

8-2010

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## Recommended Citation

Street, Chris T.; Gallupe, R. Brent; and Reich, Blaize Horner, "Predicting Patterns of Information Systems Alignment in Entrepreneurial Organizations" (2010). *AMCIS 2010 Proceedings*. 156.

<http://aisel.aisnet.org/amcis2010/156>

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# Predicting Patterns of Information Systems Alignment in Entrepreneurial Organizations

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## ABSTRACT

Organizations expend a great deal of effort managing their information system resources as they try to achieve information systems alignment (ISA), but relatively little is known about the different ways in which alignment changes over time in different organizations or what factors predict which kinds of changes are likely to occur. The purpose of this paper is to examine the factors that predict the patterns of ISA change in entrepreneurial organizations. An in-depth examination of the alignment process was conducted using two retrospective case studies. Continuous Change Theory and Punctuated Equilibrium Theory were used to explore ISA patterns in the two organizations. Longitudinal qualitative and quantitative data from the two organizations were used to compare the predictive ability of the two theories regarding ISA changes over time. Results suggest that two factors, organizational inertia and institutionalism, predict the likelihood of an entrepreneurial organization following one ISA change pattern over another.

## Keywords:

IS Alignment, BITA, Process Study, Punctuated Equilibrium, Continuous Change, Entrepreneurship

## INTRODUCTION

Organizations expend a great deal of effort to achieve Information Systems Alignment (ISA)—the fit between the mission, goals, objectives, and activities of the IS function and the mission, goals, objectives, and activities of the organization as a whole (Chan, 2002).<sup>1</sup> Achieving alignment is not a one-time task, as various factors lead to changes in ISA over time, such as changes in information technology, business strategy, organizational capabilities, and external forces that affect the firm (e.g. Sabherwal, Hirschheim and Goles, 2001). However, relatively little is known about the specific change patterns that occur that enable the synchronization of the mission, goals, and objectives of the IS area with those of the larger organization (Chan and Reich, 2007; Benbya and McKelvey, 2006).

The purpose of this paper is to begin building a theory of ISA change by examining the factors that predict the patterns of ISA change in entrepreneurial organizations. A theory would have practical value because ISA is difficult to manage from a CIO perspective. As IS users' needs and perspectives change, so do their perceptions of alignment and as a result, managing alignment can be like trying to hit a moving target from a moving vehicle.

We focus on entrepreneurial organizations because these are the most common types of organizations in most national economies. Also, entrepreneurial organizations provide a rich source of data for changes that occur over a relatively short period of time. We define entrepreneurial organizations as those organizations that exhibit a lower degree of institutionalism and a lower degree of inertia. These organizations regularly experiment with opportunity-seeking processes or products and avoid excessive routinization (Brown and Eisenhardt, 1997). Newly emerging industries also provide a context for entrepreneurial organizations to continuously experiment and thereby minimize inertia and institutionalism (Rindova and Kotha, 2001).

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<sup>1</sup> ISA is also referred to as Business/IT Alignment (BITA). We use the term ISA to reflect the IS perspective used in this study.

Accordingly, our research questions are: (1): How does ISA change over time within different entrepreneurial organizations? and (2) What factors predict the likelihood of one pattern occurring rather than another? We use two different organizational change theories— *continuous change* and *punctuated equilibrium*—to provide a basis for predicting ISA change patterns over time. We propose an inclusive measure of ISA based on strategic, structural, social, and outcome dimensions. This approach to measuring ISA is important because multiple measures provide a richer view of what alignment is and how it changes over time.

The paper is organized as follows. First, we briefly review the organizational change literature and note how it is helpful in increasing our understanding of the ISA process. Second, we develop an hypothesis—based on the continuous change and punctuated equilibrium theories—that is intended to assess the predictive ability of the two theories in terms of the pattern of ISA evolution in entrepreneurial organizations. Third, we present the results of a field study that measures patterns of ISA change over time in two different entrepreneurial organizations. The paper concludes with a discussion of the findings and implications for further ISA theory development.

## THEORETICAL DEVELOPMENT

Change processes are typically studied in terms of the sequences of events, the characteristics of the organization and its environment at different points in time, and the inferences that can be drawn about causality between organizational variables that change over time (Van De Ven, 1992). The ISA process can be viewed as a specific manifestation of more general organizational change processes (Silva and Hirschheim, 2007). The organizational change literature therefore provides a rich body of knowledge to draw on in framing some of the relationships between ISA process variables and the sequence of change, its characteristics, and causality issues.

### Organizational Change

Organizational change can be examined using a variety of perspectives. Change has been viewed as a process of socialization (Uzzi, 1997), as institutionalization (DiMaggio and Powell, 1983), and as technical development (Huber, 1984). Change can occur quickly (D'Aveni, 1994) or slowly (Fligstein, 1991), and infrequently (Christensen, 1997) or continuously (Brown and Eisenhardt, 1997). The motivation for change can originate from within the organization (Greiner, 1972), from outside of the organization (Haveman, Russo and Meyer, 2001), or from both (Pfeffer and Salancik, 1978).

Regardless of the theoretical perspective taken, organizational theorists (e.g., Meyer, Brooks and Goes, 1990; Watzlawick, Weakland and Fisch, 1974) typically see change as occurring in one of two fundamentally different modes. *First-order* (adaptive) change is frequent, cumulative, and incremental (Meyer, et al., 1990). Labels given to this type of change include “continuous change” (Brown and Eisenhardt, 1997) and “incremental change” (Cyert and March, 1963). Continuous change is apparent in opportunity-seeking entrepreneurial organizations that experiment with new ideas (Brown and Eisenhardt, 1997), or that co-evolve with emerging industries (Rindova and Kotha, 2001). Thus, companies such as Internet firms that started out looking very similar can evolve into conspicuously different businesses after a period of continuous experimentation (Rindova and Kotha, 2001). The common thread running through these examples is that the change process is incessant and cumulative.

In contrast, *second-order* (transformative) change is infrequent, non-cumulative, and transformational (Watzlawick, et al., 1974). Second-order change theories predict that once organizational structures and patterns of behavior are established, they remain essentially unchanged for extended periods of time due to inertia and institutionalism (Greenwood and Hinings, 2006; Tushman and Romanelli 1994). This type of change pattern has typically been found in less entrepreneurially organizations although the research is mixed. When changes do occur, they happen over short periods of time, are precipitated by some significant event, and involve very rapid and major transformations.

Most recent ISA process research does view changes in ISA as either first-order (e.g. Benbya and McKelvey, 2006) or second-order (e.g. Sabherwal et al., 2001). Some research suggests that interactions between business and IS strategies cause ISA to continuously fluctuate as businesses adapt to current conditions (Peppard and Breu, 2003). Benbya and McKelvey (2006) further suggest that this co-evolution occurs at the individual, operational, and strategic organizational levels, and that the rate of change in ISA is related to the co-evolutionary dynamics between these three levels. In contrast to these views, Sabherwal et al. (2001) found that alignment changes infrequently, but that when it does the magnitude of the change is large and the changes may or may not improve the organization or increase ISA.

Continuous change theory (CCT) and punctuated equilibrium theory (PET) are selected to represent first- and second-order change theories, respectively. CCT is a theory that some argue has strong explanatory and predictive power for entrepreneurial organizations (Brown and Eisenhardt, 1997). PET is a competing theory that is widely influential in the organizational literature on second-order change (Sastry, 1997). Because these two theories explain how specific factors

change in different types of organizations, they can be used to develop an hypothesis about how ISA is likely to evolve in entrepreneurial organizations.

Organizations establish initial patterns of structure and patterns of behavior based on the environmental conditions and management philosophies that characterize an organization at a particular point in time. As a result of inertia and institutionalism, these structures and patterns of behavior are strengthened over time, providing stability in established patterns (Gersick, 1991.; Romanelli and Tushman, 1994).

*Continuous Change.* Some organizations are less affected by established patterns of structure and activity and are therefore less susceptible to organizational inertia and institutionalism. These types of organizations we have defined as “entrepreneurial” organizations. These organizations tend to be adaptable. They tend to be able to make changes quickly. They tend to be able to minimize inertia and institutionalism (Rindova and Kotha, 2001). This suggests the following hypothesis:

**H1: Changes in Information Systems Alignment in entrepreneurial organizations (those with lower institutionalism and lower inertia) will follow a continuous change pattern.**

*Punctuated Change.* As noted above, an alternative to CCT is Punctuated Equilibrium Theory. The core premise of Punctuated Equilibrium theory is that organizations – small, large, young or old - resist adapting their internal structure and behaviour and that punctuations are required to break inertial and institutional forces and allow for significant change to occur (Greenwood and Hinings, 2006). Punctuations mark the beginning of a change period for structures and patterns of behavior. Post-punctuation, organizational structures and activities once again stabilize and become increasingly strengthened over time as inertia and routinization again takes hold, marking the beginning of a new equilibrium period. Indirectly, Hypothesis #1 predicts that ISA change will not follow a punctuated change pattern.

**METHODOLOGY**

A two-site retrospective case study methodology at the organizational level of analysis was used in this study. Retrospective case studies have been employed in organizational strategy research (e.g. Pinsonneault and Kraemer, 2002), and are the most practical option given the necessity of collecting data for a sufficiently long observation window for each case site.

Sites were selected using a theoretical replication strategy (Yin, 1994). The two-site case study design was developed such that the cases would provide predictably similar results; the two cases were predicted to show continuous ISA change pattern.

The five characteristics associated with higher/lower inertia and institutionalism (dominant business models, organization age, industry age, profession age, extent of industry regulation) were used as site selection criteria. In order to partially control for the importance and centrality of IS resources in organizational strategy, only organizations which treated IS as a strategic necessity (Clemmons and Row, 1991) were selected. IS was considered to be a strategic necessity for an organization if a key part of its business strategy relied on information technology. Two entrepreneurial organizations meeting the selection criteria agreed to take part in this research project: Case #1—a high-tech business specializing in television and motion picture visual effects (TECH); and case #2—a private home health care company (HEALTH). Table 1 provides background information for each organization, shows why IS was central to its strategy.

To recap, two organizational factors, organizational inertia and institutionalism, differentiate between punctuated equilibrium and continuous change theories. Five criteria are indicative of varying levels of these two factors. Two organizations were predicted to represent continuous change (TECH and HEALTH) because they each indicated *lower levels* of inertia and institutionalism.

Theoretical Variables	Case Site #1	Case Site #2
	TECH	HEALTH
	Continuous Change Expected	Continuous Change Expected
Dominant business models	<i>No dominant models</i>	<i>No dominant models</i>
Organization age	<i>Younger organization</i>	<i>Younger organization</i>

Industry age	<i>Younger industry</i>	<i>Younger industry</i>
Profession age	<i>Younger profession</i>	<i>Older Profession (nursing) but new business – privatized home care</i>
Extent of industry regulation	<i>Lower regulation</i>	<i>Lower regulation</i>
<b>Categorization of Organization Type</b>	<b><i>Entrepreneurial</i></b>	<b><i>Entrepreneurial</i></b>

### Demographic Data

Employees	70	~70
Annual Budget/Revenue (2005)	\$5-6M (\$CDN) (revenue)	~\$80M (\$CDN) (revenue)
Sector	Digital Production	Post-Franchising
Age when data collected	8y	21y
CIO or IS Director in organization?	Y (COO/CIO)	Y

**Table 1. Site Selection and Organizational Context Characteristics**

### Measures

Several measures were used to assess changes in ISA over time and to detect organizational punctuations.

*Assessing ISA.* To assess ISA in different organizations, we developed a comprehensive measure based on an integrative combination of the following four measures (details available from the first author):

- *Configuration:* As reported in Sabherwal, et al. (2001), this measure assesses changes in the organization's configuration of business and IS strategy and structural relationships.
- *Planning Integration:* This measure assesses the extent to which joint planning occurs between business and IS decision-makers. Items were taken from Chan et al., (2007) (6 questions), Xia and King (2002) (3 questions), and Germain, Droge, and Daugherty (1994) (3 questions).
- *Linkage:* This measure assesses the shared understanding between business and IS. Items were taken from Boynton, Zmud, and Jacobs (1994) (5 questions), Cresap, McCormick, and Paget (1983) (5 questions) and Reich and Benbasat (1996) (3 questions).
- *Service Gaps:* This measure assesses the extent to which an organization's technology requirements are met by the IS services being provided (e.g. Rosemann, Vessey and Weber 2004; Soh, Sia and Tay-Yap 2000). This measure—which draws on earlier work from Rosemann et al. (2004) and Nolan (1973)—identifies the gap between what information services are required by an organization and what services are actually available.

A single score was created by equally weighting each dimension and averaging the four scores. Equal weighting was used as we had no evidence that any dimension should be weighted differently from the others.

*Detecting Punctuations.* Based on the foundational (Gould, 2002) and management literature (Gersick, 1991; Romanelli and Tushman, 1994; Sastry, 1997), punctuations were viewed as a path-dependent process where a *precipitating event* (one that impacted the strategy or function of the organization) resulted in a *pervasive change* (that affected the organization's strategic orientation, function, governance structure, or organizational form) which occurred across the *entire organization* over a *relatively short period of time* (the length of time of a prior steady-state period was at least double the length of time of the change period). A punctuation was identified only if all four of the criteria were satisfied.

### Data Collection

Following established case study guidelines (Eisenhardt, 1989; Yin, 1994), primary data from interviews and secondary data from *internal* sources (IS department assessment and performance measures, user surveys, consultant reports, outsourcing contracts, service level agreements) and from *external* sources (e.g. newswire and magazine articles) were collected for each case (see Table 4). Individual interviews, following an interview protocol, were conducted with top-level managers and senior IS executives in each of the two organizations. Data collection occurred over a period of two to three months for each case. Internet and Lexus/Nexus searches for additional documentation were carried out during data collection for each organization. Case study datasets were maintained in an ATLAS-ti database (version 5.0).

Organization	Number of Interviews (# pages)		# Internal Documents (# pages)	# External Documents (# pages)	Total # Pages (timespan)
	Business	IS			
HEALTH	<u>5</u> (78)	<u>3</u> (45)	0 (0)	<u>28</u> (96)	<b>219</b> <b>(18y)</b>
TECH	2 (37)	3 (50)	8 (75)	42 (162)	<b>324</b> <b>(8y)</b>

Table 2. Data Collection Summary Data

### Data Analysis

A three step process was employed (Yin, 1994) to proceed from the raw documents to the case narratives<sup>2</sup>.

Step 1: Initial analysis of transcripts and supporting documentation. Information from interviews, internal documents and external documents was collated by year.

Step 2: Formal coding. Individual case documents (interviews, internal documents, external documents) were coded using the ATLAS-ti software. Codes were developed based on the measurement instruments (e.g., the codes "Organizational governance" and "IS goals and objectives" were developed from the Configuration measure). Coded data were then grouped by year, printed out, and physically assembled into "posters" of an organizational timeline to represent chronological data displays (Langley, 1999).

Step 3: Development of individual timelines. The case survey method (Larsson 1993) was applied to get the ISA measures for each year in a timeline once the chronological data displays were created. Each case was analyzed independently and the alignment measures were applied to systematically convert the qualitative data into quantitative values on a year-by-year basis.

<sup>2</sup> A detailed appendix fully documenting the interview protocols, code development, individual case analyses and inter-rater reliability assessment is available from the first author.

In order to test the hypothesis we needed a technique for analyzing a process chart that showed changes in alignment for an organization. The technique would have to be capable of indicating whether a succession of measurements was continuous or punctuated. Because of its use in identifying when a succession of measures is either continuous ('within bounds') or punctuated ('outside bounds'), the statistical process control chart technique (Gass and Harris, 2000) was judged capable of differentiating between punctuated and continuous change processes. Process control chart statistics also have the benefit of being applicable to charts with relatively fewer data points, a particular benefit in the TECH case with an eight-year timeline.

*Validity and Reliability.* Several methods were used to increase the reliability and validity of the case study results. *Validity* was increased by searching for multiple perspectives on constructs (multi-informant, multi-organizational level), by triangulating data sources (interviews, assessment and performance data, internal and external documents), and by having key informants review drafts of the case summaries. *Reliability* was increased by using structured interview protocols, by using qualitative analysis tools to assist in maintaining and structuring the data in an auditable fashion (ATLAS-ti), and by having a random selection of data sources independently coded by a research assistant. Longitudinal reliability (Golden, 1997) was established by using respondents from multiple levels of the organization, by using questions that focused on specific past events, and by using archival data from newspapers, magazines, and annual reports to verify and triangulate informant data.

*Hypothesis Testing.* Hypothesis 1 proposed that "entrepreneurial" organizations would exhibit a continuous ISA change pattern. In the context of this study, we propose that a testable difference between CCT and PET is that: (a) a continuous change pattern is indicated when significant changes in alignment measures are recorded between two points in time or between punctuations (if they occur), and (b) a punctuated change pattern is indicated when no significant changes in alignment measures are recorded unless a punctuation occurs first.

Process analysis statistics using a 95 % confidence interval ( $p < 0.05$ ) were used to test the hypothesis (Gass and Harris 2000). Support is evident for Hypothesis #1 if, for cases #1 and #2, changes in ISA *do not stay* within a 95% confidence interval, indicating continuous change over a given period of time.

## RESULTS

Overall, our findings showed support, although not full support, for Hypothesis 1. The TECH organization saw alignment evolving in a non-punctuated process as expected. However, the HEALTH organization did not experience only continuous change which was unexpected, a point that will be further examined in the Discussion section. The history of ISA in each of the two cases is described below, along with information about the strategy and evolution of the organization.

### Case #1: High-Tech Company (TECH)

Started in 1997, TECH produced computer-generated visual effects for television commercials for the local business community in a large Canadian city. TECH's original IS infrastructure consisted of a few personal computers and visual animation software packages that were used by employees working in basement apartments. In 1997, this technology was just sufficient to handle the creation and editing of television commercial animation for local markets. By 2005, however, TECH had grown into an established production company and had won several national and international technological and artistic awards, including an Emmy nomination for visual effects. Thus, over the course of 8 years, this infrastructure was transformed into massive data storage and processing server farms running commercial and customized software capable of providing visual effects for what is considered the pinnacle of the market—Hollywood feature films.

Figure 1 shows the alignment changes at TECH during this period and the effect of a slowly expanding IS infrastructure on ISA between 1997 and 2005. Between 1997 and 2005, there was a continuous increase in ISA except in 2000, when the scramble to adjust to TECH's first-ever major Hollywood VFX movie project caused ISA to dip temporarily. This major project was a critical event for TECH but, based on the criteria set out in the methodology section, did not qualify as a punctuation because the strategic orientation, structural orientation, form, or function of the company did not change.

Case #1 provides support for Hypothesis #1. Since there were no punctuations in TECH's timeline, the full time span from 1997 to 2005 represents one uninterrupted period when ISA goes outside of the statistical limits three times (2000, 2004, and 2005). The changes over time are therefore not indicative of a stable, steady-state alignment pattern. Rather, a continuous ISA change pattern was occurring at TECH during this span of years.

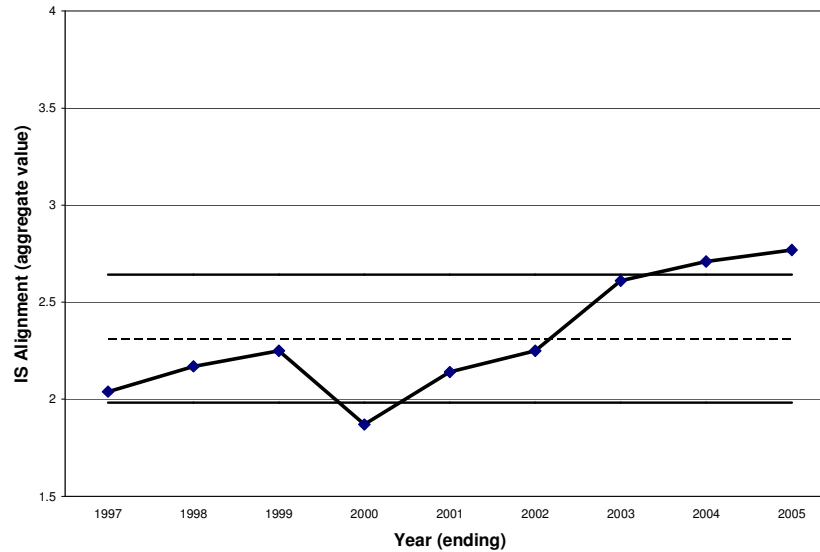


Figure 1. Period of Change at TECH: 1997 – 2005

### Case #2: Health Services Delivery Company (HEALTH)

The company was started in 1984 as a small business that provided home-based care for clients who required nursing assistance but who were not considered sick enough to be hospitalized. We started our data collection in 1987 just after the founder and her husband made the decision to create a national franchise network. By 2005, HEALTH was a privately-held corporation operating as a home health care franchisor with a network of more than 50 franchise and corporate offices across Canada. Total revenues in 2005 exceeded \$40M (CDN\$) and HEALTH was the largest Canadian-owned home health care provider in Canada, employing approximately 5000 health care professionals.

Figure 2 charts the evolution of ISA at HEALTH between 1987 and 2005. The graph shows two distinct periods – one from 1987 to 1996 and the other from 1997 to 2005.

The first period begins with a punctuation occurring in 1987 when the owners began franchising their business. This decision led to rapid changes in the strategy and structure of the business, and constituted a punctuated change for the company. The second period begins in 1997 with a new President and CEO being appointed by the board and immediately changing the business and its IS strategies, constituting a second punctuation to the company.

The period from 1987 to 1996 was one of continuous change in ISA. ISA increased slowly for the first two years as the company's strategy and operations outpaced IS's ability to keep track of a network of franchisees. Then the IS function, led by the CEO, began building momentum in developing an innovative franchise management information system (code-named Wizard) to address the company's new requirements. By 1992, the application was introduced for existing and prospective franchisees. ISA increased sharply then as IS planning practices improved and increased the effectiveness of the custom franchise software.

A second punctuation occurred in 1997 when a new leader was appointed by the board, replacing the company founders as President and CEO. The change in leadership triggered a change in strategy and IS requirements. The business strategy was changed from expanding the franchise network to buying back franchises to build a corporate-owned chain. Changes in the IS strategy were overdue by 1995; it was becoming increasingly difficult to adapt the company's Wizard software system as the demands for technical support and new development increased from the franchisees.

In the period from 1997 to 2005, ISA changed rapidly in 1997/98 due to the punctuation but then remained statistically continuous from 1999 to 2005. The rapid negative change in 1997/98 was caused when a new hosting service was implemented to replace the aging and inadequate Wizard system software. These changes supported better IS-business linkages and integration, but IS-business service gaps increased as the company's franchisees struggled to adopt the new software. The relatively stable period of ISA between 1999 and 2005 was due to a gradual reduction in the IS-business service gaps over the period and a gradual stabilization of the IS infrastructure in the firm.



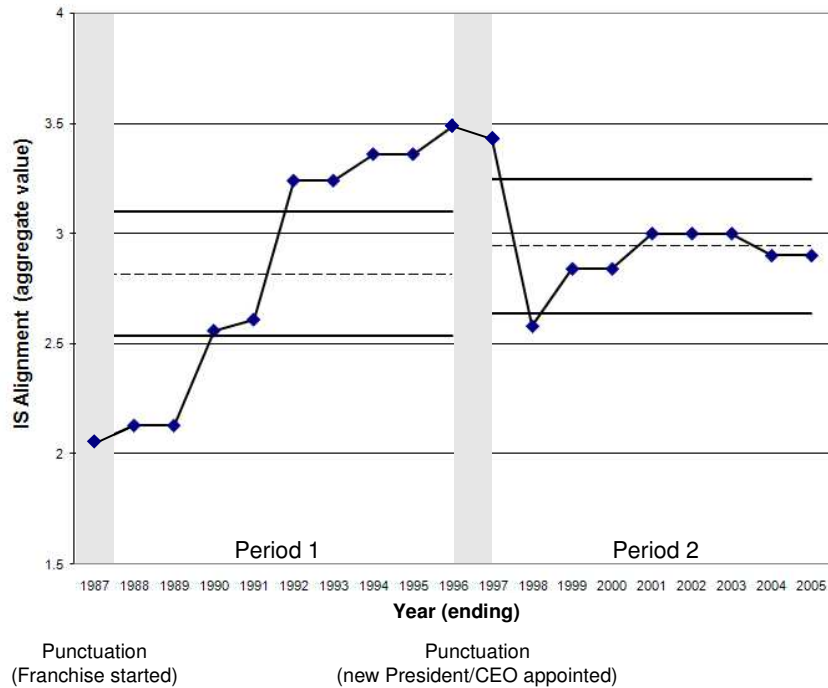


Figure 2. Periods of Change at HEALTH: 1987 – 2005

Case #2 provides partial support for Hypothesis #1. ISA measures in the first period (between 1988 and 1996) were well *outside* the confidence intervals of a stable, steady-state alignment process, indicating that the organization was experiencing continuous changes in alignment during this period. This result is consistent with the findings from the TECH case and supports Hypothesis #1. However, IS alignment measures in the second period correspond to what Sabherwal et al. (2001) describe as the ‘settling in period’ where a radical change of direction in organizational or IS strategy is followed by a quieter post-revolutionary period of relatively small changes in alignment. Using the theories, we would say that the first punctuation in 1987 kick started a period of change in ISA at HEALTH, which is consistent with Continuous Change theory, but the second punctuation in 1997 triggered a settling-in period, which is consistent with Punctuated Equilibrium theory. We will return to this point at the end of the general discussion section presented next.

## DISCUSSION

This study addressed two research questions. The first asked, “How does ISA change over time for different organizations?” We found that ISA follows at least two different trajectories: continuous and punctuated. The continuous trajectory is characterized by gradual, on-going change over time, while the punctuated trajectory is characterized by intense, short periods of rapid change followed by longer periods of stability.

The second question asked, “What factors predict the likelihood of one pattern rather than another?” One hypothesis was proposed in order to answer this question. The hypothesis—that entrepreneurial organizations with lower institutionalism and lower inertia will follow a continuous change process—was supported by the TECH data, but the HEALTH data were only partially supportive since HEALTH also exhibited signs of a punctuated pattern of alignment change.

### Patterns of Change in ISA

Our results indicate that ISA changes over time in theoretically distinct patterns or trajectories. Two independent variables—institutionalization and organizational inertia—help predict what type of trajectory the ISA process will follow. Entrepreneurial organizations that experience weaker institutionalization and inertia effects are more likely to experience continuous change in alignment.

Our results are consistent with a recently published typology of organizational change. Beginning with the differences between first and second order change patterns, Plowman, Baker, Beck, Kulkarni, Solansky and Travis (2007) developed the four-way categorization of organizational change patterns (persistent, tectonic, punctuated, turbulent). The change patterns from TECH and HEALTH are most consistent with quadrant 1 (Persistent). While we did not observe ISA change patterns

consistent with quadrant's 2 (Tectonic), or 4 (Turbulent), we see no reason why ISA change might not also follow these patterns.

The data shows that HEALTH experienced both continuous and punctuated change patterns and therefore does not correspond consistently to either Continuous Change or Punctuated Equilibrium theories. Because we had labeled HEALTH as an entrepreneurial firm, we expected to see continuous change patterns in its ISA. However, when we reflected more deeply on the company, and its business and IT strategies, we realized that the company itself changed type over the period of our investigation. This change in type may have caused the change in ISA pattern.

In 1987, when the punctuating decision was made to create a franchise operation, the opportunity to use technology to help build the company was recognized and ISA changed continually for several years. HEALTH during this period was continuing to act like an "entrepreneurial" firm as evidenced by a major change to a franchise operation, significant changes to business strategy, substantial growth, and major change to IS and ISA. Characteristics of this period are the growing and continuous demands by franchisees for better systems and struggles of the company to increase the number of franchises and meet demands of existing ones. These results for ISA are consistent with Continuous Change theory (Brown and Eisenhardt, 1997) and Hypothesis #1.

The second period, from 1997 to 2005, which exhibited brief, rapid change followed by a steady state pattern, was puzzling. According to Hypothesis #1, ISA in entrepreneurial companies should follow a continuous change pattern, whether or not a punctuation occurs. However, after further analysis, we realized that HEALTH was increasingly not acting like an entrepreneurial firm after 1992. They exhibited qualities such as inertia, avoidance of change and increased regulation. They believed they had perfected the business and technology model to expand their franchise operation and were committed to replicating this model, not changing it. They institutionalized their processes and procedures and reduced their learning and adaptation. Thus by 1997, HEALTH had become susceptible to dramatic punctuated change and this is what we observed.

For the HEALTH case, when the firm behaved like an entrepreneurial organization, we observed a continuous change pattern in ISA as expected. However, when it did not act like an entrepreneurial firm, it became susceptible to a punctuated change pattern for ISA and that is what we observed.

### **Implications**

These findings have interesting implications for practitioners. Because ISA appears to change over time in identifiable trajectories, managers may be able to predict how alignment will change if they can identify the pattern. For example, an IS manager in an entrepreneurial organization should expect that he/she can impact ISA in a continuous positive way by incrementally improving the fit between the IS function and that of the company.

The implication from the HEALTH case was to recognize that organizations can exhibit different organizational characteristics and behave differently over time, and this can affect their ISA change patterns. Entrepreneurial organizations may become established organizations and vice versa. We saw HEALTH trying to institutionalize a business model that they thought would allow them to grow and prosper. They ceased to act entrepreneurially, and the pattern of ISA changed.

### **Directions for Future Research**

Organizational change theories appear to provide a solid basis for analyzing and determining ISA change patterns and trajectories, but other studies need to be conducted to better understand these trajectories. The four quadrant typology of organizational change patterns (Plowman, et al., 2007) identifies two additional theoretical patterns besides the two reported here. This article also presents other independent variables that may affect the ISA process beyond inertia and institutionalism.

The measurement of ISA can also be further enhanced. In this study, we took a multi-perspective view of ISA measurement in order to better understand the dimensions of ISA and how it changes over time. There are likely other perspectives or measures that might be developed that might provide a deeper understanding of ISA.

### **Limitations**

This study has at least two important limitations. The first is generalizability. Only two organizations were studied, albeit from different economic sectors (high tech and health). Case studies of more organizations would provide additional data to identify and test ISA trajectories. As well, the sample was limited to organizations that considered IS as a strategic necessity. Since others have found that an organization's strategic orientation influences the degree to which ISA leads to greater performance (Sabherwal and Chan, 2001), it would be useful to determine if the importance that an organization places on IS in its business strategy influences how quickly or how smoothly alignment evolves over time.

A second limitation is that only two organizational variables were studied (organizational inertia and institutionalism). We found that these variables are important, but as indicated above other factors should be studied, individually or in groups, to determine their impact on ISA and organizational change.

## CONCLUSION

The IS alignment process in organizations seems to follow identifiable organizational change patterns or trajectories. There appear to be definable factors that help predict what types of ISA processes organizations should expect and should engage in. This should help guide future research. More significantly, this should help IS practitioners to better manage the ISA process over time.

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