Chapter 6
Ontology-Based Shopping Agent for E-Marketing

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ABSTRACT
Before Internet consumers make buying decisions, several psychological factors come into effect and reflect individual preferences on products. In this paper, the authors investigate four integrated streams: 1) recognizing the psychological factors that affect Internet consumers, 2) understanding the relationship between businesses’ e-marketing mix and Internet consumers’ psychological factors, 3) designing an ontology mapping businesses’ e-marketing mix with Internet consumers’ decision-making styles, and 4) developing a shopping agent based on the ontology. The relationship between businesses’ e-marketing mix and Internet consumers’ psychological factors is important because it can identify situations where both businesses and Internet consumers benefit. The authors’ ontology can be used to share Internet consumers’ psychological factors, the e-marketing mix of online business and their relationships with different computer applications.

INTRODUCTION
During the last 15 years, the popularity of the Internet has been growing exponentially (Hou & Cesar, 2002). One result of the online information explosion is the growing popularity of computer-based intelligent shopping agents that are mainly used to assist consumers to find and compare suitable product items they are looking for. However, most of the currently available intelligent shopping agents only request consumers to define various criteria for the product in terms of price limitation and required product features. Then consumers search the suitable product items offered by different online stores. In order to
satisfy customer needs, intelligent agents should also consider additional factors.

From the customer viewpoint, before consumers make buying decisions, they are influenced by several psychological factors when looking for their favorite business web site to buy a suitable product. From the business viewpoint, the tools of e-marketing mix are provided by the business company web sites to look for target customers. An intelligent shopping agent, which can understand the relationship between the consumers’ psychological factors and businesses’ e-marketing mix, can increase business revenues and at the same time can save online consumers a lot of searching time.

**PSYCHOLOGICAL FACTORS**

Consumers’ decision-making style is defined as a mental orientation characterizing a consumer’s approach to making choices (Sproles & Kendall, 1986). In this research field, the consumer-characteristics approach, focusing on cognitive and affective orientations related to consumer decision-making (Sproles, 1985; Westbrook & Black, 1985), is one of the most promising approaches as it deals with the mental orientation of consumers in making decisions. In a consumer market, consumers may approach the market by using some basic decision-making styles, e.g. high-quality consciousness. The consumer personality, similar to the concept of personality in psychology, is what must be characterized. Identifying the basic characteristics of decision-making styles can be used to:

1. educate consumers about their specific decision-making characteristics,
2. profile an individual’s consumer style,
3. counsel families on financial management.

**ELECTRONIC - CONSUMER STYLE INVENTORY (E-CSI)**

The origin of the consumer characteristics driven approach is the exploratory study by Sproles (1985) that identified 50 items related to his or her mental orientation. Sproles and Kendall (1986) reworked this inventory (50 items) to reduce them to 40 items under the title, Consumer Style Inventory (CSI).

Bruskin/Goldberg Research reports that 75% of Internet shoppers consider credit-card security a primary concern (Hou & Cesar, 2002). In addition, Hoffman, Novak and Peralta (1999) state that consumers’ online information privacy is the primary barrier to online shopping.

Self-service technologies on the web can lead to factors that can cause positive or negative reactions to the Internet shopping service. Meuter et al. (2000) find that subjects are most satisfied with technologies that can save time (30%), work reliably (21%), be easy to use (16%), meet a salient need (11%), and offer greater control and access (8%). The facilities offered by e-businesses are so important that they can affect consumers when shopping on-line.

To sum up, in order to deal with the emergence of e-commerce activities, it is necessary to consider the psychological factors that can affect the willingness of consumers to purchase products on the web. Therefore, additional item(s) should be added to the psychological factors reported by Sproles and Kendall (1986) in order to fit the E-commerce environment. Based on survey data and using the factor analysis technique, the eight factor items of the E-CSI model (Sam & Chatwin, 2005a) for four different types of products; namely Apparel, IT item, Jewelry and Car, are created as shown in Table 1.

According to the loading information of factor items shown in Table 1, an eight-factor consumer style model can be applied to all four types of products. However, there is no particular pro-