December 2001

Understanding the Standardization Process: A Focus on ebXML

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Abstract

The process of setting standards in the emerging realm of E-business is complex and unwieldy. While the role of industry consortia in expediting the standardization process has been widely acknowledged, the process of standards setting in the consortia needs to be examined more carefully. This research-in-progress focuses mainly on the ebXML (electronic business Extensible Markup Language) standard setting process to develop a theoretically grounded understanding of the nature and process of standard development in the E-business context. The ebXML standard is expected to enable the creation of a global electronic marketplace where organizations of any size and geographical location can conduct business. Data on the ebXML standards process is gathered from email archives, documents, and interviews with participants. Initial findings suggest that the standardization process cannot be explained by a single theory, but a combination of multiple theories based on life-cycle theory, teleology, evolution, and dialectics.

Introduction

The Forrester group predicts that 93% of the firms expect some of their trade to flow over the Internet by the year 2004. As technology takes center stage with the acceptance of E-business it is increasingly the case that IT standards become both a facilitator and in some cases the very subject of E-business. Historically standardization efforts related to IT, for example, TCP/IP and 3G Cellular Network standards, took an infrastructure orientation. While important, these standards were not key determinants of the core business processes and therefore standard bodies were primarily composed of technology provider organizations with minimal participation from user community. The process of standards creation in E-business is nebulous in that the standards tend to address business-related aspects. ebXML in particular is predicted to significantly impact the way business is conducted in the future, as it will have tremendous impact on how user organizations conduct businesses with their vertical partners.

The ebXML standardization process involves dynamic interactions between several stakeholder entities including Standards-Development-Organizations (SDOs), industry consortia, and user organizations (Figure 1). The ebXML is an international initiative established in late 1999 by UN/CEFACT, the United Nations body, and OASIS (Organization for the Advancement of Structured Information Standards), with a mandate to undertake an 18-month program of work to research and identify the technical basis upon which the global implementation of XML can be standardized. In December 2000, the UN/CEFACT and OASIS announced that the core technical infrastructure of ebXML would be delivered in March 2001. As such, this research is particularly timely since ebXML standardization efforts are currently ongoing and provide us an opportunity to closely examine the standardization processes from the time such an effort is initiated to the time a standard is agreed upon.
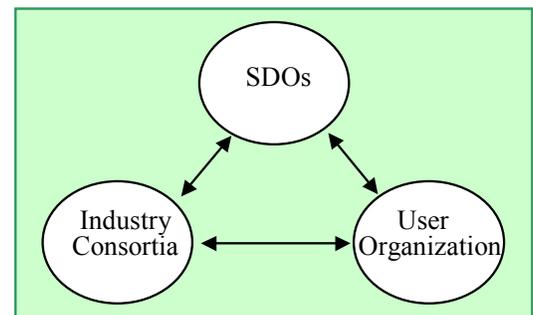

Figure 1. Dynamic Relations Among Stakeholders in ebXML Standardization

Research Objectives

The current standardization process in consortia is through a set of design goals and succession of interim drafts, resulting in technical recommendations. Unlike the official SDOs, almost all the discussion and decision-making in consortia occur via email,

teleconferences, and Web postings. The formal development process begins when a coalition of sponsors, usually consisting of one or more vendor firms, submit a proposal to organizations responsible for supervising the activities of the technical committees.

The typical standardization process described above may be conceptualized as a sequential process consisting of five distinct stages: standards proposal-adaptation-adoption-promotion-retention (Figure 2). The process of standardization may be viewed as having a life cycle with multiple stages with its own goal or purpose. Also, many competing standards go through the stages of the standardization process and each such standard specification may be subjected to the evolutionary forces of variation-selection-retention.

The objectives for this research effort are as follows:

- Analyze the interactions between stakeholders of participating organizations in the consortium within the context of E-business and organizational realities.
- Understand the nature of the evolution of the standards specification from initiation to final formation of the accepted standards specification.
- Explore the determinants and factors that contribute to the acceptance of competing and complementary specifications within a consortium.
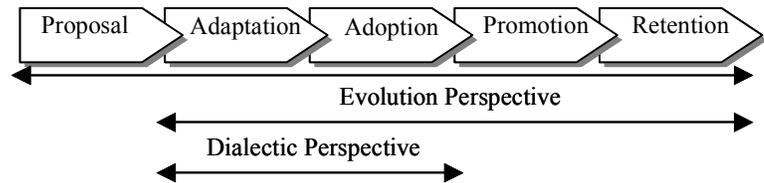

Figure 2. Standards Development Process Model and Related Theories

Research Methodology

Much of the research literature on standards results from the efforts of economists who have studied the economic aspects of technology adoption (Spring, 1991); however, most of their research has focused on the role of externalities and the potential for socially undesirable, inefficient outcomes when the industry relies on private, market-mediated mechanisms to set standards (Lehr, 1992). While there has also been an ongoing effort by a number of SDOs to better understand standardization processes and improve them (Spring and Lunin, 1992), little research has been made to understand the interactions amongst the stakeholders during standardization.

We contend that a comprehensive understanding of the complex process of standardization can be accomplished by taking multiple perspectives. The multiple stages of standards creation process indicated in Figure 2 lend themselves to the application of different theoretical perspectives to explain the underlying decision-making process. Given that the interest here is to explain the underlying decision-making process, we identify four distinct process theories that are applicable in this context: life-cycle, teleology, dialectics, and evolution. This approach closely follows previous attempts of explaining process and change in organizations such as in Van de Ven and Poole (1995).

Each theory contributes in a unique way to the understanding of the standardization process. Life-cycle and teleology theories provide a holistic perspective to the study of standardization processes. The Life-cycle theory (Nisbet, 1970) enables us to view standardization as a unitary sequential process consisting of a preset form, logic, and regulation but at the same time mediated by external events and processes. Teleology (March and Simon, 1958) enables one to view standardization as an adaptive interaction that is driven by a purposeful goal or an end-state that can be operationalized both at the individual and group levels. Dialectic process theory (Neal and Northcraft, 1991) addresses the balance of power concern and suggests that standardization process over a period of time would be determined by series of argumentation. This is especially applicable in the adaptation and adoption stages of standardization process. Evolutionary theory (Weick, 1979) allows a micro level explanation to standardization processes by focusing on the inherent socio-psychological aspects of decision-making.

Data Collection and Analysis

To get a descriptive understanding of the standardization process, data collection follows qualitative research methods that are inherently inductive, nonstatistical, and exploratory. The research data is gathered from consortia announcements, documents, and email archives during the period of November 1999 to February 2001 from the ebXML consortium. These sources provide comprehensive coverage of the process followed in standardizing ebXML. A secondary source of data will be through structured interviews scheduled with key individuals at stakeholder organizations. Organizations like Intel, HP, TekElec and Cybercillium have indicated their willingness to participate in the research. The intent here is to get a first hand understanding of the issues that organizations are grappling with as they embark on strategies related to E-business and in particular their roles and concerns

related to ebXML. The data collected via the above stated approaches will be content analyzed drawing from the things indicated earlier. We are content analyzing the data using quantitative and thematic text analysis (Roberts, 1997). Our initial findings indicate many dialectic aspects in the standards development process and that the standardization process cannot be explained by a single theory. Protocols are being further refined to understand the integrated, complex nature of standardization process.

Conclusion

This study provides a multi-dimensional view to the nature and process of standardization reality. The findings of this research will contribute to the extant literature on standardization by providing a qualitative, theoretically grounded account of the standardization process in voluntary consensus based standards bodies. The research findings will enable the development of a theoretical framework to understand how stakeholder organizations affect and impact the standards setting process in standards bodies, and enable stakeholder organizations to better understand the process of acceptance of standards.

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