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Performance Impacts of Information Assurance Alignment

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ABSTRACT

Information assurance, as an emerging organizational function, has come to play a strategic role by providing, enterprise-wide, a reliable, safe, and efficient access to information. Aligning information assurance strategy and business strategy has, therefore, become a strategic imperative. This study empirically addressed this alignment concern by exploring ways of measuring the concept of strategic alignment between business and information assurance strategies and by investigating the effects of this alignment on business performance. Both research hypotheses were empirically supported by the study's data, thereby verifying the theoretical proposition of performance impacts of information assurance strategic alignment and testing it in favor of the moderation approach.

Keywords
Strategic alignment; information assurance; business strategy; strategic fit, small business strategy

INTRODUCTION AND BACKGROUND

Although information security, which emphasizes technical aspects, has been studied for some time, information assurance, a holistic approach that encompasses information security, is basically a new discipline that focuses on the management of an organization's information assets (Birchall, Ezingeard, McFadzean, & Howlin, 2004; Ezingeard et al., 2007). Therefore, information assurance draws its strategic nature from being concerned primarily with a strategic asset; that is, organizational information (Kaplan & Norton, 2007). Kearns and Lederer (2003) suggested that information, as a resource, is capable of providing organizations with competitive advantage, provided that it is reliable and accurate. Thus, the assurance of the reliability and accuracy of organizational information has come to be critical as this intangible asset has become a strategic imperative. According to Dutta and McCrohan (2002), the value chain of today's firms is information-intensive and suggests that a successful value-creation activity depends on an effective processing of information.

A strategy for information assurance is a set of programs and policies designed to enable a firm's strategy and support corporate objectives (Birchall et al., 2004). This supporting function is enabled by aligning the two strategies: business and information assurance strategies (Ezingeard et al., 2007). Studies show, however, that the issue of alignment between a firm's strategy and information assurance strategy has just emerged, in both academic and practitioners' circles, and needs a significant effort of research as well as an immediate practitioners' commitment (Ezingeard et al., 2007; Kovacich, 2001; von Solms, 2001). Prior research examined the alignment between a firm's strategy and strategies for different functional areas such as: alignment of manufacturing with strategy and organizational learning (Chenhall, 2005), information technology alignment (Cragg, King and Hussin, 2002), strategic information systems alignment (Chan & Huff, 1993), and marketing activities alignment (Ruekert, Walker Jr., & Roering, 1985), among other studies. Some studies even investigated the alignment between two different functions of an organization; for example, Weir, Kochhar, LeBeau, and Edgeley (2000) examined the alignment between manufacturing and marketing strategies. Porter (1996) stated that the essence of strategy is fitting organizational activities together; in Porter's words, "strategy is creating fit among a company's activities" (p.75).

The interest in strategic alignment stems from the proposition that fit between strategy and its context has positive implications on business performance (Venkatraman & Prescott, 1990). This proposition has engendered a plethora of studies that focused on different facets of this concept (Chan & Reich, 2007a). Strategic fit has also served organization theory as theorists of this discipline extensively used contingency models that are based on the suggestion that structure and context must fit if an organization is to be successful (Drazin & Ven, 1985). For the last two decades, the topic of strategic alignment has been identified as a top concern by practitioners and as an important subject within the information systems (IS) research discipline (Chan & Reich, 2007b; Reich & Benbasat, 1996). This stream of research suggests that a preliminary work on information assurance (from a management dilemma standpoint) in this direction was timely and relevant.

Strategic alignment, as it relates to different organizational functions, has benefited from considerable research in strategy and strategic management; however, information assurance alignment has yet to gain the interest of academics and that of practitioners. Successful information assurance programs are suggested to be contingent to the alignment between both information assurance and corporate strategies (Ezingeard, McFadzean, & Birchall, 2007; Kovacich, 2001; von Solms, 2001). Ezingeard et al. (2007) theorized the proposition of performance impacts of information assurance strategic alignment and identified a lack of sufficient research addressing explicitly this question suggesting thereby a great need for empirical studies. This study addressed this gap by empirically investigating the nature and importance of information assurance strategic alignment. Consequently, in an attempt to initiate a debate on measuring information assurance strategic fit, the concept of alignment was approached according to the models of matching and moderation as defined by Venkatraman (1989a).

The extant literature does not empirically address the alignment concept of information assurance as a potential enhancer of business performance, although recent studies (e.g., Amio, 2009, p. 94) found that information security, as an organizational activity, "as being a means for facilitating the attainment of strategic business goals." Siponen and Oinas-Kukkonen (2007) have also found that studies on information assurance have focused on the technical aspects of the activity and neglected the managerial ones. According to Birchall et al. (2004), information assurance has the potential to make value-adding contributions to a firm by shifting decision-makers' thinking from security to assurance to, ultimately, competitive advantage. A value-adding contribution is achievable, according to this view, by adopting programs that support corporate objectives. Therefore, aligning IA strategy with a firm's strategy becomes a strategic necessity. This proposition is salient in the definition of IA strategy as stated by Birchall et al. (2004, p. 1):

> an information assurance strategy determines how the reliability, accuracy, security and availability of a company's information assets should be managed to provide maximum benefit to the organization, in alignment with corporate objectives and strategy.

First, the study attempted to answer its primary research question, which reads: *what is the impact of the alignment between information assurance and business strategies on a firm's performance?* Second, the study addressed a subsequent question: *what perspective of fit captures more effectively the concept of information assurance strategic alignment?* The primary research question guided the study in determining to what extent information assurance alignment affects, if at all, a firm's performance; whereas, the secondary research question guided the explorative nature of the study's effort in investigating which model of alignment is more appropriate for information assurance; a question that was addressed by testing the concept of fit, as recommended by prior works on the concept of strategic alignment (Prescott, 1986; Venkatraman, 1989a), according to two different perspectives: the moderation and matching perspectives. Consequently, two hypotheses were tested: 1) the alignment between IA and business strategies has a positive impact on business performance (H1); and 2) because several studies (e.g., Hoffman, Cullen, Carter, and Hofacker, 1992; Chan et al., 1997; Chan and Huff, 1993; Cragg et al., 2002) have found strong support for the moderation perspective of strategic fit, the secondary research question was addressed by testing Hypothesis2 stated as follows: the concept of information strategic alignment is better captured by the moderation perspective (H2). The contribution of this study is twofold: an empirical investigation of the impacts on performance of IA alignment, and an empirical exploration of the form and nature of IA strategic fit.

METHODS

A web-based self-administered survey served as the main tool for data collection. The questionnaire contained items measuring three constructs (business strategy, information assurance strategy, and business performance) and general demographics. The survey's items used a five-point Likert-like scale anchored at 1 = *strongly disagree* and 5 = *strongly agree*.

Sample

The survey targeted a sample of 1000 U.S small business executives, one hundred of which were first contacted for a pilot study deemed necessary for instrument refinement, and 900 served for data collection for the full study. Respondents were sourced from an independent sampling firm, which compiled and provided a random list of executives' emails and other contact information. The business size, as a sampling criterion, was determined, according to the Small Business Administration guidelines, by a maximum of 500 employees. The number of employees determined the business size such that businesses employing between 100 and 500 employees were included in the study. The upper limit is in line with the

guidelines of the Small Business Administration, while the lower limit was set to ensure adequate level of IT sophistication and some form of formal information assurance policies.

Measures

Business Strategy

A nine-item instrument developed and used by Cragg et al. (2002) in the context of small businesses measured the business strategy for this study. The instrument measures business strategy on nine dimensions, namely, quality service, quality products, production efficiency, new market, new products, product diversification, product differentiation, intensive marketing, and pricing/cost reduction.

Information Assurance Strategy

Following Chan et al. (1997) and Cragg et al. (2002), this study adopted "a paralleling" approach in developing a new instrument that measures IA strategy. The paralleling approach ensured that the items in the instrument designed to measure IA strategy mirrored the same items used to measure business strategy. IA strategy items were designed to assess the degree of support that IA strategy provides for the business strategy and the role IA strategy plays to facilitate the realization of business objectives.

Information Assurance Alignment

This study viewed information assurance alignment as the fit between business strategy and information assurance strategy. Fit was modeled according to the matching and moderation approaches. As a derived variable, the computation of IA alignment for both approaches relied on the correspondence of business and IA strategies components (the nine items on each instrument).

Business Performance

Business performance was the study's dependent variable and was assessed based on measures of growth and profitability dimensions. It was operationalized using Venkatraman's (1989b) instrument, which was validated and used in the context of small businesses (Bergeron, Raymond & Rivard, 2001; Bergeron et al., 2004; Raymond, Pare, & Bergeron, 1995). Firms' CEOs were asked to rate, on a five-point Likert-type scale, how their firms performed relative to their competition during the last two years on two dimensions: growth and profitability.

Survey Results

The survey generated an 8% return or response rate. 67.6% of the respondents were CEOs, 21% general managers, and 11% identified themselves as owners of their respective businesses. Participating organizations, although falling under the small business classification, had revenues from the low $10 to $19 million to more than $100 million. Participants also covered a wide range of industries: 14% manufacturing, 20% retailing, 18% finance and insurance, 8% healthcare, 7% wholesale distribution, and 18% identified themselves under other industries.

Validity and Reliability of the Measures

Measures were evaluated based on the results of a factor analysis (principal component analysis: PCA) and Cronbach's alpha coefficient (.70 and higher was retained as an indication of acceptable adequacy) (Hinkin, 2005).
Face validity was assessed by means of soliciting expert opinion inputs (Trochim, 2006) through a field study; content validity sought support through an analysis of the standardized factor loadings (.55 and higher) (Kearns & Lederer, 2003); and predictive validity was assessed by means of correlation analysis (Trochim, 2006). Validity and reliability results were acceptable and did not present any problematic issues.

Non-Response Bias Analysis

An independent-samples *t*-test analyzed the non-response bias. The test was performed on two equal groups of respondents identified as early and late respondents. Respondents were divided such that the last 50% of the participants (Lindner, Murphy, and Briers, 2001) were considered as the late respondents. The two groups were compared on their responses to the

Likert-like scale questions. The result indicated that the findings can be generalized to the target population and non-response bias cannot be considered as a threat to external validity.

Data Analysis

An analysis of variance was deemed appropriate for this study because the main objective was to identify the difference in performance results among aligned and non-aligned firms (e.g. firms with high, medium, and low alignment).

	Sum of Squares	*df*	Mean Square	*F*	*p-value*
Between Groups	3.365	2	1.682	7.250	.001***
Within Groups	15.780	68	.232		
Total	19.144	70			

******* *p<.01*

Table 1. One-Way ANOVA: Overall Business Performance with Moderation Aggregate Alignment

According to the *p*-value reported on table 1, it is unlikely that the overall business performance is the same for all companies across all levels of information assurance alignment (*p*-value is significant). The study's data, therefore, support the study's hypothesis H1 for a conceptualization of fit as moderation. The data, however, did not support H1 when fit was conceptualized as matching.

Testing Hypothesis H2 (H2: the concept of information assurance strategic alignment is better captured by adopting the moderation perspective of strategic fit) implied seeking and describing the strength of the relationship between information assurance strategic alignment and performance. Thus, correlations between information assurance alignment and performance were tested for statistical significance (Swanson & Holton, 2005; Cragg et al., 2002) for both the moderation and matching perspectives. For the moderation model, IA alignment was computed as a product score between business strategy and information strategy components; whereas, IA alignment according to the matching model was computed as the absolute difference between both business and IA strategies' components. Alignment scores were then summed up as an aggregate score for each participating firm and model for analysis.

Table 2 reports the correlation analysis and indicates that the moderation perspective is best supported by the study's data.

	Moderation Aggregate Alignment	Matching Aggregate Alignment	Overall Business Performance
Moderation Aggregate Alignment Score	1		
Matching Aggregate Alignment Score	-.064	1	
Overall Business Performance	.537**	.145	1
N	71	71	71

**. Correlation is significant at the 0.01 level (2-tailed).

Table 2. Correlation Coefficients for IA Alignment and the Overall Business Performance

DISCUSSION, LIMITATIONS, AND IMPLICATIONS

The main objective of this study was to empirically investigate a theorized link between information assurance strategic alignment and a firm's performance. A second objective was to explore ways of measuring information assurance strategic alignment and what analytical approach would better capture this concept.

The study's data supported both research hypotheses. The theoretical proposition that information assurance alignment affects business performance was empirically verified for the concept of fit as moderation; an analytical approach that was also found to capture better the concept of information assurance strategic fit. The study's data, however, had no support for the matching perspective.

Note that the study's findings are limited to the small business environment and data were collected from a single informant. The study is also limited by its low response rate; a result that was expected given the sensitivity of the topic. For practitioners, the study empirically confirmed the proposition that information assurance strategic alignment enhances business performance. A full understanding of the consequences of this finding would encourage industry leaders to push the agenda of information assurance to the board room and include the topic as pertinent to the overall corporate strategy formulation. Practitioners then need to find out how to achieve information assurance strategic alignment; a topic that can be of interest to academics. Practitioners need also to be able to measure the success of their information assurance strategy so that they can bring about adjustment to their policies for further improvements.

For academics information assurance as an organizational function is in its infant stage and presents a new land to explore. This study attempted to initiate a scholarly debate on this newly-emerging discipline. Subsequent research can emphasize the difference between information assurance, as a set of comprehensive policies that encompasses information security, and the rigid security measures that traditional information security entails. Academics can bring to light the role that information assurance can play as a business enabler and generalize this approach across organizations of different types and sizes.

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