing and smart cities

The Smart city concept dates back to the late 80s as a new approach for managing urban context and evolved rapidly in recent years^{6,7,8,9,10}. The idea of smart cities emerges from a new vision about the city where local government, firms and citizens use technology to enhance and reinforce their role in the new service economy, reinforce their interactions, create new jobs for the local community and improve the quality of life⁵. Hence, the concept is founded on the idea of smart use of technology for improving the quality of life in cities, including the enhancement of digital contents and services in urban areas through the employment of pervasive computing.

To date, the European Commission and US Government developed many programmes for financing international and integrated projects to achieve this goal^{11,12}. It also considered a “smart” approach to manage urban development and rapid urbanization¹³. For these reasons, it includes new visions of technology management, innovation, management and local governance as well as new policies. In fact, several cities and international firms such as IBM and ORACLE developed plans for participating in the development of smart cities¹¹. Hence, the concept of a smart city represents a continuous innovation process, which aims at developing collaborative digital environments for reaching local prosperity for the local communities through knowledge networks, smart partnerships, and integrated e-services and e-governance policies¹¹, under the goal of achieving these benefits through economic, ecological and social sustainability^{14,15}.

Recent studies further summarized the critical features of a smart city as smart (i) infrastructures (including wireless infrastructure and service-oriented information systems), (ii) technology (in terms of integrated hardware and software, and network technologies able to provide real-time awareness consciousness and advanced analytics), (iii) economy (in terms of competitiveness such as innovation, trademarks, entrepreneurship and productivity, and integration within the international market), (iv) governance (in terms of political participation and services for citizens and a more transparent and efficient local administration), (v) urban mobility (in terms of enhanced availability and access to information and technologies, and modern and sustainable transport systems), (vi) environment (in terms of attractive environment with reduced pollutions and better ambient conditions), (vii) people (in terms of integration within the local community, quality of social interactions and openness towards the surrounding innovations) and (viii) living (including all the aspects of human life that would be enhanced such as the

culture and education, safety, health, etc.)^{13,16,17}. Therefore, the specific applications of this vision can be wide ranging, including for example the development of a wireless city, of smart homes, smart public services and transportation, smart medical treatment, smart urban management and social management, smart tourism and green cities, through the employment of innovative sensor networks and network infrastructures, and cloud computing platforms¹⁸.

In this scenario, smart retailing emerges as a part of a broader concept of smart cities by focusing on a new approach to retail management, which considers technologies as enablers of innovation and improvements in consumers' quality of life. In particular, it starts from the same idea of considering smart use of technology applied to the new vision of retailing enabled by modern technology.

3. Features of smart technologies for retailing

3.1. Organizational process

Smart use of technologies in retailing requires changes in both organizational processes and selling activities. Concerning the organizational level, these technologies require an effort for identifying, selecting and introducing the best technology, while enhancing the way to create, acquire, manage and transfer knowledge from consumers to firms and *vice versa*, as well as creating smart partnership between client and retailer after the in-store adoption. In fact, retailers need to understand the environmental change and behave consequently, which pushes towards the introduction of smart technology. Hence, they need to develop the capability to understand the new competitive scenario enabling the innovation and the related action strategy by integrating and reconfiguring internal and external organizational skills, competencies, resources and technologies^{19,20,21}. Knowledge management has been recognized as a critical factor for retailer success, because the complexity of data collection and analysis can be improved through the adoption of new technologies²². Especially the tacit knowledge (not formalized and codified) can be hard to achieve and need efficient tools for being observed. Hence, smart technologies are able to collect knowledge from consumers (i.e. by codifying habits, steps before purchasing in terms of visualized information and time for consulting, etc.), and transfer product knowledge into the service (i.e., by providing enriched information about certain products, which could also employ video and audio for explaining functionalities, manufacturing, etc.). This means that these technologies would be able to (i) search for valuable information based on clients' transaction information and identify any change in consumers' behavior for supporting retailers (this is a critical issue since consumers' needs and preferences are very changeable over time)²³, and (ii) select and visualize only (extracted) customized information based on consumer characteristics and behavior²⁴. Moreover, the interaction between retailers and clients is reinforced by a huge emotional engagement, ease of use and entertaining devices, realistic and high interactive interfaces based on 3D graphics, which allow consumers and retailers the dynamic visualization of requested information. Therefore, a new collaborative and interactive shopping scenario emerges, where consumers participate in the creation of final service through their requests and smart interaction with technologies, which respond with high customized information within a new smart shopping space²⁵. Hence, the use of technology becomes smart by involving retailers and clients in a sort of "smart-partnerships" with the common goal of achieving a satisfying service.

3.2. Selling activities

Smart technologies are also able to change the selling activities in terms of consumers' access to product/service, relationships with sellers, and product service consumption. Concerning access, consumers may access the product/service through smart technologies, which overcome the traditional boundaries of physical points of sale by allowing direct access from home, from own mobile phones, from storefront windows, etc. In addition, the access to product/service is not related to a physical salesperson as a shopping assistance anymore, due to the possibility to use the technology as a supporting tool substituting the physical assistant. Hence, consumers can interact with the product and achieve the service only through technology that interactively responds to consumers' changeable requests. For instance, sensors of proximity to a certain item can advice consumers and invite them to perform some

actions. The access is further supported by a large typology of devices, such as touch screen displays, mobile devices, etc..

As a consequence, while modifying the role of physical shopping assistants, these technologies change the way for building and maintaining strong relationships with customers. In fact, they offer new modalities for submitting requests to retailers and for retailers to respond to clients, by involving actively both actors in the service and value creation. These technologies support interactions between clients and retailers, and client and product. Hence, they have a direct effect on salespersons' job by providing support for the execution of their tasks. For instance, they provide updated information of available products, which employees may use for replying to consumers' requests, and change their routines because the usage of these systems is integrated in their activities. For instance, they may be responsible for the right functioning of a certain technology and supervise its effective usage^{26,27,28}. Moreover, they are also a tool for interaction between consumers and retailers, for understanding critical issues and potential problems.

Finally, product consumption also changes. In fact, the technologies decrease the transaction costs by introducing the possibility of *advance purchases* (purchase before the effective consumption)²⁹. In this way, the moment of purchase and the one of consumption can be separated, by providing both clients and seller high flexibility and customizability. In fact, the price may be adapted to consumers' purchase behavior. Furthermore, these technologies also modify product delivery. In traditional retail settings, consumers bought and handled by themselves the purchases, while in the new smart environment the purchase can be bought in the store (both physical and online) and delivered directly at home³⁰. Hence, also the moment of physically collecting purchases is separated by the moment of buying. The benefits are a larger and customized offer for consumers, reduced transactional costs and reduction of encumbrances. The latter may be a huge advantage for people with disabilities.

Therefore, the main factors characterizing smart technology for retailing emerge as follows: developing ad-hoc capabilities, changes in knowledge management and in salesperson's jobs, creation of smart partnership, changes in service access and in consumption (Fig. 1).

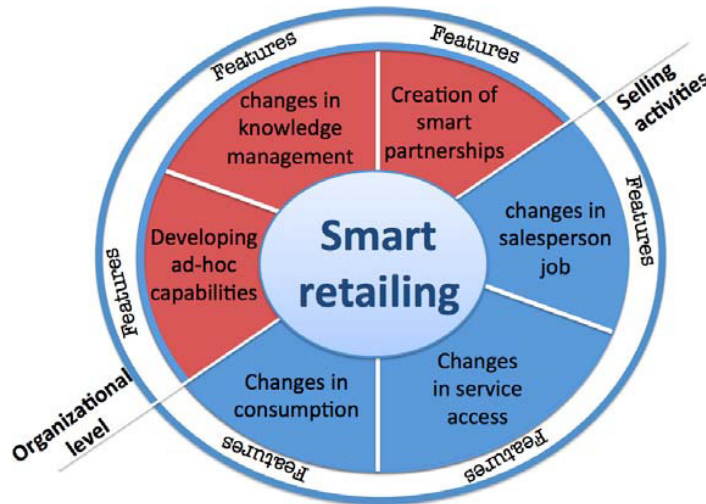


Fig. 1. Factors identifying a smart technology for retailing.

4. Discussion

Each technology feature generates challenges for retail experts, both scholars and practitioners, which need to be explored: (i) challenges resulting from the need of ad-hoc capabilities, (ii) challenges resulting from changes in knowledge management, (iii), challenges resulting from the creation of smart partnerships, (iv) challenges resulting

from changes in service access, (v) challenges resulting from the changes in salesperson's jobs, and (vi) challenges resulting from changes in consumption.

(i) Challenges resulting from the need of ad-hoc capabilities

Smart technologies need the development of particular capabilities for being understood and adopted within the organization, with effects on the traditional usage of internal and external skills, competencies and resources. This process is not static but dynamic, because these capabilities allow firms to continuously adapt organizational behavior according to the environmental changes. Hence, the firm requires new tools and analytics for evaluating and predicting the changes, as well as rapid and precise practices and procedures for behaving accordingly. Since these capabilities would require economic investments in human capital, supporting technological systems and time for transforming the prediction in effective successful actions, the challenge is how to manage them by maintaining financial sustainability.

(ii) Challenges resulting from changes in knowledge management

Retailing usually requires knowledge exchange between firms and clients. Firms need to transfer information on products for involving consumers to buy, and achieve knowledge from consumers for understanding market trends. Meanwhile, consumers collect information on products for making a better choice and communicate information on their preferences and choices to the firm. The introduction of smart technologies also changes knowledge management strategies, concerning the way to achieve knowledge on consumers, to transfer product/service/firm knowledge to consumers, and to manage knowledge on consumers²². In fact, these technologies automatically search for valuable information, select and visualize only the "useful" information^{23,24} by increasing the level of automation in the process. Thus, firms need to develop adaptive and sensitive filters for focusing "only" on the important information, by changing the level of detail according to the favored strategies. Hence, these filtering systems will require critical competences, such as expertise in business intelligence, artificial intelligence and complexity.

(iii) Challenges resulting from the creation of smart partnerships

Smart technology further mediates retailer-clients interactions through new smart shopping spaces²⁵, by creating a sort of smart partnership among the actors involved in the process. Hence, this partnership would represent the evolution of traditional relationships and proposes new challenges for building and maintaining strong relationships with consumers. In fact, retailers need to make all the involved actors conscious of the benefits resulting from the partnership, while considering the role of each partner equally important for partnership success.

(iv) Challenges resulting from changes in service access

Smart technologies overcome the traditional limits of physical points of sale by allowing consumers to direct access products without physical seller assistance. In fact, consumers are able to exploit advanced input devices to achieve the service. On the one hand, this technology-mediated access requires knowledge of new devices and effective usage; on the other hand, it modifies consumers' traditional behavior by adding critical factors that might influence (positively either negatively) the shopping experience, such as the controllability of the system, the trust in the technology, the quality of graphics, speed of response, etc. As a consequence, the challenge is how to push consumers to change traditional (physical) access to products and service for preferring the new one provided by the smart technology.

(v) Challenges resulting from changes in salespersons' jobs

Smart technologies support salesperson's tasks execution, by changing their routines and moving some tasks from the real employees to the technology^{26,27,28}. In fact, while they can use these tools for achieving knowledge of products and services that consumers want to consult, clients can self-check out without the assistance of a real seller. As a consequence, smart technologies increase the shift of tasks executed by physical humans to automated machines, with negative consequences on the number of employees. Moreover, they push employees to learn the functioning and usage of these technologies, leading to a reduced number of face-to-face interactions with clients. For these reasons, the challenge is how to push employees to adopt a technology that may substitute their role.

(vi) *Challenges resulting from changes in consumption*

Finally, changes in product consumption generate new challenges such as reduced transaction and delivery costs, the possibility to buy *in advance* and separate the moment of purchase and the time of delivery (consumption)^{29,30}. On the one hand, this increases flexibility and customizability, on the other hand, it dramatically modifies the traditional shopping experience. While the traditional experience was characterized by the *synchronicity* of each step in consumer decision making (searching, comparing, choosing and purchasing) the new scenario involves a new *distributed* space of disjoint places (from home, from the store, from another store, etc.), where the time of purchasing precedes of hours/days/weeks the time of consuming. For these reasons, the challenge will be how to enhance consumers' perception of the new shopping experience. Table 1 summarizes the challenges emerging from each feature of a smart technology for retailing.

Table 1. Summary of factors identifying a smart technology for retailing and related challenges.

Factors identifying a smart technology for retailing	Challenges for retail management
Need of ad-hoc capabilities	How to manage dynamic capabilities under financial sustainability
Changes in knowledge management	How to develop adaptive and sensitive knowledge filtering systems
Creation of smart partnerships	How to make all the involved actors conscious of the benefits resulting from the partnership
Changes in service access	How to push consumers to change traditional (physical) access to products and service for preferring the new one provided by the smart technology
Changes in salesperson's job	How to push employees to adopt a technology that may substitute their role
Changes in consumption	How to enhance consumers' perception of the new shopping experience if compared to the traditional one

5. Conclusions

Starting from the concept of smart cities⁵, our work shows how smart retailing can be included in the features of a smart city by extending the traditional issues of smart infrastructures, technology, economy, governance, urban mobility, environment, people, and living^{13,16,17}. The concept of smart retailing goes beyond the application of a modern technology to the retailing process by including a further level of "smartness" related to the employment of the technology. Hence, a smart technology for retailing, which generates the new concept of smart retailing, can be investigated according to organizational and practical dimensions (including the selling activity). Following these dimensions, we identified six main features: the need for developing ad-hoc capabilities, changes in knowledge management processes (from and to clients), the creation of smart partnerships (between retailers, clients, salesforce), changes in service access, changes in salespersons' jobs, and changes in consumption. Moreover, each of identified features generates some challenges that retailers need to overcome for achieving competitive

advantages, and which require further investigation by scholars and practitioners in terms of (i) managing dynamic capabilities under financial sustainability constraints, (ii) developing adaptive and sensitive knowledge filtering systems, (iii) making all the involved actors conscious of the benefits resulting from the smart partnership, (iv) pushing consumers to change traditional (physical) access to products and service for preferring the new one provided by the smart technology, (v) pushing employees to accept technologies that may substitute their role, and (vi) enhancing consumers' perception of the new shopping experience if compared to the traditional one.

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