Chapter XIV

Intelligent Support Framework of Group Decision Making for Complex Business Systems

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ABSTRACT

As firms compete in global markets, they design and implement complex business systems, such as Supply Chain, Virtual Enterprise, Web-Based Enterprise, Production Network, e-Business, and e-Manufacturing. Common traits of these systems are (i) co-operation to implement shared goals, (ii) global distributed product development and manufacturing, and (iii) co-ordination of strategies and communication of information, among enterprise partners.

Information in this complex business system can be shared via the Internet, Intranet, and Extranet. One of the goals of Internet-Based Management (e-management) is to facilitate transfer and sharing of data and knowledge in the context of business collaborations. It offers the platform for design and modeling of diverse implementation strategies related to the type of agreement, optimisation criteria, decision mode, organisation structures, information sharing mechanisms, and business policies for this system.

“A General Framework of E-Management” that integrates (i) intelligent information support, (ii) group-decision making, and (iii) agreement modeling for a complex business system is proposed. A generic methodology of e-management information support based on “Ontology-Driven Knowledge
Management” and “Multi and Intelligent Agents Technologies” for distributed decision making in scalable business systems is described. It is based on the premise that knowledge management should emphasize synergistic use of knowledge from multiple sources.

INTRODUCTION

As firms compete in global markets, they assume complex business system forms, such as supply chain, virtual enterprise, Web-based enterprise, production network, e-business, and e-manufacturing. Common traits of these systems are (i) cooperation to implement shared goals, (ii) global distributed product development and manufacturing, and (iii) coordination of strategies and communication of information, among enterprise partners. These traits have led the trend of transformation from a capital-to an intelligence-intensive business environment and from product-push to consumer-pull strategies.

The purpose of this type of system is to transform incomplete information about customer orders and available resources into coordinated plans for production and replenishment of goods and services in the temporal network formed by collaborating units. Information in this complex business systems can be shared via Internet, intranet, and extranet for business-to-consumer, business-to-business service, and business-to-business goods transactions. One of the goals of Internet-based management (e-management) is to facilitate transfer and sharing of data and knowledge in the context of scalable business collaboration. It offers the platform for design and modeling of diverse implementation strategies related to the type of agreement, optimization criteria, decision mode, organization structures, information sharing mechanisms, and business policies for this system.

A general framework of e-management that integrates (i) intelligent information support and (ii) group decision making for a complex business system is proposed. Implementation of e-management methodology would fundamentally change the global business environment by enabling collaboration among its network units to achieve shared objectives. This approach satisfies the need for increasingly complex business relationships and underlying technology infrastructure being implemented in business systems by firms to support their global strategies.

A generic methodology of e-management information support based on ontology-driven knowledge management and multiagents and intelligent agent technologies for distributed decision making in scalable business systems is described. It is based on the premise that knowledge management should emphasize synergistic use of knowledge from multiple sources. Knowledge must be relevant to business system goals and processes and be accessible in the right form, place, and time. This is accomplished via design and development of knowledge at various levels and in different forms, such as (i) system knowledge, (ii) facilitator knowledge, (iii) unit (plant, department, etc.) knowledge, and (iv) user knowledge. Ontology is a form of knowledge representation applied in various problem domains. The ontology-
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