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Expert Systems with Applications 24 (2003) 457–470

Expert Systems
with Applications

www.elsevier.com/locate/eswa

A multi-perspective knowledge-based system for customer service management

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Abstract

The e-business arena is a dynamic, complex and demanding environment. It is essential to make optimal reuse of knowledge of customer services across various functional units of the enterprise. On the other hand, it is also important to ensure that the customer service staff can access and be trained up with dynamically updated knowledge that meets the changing business environment of an enterprise in customer services. However, conventional way of customer service management (CSM) is inadequate to achieve the multi-perspective of an enterprise for achieving knowledge acquisition, knowledge diffusion, business automation and business performance measurement so as to drive the continuous improvement of the customer service quality. In this paper, a multi-perspective knowledge-based system (MPKBS) is proposed for CSM. The MPKBS incorporates various artificial intelligence technologies such as case-based reasoning (CBR) and adaptive time-series model which are used for decision analysis, performance measurement and monitoring. A prototype customer service portal has been built based on the MPKBS and implemented successfully in a consultancy business.

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Keywords: Business automation; Case-based reasoning; Customer service management; Knowledge-based system; Performance measurement

1. Introduction

The rapid development of information technology (IT) and electronic business has led to a great demand for achieving customer service automation on the internet. It is essential to make optimal reuse of knowledge of customer service across various functional units of the enterprise and ensure the customer service staff can access and be trained up with dynamically updated knowledge that meets the business strategies of an enterprise in customer services. However, increasing competition (whether for profit or non-profit) is forcing businesses to pay much more attention to satisfy customers. One of the essential ingredients of e-business is how to gain a better understanding of customer needs. By comparison, Meltzer (2001) claims that organisations can boost profits by 100% just by retaining 5% of their most valuable customers. The most successful businessman in the world, Bill Gates from Microsoft (Source: Business@ the Speed of Thought, 1999) agrees that ‘customer service will become the primary value-added function in every business.’ Organisations that can successfully understand and manage the behaviour of customers and customer service quality will enjoy competitive advantage.

Customer service management (CSM) offers a service oriented management interface between customer and service provider (Langer, Loidl, & Nerb, 1999). CSM includes a wide range of activities, ranging from the time that there is a customer need for a product such as, requisition of a quotation to eventually providing ongoing support to customers, who have purchased the product. Since customer service processes are becoming more complex and a large number of decisions have to be made within a short period of time, the conventional way of customer services based on fax, e-mail and telephone might not satisfy customer needs in electronic business. To automate and to retain the knowledge of an enterprise in customer services, a knowledge-based system (KBS) is much needed for facilitating knowledge acquisition, sharing and diffusion (Davenport & Prusak, 1998; Preece et al., 2001) among customer service staff. Such kind of system should be robust enough to response to the customer requirements and make sound recommendations to resolve the customer problems anytime and anywhere via the web. In this paper, a multi-perspective knowledge-based system (MPKBS) is proposed for customer service automation. A prototype customer service portal has been built based on the model and its capabilities were evaluated through the trial-run implementation at a selected reference site.

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2. Knowledge pyramid for CSM

A knowledge pyramid for customer services is shown in Fig. 1. Basically, there are three tiers of knowledge domains for customer services, which are Tier one, Tier two and Tier three, respectively. Tier one relates to general data and information service while Tier two focuses on advisory oriented services. Tier three addresses for knowledge and expert of customer service.

2.1. Tier one: general data and information services

For Tier one domain of customer services, it relates to the general data and information services provided to the customers. Those data and information are explicit knowledge to the customers, which support their decision-making. Tier one domain is most commonly found in most of voice-enabled and automated call-centre used in the banks, insurance and telecommunications companies. They usually provide data, facts and information for the customer's references. The customers are presumed to possess prior knowledge to their problems and the services provided are only for supporting their decision-making. Most of the Tier one customer service systems are rule-based systems with predefined content and navigating tools are being provided for navigating the customer to the right data and information sources.

2.2. Tier two: advisory services

Tier two domain of customer services relates to the advisory services in which the customers are provided with solutions, suggestions and recommendations to solve the problems. Examples can be found in the automatic help desk services provided to computer users. Since the customers may not have prior knowledge to the problems, this demands for the knowledge and tacit practice of the customer service staff to resolve the customer problems or requests. The solutions and recommendations are usually derived or deduced from data, information and facts in Tier one domain of knowledge, i.e. a meta-level of knowledge of

Tier one. Knowledge-based systems together with artificial intelligence (AI) technologies are usually used in the system design.

2.3. Tier three: knowledge and expert services

For Tier three domain of customer services, it relates to the knowledge and expert services. It is commonly found in consultancy business, which provides consultancy services to their customers, who are also practitioners in the field and possess prior knowledge. It is interesting to note that the knowledge for Tier three domain of customer services involves a meta-level of knowledge of Tier two and Tier one knowledge domain, i.e. knowledge used to manage the knowledge of customer service staff. For example, a consultancy company manages and trains up the expertise of its consultants so as to enable them to possess the competency in providing data, information and advisory services (Tier one and Tier two domain of knowledge) to their customers. For supporting Tier three domain of customer services, a systematic and dynamic training and learning approach is indispensable in building individual competence and organisational capability to meet the enterprise's strategic objectives. It is essential that the skill and knowledge levels of the staff members are dynamically updated and kept consistently in line with the business development so as to drive the continuous improvement of customer service quality.

2.4. Needs for KBS for supporting Tier three domain of CSM

It is interesting to note that the knowledge domain for customer services is a hierarchical network of multi-tier of domain of specific data, information and context that creates different values and levels of satisfaction to customers. However, the level of technological requirements and the depth of knowledge increase as advancing from Tier one to Tier three.

The effects of globalisation have precipitated a huge increase of importance of e-business. The e-business arena is a dynamic, complex and demanding environment. It is essential to make optimal reuse of knowledge of customer services across various functional unit of an enterprise and to ensure that the customer service staff can access and be trained up with dynamically updated knowledge that meets the business strategies of an enterprise in customer services. This demands for a KBS for achieving multi-perspective of knowledge acquisition and diffusion, business automation and business performance measurement of the customer service processes. This leads to the formulation of a MPKBS in the present study for supporting the Tier three domain of customer service.

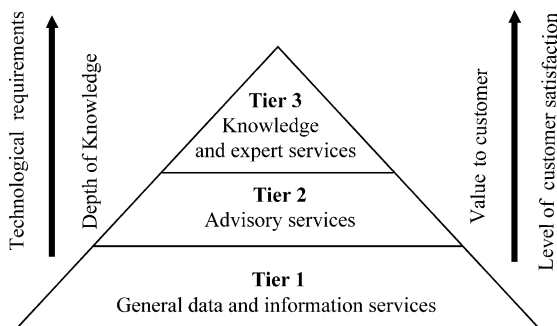


Fig. 1. Knowledge pyramid for CSM.

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