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Research articles

Performance outcomes of strategic and IT competencies alignment[1]

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Abstract

This study empirically evaluates the business performance outcomes of aligning an organization's information technology (IT) competencies with its strategic competencies. Strategic competencies include components such as shared vision, cooperation, empowerment, and innovation, whereas IT competencies comprise connectivity, flexibility, and technological scanning. Top managers from 104 organizations completed a questionnaire analyzed with EQS, a structural equation modeling tool. Based on a covariation approach to alignment, results confirm that strategic and IT competencies alignment significantly enhances perceived business performance.
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Introduction

It is widely posited that to leverage information technology (IT) functionality, business operations and IT investments should be strategically coordinated and closely aligned (Lederer and Sethi, 1988; Venkatraman, 1989a; Earl, 1993; Broadbent and Weill, 1993; Premkumar and King, 1994; Star and Ruhleder, 1996; Agarwal *et al*., 1997; Tallon *et al*., (2000); Williams, 2002;). In particular, it has been suggested that to fully leverage IT functionality, business and IT competencies should be integrated and aligned (Henderson and Venkatraman, 1999).

The power of alignment between business strategy and IT strategy is realized when internal resources and capabilities are mastered, and are strategically aligned with the environment (Fuchs *et al*., 2000). Therefore, an organization should formulate its strategy to make the most effective use of its core resources and capabilities. Among these elements are competencies that are strategic attributes that could help in developing a new business strategy or in better supporting the existing one (Henderson and Venkatraman, 1999).

Strategic competencies are part of the business strategy and help organizations to gain competitive advantage, whereas IT competencies play a role in the IT strategy formulation by enabling proper IT support. While a number of empirical studies have attempted to identify the performance outcome of aligning business and IT strategy (Chan *et al*., 1997; Papp, 1999; Sabherwal and Chan, 2001; Croteau and Bergeron, 2001), none have looked at the strategic alignment of competencies. In view of this, the present research aims to empirically test a contingency approach to the fit between the strategic and IT competencies of an organization and determine how their co-alignment enhances perceived business performance.

Aligning IT competencies with strategic competencies

The strategic alignment model proposed by Henderson and Venkatraman (1999) argues that organizations should align their components from both business and IT domains in order to increase their business performance. Researchers have successfully used this model to study business–IT alignment and empirically link it to business performance (Chan *et al*., 1997; Papp, 1999; Sabherwal and Chan, 2001; Croteau and Bergeron, 2001).

As shown in Figure 1, this model comprises four components deemed to be interrelated: business strategy, IT strategy, organizational infrastructure and processes, and IS infrastructure and processes. More specifically, the

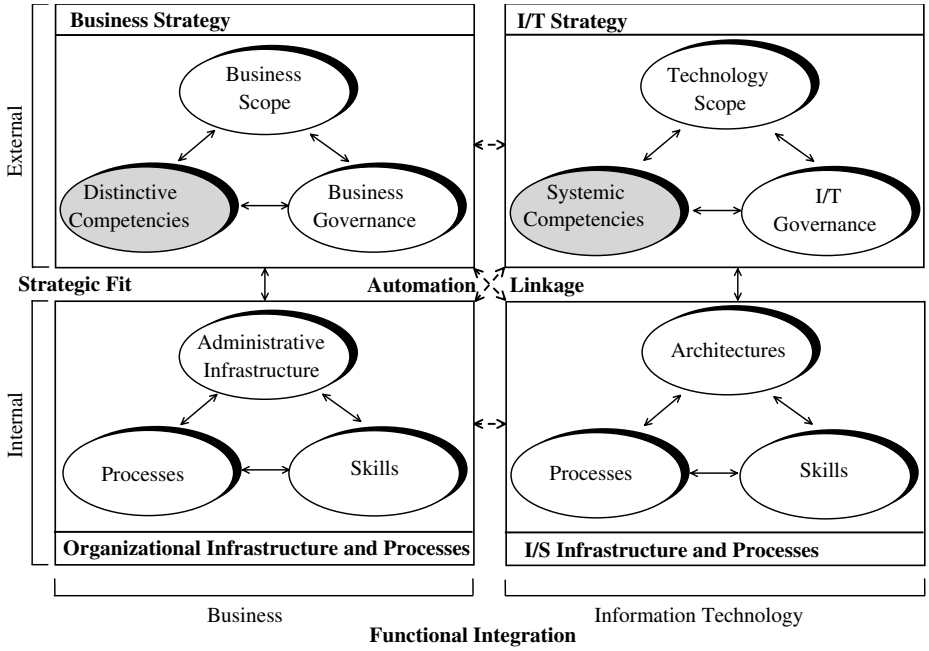

Figure 1 Strategic alignment model (Henderson and Venkatraman, 1999: 476).

model includes two types of strategic fit and two types of integration. Strategic fit reflects the need to align external and internal business domains together. Therefore, one strategic fit indicates that what is decided in terms of business strategy should be implemented throughout the organizational infrastructure and processes. The same logic is also applied for the second strategic fit between the IT strategy and the IS infrastructure and processes. Strategic integration occurs when both business and IT strategies are consistent with key environmental contingencies, including components such as distinctive competencies and systemic competencies as highlighted in Figure 1. Operational integration occurs when organizational and technological infrastructures are in harmony with the business needs and expectations, as well as with the capacity of the IT function to deliver what is requested from it. Thus, strong business and technology linkages are advocated and can be fittingly applied in the current competitive environment (Sabherwal *et al*., 2001). Therefore, the strategic and IT competencies alignment should be an enabler of the strategic alignment of IT, which contributes to business performance.

Strategic competencies

Because 'strategic competencies' and 'IT competencies' are more common terms in the literature than 'distinctive competencies' and 'systemic competencies' as labeled by Henderson and Venkatraman (1999), hereafter the former terms will be used. Developing strategic competencies involves organizational routines, that is, patterns of collaboration and learning between individuals and co-ordination between individuals and other resources such as IT (Grant, 1991). Strategic competencies also refer to the knowledge, know-how, and skills that translate into distinctive capabilities for organizations. They should help organizations in responding quickly to changes in the business environment (Hitt *et al*., 1998).

While the operational implications of strategic competencies have not yet been fully developed and utilized in empirical research, shared vision, cooperation, empowerment, and innovation are the four components that are predominantly found in the literature.

An organization should first have the ability to develop a **shared vision** among all members of the organization (Ferioli and Migliarese, 1996). A shared vision is essential, as it brings about consistency in critical beliefs and assumptions and internal stability to the firm (Henderson and Sifonis, 1988). A firm's vision describes the firm's overarching goal or objective for the organization. It is a statement of purpose, a 'photograph' of the firm's future, setting the priorities for business planning (Keen, 1991). Thus, it is at the 'heart' of strategy (Orndorff, 2002).

Cooperation is also a key factor that plays a role in the development of strategic competencies. Cooperation is a joint behavior toward a particular goal of common interest that involves interpersonal relationships (Pinto *et al*., 1993). It is also described as working with others productively and resolving conflict in an effective manner (Green, 1989). An organization is competent in this regard when it enables employees to work smoothly and effectively within teams (Grant, 1991).

Another characteristic of strategic competencies is **empowerment**. It means that organizations have the capacity to encourage teams and individuals to act, decide, and self-manage. It also refers to a working style that is autonomous in terms of making and executing decisions in the work environment. Empowerment has been defined as 'enhancing personal control by fostering involvement and inclusion in the decision-making process' (Bartunek *et al*., 1996). The attainment of a competitive advantage from practices such as Total Quality Management is influenced

by the level of empowerment (Powell, 1995). Empowerment can also be a key factor in achieving a 'world-class' status for organizations (Shrednick *et al*., 1992).

In the new competitive reality brought about by globalization, there is a constant need for **innovation** (Heunks, 1998). A firm's capacity to be creative and innovative in developing new products and processes is a pre-requisite to achieving and maintaining success in global markets (Nassimbeni, 2001). Competent firms in this regard are those that foster creativity, innovative thinking, and intrapreneurship both formally and informally through their organizational culture, structure, communication, and reward systems (Docter *et al*., 1989).

IT competencies

IT competencies focus on information technologies that can allow organizations to achieve a competitive advantage (Dehning and Stratopoulos, 2003; Tippins and Sohi, 2003) and enhance business performance (Bharadwaj, 2000; Santhanam and Hartono 2003). From a strategic alignment perspective, these competencies are meant to support the organization's strategic competencies through the effective use and management of IT. In this regard, connectivity and flexibility are important IT competencies identified by Henderson and Venkatraman (1999). Another competency, that is technological scanning, is also deemed to be critical (Raymond *et al*., 2001).

Connectivity refers to the organization's capacity to operate compatible telecommunications networks and computer systems in support of enterprise-wide applications (Brown and Magill, 1994). This competency has become more important with the advent of Enterprise Resources Planning systems and e-business applications. In the context of globalization and networked enterprises, connectivity facilitates communication and collaboration among dispersed teams within and outside the organization, supporting decentralized decision-making and enabling diffused innovation (Lang, 2001).

The current environmental complexities raise a need for **flexibility**, that is, for an IT capability that can be adapted to strategic changes within the organization. In particular, applications are expected to exhibit more versatility in information acquisition and processing and reduce the response time required in adjusting to changes in the firm's markets and operating environments (Das *et al*., 1991; Byrd and Turner, 2000). As the dominant view of strategy has evolved from the traditional 'planning' mode to a more 'emergent' approach (Eisenhardt and Brown, 1999), IT must be flexible if it is to continue to play a strategic and enabling role.

Technological scanning refers to the managed acquisition, analysis, and diffusion of IT novelty by members of the IS department to increase the competitiveness of the firm (Julien *et al*., 1999). As new IT innovations appear in the market on a regular basis, practitioners and researchers must maintain an awareness of each other's efforts (Boynton and Zmud, 1987). Organizations competent in this regard are those in which members are able to keep up-to-date on the latest technologies and have sufficient strategic knowledge and technical skills to make the best possible IT investments for their firm (Croteau and Bergeron, 2001). Technological scanning, when aligned with the firm's strategic orientation, can significantly impact business performance (Bergeron *et al*., 2001).

Business performance, contingency theory, and the concept of fit

Business performance measures the contribution of the business and technology domains to the objectives of the firm. Both the firm's external and internal environments affect this performance (Das *et al*., 1991). Business performance is linked to internal operational effectiveness, which can be supported by norms, rules, and a culture that preserve certain desired behaviors, cognitive maps, and shared values and beliefs (Ferioli and Migliarese, 1996). As businesses invest time and money in technology, they look for a payoff (Smith and McKeen, 1993), and the quality of the firm's investments can be effectively evaluated in terms of growth and profitability (Venkatraman, 1989a).

To improve business performance, research indicates that a firm's IT strategy must be aligned with its business strategy (Bergeron and Raymond, 1995; Baets, 1996; Teo and King, 1996; Luftman *et al*., 1999; Sabherwal and Chan, 2001). Business performance is enhanced by the effectiveness of the alignment between the firm's competitive strategy and the technologies that it deploys (Sethi *et al*., 1993; Sethi and King, 1994; Schroeder *et al*., 1995; Croteau and Bergeron, 2001).

The theoretical framework of the study of competencies alignment and business performance is based on the contingency theory, which has been the foundation for a substantial amount of research on the organization–technology interface (Venkatraman and Camillus, 1984; Boynton and Zmud, 1987; Lederer and Mendelow, 1987; Brown and Magill, 1994). Since contingency theory 'attempts to understand the inter-relationships within and among strategic subsystems and emphasizes the multivariate nature of organizations' (Premkumar and King, 1994; 76), a contingent perspective in this research can provide the underlying theoretical base for understanding the alignment of the firm's IT competencies with its strategic competencies. Moreover, this theory offers a basis to search for critical attributes of the strategic contexts, such as the firm's competencies and strategic orientation, and verify their impact on business performance.

Contingency theory has some important underlying assumptions, the first being that the better the fit among contingency variables, the better the performance of the firm. The contingency approach suggests that a fit between strategic variables, such as strategy, environment, structure, and the use and management of IT, positively impacts information systems performance. Furthermore, the theory suggests that there is an assumed fit between systems performance and business performance. Contingency theory also posits that an organization with fit is at equilibrium, and business performance is the result of that equilibrium (Weill and Olson, 1989; Sabherwal and Chan, 2001).

The fit among contingent variables in strategic settings has been studied in IS research (Tavakolian, 1989; Das *et al*., 1991; Earl, 1993; Premkumar and King, 1994; Doukidis *et al*., 1996; Reich and Benbasat, 1996; Bergeron *et al*., 2001). The concept of fit was initially studied in the strategy

literature, and relationships were postulated with expressions and words such as *matched with*, *contingent upon*, *consistent with*, *fit*, *congruence*, *alignment*, and *co-alignment* (Venkatraman, 1989b). Thus, strategic alignment or 'fit' is a notion that is deemed crucial to understanding how organizations can translate their development of IT competencies into actual increases in performance.

In this research, a holistic rather than a bivariate conceptualization of fit is adopted because of its greater explanatory power and its ability to retain the complex and interrelated nature of the relationships between constructs (Miller, 1981; Drazin and Van de Ven, 1985; Venkatraman and Prescott, 1990). Strategic alignment is conceptualized as a process of continuous adaptation and change. It does not matter if the impetus for change originates in strategic competencies or is enabled by IT competencies. Rather, it is the resulting alignment of all aspects that is important; hence, central to the research model is the notion of *co-alignment*. This perspective of fit assumes that there exists a pattern of covariation – which cannot be specified *a priori* – between strategic competencies and IT competencies that will be positively related to business performance.

Methodology

Research model

The proposed research model illustrated in Figure 2 is a schematic representation of the following research question: *Can organizations enhance their business performance by aligning their IT competencies with their strategic competencies*? This research model is designed to test the co-alignment between strategic and IT competencies and its impact on perceived business performance.

As shown in Figure 2, the research model adopts Venkatraman's (1989b: 435) definition of fit as covariation, wherein fit is defined as a 'pattern of covariation or internal consistency among a set of underlying theoretically related variables'. For this particular research, the perspective of fit is taken to be the covariation between strategic and IT competencies since they are assumed to be both consistent and mutually dependent in their effect on business performance. Competencies alignment being measured with the covariation perspective is called co-alignment. Co-alignment (or competencies alignment) is a second-order construct derived from two first-order constructs which are the strategic competencies and the IT competencies. Business performance is also considered as a second-order construct composed of growth and profitability. The following research proposition stems from this model:

P: Co-alignment between the firm's strategic competencies and IT competencies positively enhances its business performance.

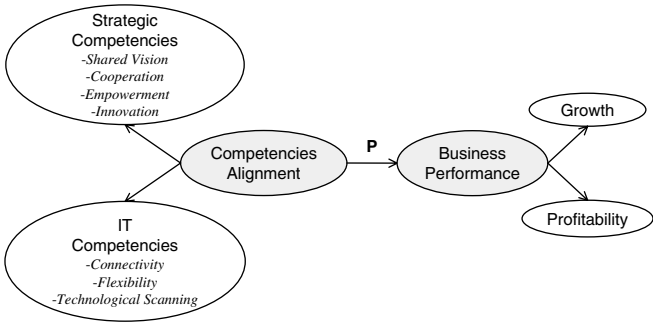

Figure 2 Research model.

Measures

Strategic competencies were operationalized using 33 items adapted from several instruments (Jones and James, 1979; Henderson *et al*., 1992; Mayer and Schoorman, 1992; Pinto *et al*., 1993; Zaheer and Venkatraman, 1994; Boynton *et al*., 1994; Lai and Guynes, 1994; Bartunek *et al*., 1996; Kravchuk and Schack, 1996; Agarwal *et al*., 1997) and are listed in Appendix A. IT competencies were operationalized by adapting several instruments (Kraemer *et al*., 1993; Sethi and Carraher, 1993; Torkzadeh and Doll, 1993; Hartwick and Barki, 1994; Lai and Guynes, 1994; Duncan, 1995; Premkumar and Ramamurthy, 1995; Ferioli and Migliarese, 1996; Chau and Tam, 1997; Croteau and Bergeron, 2001) for a total of 26 items listed in Appendix B. Five-point Likert-type scales were used (highly disagree to highly agree), some of which were inverted.

Strategic management researchers have proposed a subjective approach to measure business performance (Dess and Robinson, 1984). Results obtained from their study indicate that neither the subjective approach nor the objective approach is preferable, each producing similar results. Studies by Venkatraman (1989a), Bergeron and Raymond (1995), and Chan *et al*. (1997) among others successfully used the subjective approach to examine the relationship between strategy and performance. In this study, Venkatraman's instrument was deemed appropriate. As shown in Appendix C, the CEO was thus asked on five-point Likert-type scales (very low to very high) how his or her firm performed relative to the competition during the last 5 years on two dimensions, namely growth and profitability. As argued in previous empirical studies (Chattopadhyay *et al*., 1999; Spanos and Lioukas, 2001), there exist both practical considerations and a theoretical rationale, based on a constructionist perspective (Weick, 1979) that supports the choice of subjective data to test the research model.

Data collection

A large-scale survey was conducted because this research method allows researchers to capture 'snapshots of practices at a particular point in time' (Galliers, 1985). The questionnaire, after pre-testing, was addressed to the CEO or president of the firm. One month after the initial mailing of the survey package, follow-up reminder cards were sent to the same survey population.

In all, 945 Canadian organizations with 250 employees or more were randomly selected from the sample of large-sized firms listed in Scott's Selectory Database, a computerized mailing list. A total of 104 questionnaires were completed and usable for our analysis, giving a response rate of 11%. The majority of the respondents of the survey (48%) held the titles of President/Chairman/Ceo. The titles of Vice President/General Manager were held by 29% of the

respondents while other titles such as Chief Officer, Director, Controller, Systems Analyst/Technical Support, Controller, and Supervisor were held 1–7% of the respondents. The mean revenue of the sampled firms is 1.5 billion dollars and the median is 100 million dollars. The firms were mainly from the manufacturing and finance industries.

Results

Structural equation modeling was used to assess the research model (Figure 2), using Bentler and Weeks' (1980) approach as implemented in the EQS computer program (Bentler, 1995). As recommended by Anderson and Gerbing (1988), the data were analyzed in two steps. First, the validity of the research constructs was assessed from a separate estimation and respecification of the measurement model by confirmatory factor analyses. Second, the research model was tested by the simultaneous estimation of the measurement and theoretical (or structural) models.

Assessment of construct validity

The EQS program was first used to assess construct validity. Using the data from the 104 organizations sampled, maximum-likelihood (ML) estimates of the measurement model's parameters, that is, standardized factor loadings, correlations, error variances, and the χ^2 goodness-of-fit statistic were obtained. Bentler (1995: 6) indicates that the ratio of sample size to number of free parameters to be estimated by EQS may go as low as 5:1. The primary question here is to determine the unidimensionality of the constructs, so that they can then be related within the covariation model.

Strategic competencies

An initial second-order confirmatory factor analysis (CFA) of strategic competencies was conducted, aiming to assess *a posteriori* the unidimensionality and reliability of this construct, and its convergent validity as to the existence of the four dimensions hypothesized in the course of its development for this study. As a result, the measurement model was re-specified by deleting the six items (out of 33) that did not work out as planned, in that these items did not load significantly on their associated dimension. When not based solely on statistical considerations but rather in conjunction with content considerations, deleting an indicator from the model is the preferred way to preserve unidimensional measurement as 'a necessary condition for assigning meaning to estimated constructs' (Anderson and Gerbing, 1988). A final CFA of the adjusted measurement model of structure was then made, as presented in Figure 3.

The unidimensionality of the strategic competencies construct was assessed by looking at the χ^2 statistic

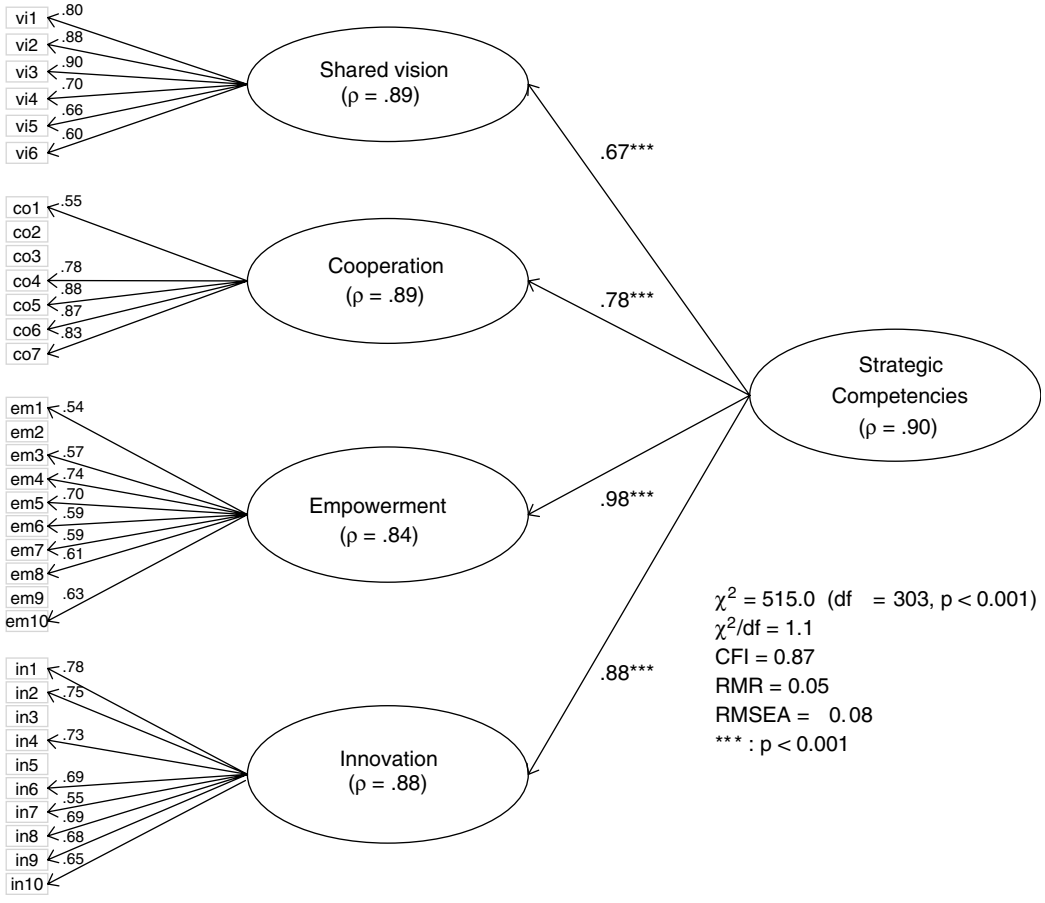

Figure 3 Second-order CFA of the strategic competencies measure.

estimated for the respecified model; here, a significant value of 515.0 (df = 303, $P < 0.001$) would be an indication of unsatisfactory fit. However, relying exclusively on the χ^2 is subject to caution in structural equation modeling as this statistic is sensitive to sample size (Fornell and Larcker, 1981). One can instead use the value obtained by dividing χ^2 by its degrees of freedom (df) to partly alleviate this problem; an adequate level of fit is usually obtained when this ratio (normed χ^2) is inferior to five (Jöreskog and Sorböm, 1993), as is the case here.

The χ^2 statistic is most often complemented by various *ad hoc* fit indices that are more practical and robust in indicating how well the model explains the data. In the EQS approach, the index of choice is Bentler's comparative fit index (CFI), as it reflects fit relatively well at all sample sizes, avoiding in particular the tendency of the previous index of choice, Bentler and Bonett's normed fit index, to underestimate fit in small samples (Bentler, 1990). The formula for the CFI is as follows:

$$\mathrm{CFI} = |(\chi_0^2 - \mathrm{df}_0) - (\chi_k^2 - \mathrm{df}_k)/(\chi_0^2 - \mathrm{df}_0)|$$

where χ_0^2 = the null model (i.e., in which all correlations among variables are zero), χ_k^2 = the hypothesized model, df = degrees of freedom for the model, and | | denotes that the resulting value is trimmed to fall into the 0–1 range. Here, the CFI is equal to 0.87, not quite attaining the acceptable 0.90 level (Bentler, 1992). However, two other widely used fit indices, that is, the root mean-squared residual (RMR) and the root mean-squared error of approximation (RMSEA) attain acceptable threshold values of 0.05 and 0.08, respectively (Browne and Cudeck, 1993).

The reliability of the strategic competencies construct was assessed with the ρ coefficient, that is, the ratio of construct variance to the sum of construct and error variance, as follows: $\rho = (\Sigma|\lambda_i|)^2/(\Sigma|\lambda_i|)^2 + \Sigma(1-\lambda_i^2)$ where λ_i is the standardized loading relating variable i to the construct. Similar to Cronbach's α coefficient, ρ can be interpreted as acceptable when it is greater than 0.70, indicating that at least 70% of the variance in measurement is captured by the construct variance (Fornell and Larcker, 1981), which is the case here ($\rho = 0.90$). The reliability of each dimension is also assessed in the same way, by using the loadings of the individual measurement scales on their underlying dimension. The 0.84–0.89 range obtained for the ρ values thus confirm the reliability of the four dimensions of strategic competencies.

IT competencies

As with the strategic competencies, the validity of the IT competencies construct was assessed by a second-order CFA. To be confirmed *a posteriori* were the unidimensionality and reliability of this construct and its convergent validity as to the existence of the three hypothesized dimensions. Again, the measurement model was respecified after deleting nine items (out of 26) whose loadings were inadequate. In particular, six out of 11 items measuring the 'flexibility' dimension were removed, as this measure was found not to be very reliable in its initial form ($\rho = 0.71$), thus casting some doubt upon it.

As presented in Figure 4, the unidimensional nature of the re-specified measurement is supported by the values estimated by EQS for the normed χ^2 ($1.1 < 5$) and other fit indices (CFI = 0.99, RMR = 0.04, RMSEA = 0.03). The reliability of IT competencies is also acceptable ($\rho = 0.81$), as are the reliabilities of its dimensions with ρ values in a 0.71–0.82 range. Convergent validity is supported by the highly significant loadings of the three dimensions on their underlying construct.

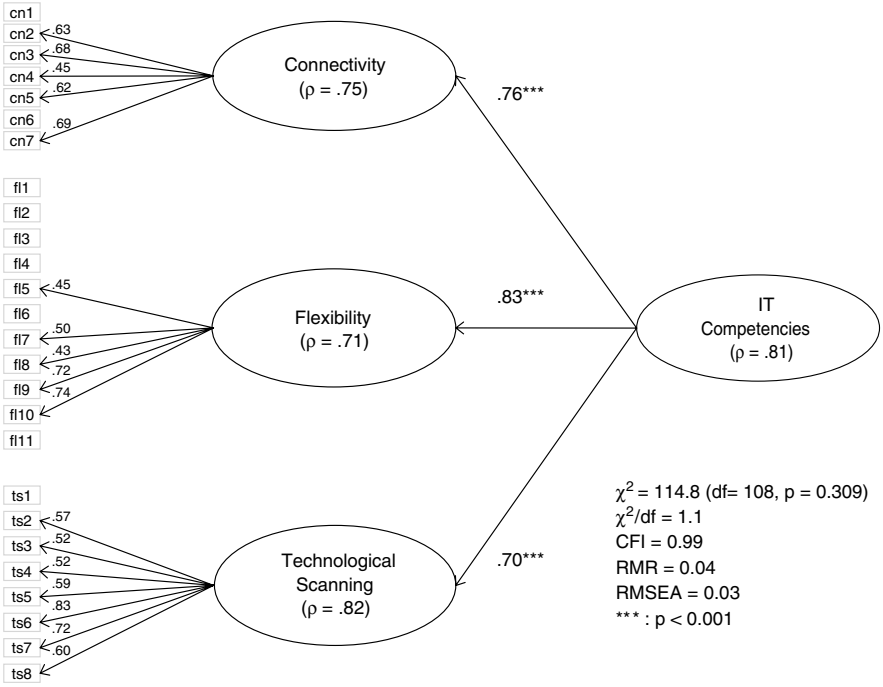

Figure 4 Second-order CFA of the IT competencies measure.

Business performance

The instrument used to measure business performance in this study hypothesizes two dimensions, that is, growth and profitability. Note that previous studies that have used this measure did not assess its unidimensionality. Hence, a second-order CFA was made on the performance construct, as presented in Figure 5. Model estimation results that include a normed χ^2 equal 3.4 and a satisfactory CFI of 0.90 and RMR of 0.04 provide adequate support in this regard. An unacceptable value of 0.15 for the RMSEA would however raise the posibility of correlation between measurement errors in the performance scales. The reliability estimation of the construct is excellent ($\rho = 0.89$), while it is also good for its dimensions ($\rho = 0.82$ for growth and 0.85 for profitability). Convergent validity is supported by the strong loadings of the two dimensions on performance, that is, 0.81 for growth and 0.97 for profitability.

Assessment of the research model

Covariation model

The second step in the data analysis consists in simultaneously estimating with EQS the measurement and structural models. As shown in Figure 6, using a covariation perspective of fit entails specifying co-alignment as a second-order factor, with the first-order factors reflecting the fit or internal consistency among the strategic and IT competencies (Venkatraman, 1989b). Hypothetically linked to co-alignment, business performance is similarly specified as a second-order factor reflected in terms of growth and profitability. Also, having confirmed in the first step that the dimensions of strategic competencies and IT competencies are unidimensional (with a *caveat* for the flexibility measure), these dimensions can now be treated as

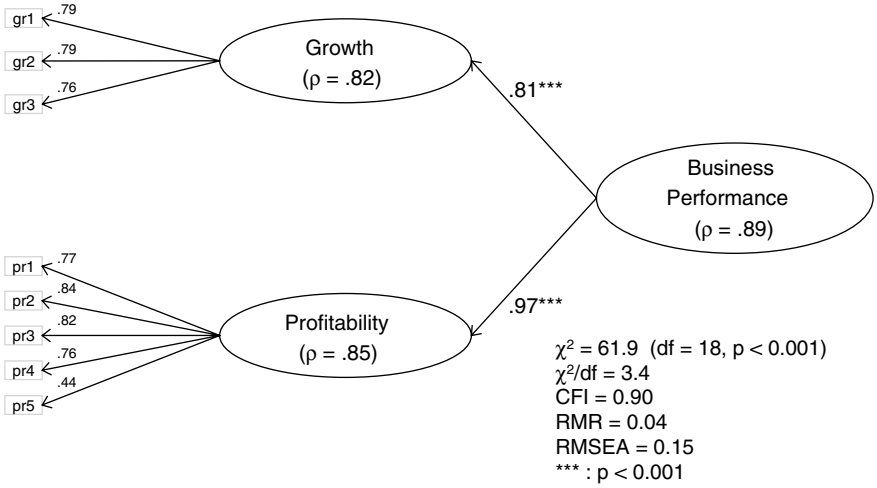

Figure 5 Second-order CFA of the business performance measure.

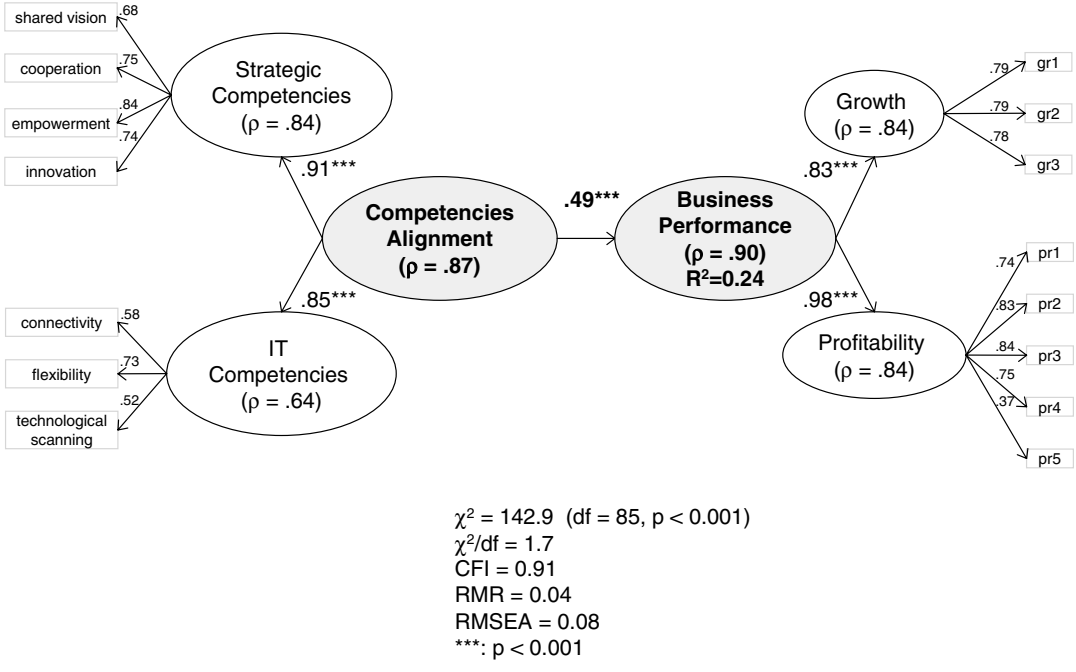

Figure 6 Covariation model of business performance.

a single value within the research model, that is, as indicators of their underlying construct.

The unidimensionality, reliability, and convergent validity of co-alignment and performance are assessed by examining the level of fit of the research model and the estimated path coefficients that link both constructs to their respective dimensions. Values of 1.7 for the normed χ^2, 0.91 for the CFI, 0.04 for the RMR and 0.08 for the RMSEA indicate adequate overall fit with no evidence of model overfitting, and provide support for the unidimensionality of the co-alignment and performance measurements as linked within the theoretical network hypothesized in this study. Note also that internal and external consistency criteria for all dimensions of co-alignment and performance, be it in terms of unidimensionality, reliability, or convergent validity, attain levels of adequacy similar to the ones attained in prior assessments of construct validity. The reliability of both second-order constructs was supported by the values obtained for the ρ coefficient, that is, 0.87 for co-alignment and 0.90 for performance. The size and significance of the path coefficients linking co-alignment and performance to their respective dimensions provide evidence of convergent validity.

Given the presence of multiple constructs in the research model, discriminant validity must also be assessed, that is, assessing the extent to which the constructs as measured are unique from each other. It can be tested by determining whether the correlation between any two constructs is significantly different from unity, that is, whether the confidence interval around the correlation includes 1 (Anderson and Gerbing, 1988). As shown in Table 1, the largest correlation is between profitability and performance, with a value of 0.98 whose 99% confidence interval is within the 0.97–0.99 range ($n = 104$) and thus excludes 1.

Additional tests provided by EQS identify the parameters that could be dropped from the model without substantial loss in model fit, and those that could be added to improve fit (Bentler, 1995). First, in regard to previous results on the validity of the IT competencies construct, a Wald test indicated that the flexibility dimension of this construct could not be dropped from the measurement model without significant loss in goodness of fit. Second, whereas all measurement errors are assumed to be independent of one another, a multivariate Lagrange multiplier test indicated that allowing the measurement errors in certain performance scales to be correlated would provide a significant improvement in model fit. However, it was decided not to respecify the model in such a manner because this would obfuscate the meaning of the underlying 'growth' and 'profitability' dimensions of performance (Anderson and Gerbing, 1988).

Table 1 Correlations between constructs of the covariation model

	(1)	(2)	(3)	(4)	(5)	(6)
First-order factor						
(1) Strategic competencies	–					
(2) IT competencies	0.73	–				
(3) Growth	0.39	0.31	–			
(4) Profitability	0.48	0.37	0.82	–		
Second-order factor						
(5) Co-alignment	0.97	0.75	0.41	0.49	–	
(6) Performance	0.48	0.37	0.82	0.98	0.49	–

Direct effects model

The preceding assessment of the measurement model, including empirical evidence of the unidimensionality and convergent validity for the second-order co-alignment construct, thus provides the necessary foundation for testing the covariation model of business performance. As proposed, the first-order constructs of strategic competencies and IT competencies should be consistent and mutually dependent in their effect on performance. This covariation model is an alternative to the baseline or 'main effects' model in which the first-order constructs are assumed not to covary and have a direct causal influence on performance (Venkatraman, 1989b). Using the same data, an estimation of the baseline model with EQS yielded a normed χ^2 value equal to 2.2 ($\chi^2 = 179.1$, $df = 82$), as shown in Figure 7.

The comparison of results showed in Figure 7 with those presented in Figure 6 illustrates the baseline model to explain 3% less variance in business performance ($R^2 = 0.21$ *vs* 0.24) and to show less fit as demonstrated by comparing the fit indices (CFI = 0.85 *vs* 0.91, RMR = 0.05 *vs* 0.04, RMSEA = 0.11 *vs* 0.08), suggesting that this model is to be rejected in favor of the more parsimonious covariation model.

Discussion

Returning to the covariation model in Figure 6, the basic research proposition on the performance effects of fit is confirmed by the positive and highly significant path coefficient ($\gamma = 0.49$, $P < 0.001$) linking the co-alignment of both strategic and IT competencies to business performance. Co-alignment explains a significant amount of the variation in business performance ($R^2 = 0.24$), thus providing empirical validation of the research model, including both the theoretical and methodological foundations on which it is based. This implies that as firms tend toward a co-alignment of their strategic and IT competencies, higher levels of performance are likely to be attained.

In sum, the preceding results strongly support the conceptualization of strategic alignment across two domains of organizational competency. They also illustrate the existence of a normative co-alignment profile mirroring the model's premise that the development of IT competencies will lead to increased business performance, insofar as this development is balanced with the development of strategic competencies. The research findings confirm and support the theoretical underpinning of competencies alignment, namely that both strategic and IT competencies must be taken into account during the strategy formulation, planning, and implementation processes.

The concept of competencies alignment implies that there is a strategic link between strategic and IT competencies through internal coherence between organizational requirements on the one hand and organizational development on the other. Therefore, the findings indicate that perceived business performance is enhanced when

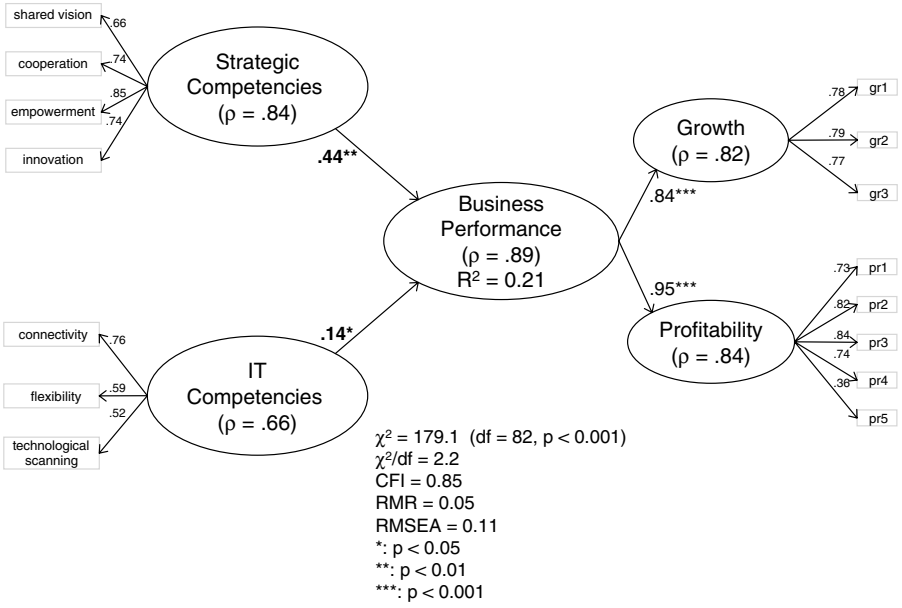

Figure 7 Direct effects model of business performance.

components of both strategic and IT competencies are set in such a way that organizational members could properly accomplish their tasks and fulfill their responsibilities, while being adequately supported by information and communication technologies.

Developing and maintaining strategic competencies create value to organizations in terms of strategic business issues. Having a shared vision makes the articulation of the firm's strategic objectives possible. Organizational cooperation encourages participation in the firm's strategic directions. Individual empowerment assigns accountabilities to the appropriate organizational orientation. Innovation adds value and is the basis for survival, growth, and competitiveness of the firm in the long term. These characteristics are profit oriented and support the firm's chosen position in the market.

The research results also indicate that IT competencies have a high impact on business performance. An explanation as to the enhancement of business performance may be that these competencies create value to organizations in terms of strategic IT issues. Connectivity comprises IS architecture designs that are linked to IT strategies. IT flexibility creates business-driven IT. Technological scanning helps to deploy IT effectively and profitably to meet strategic IT and business objectives. These technological characteristics provide organizations with technological configurations, IT work processes, and shared services that address strategic IT goals and sustain business applications.

Implications and limitations

Having lent empirical credence to the concept of competencies alignment and its performance impact, this study has implications for researchers. First and foremost, this means that the strategic alignment model used here constitutes a valid theoretical foundation on which to further investigate a fundamental IT problem for organizations, namely how to achieve value from ever-increasing IT investments by maintaining and developing the appropriate IT resources and competencies. On a methodological basis, the covariation perspective used to operationalize the competencies alignment concept seems most promising in its capacity to describe, predict, and explain the performance impacts of IT, as opposed to other fit perspectives used in previous IS alignment research.

This research also has prescriptive implications for managers and IS practitioners. Strategic competencies and IT competencies were found consistent and mutually dependent in their prediction of business performance. Hence, when shifts in the business environment, both external and internal, require strategic choices or provide strategic opportunities, resulting changes in strategic and IT competencies must be inter-linked and assessed continually if the firm wants better performance.

This study has attempted to operationally define the concept of competencies alignment, and demonstrate the influence of this complex managerial process on business performance. Given such an ambitious endeavor, the research findings have inherent limitations. The relatively small size of the sample limits the capacity to generalize the research findings. Another limitation resides in the range of constructs developed to represent strategic alignment. When compared with the complex specification of the strategic and IT competencies required of firms in the new global and knowledge-based economy, only some aspects of this complexity have been captured in this study. Also, given that attaining strategic alignment is evolutionary and dynamic (Luftman *et al*., 1999), a longitudinal rather than cross-sectional investigation would have provided deeper knowledge and truer confirmation of causal relationships.

Another limitation pertains to a possible response bias associated with a practice typical of IS survey research,

namely the use of a single organizational informant. Multiple informants and triangulation of collected data ideally provide more accurate measures of organizational properties. However, given the sampled organizations, CEOs are generally well placed to provide valid and accurate data on their firm's resources, overall capabilities, and performance. Also, although similar measurement approaches have been used previously in both strategy (Spanos and Lioukas, 2001) and information systems studies (Croteau and Bergeron, 2001), and the research constructs in this study were shown to be valid, there may still be social desirability and informant biases related to the subjective nature of the data.

Conclusion

In an economic context that has become fundamentally globalized and virtualized, business enterprises must leverage information technology in order to transform themselves into 'intelligent' and 'agile' organizations, continuously adapting and changing in a process of strategic alignment or fit. Aligning competencies signifies to effectively use and manage IT with the strategic competencies required to remain competitive in the new economy. Of increasing importance in this regard is research that provides more rigorous measurement, more accurate description, and better explanation of this process and its impact on organizational effectiveness.

While previous theoretical and methodological works have provided a solid foundation for identifying the dimensions and performance impacts of strategic alignment and for conceptualizing fit, few attempts have been made to empirically test the proposed theory and operationalize the fit. As a further step in that direction, this study has provided a richer view of competencies alignment and how it contributes to business performance.

Notes

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Appendix A:

(See Table A1).

Table A1 Items of strategic competencies

Shared vision
1. The company mission is clear and coherent.
2. The company objectives are clear and coherent.
3. The company strategy is clear and coherent.
4. There is a strong feeling in the organization that a common purpose exists.
5. I find that my values and the organizational values are very similar.
6. The strategic decision process is participative.

Cooperation
1. All individuals are committed to the same project goals.
2. For most problems that arise, there are rules and procedures for dealing with them.
3. Individuals establish their own rules and procedures to facilitate the work's progress.
4. There is a cooperative effort among individuals to carry out difficult tasks.
5. There is an open communication among individuals, and the atmosphere is characterized by friendly relations.
6. There is a high level of mutual trust.
7. Individuals actively work together as partners.

Empowerment
1. Decision-making tends to occur in a decentralized manner.
2. Operating rules and standard procedures play important roles in how decisions are handled. *(reverse)*
3. Ideas tend to flow horizontally as well as vertically.
4. Decision-making responsibilities are pushed down to the lowest possible level.
5. Individuals are capable of directing and taking charge of their own work.
6. There are opportunities to select options and make choices at work.
7. The individual's knowledge base in this organization has increased.
8. Individuals have been given or taught the skills that are needed to arm themselves.
9. Individuals participate equally in organizational activities.
10. There are opportunities for personal development such as growth in self-worth or self-efficacy.

Innovation
1. Creativity is encouraged.
2. My ability to function creatively is respected by the leadership.
3. Here, people are allowed to solve the same problems in many different ways.
4. This organization can be described as flexible and continually adapting to change.
5. The best way to get along in this department is to think the way the rest of the group does. *(reverse)*
6. This place seems to be more concerned with the *status quo* than with change. *(reverse)*
7. The reward system here encourages innovation.
8. Assistance in developing new ideas is readily available.
9. There are adequate resources available to enable innovation in this organization.
10. There is adequate time available to pursue creative ideas here.

Appendix B:

(See Table B1).

Table B1 Items of IT competencies

Connectivity

1. A good telecommunication infrastructure is available.
2. Information system applications are integrated and encompass different functional areas.
3. Database-oriented applications are regularly used in daily operations.
4. Information systems improve internal meetings and discussions.
5. Information systems provide better coordination among functional areas in firms.
6. There are difficulties in accessing computer-based data gathered or held by other members/departments/groups. *(reverse)*
7. There is information systems support for lateral mechanisms of coordination and communications.

Flexibility

1. The information technology infrastructure is constrained by proprietary systems.
2. There are a lot of choices for hardware.
3. There are a lot of choices for software.
4. Flexibility in the IT competencies is encouraged.
5. Today's user interfaces commonly provide invisible access to platforms.
6. In our major systems, data rules and relations are not hard-coded into applications.
7. Current corporate rules and standards for hardware and operating systems support future platform compatibility and standardized platform gateways.
8. Current corporate standards adequately address vendor choices for operating systems and protocol selection and use.
9. Our firm has formally and sufficiently identified data to be shared across business units.
10. Our firm has adequately identified sharable business process components.
11. The complexity of current applications software seriously restricts our ability to develop systems of single-process reusable modules. *(reverse)*

Technological scanning

1. The members of the information systems department participate in corporate organizational meetings.
2. The members of the information systems department read technological journals on a regular basis.
3. The members of the information systems department attend information systems conferences.
4. The members of the information systems department continuously learn about new technologies and their applications.
5. Continuous learning about ways to integrate new technologies is encouraged by our firm.
6. The company promotes the use of new information technology.
7. There is an informal network to keep up with new information technology.
8. There are formal procedures for evaluating new technologies.

Appendix C:

(See Table C1).

Table C1 Items of business performance

Growth

1. The sales growth position relative to our principal competitor is:
2. My satisfaction with sales growth rate is:
3. The market share gains relative to our principal competitors are:

Profitability

1. The return on corporate investment position relative to our principal competition is:
2. My satisfaction with the return on corporate investment is:
3. My satisfaction with return on sales is:
4. The net profit position relative to our principal competitor is:
5. The financial liquidity position relative to our principal competitor is: