

December 2006

# Are All Systems Alike? Moderating Effects of System Characteristics on Institutional Explanations for Systems Adoption

Joseph Ugrin  
*Southern Illinois University*

Ronnie Jia  
*Southern Illinois University*

Follow this and additional works at: <http://aisel.aisnet.org/amcis2006>

## Recommended Citation

Ugrin, Joseph and Jia, Ronnie, "Are All Systems Alike? Moderating Effects of System Characteristics on Institutional Explanations for Systems Adoption" (2006). *AMCIS 2006 Proceedings*. 143.  
<http://aisel.aisnet.org/amcis2006/143>

This material is brought to you by the Americas Conference on Information Systems (AMCIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in AMCIS 2006 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact [elibrary@aisnet.org](mailto:elibrary@aisnet.org).

# Are All Systems Alike?

## Moderating Effects of System Characteristics on Institutional Explanations for Systems Adoption

**Joseph C. Ugrin**  
Southern Illinois University  
jugrin@siu.edu

**Ronnie Q. Jia**  
Southern Illinois University  
ronnie@siu.edu

### ABSTRACT

Prior research has used various theoretical perspectives, including institutional theory, to investigate the adoption of information systems. Institutional studies have examined the adoption of a number of different systems, such as EDI, ERP, and accounting information systems. However, an important, but long overlooked question in this literature is, “What is it about a system that makes it susceptible to institutional forces?” In other words, “Are all systems equally likely to be influenced by institutional factors?”

In this paper, we argue that all systems are not alike and report on an on-going research project that examines how system characteristics moderate the effects of institutional forces on the adoption of information systems. Thus, this paper contributes to the adoption literature by investigating the boundary conditions of institutional theory.

### Keywords

Institutional Theory, Technology Acceptance, Systems Adoption, Isomorphism.

### INTRODUCTION

The adoption of information systems has been investigated for over two decades using various theoretical perspectives, including the technology acceptance model (Davis et al., 1989), innovation diffusion theory (Rogers, 1995), the unified theory of acceptance and use of technology (Venkatesh et al., 2003), institutional theory (DiMaggio & Powell, 1983), and others.

In the institutional theory literature, existing research tends to focus on the impact of certain environmental and organizational factors on system adoption decisions and the institutionalization of a system (e.g., Jeyariaj et al., 2004; Nicholaou & Schick, 1996; Teo, Wei and Benbasat, 2003), but has largely ignored the system itself. Many important questions are left unanswered at this point, such as, “Are all systems alike?” “Do institutional pressures influence the adoption decisions of all types of systems equally?” and “What unique characteristics a system make organizations more susceptible to being influenced by institutional forces as compared to other systems?”

Thus, as a response to Orlikowski and Barley (2001) and Teo et al.’s (2003) call for more research on how institutional theories impact information systems, this paper contributes to the study of systems adoption by introducing systems characteristics as moderating variables on the effect of institutional forces.

The remainder of this paper is organized as follows. First, we introduce institutional theory and prior institutional theory literature on systems adoption. Next, we discuss systems characteristics and how they moderate the impact of institutional forces. We then present our research design and conclude by discussing the potential contributions of this research.

### INSTITUTIONAL THEORY

Institutional theory suggests that organizations make decisions based on external influences. Citing Meyer and Rowan (1977), Barley and Tolbert (1997) state that socially developed norms arise which become “taken-for-granted” and relied upon as fact, thus shaping future actions of organizations. DiMaggio and Powell (1983) support this linkage and define it further by positing that organizations are constructed through processes such as mimicry of perceived legitimate organizations, conformity to established norms, and compliance to coercive pressures. Due to these processes, organizations become increasingly homogeneous. Based on Hawley et al. (1965), DiMaggio and Powell (1983) define homogeneity amongst organizations as isomorphism. DiMaggio and Powell also introduce three modes of isomorphism: coercive,

mimetic, and normative.

Coercive isomorphism occurs when organizations adopt structures or technologies due to coercion from outside entities, such as governments or funding sources. Firms are compelled to adopt technologies by pressures, real or perceived, put forth by norms of society or by other organizations on which the firm is dependent (DiMaggio and Powell, 1983, 1991). Normative isomorphism occurs when organizations conform to norms developed by professional organizations. This is influenced by involvement of members of the organization with professional groups (professionalization) (Donaldson, 1995). The more an organization employs individuals belonging to specific professional groups, the more the organization will be influenced by normative factors popularized by those professional groups. Mimetic isomorphism occurs when organizations ‘model’ one another; it involves organizations eliminating uncertainty by imitating other organizations which it perceives as being more legitimate or auspicious. Under conditions of uncertainty, mimicry helps alleviate the insecurity caused by ambiguity and gives confidence to the decision maker (Donaldson, 1995).

### INSTITUTIONAL THEORY AND SYSTEMS ADOPTION

Prior research has applied institutional theory to technology adoption. Jeyariaj et al. (2004) propose a linkage between institutional factors (e.g., prior adoption by larger strategic partners and other organizations in the same industry) and adoption of B2B applications. Nicolaou and Schick (1996) note that institutional theory has an effect on the adoption of accounting information systems (AIS). They postulate that external dependencies and unclear performance standards relate positively with AIS adoption, and that frequent interaction between organizations, can amplify the effects of all three modes of isomorphism on AIS choice. Teo et al. (2003) found empirical evidence that links coercive, normative, and mimetic isomorphic pressures to intentions to adopt electronic data interchange (EDI).

Thus, the existing research in the institutional theory literature tends to focus on the impact of environmental and organizational factors on system adoption, but has largely ignored the system itself, as if all systems were alike, and institutional pressures influence the adoption decisions of all types of systems equally. In the following section, we discuss certain systems characteristics and why they moderate the influence of institutional forces on systems adoption.

### SYSTEMS CHARACTERISTICS

The institutional theory literature suggests that a number of factors may strengthen institutional pressures. For example, organizations are more likely to institutionalize when there are ambiguous goals and uncertainty about ends and means relationships, and when there is increased interaction and mutual awareness between organizations in the field, among other things (DiMaggio and Powell, 1983, 1991). Thus, we posit that information systems that possess these characteristics will enhance the impact of institutional pressures on adoption and adoption intentions.

Increased interaction between an organization and outside entities increases the effect of all three modes of isomorphism. Building on DiMaggio and Powell (1983) and Meyer and Rowan (1977), Nicolaou and Schick (1996) argue that increased interactions help organizations learn about one another’s problems and solutions, whether they intend to or not, and facilitate imitation of each other’s choices. Thus, mimetic and normative isomorphism influences choice. In addition, DiMaggio and Powell (1983, p. 154) note that “dependence leads to isomorphic change” and “coercive pressures are built into exchange relationships,” implying that frequent exchange relationships lead to increased coercive pressures. That said, the interaction between employees, customers, suppliers, consultants, and other outside agencies increases the interconnectedness and mutual awareness amongst organizations and therefore tends to spread institutionalized norms (DiMaggio and Powell, 1983; Meyer and Rowan, 1977). Teo et al. (2003, p. 20) exemplify this in an IS context by suggesting that financial EDI “cannot be independently adopted by any organization. FEDI success depends on the willingness of an adopting organization’s suppliers and customers to accede to electronic linkages, and on the universal acceptance of a common standard.” Thus, interorganizational systems, such as EDI, promote a high degree of *interaction* and *increased mutual awareness* between organizations. Therefore, we posit that institutional pressures will be stronger when adopting systems that tend to enhance interaction and mutual awareness between organizations, and that this moderating effect exists for all three modes of isomorphism.

**H1:** *Institutional pressures (mimetic, normative, and coercive) will have a more significant impact on the intent to adopt information systems that enhance interaction between organizations than systems that do not.*

**H1a:** *Institutional pressures (mimetic, normative, and coercive) will have a more significant impact on the adoption of information systems that enhance interaction between organizations than systems that do not.*

The level of difficulty in quantifying the benefits of a system will also moderate the impact of institutional forces on organizations’ adoption decisions. In the enterprise system literature, it is noted that systems such as ERP are complex and notorious for having benefits that are hard to quantify when making adoption decisions and setting goals for the

implementation projects (Markus and Tanis, 2000).

Difficulty in quantifying system benefits and ambiguous goals will influence system adopters to look outside their own organizations for answers. DiMaggio and Powell (1983) propose that ambiguous goals and uncertainty about ends and means relationships lead to a greater degree of mimicry for two reasons: (1) organizations with ambiguous goals become dependent on appearances for legitimacy, and they resort to modeling organizations they perceive as being legitimate in order to meet the expectations of prominent organizational partners, (2) when conflict over goals arises, organizations find it easier to mimic rather than go through an arduous systematic analysis. Building on this logic, we posit that systems that have benefits that are more difficult to quantify will have more ambiguous adoption and implementation goals thus leading to uncertainty about adoption and implementation outcomes and a positive relationship with mimetic isomorphism. Because there is no theoretical or empirical support in the literature for the relationships with normative and coercive pressures, we do not hypothesize such relationships *a priori*.

**H2:** *Mimetic pressures will have a more significant impact on the intent to adopt information systems whose benefits are more difficult to quantify than systems whose benefits are more easily quantified.*

**H2a:** *Mimetic pressures will have a more significant impact on the adoption of information systems whose benefits are more difficult to quantify than systems whose benefits are more easily quantified.*

## RESEARCH DESIGN

A survey is being planned to test the above hypotheses. We are establishing contact with a state chamber of commerce group whose membership represent organizations of various sizes from diverse industries. The targeted respondents will be the CEOs, CIOs, or CFOs of the member organizations.

We will focus on three types of systems in the survey, including enterprise systems (ERP), interorganizational systems (EDI), and customer relationship management systems (CRM). These three types of systems became available at different points of time, thus allowing us the opportunity to compare and contrast the patterns of adoption. Following Teo et al., we will ask the respondents whether they have adopted these systems, and their intent of adoption in case they have not. The survey administration procedure will be similar to that of Teo et al.

Due to space limitations, we summarize our main variables and measures in Table 1. Measures for the two moderators are newly developed and will be first validated in a pilot study before they are used in the survey.

The hypothesized moderated relationships will be tested against the intention to adopt using OLS and against the actual adoption using logistic regression. The hypotheses will be supported if the interaction terms are statistically significant.

	Variable Name	Measurement Scales	Source
IV	Mimetic pressure	1) Extent of adoption among competitors 2) perceived success of competitor adopters	Teo et al. 2003
	Coercive pressure	1) Perceived dominance of supplier adopters 2) Perceived dominance of customer adopters 3) Conformity with parent company practices	Teo et al. 2003
	Normative pressure	1) Extent of adoption among customers 2) Participation in industry business and trade associations	Teo et al. 2003
DV	Adoption intent	1) Contemplating adoption in a year's time 2) Likelihood to adopt in a year's time	Teo et al. 2003
	Actual adoption	Whether system has been adopted or not	--
Moderator	Difficulty to quantify system benefits	Difficulty in quantifying the benefits in achieving the organization's 1) strategic goals and 2) operational goals	Newly developed
	System integrativeness	Extent to which the system is likely to lead to increased 1) information sharing, 2) coordination of business operations, and 3) coordination in strategic planning activities between companies.	Newly developed

**Table 1. Main Variables and Measures**

## SUMMARY AND CONTRIBUTIONS

Prior research on institutional explanations of information systems adoption has focused on characteristics of the external environment and those of the adopting organization. What has not received much research attention is the characteristics of the information system itself. In this paper, we argued that not all systems are alike, and that systems that have benefits that are more difficult to quantify or contribute to integration between organizations will lead to stronger institutional pressures than those that do not.

This paper contributes to system adoption research by exploring the boundary conditions of institutional theory and extending existing knowledge about how institutional pressures affect system adoption, and how certain systems characteristics moderate such effects. This knowledge also has important implications for practitioners, as awareness of the impact of certain systems characteristics on adoption decisions will likely lead to more informed decision making in systems adoption.

## REFERENCES

1. Barley, S. and Tolbert, P. (1997) Institutionalization and structuration: Studying the links between action and institution, *Organization Studies*, 18, 1, 93-117.
2. Davis, F., Bagozzi, R., and Warshaw, P. (1989) User acceptance of computer technology, *Management Science*, 35, 8, 982-1003.
3. DiMaggio, P. and Powell, W. (1983) The iron cage revisited: institutional isomorphism and collective rationality in organizational fields, *American Sociological Review*, 48, 2, 147-160.
4. DiMaggio, P. and Powell W. (1991) Constructing and organizational field as a professional project. U.S. art museums, 1920-1040. In W. Powell and P. DiMaggio (Eds.), *The New Institutionalism in Organizational Analysis*, 67. Chicago: University of Chicago Press.
5. Donaldson, L. (1995) *American Anti-Management Theories of Organization: A Critique of Paradigm Proliferation*, Cambridge University Press.
6. Hawley, A., Boland, W. and Boland, M. (1965) Population size and administration in institutions of higher education, *American Sociological Review*, 30, 252-255.
7. Jeyariaj, A., Charles C., Balser D., and Griggs G. (2004) Institutional factors influencing e-business adoption. *Proceedings of the Tenth Americas Conference on Information Systems*, New York, New York.
8. Markus, L. and Tanis C. (2000) The enterprise system experience - from adoption to success, in R.W. Zmud (Ed.) *Framing the Domain of IT Management Projecting the Future Through the Past*, Pinnaflex: Cincinnati, 173-207.
9. Meyer, J. and Rowan, B. (1977) Institutional organizations: formal structure as myth and ceremony, *American Journal of Sociology*, 83, 340-363.
10. Nicholau, A. and Schick A. (1996) Institutional forces in accounting information systems choice. Unpublished manuscript.
11. Orlikowski, W. and Barley S. (2001) Technology and institutions: what can research on information technology and research on organizations learn from each other. *MIS Quarterly*, 25, 2, 145-165.
12. Rogers, E. (1995) *The Diffusion of Innovations*, New York: Free Press.
13. Teo, H., Wei K., and Benbasat L. (2003) Predicting intention to adopt interorganizational linkages: An institutional perspective, *MIS Quarterly*, 27, 1, 19-49.
14. Venkatesh, V., Morris, M., Davis, G., and Davis, F. (2003) User acceptance of information technology: Toward a unified view, *MIS Quarterly*, 27, 3, 425-478.