WEB PERSONALIZED INTELLIGENT USER INTERFACES AND PROCESSES

An Enabler of Multi-Channel eBusiness Services Sustainability

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Abstract: The explosive growth in the size and use of the World Wide Web as a communication medium has been enthusiastically adopted by the mass market to provide an electronic connection between progressive businesses and millions of customers bringing to light the eBusiness sector. However, the nature of most Web structures is static and complicated, and users often lose sight of the goal of their inquiry. Hence, practitioners need to alleviate any navigational difficulties and satisfy the heterogeneous needs of the users to allow web applications of this nature to survive. Main emphasis is given at saving costs, improving efficiency and growth, competitiveness, expanding markets, create new infrastructures to support B2B and B2C Web activities and creating more business opportunities, for local and regional governments. This paper presents the research implications and challenges of the Web Personalization concept as an enabler of eBusiness Services sustainability with the development of Personalized Intelligent User Interfaces and processes.

1 INTRODUCTION

This paper[1] focuses on the eBusiness services delivery sector and analyzes the concepts and factors that could affect their continuous quality provision in a multi-channel and widely diverse environment securing their sustainability. Its main argue is that, in the new technological emergent environment and the resulting changing customer requirements, Web personalization and the developed Intelligent User Interfaces and processes are considered fundamental for the provision of adapted and personalized eServices, via any medium, increasing one-to-one service delivery and integrity enabling businesses to retain their customers and therefore to gain a substantial competitive advantage.

The Internet has been adopted by the mass market more quickly than any other technology over the past century and is currently providing an electronic connection between progressive businesses and millions of customers and potential customers whose age, education, occupation, interest, and income demographics are excellent for sales. The complicated nature of most Web structures results in orientation difficulties, since users lose sight of the goal of their inquiry, look for stimulating rather than informative material, and use the navigational features unwisely. As the eBusiness sector is rapidly evolving, the need for such Web structures that satisfy the heterogeneous needs of its users is becoming more and more evident. To alleviate such navigational difficulties, practitioners must identify the peculiarities of each user group and design methodologies and systems that could deliver up-to-date personalized information, with regards to products or services. Doing business electronically, both intra- and inter-firm over computer mediated networks (eBusiness Watch, 2004), implies a primary focus on commercial transactions and services delivery between

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companies and their customers (consumers (B2C) or other companies (B2B)), and processes within a company and between companies. Two different strategies for improvement of eServices are identified, *process integration* (back-end) and *service delivery* (front-end) (Top of the web, 2003). eBusiness aims to deliver better quality of eServices increasing productivity with focused services to be provided by various channels and devices, at a lower cost and time and in a personalized style.

2 THE *E*BUSINESS SECTOR – TRENDS AND OPPORTUNITIES

In today's evolving business environment, the eBusiness services sector faces new opportunities mainly because of the rapid growth of the ICT challenges. Therefore, main emphasis is given on the development of multi-channel (especially mobile) and broadband services to provide more interactive business services that match the customers' needs in terms of easy-to-use, personalized and timely delivered services. However, for a better understanding of the impact of ICT in the eBusiness services and the actions to be undertaken, the related trends and opportunities embedded in the internal mechanisms and operational procedures of the various enterprises have to be realized.

eBusiness is often described as the Small to Medium Enterprises (SMEs) gateway to global business and markets exploiting the opportunities provided by ICT to improve performance. Nevertheless, SMEs find the opportunities difficult to grasp (European Commission, 2004). However, the important trends and challenges introduced by the new technological advancements and methodologies are underlining some specific guidelines for the improvement of the digital SMEs and consequently of the eBusiness sector. More particular, such actions emphasize upon the improvement of networking and new infrastructures to support more effectively high-level B2B and B2C activities on the Web; the improvement of innovation within an organization; the improvement of the effectiveness of human and knowledge resource; and the adoption of new interaction channels, such as mobile business (mBusiness), cutting the cost and increasing employee productivity, providing information and services using mobile devices.

3 SERVICE REQUIREMENTS AND DELIVERY

3.1 General User Requirements

To get the right information at the right time and the right place is not so easy for the customers. The eBusiness sector working at its front or back office, it has encountered in several times and occasions the particular problem. Customers' interaction with the services has to be improved, and a serious analysis of customers' requirements in the area of eBusiness has to be undertaken and documented and furthermore examined taking into consideration its multi-application to the various delivery channels and devices.

This paper presents, based on studies conducted (Top of the web, 2003; CAP Gemini Ernst & Young, 2004), some of the user (customer) requirements and arguments anticipated. They could be clearly distinguished into: (a) *General User Service Requirements* (flexibility: anyhow, anytime, anywhere; accessibility; quality; and security), and (b) *Requirements for a Friendly and Effective User Interaction* (information acquisition; system controllability; navigation; versatility; errors handling; and personalization).

3.2 Multi-Channel Service Delivery

A channel can change the customers' perception of a service. If channels are integrated, the introduction of a new channel is not merely an additional channel but a new opportunity to improve service delivery. With regards to the customer, the integration of channels means more accessible and more flexible service delivery. Separate development of different channels for a single service (multi-channel delivery) can lead to inconsistencies such as different data formats or interfaces. To overcome the drawbacks of multiple-channel service delivery, the different channels should be integrated and coordinated (Caldow, 2001). Since successful eServices delivery depends on a vast range of parameters, there is not a single formula to fit all situations. However, there have been reported particular steps (IDA, 2004) that could guide a provider throughout the channel selection process. It should be mentioned, though, that the suitability and usefulness of channels depends on a range of factors, out of which technology is only one element. Additional features that could affect the service channels assessment could be: *directness*, *accessibility and inclusion*, *speed*, *security and privacy* and *availability*. To realize though their

potential value, channels also need to be properly implemented and operated.

The design and implementation complexity is rising significantly with the many channels and their varying capabilities and limitations. Network issues include low bandwidth, unreliable connectivity, lack of processing power, limited interface of wireless devices and user mobility. On the other hand, mobile devices issues include small *size*, limited *processing* power, limited *memory* and *storage space*, small *screens*, and restricted *data entry*.

4 THE DEVELOPMENT OF THE MOBILE COMMUNICATION SECTOR – THE MBUSINESS EMERGENCE

The anticipation of faster and cheaper W4 (Wireless World Wide Web), the third generation (3G) wireless networks as well as the more sophisticated mobile devices will soon establish mobile broadband services as the future trend. At the same time there is a growing number of organizations that plan to deploy parts of their traditional Web sites for multi-channel access. This can be an overwhelmingly difficult task, since several problems have derived in building and maintaining business applications for access by heterogeneous platforms. The mobility emergence has brought to light mBusiness, which could be easily considered as the logical extension of eBusiness. mBusiness will create tremendous opportunities for most innovative companies allowing them to promote their products and services effectively and efficiently, by cutting the cost, increasing employee productivity (working while they are off-site) and addressing return on investment on their applications and services. At the same time, mBusiness will enable them to increase customer retention, by establishing valuable direct links with them and strengthen important relationships by improving to an "anywhere, anytime and anyhow" interaction achieving the competitive difference. Moreover, mBusiness could be considered as a new kind of front-end access to Adapted and Intelligent Web-Based Systems with specific capabilities of delivering on demand real time information, orders, products, and payments adapted to the individual customer as well as the context of customer's work.

5 WEB PERSONALIZATION AS AN ENABLER FOR EBUSINESS SERVICES SUSTAINABILITY

Evidently, the demands of mobile users differ significantly from those of desktop users. Getting personalized information "*anytime, anywhere and anyhow*" is not an easy task. Business Analysts and Practitioners have to take into account new adaptivity axes along which the personalized design of e- and mBusiness services would be built.

However, creating and maintaining a Web site to support multi-channel access is proved to be quite costly and also requires significant amounts of work. Further to this, mobility applications can suffer from a handful of problems such as: local mobility, limited mobility, closed mobility and interrupted mobility. To overcome such problems personalized intelligent techniques have to be implemented to enable the development of an open Adaptive Personalized Mobile Web (Brusilovsky, & Nejdl, 2004). The "Mobile" generation extends the basis of adaptation by adding models of context such as location, time, computing platform and bandwidth to the classic user model and exploring the use of known adaptation technologies to adapt to both an individual user and a context of their work. Now, customer needs imply both, the *thematic preferences* (i.e., the traditional notion of profile) the *device profile* (i.e., the characteristics of the mobile device),.To this end, adaptive personalization is concerned with the negotiation of customer requirements and device abilities.

Indisputably, the user population is not homogeneous, nor should be treated as such. To be able to deliver quality services, eBusiness Services should be tailored to the needs of individual customers providing them with personalized and adaptive information upon request. Although one-to-one service provision may be a functionality of the distant future, customer segmentation is a very valuable step towards that direction. Customer segmentation means that the customers are subdivided (ideally per service or group of related services, based on their *demographic characteristics*, *socio-economic characteristics*, *psychographic characteristics*, or *individual physical and psychological characteristics*), into more or less homogeneous, mutually exclusive subsets of customers who share an interest in the service.

The issue of personalization is rather complex. And it becomes even more complicated once viewed from a moving user's perspective. The new issues now also include: *what content to present to the user*, *how to show the content to the user*, *how to*

ensure the user's privacy, or *how to create a global personalization scheme* (Panayiotou, & Samaras, 2004). In addition, there are also many approaches each of which focuses on a specific area, i.e. whether this is profile creation, machine learning and pattern matching, data and web mining or personalized navigation. Personalization varies from Link to Content to Context to Authorized to Humanized levels, with several paradigms to implement them. Among others these include, content-based filtering, rule-based filtering, collaborative filtering, Web-usage mining, demographic-based filtering agent technologies, and cluster models. Having these in mind Business Analysts and Practitioners should develop new intelligent user interfaces advanced with adaptive presentation and adaptive navigation techniques that would take advantage of these constraints to the benefits of their customers whenever applicable and provide them with uninterrupted sustainable eServices.

6 CONCLUSION

The rapid expansion of the adoption of the Internet as a communication medium, as well as the explosive growth in the size and use of the World Wide Web and the need for eBusiness Services to retain their customers and therefore gain a substantial competitive advantage results in the inference that Web Personalization techniques, like intelligent user interfaces, enable eBusiness services providers to adopt successfully the new multi-channel (wireless and mobile) technologies increasing their eServices provision sustainability across their market segments. This paper analyzed key concerns about customers' requirements for multi-channel service provision anywhere, anytime and anyhow, thus re-enforcing core functionality issues related to mobility, and therefore mBusiness. All of the above activities, related to eBusiness Services and eServices delivery, should always be aligned to the customers' perceptions and requirements. Once these are thoroughly realized taking advantage of the adaptive and personalized user interfaces and processes, eBusiness services providers will be in position to retain their customers by targeting their individual needs, offering quality adaptive and personalized on demand multi-channel services delivery, and hence intensifying eServices sustainability gaining the competitive advantage in their market segment.

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