

## Chapter 15

# Data Mining in the Context of Business Network Research

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### **ABSTRACT**

*In the field of information technology (IT) enabled business networks and research the traditional data mining approach is theoretically and practically inadequate for knowledge elicitation and management requirements in inter-organizational collaborative business environments. The issues are mostly related to fundamentally and philosophically narrow conceptions of the meaning of information, and are grounded to the metatheoretical implications of positivistic, nomothetic and objective view of reality that restricts the feasibility of research oriented application based on them. Here a novel research framework for network-wide knowledge discovery is presented that is based on sociologically anti-positivistic, ideographic and subjective view of society construed from social facts. The theoretical framework is further developed here by synthesizing it with and extracting results from existing research models and artefacts originated in analyzing a variety of business networks (for example, a case study concentrating on modeling the IT enabled service provision of local travel industry value chain). The main contribution here is the explication and elaboration of existing and emerging business network research theories and related stakeholder-level practical considerations focusing on topics such as: multidisciplinary research conceptualizations, information asymmetry reduction by benefiting from contract law oriented functional principles, and network-wide knowledge governance approaches.*

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## INTRODUCTION

Typically, commercial organizations pursue to find optimal ways to use, manage, administer, and share the critical business information owned by them. In its static form, information (or knowledge) can reside in various internal and external data sources. Traditional *data mining* then consists of techniques that enable the organization to utilize these data repositories (for example databases, data marts, or data warehouses) to support timely access to relevant information (*business intelligence*) and to extract new knowledge for business purposes. However, organizational knowledge also has a tacit and dynamic nature – especially in the context of inter-organizational (customer) relationships – that does not easily comply with the contemporary methods of knowledge discovery (KD). The same applies to the information content that many organizations (specifically SMEs) still have only in the form of unstructured, unorganized, and uncategorized (paper or electronic) business documents.

The intra-organizational and data-centered perspective to business information and data mining emerges mostly from objective and positivistic assumptions of reality. However, considering the nature of inter-organizational communications and information flows, it seems evident that there is a need for a more subjective, relativistic and anti-positivistic view in business and research.

Also, the multidisciplinary character of scientific work that concentrates on the complex phenomena of network-oriented knowledge discovery requires the application of appropriate methodologies and explicit and shared research conceptualizations. In the University of Lapland, a related example is an on-going two-year PROVEM-research project that concentrates on modeling and analyzing the service provision of a local travel industry network, which is examined through three partly overlapping research areas; customer value chains, knowledge management and information modeling, and the legal perspec-

tives of inter-organizational business relationships and agreements.

In addition to the above intrinsic limitation of the contemporary data mining approach, it is not very well applicable to tackling *information asymmetry*, especially in business networks based on customer-centric service provision. In the world of economy, problems arise when one party of a business transaction has more information than the other because this type of a situation has negative implications on business relationships based on trust and power (Aaltonen, 2007; Gratzner & Winiwarter, 2003). To enable the reduction of information asymmetry (Turunen, 2005), the mentioned travel industry network research is in a good position to develop frameworks based on organizational information modeling. These frameworks can be used to expand the traditional data mining paradigm by analyzing the characteristics of inter-organizational information flows and, for example, by specifying the preliminary requirements of the information-intensive governance of business relationships.

In order to address these complex phenomena, this chapter is organized as follows: the first section “Theoretical background” addresses the theoretical aspects of knowledge discovery research in business network context by introducing a novel information technology discipline and its philosophical base grounded on the idea of socially construed reality. The main contribution of this work is then presented in the section “Multilevel model for network-wide knowledge discovery” which first exposes the logical structure of traditional and here proposed novel KD-process by using the construct of sociological paradigms, then in the section “Multidisciplinary concept analysis of the domain area” the key terminology and the conceptual foundations of the main research areas (i.e. business networks, organizational IT and contract law) in the on-going business network project is depicted, and finally these constructs are combined in the section “Preliminary research framework” to an overall multilevel model and a

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