Journal of Retailing and Consumer Services 21 (2014) 860–868

Contents lists available at ScienceDirect

Journal of Retailing and Consumer Services

journal homepage: www.elsevier.com/locate/jretconser

Developing a framework to improve virtual shopping in digital malls with intelligent self-service systems

Haluk Demirkan [a,*], Jim Spohrer [b]

[a] Center for Information Based Management, Milgard School of Business, University of Washington-Tacoma, 1900 Commerce Street, Box 358420, Tacoma, WA 98402-3100, USA

[b] IBM University Programs World-Wide, IBM Almaden Research Center, San Jose, CA 95120, USA

ARTICLE INFO

Available online 29 March 2014

Keywords:
Self-service systems
Service innovation
Virtual shopping

ABSTRACT

Growing movements to urban places, increasing unemployment, decreasing buying power, rising real estate cost and demanding consumers for convenience and price are creating challenges for retailers. This paper reviews a sample list of retail channels, and proposes a systematic framework for conceptualizing the data-driven, and mobile- and cloud-enabled intelligent self-service systems to improve virtual shopping. With adoption of intelligent self-service systems, – more service oriented, more instrumented (from sensors to smart phones for monitoring consumers' behaviors), interconnected (patterns of interactions), and intelligent (algorithms help recognize patterns) – retail organizations can provide more cost effective quality retail service experiences to consumers.

1. Introduction

According to research, almost all players in the U.S. retail ecosystem today (e.g. mall developers, retailers, vending operators and consumer product manufacturers) are facing key demographic, economic, and technological changes (Bethlahmy et al., 2012). For example, consumers are moving to urban areas significantly (Dobbs et al., 2011); high unemployment continues to depress consumer spending; e-Commerce retail growth of 16% continues to significantly outpace total consumer spending, which grew by 5% in Q2 (Fulgoni et al., 2013); mobile phones have become the new retail showrooms; and the Millennial generation expects an engaging, personalized digital shopping experience.

These developments are creating lots of new and advanced challenges for the retail organizations about vacancy rates, sales declines, enhancing customer experiences, reduce labor and construction costs, deepen brand differentiation, optimize small urban formats, and justify investment in innovation.

Emerging technology solutions are creating new opportunities to address these challenges. During the past decade, the growth in service development and delivery options based on technology has been remarkable. Today, more and more organizations are choosing to provide self-service system options for their customers and employees for better, more efficient and customized services. Their main goals are to reduce costs, to increase customer satisfaction and loyalty, and to reach new customer segments (Bitner et al., 2002). Potential benefits of successful development and implementation of such systems can be tremendous. For example, IBM shifted 99 million service telephone calls to a web based system, which resulted in cost savings of $2 billion (Bryson et al., 2004).

Although the potential benefits of successful system incorporation are enticing, the benefits cannot be realized unless customers use these new systems (Meuter et al., 2006). For example, McKinsey & Company reports that one firm projected a $40 million savings from moving its billing and service calls to the web. However, it suffered a $16 million loss, as a result of lower customer use and technology failure, service partners' penetration issues, and the absence of cross-selling opportunities. To be of maximal value in today's global service based economy, we need superior, robust, self-service systems that can assimilate, organize, design and deliver high quality services to consumers and to end users.

In context of retail services, self-service systems for online shopping are among the fastest growing applications in the 21st century. There is rapid growth in self-service in retail services that allows consumers to take on the traditional role of a service worker in the provision of a service (Castro et al., 2010). Self-service seems to be an inevitable trend, as the operation of complex systems shifts from dedicated human operators to customers pushing buttons—examples include making personal phone calls, riding an elevator, and now even driving a car (Benenson et al., 2008). Self-checkout is one of the most widespread applications of self-service technology. With self-checkout systems, customers can scan, bag, and pay for their own items. Given that there are over 60 billion transactions

* Corresponding author. Fax: +1 253 692 4523.
E-mail addresses: haluk@uw.edu (H. Demirkan), spohrer@us.ibm.com (J. Spohrer).

http://dx.doi.org/10.1016/j.jretconser.2014.02.012
0969-6989

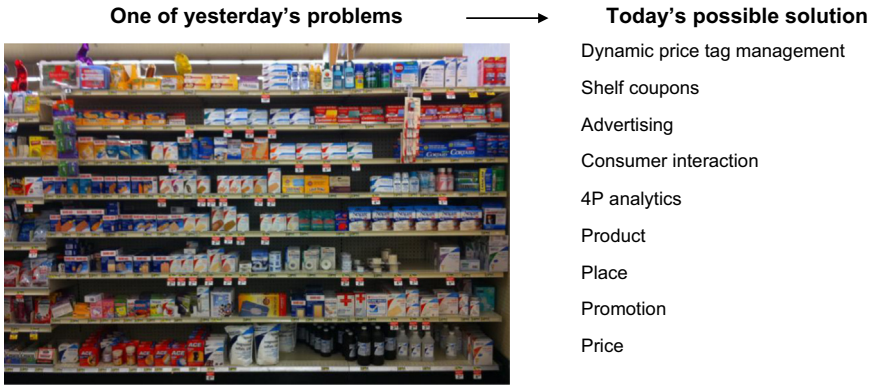

Fig. 1. From yesterday's problem to today's solution.

a year in retail stores alone, 68 percent of which are in grocery, gas and convenience stores, the potential savings are significant as a large number of these transactions could easily be done with self-service applications (Atkinson, 2005).

Another possible application of self-service solutions is to provide customers with a digital mall and virtual shopping experience. Bethlahmy et al. (2012) estimates that this is almost $7billion market for retail service providers. Fig. 1 depicts a simple application of digital signage that is just one of the many components of self-service system that proposes to replace cumbersome shelf tags with dynamic retail screens spanning the edge of the shelf. According to Avalos (2011) from Intel Corp, digital signage has demonstrated a continuing ability to reach large audiences in a targeted way at a point where it really matters: at the point of sale or, at a very minimum, when consumers can easily alter their travel plans to go to a point of sale (e.g., a pet owner watching digital signage at a vet's office). Other media – newspapers, magazines, TV – do not have the strength of place or the flexibility to deliver such targeted messages to specific audiences. Add to this, a growing sophistication in how brands want to manage the consumer experience.

A photo taken in a retail store, there are 195 price tags and 48 "specials" tags hanging off the price tags. Micro Digital Signage would replace the paper price tags with a unique digital display that is the height of the shelf edge—as well as the length of the shelf edge. In a simple calculation, there are 20,055 stores in top 20 US retailers with store inventory 20,000–55,000 skus with average 40 foot aisles, 11 aisles/store and 5 shelves/shelf section. Hybrid solutions are also possible with augmented reality systems that put information in places (Spohrer, 1999).

In literature, there are a number of studies that assess the application of self-service technologies to increase productivity and efficiency (Gelderman et al., 2011; Walker et al., 2002; Zeithaml and Gilly, 1987), and to provide better customers access and convenient channels (Meuter et al., 2003), to better meeting customer demand and increasing satisfaction (Bitner et al., 2002; Lee and Yang, 2013). Also, a number of studies review customer adoption of self-service technologies (Dabholkar and Bagozzi, 2002; Parasuraman, 2000; Tsikriktsis, 2004).

When utilization of self-service systems is rapidly increasing, any related issues and problems are also growing. Some of these problems are: (1) erroneous or missing data can be a show-stopper for a self-service consumer, (2) easy-of-use is mostly under the control of vendor, (3) not having a personal touch, (4) data privacy. One of the primary challenge is that most of these systems have been developed "as self-service technologies" with "goods" thinking logic, not "as systems" with service dominant logic (Lusch and Vargo, 2006). We need to rethink the best ways to design, build and utilize self-service *systems*, not just the self-service *technologies*.

The convergence of Information and Communication Technology (ICT) – emergent smart systems, Web applications, cloud computing, mobile solutions, RFID, big data, social networks, high-performance computing, global high-speed communications, and advanced sensing and data analysis – is creating opportunities to organize these technologies into service relationships by configuring retail self-service systems that include people, processes, technology, organizations, information, language, laws, regulations, metrics, measures, models, etc. to co-create new value between providers and receivers (Demirkan, 2013; Spohrer et al., 2007). Cloud enabled sustainable intelligent self-service systems, coupled with the sensors and cameras – big data – and the emergent mobile solutions, demonstrate unprecedented potential for delivering highly automated intelligent sustainable retail services.

In this article, we propose an Intelligent Self-Service Systems Framework (ISSS) that provides opportunities for retail organizations to deploy platform, technology and location independent, reduced risk and context-rich cloud solutions, and to increase virtual shopping experience. Our work contributes the "Dynamic Capabilities Reference Model". The framework is founded on theoretical research on organizations' processes and capabilities for managing and thriving in environments characterized by turbulence (Teece et al., 1997). It is also founded on practical experiences with services systems, ISO 9126, and other efforts in resilient systems. The framework aims to cover aspects necessary for both management and technical solutions arising in long-term evolution of successful self-service systems for retail.

In the next section, the foundations of ICT enabled retail services are described along with a list of challenges and issues. Section 3 presents the Intelligent Self-Service Systems Framework that could help pave the way to a scalable prototype/test-bed of a dynamic capability driven self-service system for retail. Finally we provide suggestions for future research and practice.

2. Challenges for self-service solutions in retail

A critical enabler of self-service systems is the convergence of Information and Communication Technology (ICT). Growing knowledge of ICT design, execution, storage, transmission and reuse knowledge is creating opportunities to configure information technologies into service relationships that create new value (Chesbrough and Spohrer, 2006; Spohrer and Maglio, 2008). More specifically, ICT provides the means to improve the efficiency, effectiveness, and innovativeness of organizations through: (1) make it possible for commoditization of none-core competencies (e.g. outsourcing, out-tasking); (2) improving the collaboration (e.g. inter- and intra-organizational workflows and business