Constructing New Venues for Service Improvements Using the Architecture of Preventive Service Systems

Elad Harison
Shenkar College of Engineering and Design, Israel

Ofer Barkai
Shamoon College of Engineering, Israel

INTRODUCTION

The operation of information systems supporting the provision of services is typically complex and demanding, as organizations aim at continuously sustaining a high degree of QoS (quality of service) to satisfy their customers. Yet, service related operations require significant investments, even though the resulting service quality improvements often prove to be marginal.

The article introduces a new framework and architecture for constructing preventive service systems that are based on the integration of infrastructure monitoring and Customer Relationship Management (CRM) to selectively apply and deliver service quality sustaining activities via the use of information systems. These systems aim at assuring customer satisfaction by applying automated means, thereby reducing the amount of service outages and customer complaints. The proposed system architecture is based on continuous infrastructure monitoring of service provision facilities and prevention of service outages. The preventive service system is integrated with the CRM system of the organization. When conditions for potential service malfunctions are identified, the system triggers operations that aim at preventing service outages or notifies customers in advance about them.

BACKGROUND

Infrastructure monitoring is based on a dated set of practices aimed at discovering technical failures in service delivery facilities, such as water pipes and electrical lines (Carden and Brownjohn, 2008; Gul and Catbas,

2009). Its systems are usually based on a group of sensors that are embedded within the monitored equipment and continuously indicate its state of operation and whether any malfunctions occur (Pakzad et. al., 2008). However, these sensors capture only a pre-defined set of indicators, rather than a broader range of parameters that can highlight whether additional failures may occur and hence is limited to the identification of technical malfunctions in the monitored infrastructure and not to the wider contexts of their impact of on services that utilize them or on the population of consumers.

The inherent complexity of services and the large variety of customers, needs and quality perceptions impose significant challenges for service providers. Among them is the need to satisfy as many customers as possible, despite the inherent diversity of their tastes and quality demands. However, the improvement of services requires substantial expenditures on capital and skilled labour. Often, these investments do not yield the expected returns, due to perceptual differences existing between organizations and customers as to the quality and the scope of services that customers expect to receive (Parasuraman et al., 1985).

Alternatively, the success of a service might prove to be a double edge sword as service providers may experience success that ultimately leads to the failure of their venture. When a certain service succeeds and more customers join it, the quality of the service often decreases if the service provider fails to identify the increasing demand and continues to invest in the resources and facilities that support it (Duffy et al., 2006). For example, when an Internet provider offers high-demanded services of access to an ultra fast network, the number of users and their profile of use may exceed the network's capacity within a short period,

resulting in frequent communication malfunctions and "cutoffs." Consequently, unless the service provider "catches-up" with the demand by allocating additional resources, the quality of the service would deteriorate and customers would abandon it. At the same time, new customers would hesitate to join the service due to its negative reputation.

Various studies introduced different architectures for information systems aimed at carrying out different functions of service operations. Yeh et al. and Chien and Tsaur examine the impact of ERP systems on service quality improvement (Yeh et al., 2007; Tsien and Tsaur, 2007). Bull describes how data obtained from a company's CRM system can be applied to assess the service quality of its intermediaries and even select the most qualitative companies among them as business partners to foster customer service improvements (Bull, 2009). Jøsang et al. emphasize the importance of trust in service provision systems by analyzing the manner in which architectures of service systems are affected by the goal of ensuring the quality of services and thereby sustaining the trust established between customers and service providers their reputation (Jøsang and Ismail, 2007). The results of the study indicate that service systems can successfully replace the physical interfaces (such as reception offices and service representatives) existing between service providers and customers, but they are unable to provide customers with the opportunity to see and try products before a purchase decision is made, a state of affairs that might lead to hesitation and mistrust among potential customers that are interested in these types of digital and online transactions. For example, eBay is an Internet-based auction service that succeeds in preserving trust among buyers (albeit concealing the identity of sellers) by compensating them for damaged goods, fraud or other losses they may suffer. At the same time, reviews of former customers dictate the "trust ranking" of each seller. Yet, Jøsang et al.'s study is focused mostly on clients that never encountered the providers that they choose to contact and did not receive the services that they provide. Therefore, market failures that result from asymmetrical information concerning the quality and skills of service providers are resolved via the application of trust and reputation systems. These systems record the reviews and the rankings provided by former clients when delivery of services and payment processing are completed.

From the IS perspective, the design of IS architecture is pivotal to properly accomplish the business processes of a firm on a continuous basis and goes beyond issues of business and IT strategic alignment. When information systems are poorly constructed, their various components and elements are not fully integrated and the potential of the systems cannot be fully materialized in terms of carrying out business processes that depend on it. Wieringa et al. argue that services are among the various dimensions of the operation of organizations that are affected by the architecture of IS in use. Service quality, the performance of organizations and the perceptions of their customers are influenced by there IS (Wieringa et al., 2003).

The current design of service IS revolves primarily around the delivery of services, i.e. providing the technical infrastructure and means for communicating with customers and fulfilling their orders. Very often, service outages are identified only after customers contact the provider's helpdesk and complain about their occurrence. In other cases, firms monitor their service delivery infrastructure and operations, but usually do so after customers have revealed repetitive service malfunctions. Both scenarios illustrate the perils that service providers may address in terms of dissatisfaction of clients and their propensity to renew their service contracts with their providers. Customers' dissatisfaction and mistrust in service providers and the quality of the services provided may result in contract termination and loss of revenues, as well as loss of reputation and avoidance of new customers from joining the services due to the negative experiences undergone by former ones. Further, most of the customers that leave their service providers do not complain or express their discomfort prior to their decision. Thereby, these customers do not provide service providers the opportunity to correct the service malfunctions that they experienced or receive compensation for them (Chebat et al., 2005; Sharma et al., 2010).

The article defines and devises a new architecture of preventive service systems aiming at reducing the volume of service malfunctions and the amount of resulting customer complaints. It highlights the benefits of the methodology for service providers and their customers in terms of quality of service and discusses its manner of implementation for the purpose of enhancing the profitability of firms.

Related Content

Acquiring Competitive Advantage through Business Intelligence
Foad Boghrati, Iman Raeesi Vananiand Babak Sohrabi (2015). *Encyclopedia of Information Science and Technology, Third Edition (pp. 4465-4477).*
www.irma-international.org/chapter/acquiring-competitive-advantage-through-business-intelligence/112889

Research on Singular Value Decomposition Recommendation Algorithm Based on Data Filling
Yarong Liu, Feiyang Huang, Xiaolan Xieand Haibin Huang (2023). *International Journal of Information Technologies and Systems Approach (pp. 1-15).*
www.irma-international.org/article/research-on-singular-value-decomposition-recommendation-algorithm-based-on-data-filling/320222

Knowledge-Based Urban Development
Tan Yigitcanlar (2015). *Encyclopedia of Information Science and Technology, Third Edition (pp. 7475-7485).*
www.irma-international.org/chapter/knowledge-based-urban-development/112448

Using Causal Mapping to Uncover Cognitive Diversity within a Top Management Team
David P. Tegarden, Linda F. Tegardenand Steven D. Sheetz (2005). *Causal Mapping for Research in Information Technology (pp. 203-232).*
www.irma-international.org/chapter/using-causal-mapping-uncover-cognitive/6520

Discovery of User Groups Densely Connecting Virtual and Physical Worlds in Event-Based Social Networks
Tianming Lanand Lei Guo (2023). *International Journal of Information Technologies and Systems Approach (pp. 1-23).*
www.irma-international.org/article/discovery-of-user-groups-densely-connecting-virtual-and-physical-worlds-in-event-based-social-networks/327004