Chapter 108
An Exploratory Analysis of the Relationship Between Organizational and Institutional Factors Shaping the Assimilation of Vertical Standards

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ABSTRACT

Vertical standards describe products and services, define data formats and structures, and formalize and encode business processes for specific industries. Vertical standards enable end-to-end computing, provide greater visibility of the organization's supply chain, and enable transactional efficiencies by automating routine tasks, reducing errors, and formally defining all parameters used to describe a product, service, or transaction. Research on standards diffusion has explored either firm-level and institutional variables, without integration of the two areas. This study develops scales for 11 constructs based on concepts culled from diffusion of innovations theory, organizational learning theories of technology adoption, institutional theory and network effects theory. The scales are validated with data collected from the membership of OASIS, a leading international standards-developing organization for electronic commerce technologies. Using data cluster analysis, relationship patterns between the 11 constructs are investigated. Results show that low fit between vertical standards and existing organizational business processes and data formats, low levels of anticipated benefits, and inadequate momentum with critical business partners contribute to slower vertical standards assimilation. However, organizational involvement with influential standards-development organizations, and the right set of technologies, skills, and structures to readily benefit from vertical standards spur their assimilation.

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INTRODUCTION

Accuracy and consistency in product and service descriptions are some of the biggest challenges facing organizations engaged in electronic commerce. While EDI technologies have been widely implemented, their static, document-driven approach does not provide the flexibility and transparency to meet today's dynamic data exchange needs. Vertical standards formally define industry-specific vocabularies for product and service descriptions, operating and interface system parameters, and semantic data definitions (Markus et al., 2003). Vertical standards are implemented with XML (eXtensible Markup Language), syntax rules which enable the creation of robust industry-specific vocabularies and reduce development complexity and costs for organizations. Vertical standards are made up of collections of interrelated modular standards that grow and evolve to meet dynamic business needs, a different approach from the monolithic, stable, finished-product approach of prior data exchange technologies such as EDI. Vertical standards typically consist of a set of vocabulary markup tags that accompany data in order to embed a semantic payload with the data and of data dictionaries which contain consistent definitions and formatting instructions for specific data elements. The vocabulary and data dictionaries form the bases for creating flexible modules that provide semantic consistency to individual terms associated with the data payloads exchanged by various systems. This modularity enables firms to expand and modify vertical standards to reflect changes in business processes faster, easier, and much more accurately than the document-specific transactional approach of EDI technologies. By contrast, the maintenance of fixed EDI documents to reflect business process changes requires greater development and testing effort and cost. Changes to vertical standards can be implemented by firms faster, and with much lower risks to existing compatibility and features.

An emerging body of literature has explored vertical standards adoption but has generally treated adoption as a single event indicated by a public announcement of the acquisition or first deployment of these technologies (Chen et al., 2003; Markus et al., 2006). However, it has been observed that wide-scale industry acquisition of new technologies is sometimes followed by sparse deployment within the acquiring firms, resulting in a gap between reported adoption and internal deployment of the technologies. This assimilation gap (Fichman & Kemerer, 1999) can lead to incorrect assessments of the strength of a technology's assimilation throughout an industry, depending on the event used as the measure of adoption. We explore the assimilation of vertical standards as a progression from first awareness through complete deployment in production environments in order to reduce the effect of assimilation gaps. Understanding organizational and institutional factors driving the assimilation of vertical standards requires at least partial answers to each of several potential dilemmas. First, organizational participation in the development of vertical standards is more likely to take place when the benefits of early or continued participation are clear, but such benefits are often not immediately obvious and are dependent on the firm's familiarity with the standard itself. Secondly, identifying value and extracting it from vertical standards will determine the extent to which vertical standards are assimilated, but resources needed to successfully solve the value extraction problem are not homogeneously distributed across industry members, complicating the efforts of standards-developing organizations (SDO) and industry consortia to promote a dominant vertical standard. Lastly, extracting value from deeply-entrenched business processes and data formats will be a function of firm-specific environment and skill combinations, but firms with large legacy investment to protect may decide not to invest in replacement technologies, even if they can serve to extend the useful life of legacy investment (Fichman & Kemerer, 1993).