

# Chapter 23

## An Agent–Based Knowledge Management Framework for Marketing–Mix Decision Making

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### ABSTRACT

*Marketing-mix plays an essential role in the competitive business environment. Marketing decision makers constantly need to monitor changes in the environment and organization to make necessary changes. Therefore, a knowledge management system is required to acquire, store, retrieve and use up-to-dated knowledge. Corporations also tend to look for systems assisting them in knowledge management. Agent technology looks set for assisting organizations in collecting, processing and using knowledge with high accuracy, speed and efficiency. This paper proposes a knowledge management framework for marketing-mix decision making through using agent technology. A multi-agent system is deployed to acquire, refine, store, retrieve, present, show and update the related knowledge of marketing-mix decision making. The fuzzy logic is applied by multi-agent system to make decision. Implementation of the proposed system in a car factory indicates that it is efficient and effective in supporting and improving marketing-mix decision making.*

### 1. INTRODUCTION

Marketing is becoming a dominant force in competitive business environment and is taking place everywhere; by doctors, hospitals, charities, social workers, banks, financial institutions and lawyers.

Many practitioners use marketing-mix as an essential part of formulation and implementation of marketing strategy. Marketing-mix as a key concept in marketing is defined as: “the process of designing and integrating various elements of marketing in such a way as to ensure the achieve-

ment of enterprise objectives.” (Brown, 1996). It is referred to as the 4Ps of Product, Price, Place and promotion.

Marketing-mix requires attention to customers’ needs and desires, and wants a little intuition, creative ideas, much planning and a trial-and-error attitude to find out what works best (Keiser & Galvin, 1988; Mason, 2007). The marketing manager should constantly review the conditions and mix of market and make necessary changes according to market changes (Brown, 1996). The changes may occur in two areas: a) changes in external environment such as changes in customers’ tastes and preferences, brand loyalty and purchasing power, and b) changes within the firm like technological changes, changes in the size and scale of operation, or changes in the product line (Brown, 1996). The environment changes are becoming rapid and extremely complex (Mason, 2007). Marketing decision makers, thus, must acquire up-to-dated knowledge about environment and organization to make effective decisions (Jajimoggala & Rahul Karri, 2013; Salmasnia. et al. 2013).

In these conditions, there is a need for a framework that supports marketing managers in gathering and refining related information to make effective marketing-mix decisions. One of the most effective solutions is Knowledge management (KM). KM is becoming a competitive differentiator for both ‘traditional’ and ‘virtual’ organizations (Hlupic, Pouloudi, & Rzevski, 2002). It manages the knowledge assets of an organization and the processes that act upon these assets (Sugumaran, 2002). KM system must be able to adapt to most changes that occurs in the environment, e. g. changes in needs and preferences of users, or in the organization, e. g. changes in work methods, tools and processes. Thus, KM systems must be both *reactive*, i.e. able to respond to user requests or environment changes, and *proactive*, i.e. able to take initiatives to attend to users’ needs. A multi-agent system is one of technologies that can meet these characteristics (Dignum, 2004).

Different studies have been done in applying intelligent agents in KM and marketing, Table 1. The + symbol indicates that research has the related attribute. In these researches there are some issues. First, they do not present the knowledge to users based on its importance and freshness, and user has to look for best knowledge extracted by agents. Second, they do not get feedback from user about the application of extracted knowledge to their problem. As some knowledge is not applicable or unlike, may be the most appropriate for some problems, it is better to get feedback from users about the application rate of knowledge in solving their problems, then affect the average of these feedbacks on the importance of knowledge for that problem, periodically. Third, they do not update knowledge in knowledge base. There may be knowledge that is not used and applicable, so it just gets a space in knowledge base. For example the knowledge of a product that is not produced now. So if it is not used anymore, it’s better to delete this knowledge. This paper tries to solve these issues and also uses the fuzzy logic in marketing-mix decision making because of uncertain situation of decision making in marketing.

The objectives of this study are as follows:

- Developing a knowledge management framework for capturing, storing, disseminating and utilizing marketing knowledge using enabling technologies such as agent systems,
- Helping marketing decision makers to make effective decisions based on useful knowledge, and
- Encouraging marketing decisions towards the intelligence.

The reminder of this paper is organized as follows. Following the introduction, knowledge management, marketing-mix and agent system are briefly explained. The next section discusses the role of knowledge management in marketing-

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