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Factors for web mining adoption of B2C firms: Taiwan experience

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Abstract

This paper focuses on the web mining adoption of small and medium size enterprises (SMEs) in terms of organizational innovation theories. It first examines the current literature of information systems studies and suggests that the context of web mining adoption needs to be taken into account. This paper proposes an analytical model employing a number of internal, external factors, and the stages of web mining adoption. The model explores the relationships influencing the stages of web mining adoption. Empirical testing is based on a sample of 68 B2C firms from Taiwanese SMEs. The results show that firm's Internet strategy, internationalized strategy, and business complexity along with competitive pressure influence on the stage of web mining adoption. The implications of findings for the management of web mining adoption and suggestions for the future study are discussed.
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Keywords: B2C firms; Electronic commerce; Web mining

1. Introduction

Similar to conventional industries, B2C firms not only need to be profitable to survive, but also need to be adaptable to the turbulent business environment. However, attracting new online customers or retaining existing one are not easy [10]. In this circumstance, a historical archive of customer information and data mining techniques are valuable to overcome this problem by drawing and analyzing information on customer behavior and activities, and providing analysis of customer preference. In particular, web mining in the analysis of user behavior on the Internet has been increasing rapidly to understand users' common behavior [33]. Web mining provides greater purchasing and customer service options by incorporating data warehouses and knowledge management projects. It is one of the best strategies to differentiate from competitors and enables B2C firms to discover resource, extract information and uncover general patterns [32], resulting in a quicker respond to their customers and, in turn,

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a more satisfied and loyal customer. Accordingly, the management of adoption of web mining is now of a critically important issue.

Although the strategic potential of web mining is now well recognized, a number of phenomena show more efforts are need. First, previous studies mainly focused either on the technical perspective or on the application development of web mining (e.g. [6,20]), and have little efforts on the factors that affect the process of web mining deployment. Adoption and diffusion of innovative technologies have remained critical concerns in IT research. IT investment and adoption decisions are more difficult than many other investment decisions [37] and management now faces a dilemma concerning the strategic use of IT. Second, most previous research has concentrated on large business context, ignoring small and medium size enterprises (SMEs). This is understandable, since IT has been the privilege of large businesses due to the huge investment required in the past. However, SMEs potentially constitute the most dynamic firms in an emerging economy and are the life-blood of modern economics [15]. The importance of SMEs in economic growth has made them a central element in much recent policy making to promote and facilitate the operation of the innovation process within SMEs [19].

Third, studies (e.g. [20]) have revealed many reasons for data mining such as to improve customer service, to build a long-term client relationship, to reduce marketing cost, and to increase sales. Too often, the business is surfing in prevailing views enthusiastically such as the adoption of web mining without asking: "why some organizations do not?" That is, they do not explain why some organizations adopt it earlier than others, and why some may never adopt this innovation.

Accordingly, the adoption behavior of web mining has not yet been convincingly demonstrated. This study attempts to address these concerns by viewing web mining as a technological innovation and examining factors that facilitate their initiation, adoption, and implementation. A research model is then proposed and tested. Both internal and external contextual factors of web mining adoption are investigated. Using data from a national wide survey, impact of internal and external e-commerce characteristics on the initiation and adoption of web mining was examined. This empirical test of the proposed research model is drawn on a sample of 68 Taiwanese B2C firms in terms of the stages of adoption. The next section discusses the background and the state-of-the-art of the development of web mining. This is followed by a detailed description of the proposed model and research methodology. Subsequently, the paper presents the data analysis and hypotheses testing. The final section concludes by discussing future research directions.

2. Research background

In terms of resource perspective, data captured in different operational databases over time could further be extracted, transported and integrated together in data warehouses for building decision support systems [8]. Data mining is a subset of knowledge discovery in databases, data warehouses, and data marts [8]. Web mining inherits the characteristics of data mining, but also has its own characteristics. Web mining generally refers to data mining on the Internet and is a technology of the interaction between data mining and the World-Wide Web [54]. That is, Web mining is the application of data mining techniques to discover meaningful patterns, profiles, and trends from Web sites. Web mining is critical for EC due to the large number of visitors to EC sites [34]. However, the term Web mining is being used in two different ways. First, web content mining is the process of discovering information from millions of Web documents. Second, web usage mining is the process of analyzing Web access logs on one or more Web localities.

Web mining is an increasingly important and very active research field, which adapts advanced machine learning techniques for understanding the complex information flow of the World-Wide Web [28]. This is especially true since markets and competitive structures have grown increasingly complicated and volatile. The potential of web mining to help people navigate, search, and visualize the contents of the web is enormous [32].