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Nicholas Ball  
*University of Minnesota*

Carl Adams  
*University of Minnesota*

Weidong Xia  
*University of Minnesota*

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# OVERCOMING THE ELUSIVE PROBLEM OF IS/IT ALIGNMENT: CONCEPTUAL AND METHODOLOGICAL CONSIDERATIONS

**Nicholas L. Ball**

Carlson School of Management  
University of Minnesota  
[nball@csom.umn.edu](mailto:nball@csom.umn.edu)

**Carl R. Adams**

Carlson School of Management  
University of Minnesota  
[cadams@csom.umn.edu](mailto:cadams@csom.umn.edu)

**Weidong Xia**

Carlson School of Management  
University of Minnesota  
[wxia@csom.mn.edu](mailto:wxia@csom.mn.edu)

## Abstract

*IS/IT alignment has consistently been identified as a top concern of senior IS/IT executives. Although organizations intuitively expect benefits from IS/IT alignment, many struggle to create alignment. Because the mechanisms which develop alignment are likely to be different for each organization, research must provide practice with a comprehensive conceptualization of alignment. Conceptualizations of alignment are presented. Methodological considerations of assessing alignment are addressed in the context of a research project that tests a model of fit as a significant component in IS/IT alignment.*

**Keywords:** Integration, fit, corporate strategy, business strategy, functional strategy, IS/IT strategy, IS/IT infrastructure, IS/IT performance, taxonomy, typology

## Introduction

The alignment of IS/IT to the business is a significant issue for managers of the IS/IT function. As Hoque (2002) points out, the issue has been highlighted in a number of surveys, which identify key issues IS/IT managers face. A recent survey of chief information officers (CIOs) conducted by the CIO Collaborative Research Consortium on IS/IT Organizational Governance and Design at the University of Minnesota likewise reveals that alignment of IS/IT to the business is perceived as the most significant issue for senior IS/IT executives. Alignment is not new (Berkman, 2001); it has been a persistent problem for organizations for over two decades.

Alignment of IS/IT is a general term, which describes two conditions: integration of business strategy and IS/IT strategy, and fit between IS/IT strategy and IS/IT infrastructure (Henderson and Venkatraman, 1993). Integration of IS/IT strategy occurs when IS/IT strategy is appropriately matched with the organization's corporate and business strategies. Fit between IS/IT strategy and infrastructure occurs when the IS/IT functional organization has an infrastructure (architecture, processes, and resources) that appropriately supports the IS/IT strategy.

Prior research in IS/IT alignment can be classified into three types: process effectiveness, factor influence, and organizational element matching. Table 1 classifies selected IS/IT alignment research publications in each of these categories. Process research is designed to describe organizational mechanisms that generate higher levels of alignment within the organization. Factor research presents organizational factors, such as shared understanding between business and IT managers, which correlate highly with alignment and performance. Element matching research attempts to identify specific organizational elements, such as

business and IS/IT strategies that are matched, and then relates these matched pairs to organizational performance. Although alignment can be either a dependent or an independent variable in any of these types of research, alignment is typically a dependent variable in process and factor research, and an independent variable in element matching research.

**Table 1. Classification of Selected IS/IT Alignment Literature**

Type of IS/IT Alignment Research	Representative Literature
Organizational Element Matching	Sabherwal and Chan, 2001
	Croteau and Bergeron, 2001
	Chan, Huff, Barclay, and Copeland, 1997
	Das, Zahra, and Warkentin, 1991
Influencing Factors	Reich and Benbasat, 2000
	Luftman, Papp, and Brier, 1999
	Baets, 1996
	Broadbent and Weill, 1993
	Baets, 1992
	Lederer and Mendelow, 1989
	Pyburn, 1983
Process Effectiveness	Sabherwal, Herschheim, and Goles, 2001
	Keen, 1993
	Earl, 1993
	Boynton and Zmud, 1987
	Bowman, Davis, and Wetherbe, 1983
	King, 1978

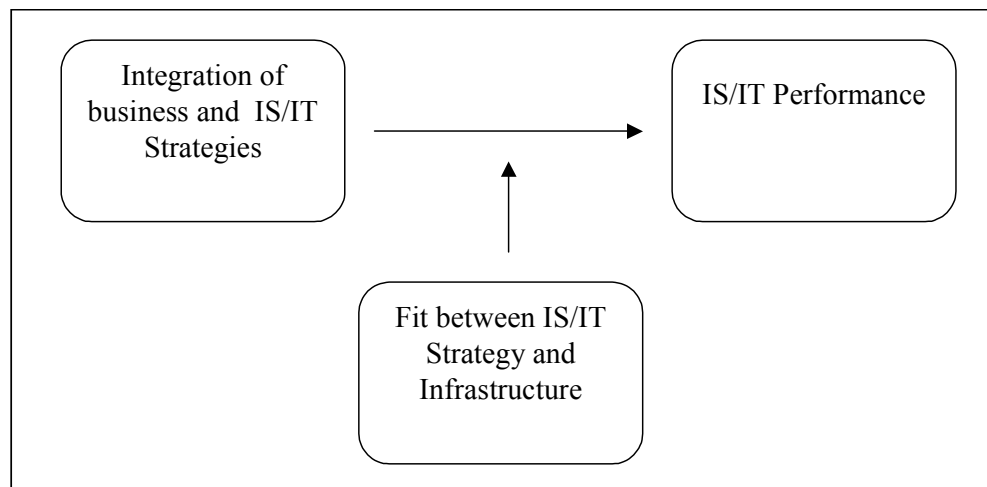
Intuitively, an organization expects benefits from the alignment of IS/IT. The more aligned the IS/IT function is with the rest of the business, the more effectively and efficiently the IS/IT function will be able to support the accomplishment of organizational objectives. Although the problem of achieving alignment has been around for many years and the benefits expected from alignment are intuitive, many organizations exhibit low levels of alignment. To further complicate matters, research conducted on alignment has produced different definitions of alignment. As Chan (2002) points out, definitions of alignment range from “high-level, broadly encompassing definitions... to more focused definitions.” Additionally, empirical studies, which demonstrate the link between IS/IT alignment and performance, are sparse and have provided only limited support. For example, Sabherwal and Chan (2001) find a link between alignment and organizational performance, but fail to show that this link exists for firms that have adopted a defender strategy.

In the face of the difficulties managers have encountered in creating alignment, Chan (2002) has argued that managers should shift their focus from achieving multifaceted, overall alignment toward managing specific components of alignment. Although this notion may lead to more pragmatic prescriptions for practitioners, it ignores the fact that the alignment of IS/IT is a multifaceted construct that requires managers to have a systemic understanding. In addition, the principle of equifinality (Doty, et al, 1993) suggests that the specific components that generate alignment are likely not to be unique. There are no generic alignment mechanisms for all organizations just as it is unlikely that there is a silver-bullet alignment solution that will consistently work for the same organization. Because of this, organizations that have a comprehensive understanding of alignment will be better equipped to develop specific organizational mechanisms to create positive alignment outcomes within their organization than those that only understand specific alignment mechanism.

## Conceptual Considerations for Alignment Research

We assert that many of the problems that firms have had in achieving alignment and that researchers have had in establishing a link between alignment and performance can be traced to the fact that many academic discussions of alignment focus on integration between business and IS/IT strategy and omit fit between IS/IT strategy and infrastructure. To address this deficiency we conducting a research program, which empirically studies IS/IT alignment and incorporates both the constructs of integration

and fit. As Figure 1 demonstrates, we expect that, consistent with prior research on alignment, integration of business and IS/IT strategies will lead to performance. Additionally, we argue that fit between IS/IT strategy and infrastructure modifies this relationship. Those organizations that exhibit higher levels of fit between IS/IT strategy and infrastructure will also demonstrate a stronger link between integration and IS/IT performance. On the other hand, those organizations that exhibit low levels of fit will not experience the same performance benefits as a result of integration.



**Figure 1. The Research Model**

There are four conceptual issues that must be addressed to conduct this research. First, the research must employ a comprehensive conceptualization of organizational strategy. Organizational strategy is itself a multi-dimensional construct. Organizational strategy is comprised of corporate strategy, one or more business unit strategies, and various functional strategies (Hofer and Schendel, 1978). Corporate strategy defines *where* an organization will compete. Corporate strategy details the synergies the organization will achieve across business units and throughout the value chain of the organization. Business unit strategy describes *how* a business unit is positioned to compete within a particular industry. Functional strategies describe the positioning of the functional units (marketing, operations, IS/IT, etc) within the organization to support each business unit and to create synergies across the business units.

Prior research in IS/IT alignment has often employed a limited view of organizational strategy. In many cases, this research has focused on a single element of organizational strategy, such as a business strategy, as a basis for determining the level of alignment between organizational and IS/IT strategies. When the alignment between organizational and IS/IT strategies is assessed with a limited conceptualization of the organizational strategy, improper conclusions about the actual level of alignment for an organization can be drawn. For example, an IS/IT strategy may be well aligned to the corporate strategy of the organization, but poorly aligned to some of the business units or to the other functional strategies of the firm. Tight alignment between IS/IT strategy and just one element of the organizational strategy may be sub-optimal for an organization if the alignment between IS/IT and other elements of organizational strategy are sacrificed. Incomplete assessments of the alignment between IS/IT and organizational strategies will lead to inconclusive or misleading results when the relationship between alignment and performance is assessed. Employing a comprehensive conceptualization of organizational strategy will lead to more complete assessments of IS/IT alignment.

Second, the research must adopt a comprehensive view of IS/IT strategy. There is ambiguity in past research on the construct of IS/IT strategy. In many cases, IS/IT strategy is derived directly from elements of business strategy. Using such a conceptualization, a limited view of IS/IT strategy may result for two reasons. First, it may not provide sufficient coverage of the strategic positioning of the IS/IT function within the organization. Second, such a conceptualization will likely not capture all of the forces, which interact with the IS/IT function and must therefore be addressed by the IS/IT strategy. An incomplete conceptualization of IS/IT strategy can lead to improper assessments of alignment in the same manner that an incomplete conceptualization of organizational strategy does. A comprehensive conceptualization of IS/IT strategy will include a discussion of the desired scope, competencies, and governance mechanism of the IS/IT function (Henderson and Venkatraman, 1993). Such a conceptualization represents a clear positioning of the IS/IT function with respect to the many forces that impact the function and ensures the comprehensive coverage of the IS/IT strategy.

Third, the research must include a comprehensive conceptualization of IS/IT organizational infrastructure that will be used to assess fit. Much of the prior research on IS/IT alignment has omitted fit between IS/IT strategy and organizational infrastructure. A notable exception to this is the work of Papp and Luftman (1995), which demonstrates how each of the elements of the Henderson and Venkatraman (1993) model work together to create alignment. Fit is an important piece of the alignment puzzle. An organization may exhibit strong alignment between IS/IT and organizational strategies, but if the IS/IT function lacks the infrastructure to support the IS/IT strategy, then it is doubtful that the IS/IT function will effectively support the business units and the other functions. It is likely the case that high level of *both* integration and fit are necessary for high levels of performance.

Finally, there is a strong potential for tautology in IS/IT alignment research. A tautology occurs when and the proposed relationship between variables must be true due to the definition of the constructs involved. This is most likely the case when dependent and independent variables are defined in the same terms. Because of the highly intuitive relationship between alignment and performance, it is often difficult to separate the dimensions of each construct. When there is not a clear distinction between the definitions of alignment and performance, then the resulting research is not informative.

### General Research Plan

We have developed a research project that explicitly addresses each of the conceptual considerations outlined above. Figure 2 describes the overall research model for the larger IS/IT alignment project undertaken by the CIO Consortium. First we include in our conceptualization of organizational strategy; corporate, business unit, and functional strategies to provide a comprehensive and rich conceptualization of organizational strategy. Second, we use a rich and comprehensive notion of IS/IT strategy that is based upon the constructs of scope, competency, and governance. Third, our model explicitly includes the construct of IT functional infrastructure. Finally, care has been taken in defining alignment to eliminate tautological concerns.

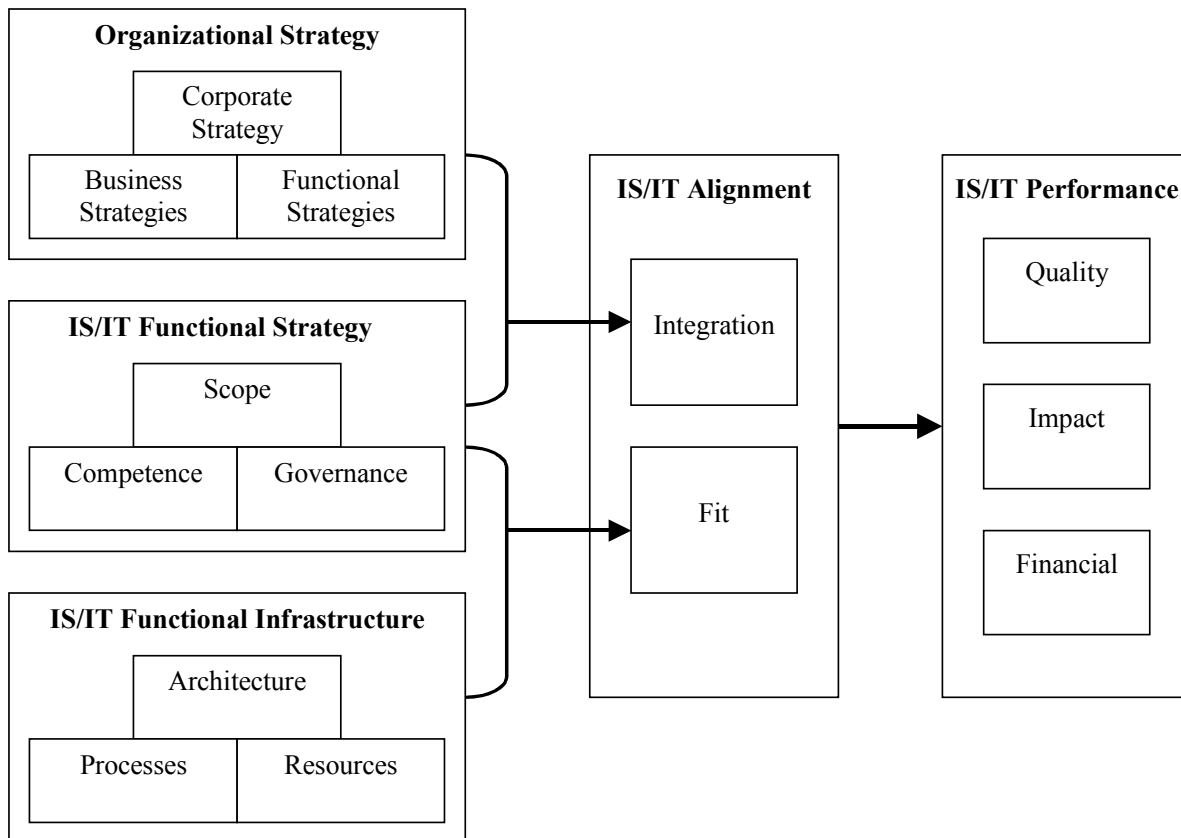


Figure 2. Overall Research Model

When the model was initially conceived, the constructs of IS/IT strategy and infrastructure required further development before the model could be tested effectively. Additionally, the construct of fit between IS/IT strategy and infrastructure was relatively undeveloped by previous research. The CIO Collaborative Research Consortium on IS/IT Organizational Governance and Design has efforts underway to address each of these issues. The project described in this paper develops the constructs of IS/IT infrastructure and fit. With the various constructs in place the general research model relating the constructs of integration, fit, and performance will be tested.

## Methodological Considerations

Parallel efforts in the CIO project are aimed at operationalizing IS/IT strategy. Before fit between IS/IT strategy and infrastructure can be assessed, the construct of IS/IT infrastructure must be better defined. We will develop both a taxonomy and a typology of infrastructures to create an operational definition of IS/IT organizational infrastructure. Examples of this methodology from the manufacturing and operations areas are described by Bozarth and McDermott (1998), Miller and Roth (1994), and Heim and Sinha (2001). The taxonomy and typology will be based on three main constructs of IS/IT infrastructure: architecture, processes, and resources.

The development of the taxonomy of IS/IT infrastructure will require that IS/IT infrastructure variables will be identified which capture meaningful differences among the dimensions of architecture, processes, and resources of the IS/IT function. A survey will be developed to measure each of these variables. The sample for this survey has been identified from the current list of Fortune 1000 and Information Week 500 companies. The top IS/IT executive in each organization will be asked to respond for their organization. Hierarchical cluster analysis (Milligan and Cooper, 1985) will be used to group the responses. We will follow the advice of Milligan and Cooper to assess the quality of the taxonomy.

The development of a typology is an exercise in theory building at multiple levels (Doty and Glick, 1994). Typologies include grand theories, which generalize across all organizations by presenting a limited set of ideal types and middle-range theories that explain the patterns of relationships between the constructs of the model within each of the types. We take a bottom-up approach to developing the typology by creating middle-range theories about the interactions among the major IS/IT infrastructure constructs and then developing the grand theories by analyzing the patterns of interactions postulated by the middle-range theories. The result will be a set of ideal types of IS/IT functional infrastructures.

### *Assessing Fit*

Venkatraman (1989) outlines a general concept of fit that has six different specific operationalizations. The matching operationalization is particularly insightful for defining both integration and fit that are parts of alignment. For integration, the matching perspective requires that specific organizational strategies match specific IS/IT functional strategies. For fit, the matching perspective requires that specific IS/IT infrastructure types match specific IS/IT functional strategies. Since the definition of the appropriate matches would be based on existing knowledge of the correctness of the matches, this concept of fit may be seen as reasonably objective.

If the basis for the objective matching does not exist, an alternative definition of alignment, namely executives' shared understanding of and agreement about the appropriateness of organizational elements, may be used. A firm exhibits a high degree of integration, under this perspective, when business and IS/IT managers understand each others' strategies and to the extent that it is appropriate, agree with each others strategies. Fit occurs when IS/IT executives and IS/IT managers of the IS/IT infrastructure mutually understand and agree with the IS/IT strategy position and the IS/IT infrastructure position.

Since research on fit between IS/IT strategy and infrastructure is relatively underdeveloped, we are pursuing a research agenda that measures fit in both ways, one that is subjective and the other is relatively objective. Subjective assessments of alignment will be made using the shared understanding/agreement perspective. Objective assessments of alignment will be used to understand those configurations of strategy and infrastructure that are a match.

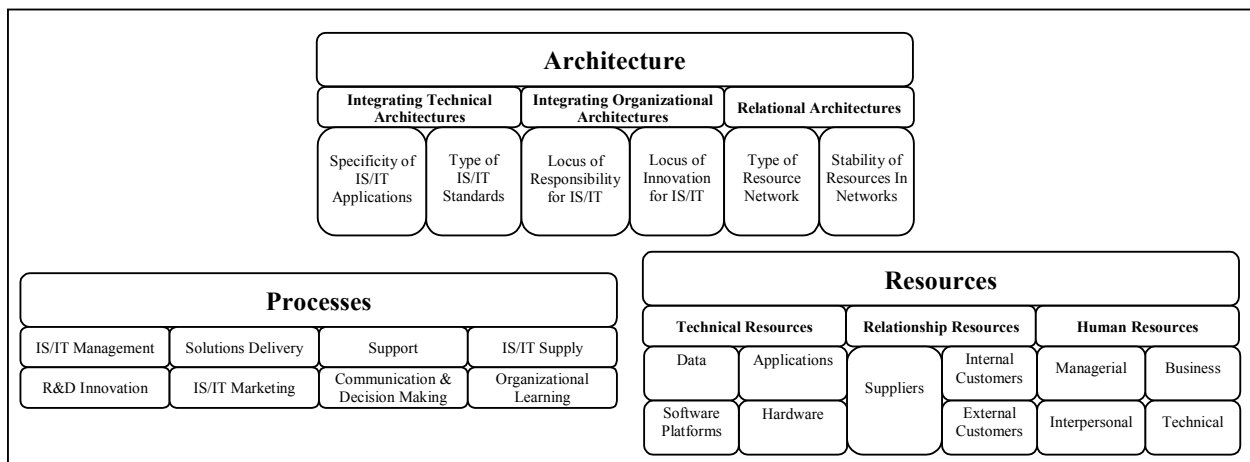
The methodological considerations for conducting research using subjective definitions of alignment differ from those for conducting research using objective definitions of alignment. We outline the considerations for subjective assessments of IS/IT alignment first. The subjective form of fit will utilize the taxonomy of IS/IT strategies and also a taxonomy of IS/IT infrastructures. The objective form requires the typology.

**Subjective Assessments of Fit**

Subjective assessments of fit require an informant (or group of informants) to make judgments concerning the level of alignment that is exhibited within their organization. Although there is some indication that summary subjective assessments of fit can be valid (Goodhue, 1998), they can also be fraught with problems. These problems include determining the appropriate informant within an organization to make the assessment, halo effects, recency effects, and personal biases.

Subjective assessments of fit are based on the shared understanding of IS/IT strategy and IS/IT infrastructure positions among IS/IT senior executives and IS/IT managers and the agreement of the executives and managers that the IS/IT strategy and infrastructure positions are appropriate. In order to overcome the problems with subjective assessments of fit, we employ a structured process for assessing fit. We have a senior IS/IT executive familiar with IS/IT strategy and an IS/IT manager familiar with IS/IT infrastructure each identify the IS/IT strategy and IS/IT infrastructure positions of the organization and comment on the appropriateness of these positions. The degree of similarity of response determines the degree of fit. This structured process requires a classification mechanism, or taxonomy, of both IS/IT strategy and IS/IT infrastructure. Using the taxonomies, both respondents will be asked to categorize their organizations with respect to the IS/IT strategy and infrastructure positions of the firm. Shared understanding is operationalized as the extent to which both respondents are consistent in their classifications of IS/IT strategy and infrastructure positions. Both respondents will be asked to comment on the extent to which they believe that the infrastructure position and the IS/IT strategy position of the organization are appropriate.

The taxonomy of IS/IT strategy is being developed by other researchers in conjunction with the research consortium. Key variables have been identified for IS/IT strategy, which assess the dimensions of the construct: IS/IT scope, competencies, and governance (Henderson and Venkatraman, 1993). A measurement instrument has been developed and will be administered to a large sample of organizations to gather empirical data from which the taxonomy will be developed. The progress on the development of the IS/IT infrastructure taxonomy is somewhat less advanced. We are in the process of identifying the variables, which define the key elements of the IS/IT infrastructure construct: architecture, processes, and resources (Henderson and Venkatraman, 1993). The literature related to understanding the appropriate variables and categories of IS/IT infrastructure is varied and fragmented (Galbraith, 1977, Chandler, 1962, Agarwal and Sambamurthy, 2002, Leitheiser, 1992, Bharadwaj, et al, 1999, Feeny and Wilcocks, 1998, Rockart, et al, 1996, Sambamurthy and Zmud, 2000, Weill and Broadbent, 2000, Weill and Broadbent, 1998). A potential structure for the IS/IT infrastructure construct can be seen in Figure 3. Once major variables are identified, a measurement instrument will be developed and administered to a large sample of organizations to obtain empirical data for the development of the taxonomy of IS/IT infrastructures.



**Figure 3. IS/IT Functional Infrastructure**

It should be noted that taxonomies of IS/IT strategy and infrastructure cannot be appropriately used as the basis for an objective assessment of alignment. The main reason for this is that taxonomies are empirically, not theoretically derived. Because there is little theory underlying a taxonomy, it does not represent a theory concerning which categories of a taxonomy of IS/IT strategy are a match for a corresponding element of an IS/IT infrastructure. To develop an objective assessment of alignment based on matching pairs of IS/IT infrastructure and strategy, typologies of IS/IT strategy and infrastructure are required. We outline considerations for this approach below.

## **Objective Assessments of Fit**

Objective assessments of fit are made by determining whether an organization has adopted IS/IT strategy and infrastructure positions that are a match for each other. The matches of IS/IT strategy and infrastructure pairs are determined a priori and are driven by theory. In order to develop theory-driven IS/IT strategy and infrastructure pairings, the classifications schemes used to categorized IS/IT strategy and infrastructures must also be grounded in theory. A classification mechanism that is well grounded in theory is a typology (Doty and Glick, 1994). Typology research can either look for the closeness of an organization to one or more ideal types or it can consider contingent relationships.

Our use of typologies of IS/IT strategies and infrastructures is aimed at the development of testable hypotheses concerning the contingent relationships between IS/IT strategy and IS/IT infrastructure as well as the relation of IS/IT alignment to IS/IT performance. To test these hypotheses, IS/IT executives will be asked to respond to questionnaires that will assess the strategy and infrastructure positions of the IS/IT function in terms of the typologies.

Theoretical groundwork for the development of typologies of IS/IT strategies and infrastructures is currently in progress. It is based in the same literature that provides the foundation for the development of the taxonomy of IS/IT infrastructures.

## **Summary**

The paper describes the research being undertaken to clearly operationalize fit between IS/IT strategy and infrastructure. Both objective and subjective approaches to measuring fit are examined. When combined with parallel research on IS/IT organizational strategies, it should provide a clear understanding of IS/IT business alignment and the relationship of alignment to performance.

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