AGENT-BASED ANALYTICAL FRAMEWORK FOR KNOWLEDGE MANAGEMENT IN SERVICE-ORIENTED ORGANIZATIONS

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ABSTRACT

This paper provides an agent-based analytical framework for analyzing knowledge management policies in service-oriented organizations. The knowledge of workers dynamically changes as various services are created through the service interactions between workers and customers. Our previous study focused on the knowledge dynamics and proposed an agent-based model to discuss effective management policies in a specific customer center. However the model is unable to analyze problem situations in other types of organizations directly. In this research we investigate service characteristics and various types of business, and then construct the framework including essential model components for representing service interactions and organizational learning mechanisms in service-oriented organizations. The framework enables analysts easily to build an agent-based model by selecting model components based on the features of their target organization. The simulation with the framework can provide an enormous volume of useful information about possible organizational changes and workers' behavior for their decision making.

1   INTRODUCTION

In conventional manufacturing firms, workers are required to gain a group of related skills for developing some standardized products. The firms aim to improve their operational efficiency in some standardized work processes. On the other hand, workers in service-oriented organizations have to conduct different problem solving for handling various customer needs. So each operation in the organization will be dependent on the knowledge of individuals. As a result, the organizations have to accelerate organizational leaning through the assistance of knowledge sharing among workers to increase their service productivity.

In our previous research (Ohori et al. 2011; 2012), we have analyzed the effectiveness of knowledge management policies such as job rotation patterns and knowledge-base techniques in a customer center with an agent-based organizational model representing the service interactions between customers and workers and the knowledge sharing processes in the organization. The simulation results with the model could provide possible changes of agents' knowledge and behaviors in the organization by using some policy scenarios. However the model is unable to describe other situations observed in different organizations because it focused on only a specific problem situation in the customer center. So if analysts want to consider other problem situations, then they have to rebuild a new type of model from scratch.

In this research we firstly extract service characteristics based on conventional service research (Grönroos 1994; Lovelock and Gummesson 2004), then describe various problem situations in service-oriented organizations such as a call center, a bank counter and a government office counter, and then construct an agent-based analytical organizational framework consisting of essential model components for representing the problem situations. The framework enables analysts easily to assess the effectiveness of knowledge management policies by selecting some model components based on their organizational features.

2   FRAMEWORK

This section provides a summary of our proposed framework, which is called SIEBOLD (Service Interaction Evaluation Based on Organizational Learning Dynamics) framework (Figure 1). The main components of the framework are customer agents, an organization consisting of service provider agents and interaction mechanisms between agents. The interactions between the customer and service provider agents represent the service interaction processes in a front office, while the interactions between the service agents describe the knowledge sharing processes for resolving customers' needs as organizational learning dynamics.

Each customer agent has a need consisting of some sub needs, while each service agent has a part of knowledge for resolving customer sub needs as its parameter. The work level of service agents is determined depending on their knowledge. For example, the high-level service agent who has a large amount of knowledge can satisfy various customer needs. If a service agent does not have the knowledge to satisfy a sub need of its customer, then it queries to another service agent or uses another method (e.g. access to knowledge-base and work manual) for acquiring the knowledge. The most important focal point in policy making is to promote the knowledge acquiring processes which is called "organizational learning."
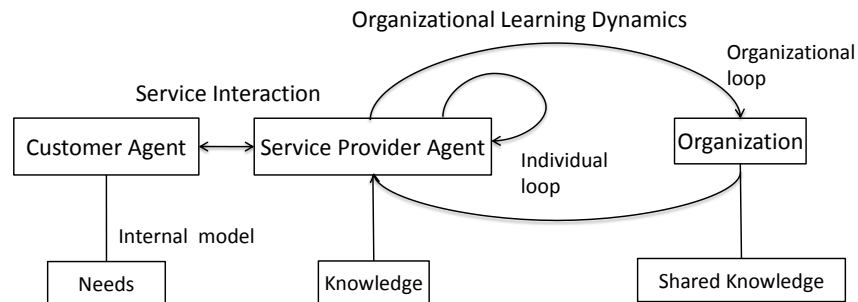

Figure 1: Summary of SIEBOLD framework

3   SCENARIO ANALYSIS AND CONCLUSION

With our framework we can assess the effectiveness of various policy scenarios such as human deployment, personnel training and information sharing depending on some problem situations. We set following analytical examples of policy assessments: 1) shift design of workers in customer centers; 2) role definition of workers in a large grocery store; 3) introduction of knowledge-base into a administrative office in an university. The simulation with the framework shows the possible organizational changes generated by policy scenarios based on the relationship among some key performance indicators. So we can understand the mechanisms of organizational behaviors not only from the viewpoint of the performance of an organization as a whole system but also from a micro or individual learning viewpoint.

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