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Chapter XII
Mass Customisation of Services and Processes Based on Fuzzy Cognitive Maps

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ABSTRACT

This chapter draws on the theory of fuzzy cognitive maps (FCM) to propose a modelling approach for mass customisation (MC) of services. The proposed model integrates concepts from service quality and customer preferences with business process and IT capabilities models. The model presented in this chapter is, to the best of our knowledge, the only fuzzy service model for MC that provides the means to consider the business objectives for service customisation, associate them with specific business areas, and suggest opportunities for MC. In contrast to other service designs and management approaches, the proposed model is dynamic, exhibits flexibility and responsiveness to environmental changes and customisability to specific organisational contexts, and allows the development of planning scenarios.

INTRODUCTION

In an era of increasing competition and demanding customers, businesses are investigating new ways of improving their performance and differentiating their products and services. Developed economies shift from manufacturing to service industries. As a result, service design and management has been a top concern for business management in the 1990s, and it continues to be so in the 21st century as well. Nowadays in order to be successful, services have to be more innovative, flexible, and customisable in order to achieve customer satisfaction. Mass production

is not suitable anymore due to the current state of the global markets, which are characterised by the increasing variety of products and services, and the advent of electronic commerce.

It is argued that **mass customisation** (MC) is expected to be a critical strategic option for the survival and competitiveness of many organisations in the 21st century (Boynton, Victor, & Pine, 1993). MC focuses on delivering differentiated products and services at competitive prices. MC implies the development and distribution of products and services that are customised to specific customer needs and are made available at an acceptable cost and in accordance to customer's priorities with respect to quality factors. MC of markets means that organisations can reach the same large number of customers as in the mass markets, but additionally they have the ability to address their customers individually as in the customised markets. Business organisations already face intensive competitive pressure and can no longer capture market share and gain higher profits by supplying large volumes of standard products for mass markets. Firms that can understand, anticipate, and originate customer preferences, and then exhibit the necessary flexibility to respond with suitable products will become more competitive over their less-flexible competitors. It is argued that mass customisation is expected to be a critical strategic option for the survival and competitiveness of many organisations in the 21st century. A new market for mass customisation has already developed, and the growth of this concept is increasing. Thus organisations can address this new-segmented market, which is one of a series of niches, with each niche differentiated from the others by a number of factors.

Responding to the increasing interest in service design and the proliferation of Internet applications and e-services, researchers have developed a large number of methodologies and models for service management. However, none of the service management methodologies and models described in the relevant literature addresses the challenge of MC in services. This chapter draws on the theory of fuzzy cognitive maps (FCM) and proposes a modelling approach for services in MC. The proposed model integrates concepts related to service quality and customer preferences with business process and the capabilities of modern IT. The model presented in this chapter is, to the best of our knowledge, the only fuzzy service model for MC that provides the means to consider the business objectives and to associate them with specific business areas, which can represent opportunities for MC. In contrast to other service design and management approaches, the proposed model is dynamic, exhibits flexibility and responsiveness to environmental changes and customisability to specific organisational contexts, and allows for the development of planning scenarios.

The research objectives of the approach described in this chapter follow:

- Develop a new model based on the theory of cognitive maps to facilitate services of MC;
- Develop business process models that integrate services design priorities with process design options; and
- Develop a methodology and associated models that draw on the principles of MC, service quality, and customer satisfaction as well as on FCMs.

SERVICES AND E-SERVICES QUALITY

The concept of **service** and its quality is extensively discussed in the business literature. Ramaswamy (1996), for example, describes service as "the business transactions that take place between a donor (service provider) and receiver (customer) in order to produce an outcome that satisfies the customer". Gronroos (2000) defines service as "... an activity or series of activities of more or less intangible nature that normally,