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Responding to Technological Change: From Issue Interpretation to  
Strategic Choice

Ari Ginsberg  
and  
N. Venkatraman

Working Paper No. BPS 3351-91

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FROM ISSUE INTERPRETATION TO STRATEGIC CHOICE**

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## Responding to Technological Change: From Issue Interpretation to Strategic Choice

### Abstract

We develop an interpretive model of strategic responses to the introduction of a new information technology: electronic filing of individual income-tax returns. Based on data from over four hundred tax-return preparation businesses, we examined the effects of issue interpretation on two dimensions of response strategy - the *target* (intraorganizational versus interorganizational) and the *magnitude* (level of commitment). Results of structural equation analyses support the usefulness of an interpretive approach for explaining different response patterns. Our findings indicate that two dimensions of issue interpretation -- perception of urgency and feasibility -- shape the level of commitment devoted to actions designed to resolve the issue. Our results also support the sequential nature of response consideration with respect to target, namely that intraorganizational strategies were considered before interorganizational strategies because the former are less costly with respect to the maintenance of self-determination and autonomy.



New information technologies with enhanced connectivity capabilities can trigger the transformation of industry structures and change the sources of competitive advantage (McFarlan, 1984; Cash & Konsynski, 1985; Keen, 1986; Scott Morton, 1991). Such technological changes may trigger strategic responses that seek to capture advantages of technological leadership (Porter, 1985). Those that are among the first to respond may obtain competitive benefits of volume and experience that may not necessarily accrue to the followers (Lieberman & Montgomery, 1988; Tushman & Anderson, 1986). Strategic responses may also reflect efforts to minimize their dependence on other firms that seize the opportunities afforded by technological innovation, for example absorbing external dependence by expanding resources or negotiating external dependence by establishing cooperative relations with other firms (Dunford, 1987).

Environmental changes brought about by the development of new technologies provide senior managers with a major challenge: If managers misjudge the impact of technological innovations, they might neglect to take appropriate and timely actions and may thereby jeopardize their organizations' success and survival (Cooper & Schendel, 1976; Pfeffer & Salancik, 1978). Therefore, understanding strategic responses to technological innovations requires a systematic conceptualization of the role of managerial interpretation in influencing strategic decisions.

From an interpretive perspective of organizational action, strategic responses to technological changes reflect managers' assessments of the potential impact of a newly introduced technology on organization-environment alignment and firm performance. An interpretive view of organizational action holds that managers are continually besieged by a stream of ill-defined events and trends, some of which they may ignore, and others to which they attend and subsequently imbue with meaning (Dutton & Jackson, 1986). The meanings managers attach to an

environmental occurrence, such as the introduction of a new information technology, explain why they may respond differently to the same event (Daft & Weick, 1984; Dutton & Duncan, 1987). Hence, a richer understanding of why organizations choose different types of resource dependence strategies in response to technological change requires an examination of how managers interpret the introduction of new technologies as strategic issues.

This paper develops an interpretive model of strategic responses to a fundamental technological change to explain strategic choices made by tax-return preparation firms in response to the recent initiative of the Internal Revenue Service (IRS) to accept electronic returns of individual tax-returns. Representing a significant point of departure in the management processes of return-preparation firms, electronic filing of tax-returns has the potential to change radically the structural and competitive characteristics of the market; and firms in the return preparation services industry have faced the challenge of responding to its potentially widespread and significant impact (Venkatraman & Kambil, 1991). The return-preparation industry, thus, provides a useful setting for investigating the impact of issue interpretation on strategic decisions made in response to technological change.

Specifically, we focus on two specific aspects of organizational responses to strategic issues (Dutton & Jackson, 1987): (a) the *target* of response, namely, whether firms use intraorganizational strategies, such as enhancing competences, or interorganizational strategies, such as engaging in cooperative relations with other firms; and (b) the *magnitude* of responses, namely, the extent to which the response is large or small. Our study probes the sequential nature of strategic decisions as they pertain to the target of response and examines the impact of managerial interpretation on the magnitude of these decisions in terms of the level of effort and commitment devoted to resolving the issues raised by technological innovation.



## BACKGROUND

### *Strategic Implications of Information Technologies*

Recent advances in information technologies (IT) -- especially the development of standards for connectivity, greatly improved hardware price-performance ratios, and progress in the area of expert systems -- have made it economically and technologically feasible to exchange large volumes of complex information between firms with unprecedented ease and rapidity (Keen, 1986; Huber, 1990). The organizational implications of this trend is that these IT capabilities will not only impact the design of administrative structures and decision-making (Huber, 1990) but also fundamentally change the pattern of vertical and horizontal relationships in the marketplace (see for instance, Malone, Yates, & Benjamin, 1987). Within this broad stream, we are concerned with how managers respond to a fundamental IT-based shift in the marketplace. For this purpose, we consider electronic filing of individual income tax-returns as a case in point.

*Electronic Filing of Tax-returns.* In 1985, a significant proportion of the over \$1 billion spent by the IRS on the processing of tax returns (an amount which represents a third of the IRS budget) was allotted to handling paper returns and transcribing data to machine readable form. At the same time, the data transcription process was prone to errors that lead to costly delays in returns processing and sending of refund checks (Venkatraman & Kambil, 1991). In an early attempt to identify new ways to improve efficiency through automation, in 1985 the IRS adopted the use of optical character recognition (OCR) software at its service centers. Although the use of OCR brought some reductions in costs and errors, OCR did not eliminate several components of the overall costs of handling, sorting, and storing paper returns. To demonstrate the feasibility of a system that would capture the relevant taxpayer information electronically at the time of return preparation, in 1986 the IRS developed and pilot-tested an electronic filing system that would

permit computer-to-computer exchange of data between the taxpaying community and the IRS. The IRS expanded this initiative to over a third of the country in 1988 and the service is now available nationwide.

In contrast to the earlier adoption of OCR software by the IRS, which did not radically alter all the stages of processing within the IRS and did not influence the nature of the relationship between the IRS and the taxpaying community, electronic filing of tax returns is a radical technological departure from the traditional process of processing returns that has important strategic implications: By merging computerization with communications technology, electronic filing offers firms the potential to provide a visible differentiation factor between the roles of return preparation and return filing. By creating the potential to offer new technology-based products (e.g., refund-anticipation loans, tax planning, investment services) and the opportunity for new entrants to compete in the market (e.g., retail banks and credit card issuing institutions), electronic filing offers firms the potential to leverage technology and information capabilities to redefine the characteristics of products and services and to create new sources of competitive advantage (Venkatraman & Kambil, 1991). In sum, the electronic filing initiative was an event that blurred the boundaries between tax services and financial services because the use of computer and communications technology allowed for a larger package of financial services to be offered than tax preparation alone.

Therefore, the electronic filing initiative of the IRS has confronted managers of tax-preparation businesses with an important set of strategic questions: How will electronic filing affect their firms' performance and position in the competitive environment? Should they attempt to respond to this issue through intraorganizational strategies, such as investing in computer and communications related competencies? Should they respond through interorganizational strategies, such as establishing cooperative relations with other firms? Should their firms



become highly committed to such strategies or should they be more cautious? To explain differences in the patterns of strategic decisions, we develop a model that focuses on the key dimensions of issue assessment and organizational response.

## RESPONSES TO TECHNOLOGICAL INNOVATION

### *Response Dimensions*

Confronted with technological innovation as a strategic issue, managers must decide how to adapt their firm to the future environment that it presages.

Researchers of adaptive responses to environmental events have identified two predominant dimensions: *response target* and *response magnitude* (Dutton & Jackson, 1987). The target of an organization's response to strategic issues may be either internal -- namely, intraorganizational actions -- or external -- namely, interorganizational actions -- (Cook, et. al, 1983; Miles, 1980). Underlying this distinction is the issue of decision control or autonomy: intraorganizational responses, such as resource modifications, reflect a desire to protect or increase organizational autonomy while cooperative arrangements require sharing of control (Carter, 1990).

*Intraorganizational Responses: Enhancing Organizational Competences.* Efforts to deal with strategic implications of a technological innovation by enhancing intraorganizational competences exemplify adaptive responses that seek to absorb the resource uncertainties created by impending environmental changes (Carter, 1990). While organizational competence as a general concept has been central to strategic management research (Selznik, 1959; Snow & Hrebiniak, 1980; Prahalad & Hamel, 1990), conceptualization has been context-related. In this research, given our focus on small organizations faced with the implications of a major technological change, we consider two dimensions of organizational competences -- *technological competences* and *administrative competences*. The first is concerned with the need to

acquire specific capabilities in hardware, software and communication technologies so that appropriate strategic changes can be implemented. Our field interviews conducted at the time of the electronic filing initiative indicated that managers felt the need to develop competences in these new areas as quickly as possible to gain potential competitive advantage. Although this dimension of competence is necessary for successful adoption of a new technology (Ginsberg & Venkatraman, 1991), it is not sufficient since complementary administrative or managerial competences are necessary to maximally leverage the functionalities of new technologies (Marcus & Robey, 1988; Scott Morton, 1991).

From an organization adaptation perspective, technological innovations reflect specific sources of environmental variations and strategic responses reflect particular realignment activities that occur along a continuum of costliness. By adjusting incrementally to changing environmental conditions, an organization can delay or even avoid more costly alternatives while it is in the process of accommodating variation (Carter, 1990). These assumptions are consistent with theories of adaptation that acknowledge managers' abilities to evaluate the cost of adaptive responses relative to the challenges presented by environmental change; these theories characterize the process of adaptation as a sequence of realignment activities (Aldrich, 1979; Carter, 1990; Weick, 1976).

Managers faced with impending technological change will first consider the potential feasibility of internalizing these capabilities within the 'organizational core' (Thompson, 1967). This is also consistent with the organizational economics literature on markets versus hierarchies regarding the need to internalize those activities that are fundamental and unique to the organization's process of delivering products and services in the marketplace (Williamson, 1985). Organizations will consider interorganizational responses only after considering

intraorganizational responses because the latter are less costly with respect to the maintenance of self-determination and autonomy (Carter, 1990).

*Hypothesis 1: In response to a technological change, managers will first consider enhancing organizational competences through intraorganizational mechanisms and will then consider establishing collaborative arrangements with other firms.*

**Interorganizational Responses: Collaboration across Domains.** In recognizing interorganizational strategies as an important set of response options open to managers, our model considers two two domains: *current domain response* and *new domain response*. The current domain response refers to the specific pattern of likely actions taken by the firm, given the specific technological change, that relate to the current product-market domain. For instance, it might include those mechanisms for dependence negotiation such as formal business agreements or strategic alliances with firms in the traditional business arena. In contrast, the new domain response refers to those specific pattern of likely actions taken by the firm, given a specific technological change, that relate to newer business domains that become relevant due to the impact of technology on the business processes. For instance, in the case of electronic filing of tax-returns, newer domains involving hardware, software and communication technologies as well as financial institutions become relevant, requiring novel strategic responses.

We contend that the likely intensity of strategic responses in these two domains should be distinguished for the following reasons: (a) the two domains of strategic response differ in terms of the degree to which they rely on established organizational 'routines' (Nelson & Winter, 1982); and (b) their determinants may differ given managers' perceptions of the technological change and its likely impact on the business. Moreover, we argue that organizations are more likely to respond by focusing on the familiar areas, or current task domains given the logic of

organizational routines (Nelson & Winter, 1982) before attempting to significantly alter these routines to develop arrangements in the new domain. Thus, we test:

*Hypothesis 2: In response to a technological change, managers will consider mechanisms that establish collaborative arrangements with other firms in the new domain only after considering such arrangements in the current domain.*

### ***Response Magnitude: Levels of Commitment***

The other aspect of an organization's response to strategic issues is its magnitude, which may be small and incremental or large and radical. Responses of large magnitude are more costly and more difficult to achieve than responses of a smaller magnitude (Dutton & Jackson, 1987). Response magnitude also reflects the level of effort and commitment that top managers are willing to devote to resolving an issue: where this level is higher, the momentum for more costly and radical change is higher (Dutton & Duncan, 1988).

From an interpretive viewpoint, the assessments that managers attach to a strategic issue (in our case, electronic filing) influence the level of commitment reflected in the intraorganizational and interorganizational response strategies that managers choose. Dutton and Duncan (1988) identified two key aspects of issue diagnosis: issue urgency and issue feasibility. Both are important in shaping managers' interpretations of an issue and in creating momentum for change.

***Issue Urgency.*** Issue urgency, which indicates the perceived *importance* of taking an action on an issue and, conversely, the perceived *cost* of not taking an action, is a composite perception based on several judgements made about the nature of a strategic issue. Assessments of issue urgency are tied to the time pressures that are associated with the issue and also depend on the perceived visibility, or exposure of an issue to important constituencies (Dutton & Duncan, 1988). When, for example, managers believe that a significant shift towards the use



of electronic filing is highly likely, they associate a higher level of imminence with the issue, which in turn reflects an increased sense of issue visibility and time pressure to respond. The result of urgency assessment is an interpretation of the perceived need to respond in some way so as to resolve an issue. Therefore, we expect that:

*Hypothesis 3: The greater is the issue urgency surrounding a technological change, the stronger will be managers' commitments to enhance organizational competences, which, in turn, will lead to stronger commitments to engage in collaborative arrangements.*

**Issue Feasibility.** Issue feasibility, in contrast, reflects the judgements made about the possibility of resolving an issue. According to Dutton and Duncan (1988), two judgements are particularly important in forming a feasibility assessment: (a) perceived issue understanding, which refers to the perception that decision makers, with some effort, can identify the means for resolving an issue; and (b) perceived issue capability, which describes the perception that the means for resolving the issue are available and accessible. For example, to the extent that managers have a higher level of confidence in their ability to identify and evaluate different alternatives to respond to electronic filing, their perception of the issue of electronic filing involves greater understanding. To the extent that they believe that their firm can exploit electronic filing to gain relative advantage over their competitors, their perception of issue capability is higher. Together, higher levels of issue understanding and issue capability reflect a higher level of issue feasibility. The more decision makers believe that an issue can be resolved, the greater is the level of effort and commitment that is devoted to actions designed to address the issue (Dutton & Duncan, 1988). Therefore, we hypothesize that:

*Hypothesis 4: The greater is the issue feasibility surrounding a technological change, the stronger will be managers' commitments to enhance organizational competences, which, in turn, will lead to stronger commitments to engage in collaborative arrangements.*

Figure 1 is a schematic representation of our theoretical model of strategic choices made in response to electronic filing. This model, which is grounded in an interpretive perspective of organizational adaptation reflects two important suppositions: First, that strategic responses are considered sequentially because their costs are assessed relative to the issues presented by an environmental change; and second, that perceived issue urgency and issue feasibility generate commitment to intraorganizational and interorganizational responses.

[Insert Figure 1 about here]

## METHODS

### *Phase One: Detailed Field Interviews*

We began this research project with a set of detailed field interviews with key participants in the marketplace: (a) senior management of the IRS, to understand the steps taken by them to encourage and accelerate the conversion from paper-based returns towards electronic returns; (b) return-preparers, to understand the nature of expected impacts of the electronic filing initiative on the marketplace; and (c) key providers of the software and communications services, to understand the nature of emerging new products and services.

Interviews with senior management of the IRS were critical in ascertaining the level of mandate, or regulation, involved in the electronic filing initiative: if this was to evolve as a forced pattern of change in the way we file our tax-returns, a research model emphasizing interpretive differences would clearly be inappropriate. The second set of interviews with the professional return-preparers helped us to comprehend the degree of importance of the change in the technology from paper-based processes towards information technology-based activities for their business

operations. A unanimous view was that this shift represented a significant departure away from traditional competences and the basis of competition, but there were wide differences in how to deal with this discontinuity. The third set of interviews enabled us to appreciate the range of new skills and capabilities required to compete in the changed marketplace.

At the end of these interviews, we became convinced that the various players in the marketplace were interpreting and responding to this phenomenon in very different ways. For instance, some perceived the electronic filing initiative as a major source of business opportunity to differentiate their services and provide value-added services to their clients. In the words of one informant:

“..... Electronic filing is a major boon for my business -- especially since the taxpayer cannot file directly from home due to problems with signature verification and the need to certify the identity of the taxpayer. Now I can leverage the value from computerization because of its interconnection with the communication technology and the link with IRS. Now I can not only improve my service-quality (reduced errors) but also guarantee that the tax-return has reached IRS (since I get the confirmation back). I may finally be able to attract those new customers. -- who have always thought that they could fill these forms themselves and that we do not add any value. ”

Others saw it as a potential threat to the fundamental business skills and competences. According to the owner of a regional return-preparer chain, who put it rather vividly:

“If IRS is serious about electronic filing, I better get my act together to catch up with this technology. This is clearly the way of the future. I don't want to be like those farmers who did not invest in mechanized farming”

In addition, it became clear during the interviews that the range of strategic responses of the return-preparers would include new inter-organizational relationships via joint-marketing, partnerships and strategic alliances as well as possible mergers and acquisitions. One perceptive informant stated:



“This initiative is imposing new rules on the marketplace and we may not have all the capabilities to conduct business in the future. For example, I do not know anything about these new software packages, optical character recognition and high-speed modems. Nor can I afford to develop the required capabilities within my organization. I will need to form partnerships to share costs and learn the new ways of doing business.”

In Tushman and Anderson's (1986) terms, some managers viewed the electronic filing initiative as competence-enhancing, while others saw it as competence-destroying. Hence, instead of classifying a technological change as either competence-enhancing or competence-destroying, we inferred that the same technological change could be perceived and interpreted by senior managers as either one or the other; therefore, we concluded that a managerial interpretation view was an appropriate theoretical lens for this study.

#### *Phase Two: Data Collection Using a Structured Instrument*

Subsequently, we developed an instrument that captured the measures of the key constructs underlying our hypotheses. We pre-tested this instrument with eight professionals in the market and with three senior IRS managers for understandability, wording, and fatigue. We also developed and tested a one-page scenario describing the electronic filing initiative that could serve as the common stimulus for all participants in answering the questions. We include a copy of this one-page scenario in Appendix 1 and provide detailed descriptions of the operational measures with corresponding measurement properties in Appendix 2.

*Issue urgency.* This was measured in terms of the probabilistic character of environmental outcomes (in, our case, the occurrence of a significant shift towards the use of electronic filing) and firm-level outcomes (in our case, the effect of this shift on a specific business). Following Leblebici and Salancik (1981), who argue that the probabilistic character of issue outcomes is clearly allied to the construct of decision uncertainty, we used an entropy measure --  $E = [(1-p) \cdot \log(1-p) + p \cdot \log(p)]$ , where  $p$  is the perceived likelihood of an occurrence or effect -- to capture managers'



predictions. As argued by Leblebici and Salancik (1981), the entropy measure -- which plays a significant role in information processing research -- is associated with the amount of information contained in the space of possible outcomes.

*Issue feasibility.* Following Duncan and Dutton (1988), this was measured in terms of issue understanding and issue capability. The former was measured in terms of the managers' confidence in their awareness of and ability to evaluate alternative responses to the issue (in our case, electronic filing). The latter was measured in terms of the managers' assessment of the degree of opportunity or threat posed by the specific event studied, namely: electronic filing of tax-returns. As argued by Jackson and Dutton (1988) and Thomas and MacDaniel (1990), framing issues as opportunities is associated with a strong sense of confidence or control with respect to issue resolution, whereas framing issues as threats is associated with inadequacy with respect to issue resolution.

*Commitment to organizational competence enhancement.* This was measured in terms of technological competence (in our case, computers and communication technologies and related capabilities) and administrative competences (in our case, changes in knowledge base and related skills).

*Commitment to current domain collaboration.* This was measured in terms of the manager's degree of commitment to establishing collaborative arrangements in the current domain -- involving other *tax-return preparers* and *service bureaus*. Each manager was asked to indicate the degree of commitment to four types of arrangements (in terms of the increasing degree of importance): informal business agreements, formal business agreements, joint ventures and mergers and acquisitions. The organization's score was a weighted sum of the degree of commitment to the current domain.

*Commitment to new domain collaboration.* This was measured in terms of the manager's degree of commitment to establishing collaborative arrangements in new

business domains -- involving *software manufacturers, telecommunication providers, and financial institutions*. These three domains emerged as critical for the changing marketplace for return-preparation. Each manager was asked to indicate the degree of commitment to four types of arrangements (in terms of the increasing degree of importance): informal business agreements, formal business agreements, joint ventures and mergers and acquisitions. The organization's score was a weighted sum of the degree of commitment to the new domain.

*Data.* Our study is based on data pertaining to 430 businesses providing return-preparation services to individual taxpayers in the USA. We mailed a structured questionnaire in May 1987 to 1000 businesses, stratified according to the population of taxpayers in each Zipcode. Each questionnaire was accompanied by a letter explaining that the study seeks to understand the perceptions of the managers to the specific initiative of electronic filing of individual tax-returns. After four weeks, those who had not yet participated were sent a reminder letter with an additional copy of the questionnaire.

Our effective response rate was 43%. We compared the respondents to the original sample to ensure representativeness of the sample along the following two criteria: (a) the fifty states; and (b) the size category maintained by the IRS that was initially used to derive the sample. The sample did not differ from the original sample along these two criteria. In addition, we compared the the first two waves of responses (excluding 47 that trailed) waves of responses, following the procedures in Armstrong and Overton (1977) to assess similarities. We found no differences along a set of descriptive variables (size measured in terms of the category of returns filed, number of professionals, categorization of returns -- balance-due versus tax payment). Thus, we are confident that the profile of respondents is an accurate reflection of the stratified sample and the population. In addition, when asked if the

informant had heard of the electronic filing initiative, 6 indicated that they had not; so, we excluded them from the sample for an effective sample  $n=424$ .

*Informant.* We acknowledge the need to minimize key-informant bias that could potentially invalidate the results (Bagozzi & Phillips, 1982). During our field interviews, we sought to identify the knowledgeable informants for each business. We observed that most businesses were owner-managed with one or two professionals (average size of tax-professionals: between 2 and 3); and even in larger organizations like the accounting firms, the tax services practice had a specific senior manager with responsibility and authority for directing the practice. Hence, we concluded that data collection from multiple informants in each organization would be futile given that there is only one relevant informant for each. Additional discussions with IRS managers responsible for interfacing with this business community reinforced our assessment that there was only one relevant informant per organizational unit. Overall, our data collection approach is consistent with the general recommendation to use the most knowledgeable informant (Huber & Power, 1985; Venkatraman & Grant, 1986) and with the research practice of relying on a single informant in studies designed to collect data from small organizations (Daft & Bradshaw, 1980; John & Weitz, 1988).

### *Model Specification*

*Overview.* We specify the models using the notations of structural equations that follow the estimation procedures implemented in the LISREL 7 program (Joreskog & Sorbom, 1988). This analytical scheme offers the capability of statistically comparing the superiority of competing theoretical models (Joreskog & Sorbom, 1979; Bagozzi, 1980) and hence is a powerful scheme for testing alternative, competing theoretical perspectives. Specifically, the superiority of one model over another competing, nested theoretical model is given by the difference in  $\chi^2$  statistic ( $\chi^2_d$ ), which is asymptotically distributed as  $\chi^2$ ; these sequential chi-square difference



tests are asymptotically independent (Joreskog & Sorbom, 1989; Steiger, Shapiro, & Browne, 1985).

Following Anderson and Gerbing (1988), we consider the following two types of models:

*Theoretical Model ( $M_t$ )* -- representing the model specification based on the underlying theory and hypotheses; and the

*Unconstrained Model ( $M_u$ )* -- representing the model specification based on an alternate theory with less constraints on the specification.

We assess the fit of the models based on an absolute criterion, namely the  $\chi^2$  statistic, the associated  $p$ -values and the goodness of fit index (GFI). In addition, we employ a relative criterion, namely, the statistical significance of the difference in the  $\chi^2$  statistic between competing model specifications.

## RESULTS

### *Overview*

After confirming multivariate normality of measures, we used LISREL 7 to estimate the fit of the theoretical model. The estimation of the model ( $M_t$ ) shown in Figure 1 yielded the following statistics:  $\chi^2$  with  $df: 52 = 251.88$ ,  $p < .001$ ;  $GFI = 0.909$ , indicating poor fit to the data. So, we assessed an alternative specification that primarily involved finer specification of the dimensionality of the constructs. More specifically, based on Dutton and Duncan (1988), we specified the underlying subdimensions of the issue feasibility construct: issue capability and issue understanding. Further, we distinguished between the technological competences and administrative competences. Since we relaxed the constraint that three indicators of issue feasibility should load on one construct and that all indicators of competence enhancement should reflect one construct, this specification serves as the unconstrained model ( $M_u$ ). Estimation of  $M_u$  yielded the following statistics:  $\chi^2$

with  $df: 44 = 53.42$ ,  $p < .16$ , indicating excellent fit to the data, thus satisfying the absolute criterion. In addition, a comparison of this model to the original specification yielded a statistic of  $\chi^2_d$  of 24.5,  $p < .001$  indicating that the unconstrained model is superior than the original specification. This is diagrammatically represented in Figure 2 as the research model and serves as the basis for testing the set of five hypotheses. Table 1 provides a matrix of zero-order correlations among the seven constructs underlying the research model and Table 2 summarizes the results of the comparison of these two models.

[Insert Figure 2 and Tables 1 and 2 about here]

### *Measurement Validity*

We assessed the internal consistency of the multi-item measures through the  $\rho_C$  index (Bagozzi, 1981), which reflects the proportion of trait variance of the construct. As shown in Appendix 2, all the constructs measured with multi-item scales show acceptable levels of internal consistency with  $\rho_C$  in the range of 0.78 to 0.91. Further, we assessed the predictive validity of the technological competence and administrative competence measures by correlating it with the percentage of returns filed by the 291 businesses who had the opportunity to file electronically during the next tax-season. Others had to be excluded since these businesses were situated in those states where electronic filing was not available during the following year. The correlation with technological competence was 0.291,  $p < .01$  and with administrative competence was 0.241,  $p < .01$  -- thus, providing additional strong support to the quality of measurements in the study.

### *Tests of Hypotheses*

Table 3 summarizes the individual parameter estimates (LISREL 7 estimates) of the research model shown in Figure 2, while Table 4 summarizes the results of the hypotheses testing. It is important to note that since the test of hypotheses involve more than one structural paths of the model (see Figure 2), we test the

hypotheses in terms of the  $\chi^2$  statistic. More specifically, we compare a model with the appropriate path(s) constrained to be zero with an alternate model with these paths left free. A statistically significant value of  $\chi^2_d$  supports the hypothesis (Joreskog & Sorbom, 1989).

As Table 3 indicates, all the four hypotheses are strongly supported given strong values of the  $\chi^2_d$  statistic. In addition, for the second hypothesis, we tested a subsidiary (rival) hypothesis that there is no reciprocal effect of new domain collaboration on current domain collaboration. Since this reciprocal effect was not supported –  $\chi^2_d$  (df:1) of 0.78, ns, it provides further strength to accept the second hypothesis.

[Insert Tables 3 and 4 About Here]

## DISCUSSIONS AND CONCLUSIONS

As new technologies change the basis of competition, it is important to understand how managers perception and interpretation of the potential impact of technological innovations influence their commitment to different courses of strategic action. In this vein, this paper developed an interpretive model that sought to predict the effects of issue interpretation on two dimensions of response: the *target* (namely, intraorganizational versus interorganizational) and the *magnitude* (namely, the level of commitment). The research model was supported -- as indicated by both the absolute statistical criterion (the low value of  $\chi^2$  with an associated p-value greater than 0.10) as well as the relative statistical criterion (superiority of the statistical fit of the research model with a more detailed specification of the dimensionality of the constructs compared to the theoretical model). Thus, we are able to discern a structural model of the relationships between issue interpretation and strategic response in the context of one issue, namely:

electronic filing of tax-returns. In the following paragraphs, we discuss a set of important conclusions that emerge from this research study.

First, our model supports the sequential nature of response consideration with respect to *target*. Dutton and Jackson (1987) asserted that the interpretation of an issue as either an opportunity or a threat can be related to the *target* of response, namely: inter-organizational or intra-organizational respectively. However, we find that the interpretation of an issue as an opportunity or threat has more of an effect on the *magnitude* of response than the target of response. Given that the three issue interpretation constructs (including issue capability) had no significant effect on interorganizational strategies but had some effect on commitment to enhance organizational competences, we argue that the effect of interpreting an issue (as either an opportunity or a threat) has an immediate effect on the magnitude of response commitment with subsequent effect on interorganizational strategies.

Second, our findings provide empirical support to Dutton and Duncan's (1987) conceptualization of the importance of issue urgency and issue feasibility. Their assertion that both of these dimensions of issue interpretation shape response momentum is empirically borne out in this study, given that hypothesis 3 and 4 are supported. Thus, it is clear that the urgency of the issue, namely: the perceived impact on the firm's future as well as the ability of the organization to effectively respond to the issue together act to create the requisite momentum to enhance organizational competence. We argue that future research should take particular care to recognize the centrality of both dimensions of issue interpretation in modeling responses to a strategic issue.

Three, in a related vein, our research provided empirical support to the two-dimensional conceptualization of the issue feasibility construct (Dutton & Duncan, 1987). The empirical results surrounding our research model (Figure 2) clearly support the decomposition of the dimensions of issue capability and issue



understanding with differential effects on the competence constructs. The implication is that a composite conceptualization (and corresponding operationalization) masks the underlying differences between the two dimensions of issue feasibility. This is because we find that while issue capability has expected positive relationships with both dimensions of the intraorganizational strategies (statistically significant results for  $\gamma_{31}$  and  $\gamma_{41}$ ), the other dimension, namely: issue understanding, per se did not have any significant effects (statistically insignificant results for  $\gamma_{32}$  and  $\gamma_{42}$ ).

The traits of positive and negative (associated with opportunity and threat respectively) may reflect evaluative appraisals that are the affective components of interpretation, i.e., the components that make interpretations 'hot' (Dutton & Jackson, 1987: 82). At a general level, our results might thus convey the impression that the emotional, feeling-related components of interpretation are more powerful triggers of responses to technological change (as reflected in commitment to enhance organizational competences) than the reflective, thinking related component of issue understanding. If this is true, then it obviously raises the question -- does issue understanding have any specific role in the model? We note that the positive and significant correlations ( $\phi_{31}$  and  $\phi_{32}$ ) between issue understanding and the other two dimensions -- issue capability and issue urgency -- imply that there are 'spurious' associations that can not be denied (see Simon, 1954 for a detailed discussion on the importance of spurious effects). Thus, we urge that future models incorporating the construct of issue feasibility should be predicated on the decomposed specification of this construct.

Four, our results indicate that issue urgency has a significant impact on both dimensions of commitment to competence enhancement while issue feasibility (especially, issue capability) has a significant effect only on the administrative competence dimension. If we view the enhancement of technological competence --



in terms of hardware, software and communication capabilities -- to be related to financial resource allocation, while the enhancement of administrative competence -- in terms of new skills and capabilities -- to be related to both time and money, then the results are consistent and as expected. For instance, the perceived urgency of an issue will be reflected in the enhancement of competences that can be readily acquired while the perceived opportunity arising from the electronic filing of tax-returns requires the creation of an appropriate organization (beyond technological capabilities) to provide sustained value in the marketplace, thus requiring administrative competence. In the words of a manager of a national franchise:

“it is easy for me to go out and buy the technological capabilities required to file returns electronically, but my problem is where do I go to find the personnel who know enough about tax-laws and technology to staff my offices without having to double my payroll bill?”

Again, we urge researchers employing the construct of organizational competence to pay particular attention to the dimensionality of this construct as relationships at the disaggregated level are far more insightful than at an aggregate level of specification.

Five, we observed an interesting pattern of relationships between the *magnitude* and the *target* of response: (a) a positive and significant effect of commitment to enhancing technological competence and new domain collaboration; and (b) a positive and significant effect of commitment to enhancing administrative competence and current domain collaboration. The former implies that firms intending to place a higher level of emphasis on technological competences are more likely to form intraorganizational collaboration in new domains (including retail banking) to leverage their enhanced ‘technical core’ by offering technology-based services such as refund-anticipation loans (Venkatraman and Kambil, 1991). A related implication from this finding is that return-preparation

firms will seek to enhance their technical competence through a variety of mechanisms that fall within the market-hierarchy continuum since it is impossible for them to fully internalize (i.e., through the hierarchy) all the complex and fast-changing technological capabilities nor is it effective to rely on standard technology-based solutions (i.e., market-mode of exchange) given the criticality of information technology in the marketplace. The latter implies that firms committed to enhance their administrative competences would nevertheless seek to protect their 'technical core' through collaboration with service bureaus or participate in cooperative alliances with other return-preparers. Indeed, such cooperative relationships are beginning to appear in the marketplace (Venkatraman and Kambil, 1991).

Six, our model could be potentially tested across differing contingencies to assess the robustness of the relationships. While an examination of a complete array of contingencies is impossible, we explored the possible role of two potentially important moderators: size (larger versus small return-preparers) and business scope (narrow scope of service versus broad scope of service). Our analyses employed two-group structural equation models (Joreskog & Sorbom, 1989) that sought to assess the invariance of the structural parameters across the groups. The results indicated that the model estimates are invariant across the potential contingencies (details are available on request).

Beyond this specific case of electronic filing of tax-returns, this model can be extended to other types of technological innovations -- both radical and incremental -- to understand the nature of the relationships between issue interpretation and strategic responses. We hope that future research efforts will be both informed and stimulated by this study.

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**Table 1**  
**Means, Standard Deviations and Matrix of Zero-order Correlations (n=424)**

Concept	Mean	sd	1	2	3	4	5	6	7
1 Commitment for New Domain Collaboration	2.68	2.24	1.00						
2 Commitment for Current Domain Collaboration	1.40	1.45	0.284**	1.00					
3 Commitment to Enhance Technological Competence	4.56	1.73	0.163**	0.013	1.00				
4 Commitment to Enhance Administrative Competence	4.13	1.75	0.122*	0.118*	0.522**	1.00			
5 Issue Capability	4.94	1.53	0.087	0.039	0.375**	0.185**	1.00		
6 Issue Understanding	4.54	1.46	0.058	0.010	0.096	0.033	0.330**	1.00	
7 Issue Urgency	181.0	8.0	0.077	-0.052	0.215**	0.014	0.208**	0.196**	1.00

\*\* p <.01

\* p <.05

**Table 2**  
**A Summary of Model Comparisons**

Model	Description	Model Fit	Model Comparisons	Results
$M_t$	Specification of the theoretical model as shown in Figure 1.	$\chi^2$ (df: 52) = 251.88; $p < .001$	NA	NA
$M_u$	Specification of the research model as shown in Figure 2.	$\chi^2$ (df: 44) = 53.42; $p < .16$	Comparison of $M_u$ with $M_t$ yields a $\chi^2_d$ (df: 8) = 198.46; $p < .001$	Accept the research model (Figure 2) as a refinement over the theoretical model (Figure 1)

**Table 3**  
**Parameter Estimates for the Research Model (Figure 2)**

Parameter	ML Estimate	t-value	Standardized Solution	Parameter	ML Estimate	t-value	Standardized Solution
$\lambda_{x1}$	1.00	(fixed)	1.00	$\beta_{13}$	0.191	2.261**	0.157
$\lambda_{x2}$	1.00	(fixed)	0.718	$\beta_{14}$	0.055	0.531	0.038
$\lambda_{x3}$	1.15	6.852**	0.824	$\beta_{23}$	-0.131	-1.65 <sup>t</sup>	-0.123
$\lambda_{x4}$	1.00	(fixed)	0.767	$\beta_{24}$	0.270	2.648**	0.197
$\lambda_{x5}$	0.85	5.226**	0.651	$\beta_{12}$	0.261	4.855**	0.251
$\lambda_{y1}$	1.00	(fixed)	1.000	$\phi_{11}$	1.00	13.266**	1.00
$\lambda_{y2}$	1.00	(fixed)	1.000	$\phi_{22}$	0.588	5.456**	1.00
$\lambda_{y3}$	1.00	(fixed)	0.867	$\phi_{33}$	0.515	4.658**	1.00
$\lambda_{y4}$	1.044	24.046**	0.906	$\phi_{21}$	0.280	5.235**	0.292
$\lambda_{y5}$	1.019	23.213**	0.884	$\phi_{31}$	0.148	2.905**	0.188
$\lambda_{y6}$	1.00	(fixed)	0.737	$\phi_{32}$	0.147	3.420**	0.267
$\lambda_{y7}$	1.247	11.98**	0.919	$\psi_{11}$	1.00	(fixed)	0.791
$\gamma_{31}$	0.224	4.593**	0.265	$\psi_{22}$	1.00	(fixed)	0.791
$\gamma_{32}$	0.038	0.475	0.031	$\psi_{33}$	0.640	10.176**	0.851
$\gamma_{33}$	0.283	3.444**	0.250	$\psi_{44}$	0.531	7.360**	0.977
$\gamma_{41}$	0.116	2.573**	0.161	$\psi_{43}$	0.365	7.743**	0.571
$\gamma_{42}$	0.086	1.175	0.084				
$\gamma_{43}$	0.001	0.022	0.002				

\*\* -- p<.05 t- p<.10



**Table 4**  
**Results of Hypotheses Testing**

Hypotheses	Description	Constrained Model	Theoretical Model	Results of Hypotheses Tests
H1	The effect of competences on interorganizational strategies	$\chi^2$ (df: 48) = 74.73; $p < .01$	$\chi^2$ (df: 44) = 53.42; $p < .16$	Comparison of $M_C$ with $M_t$ yields a $\chi^2_d$ (df: 4) = 21.31; $p < .01$ providing support for the hypothesis
H2	The effect of current domain on new domain collaboration	$\chi^2$ (df: 45) = 79.00; $p < .01$	$\chi^2$ (df: 44) = 53.42; $p < .16$	Comparison of $M_C$ with $M_t$ yields a $\chi^2_d$ (df: 1) = 25.58; $p < .01$ providing support for the hypothesis
H2 (alternate test)	No reciprocal effect between new domain and current domain collaboration	$\chi^2$ (df: 43) = 54.20; $p < .118$ (unconstrained model)	$\chi^2$ (df: 44) = 53.42; $p < .16$	Comparisons of the two models yield a $\chi^2_d$ (df: 1) = 0.78; ns -- implying that the theoretical model (with more degrees of freedom) is supported and the rival hypothesis of reciprocal effect is rejected.
H3	The effect of issue urgency on commitment to competence enhancement	$\chi^2$ (df: 46) = 74.23; $p < .01$	$\chi^2$ (df: 44) = 53.42; $p < .16$	Comparison of $M_C$ with $M_t$ yields a $\chi^2_d$ (df: 2) = 20.81; $p < .01$ providing support for the hypothesis
H4	The effect of issue feasibility on commitment to competence enhancement	$\chi^2$ (df: 48) = 77.31; $p < .01$	$\chi^2$ (df: 44) = 53.42; $p < .16$	Comparison of $M_C$ with $M_t$ yields a $\chi^2_d$ (df: 4) = 23.89; $p < .01$ providing support for the hypothesis

## **APPENDIX 1**

### ***A copy of the One-page Scenario Used in the Instrument***

**You may be aware that the IRS has introduced Electronic Filing in selected areas in 1986 and 1987. A brief description of the system is provided below. (Please read before continuing)**

The IRS has completed pilot tests of electronic filing of individual tax returns. Initially, it was limited to returns prepared in a few metropolitan areas. Next year the project will be substantially expanded to cover entire states or major portions thereof. Soon, it will be nation wide. The IRS will only accept returns from approved electronic filers. An electronic filer is usually (but need not necessarily be) a return preparer.

Each year, the IRS will publish specifications which prescribe the format of computer-prepared returns and the communications requirements for transmitting these returns to the IRS. A firm desiring to file returns electronically must arrange for the computer software and facilities to computer-generate and electronically transmit returns in accordance with the specifications. It must then successfully complete an acceptance test to demonstrate its ability to comply with the IRS specifications.

Prior to transmitting live returns, an electronic filer must secure the signatures of the taxpayers on Taxpayer Declaration Forms, which are batched and mailed to the Service weekly. In addition, the preparers must provide clients with printout of their electronic return. IRS will transmit acknowledgements to electronic filers within 24 hours of receipt of electronic return, indicating whether returns have been accepted or rejected. The reasons for rejection will be provided so that they can be retransmitted after correction.

Electronic filing enables the Service to generally issue 95% of the refunds within three weeks of receipt. The remaining returns have problems that would have resulted in a delay irrespective of the method of filing. The Service will guarantee that electronic returns are not treated any differently from those filed on paper from the standpoint of audit selection or other compliance action.

A taxpayer filing electronically can elect to have the refund directly deposited in his or her bank, savings and loan, or credit union account. Further, the IRS has advised that electronic filers may assist taxpayers who elect direct deposit in securing refund anticipation loans from the financial institutions designated to receive the direct deposits. The financial institution would normally secure repayment by setting off the directly deposited refunds.

IRS is considering the possibility of accepting electronic payments with electronic returns. The payments would be in the form of authorizations by the taxpayers contained on the electronic returns for the IRS to either (a) debit checking accounts, or (b) draw on established lines of credit, such as credit card accounts.

## APPENDIX 2

*Measurement Details*

Table A1 summarizes the details of the scales with: (a) the items; (b) the scoring scheme; and (c) the assessment of the internal consistency of the multi-item scales.

Table A1: Measurement Properties of Multi-Item Scales

Construct	# of Items	Description of the Measures	$\rho_c^1$
Issue Urgency	2	<p><b>Items:</b>            (a) Some feel that there will be a significant shift towards the use of Electronic Filing of tax returns in the future. If you were to assign a probability as to the likelihood of this trend to occur, what would it be?            (b) How likely is it that your business will be affected by this trend?</p> <p><b>Scoring:</b>            0-100% and the probabilities converted into entropy measures (based on Leblebici and Salancik, 1982)</p>	0.89
Issue Understanding	2	<p><b>Items:</b>            (a) I feel confident that we are aware of all the possible response alternatives available to our firm.            (b) When weighing the alternatives, it is hard to decide which is likely to be most effective in the long run (reverse scored)</p> <p><b>Scoring:</b>            A seven point scale from strongly agree to strongly disagree</p>	0.85
Issue Capability	1	<p><b>Item:</b>            Electronic filing of tax-returns.</p> <p><b>Scoring:</b>            A seven point scale from great threat to great opportunity</p>	NA
Commitment to Technological Competence Enhancement	3	<p>Please indicate the likelihood that your organization will adopt the following responses:</p> <p><b>Items:</b>            (a) Strengthening, or acquiring computer processing facilities.            (b) Strengthening, or acquiring software capabilities.            (c) Strengthening, or acquiring communication capabilities.</p> <p><b>Scoring:</b>            A seven point scale from not at all likely to extremely likely.</p>	0.91

Table A1 (Continued)

<p><b>Commitment to Administrative Competence Enhancement</b></p>	<p>2</p>	<p>Please indicate the likelihood that your organization will adopt the following responses:  <b>Items:</b>                  (a) Increasing our expertise in tax laws.                  (b) Altering the skill-base of our professionals.  <b>Scoring:</b>                  A seven point scale from not at all likely to extremely likely.</p>	<p>0.78</p>
<p><b>Commitment to Current Domain Collaboration</b></p>	<p>1</p>	<p>Please indicate the degree of commitment to establishing collaborative arrangements within the current domain:  <b>Items:</b>                  (a) Other return-preparers; and                  (b) Service Bureaus.  <b>Scoring:</b>                  A scale with increasing level of commitment from: informal business agreements to formal business agreements to joint ventures to mergers and acquisitions. The scale score is the sum of the two indicators</p>	<p>NA</p>
<p><b>Commitment to New Domain Collaboration</b></p>	<p>1</p>	<p>Please indicate the degree of commitment to establishing collaborative arrangements within the new domain:  <b>Items:</b>                  (a) Software manufacturers;                  (b) Telecommunications providers; and                  (c) Financial institutions.  <b>Scoring:</b>                  A scale with increasing level of commitment from: informal business agreements to formal business agreements to joint ventures to mergers and acquisitions. The scale score is the sum of the three indicators</p>	<p>NA</p>

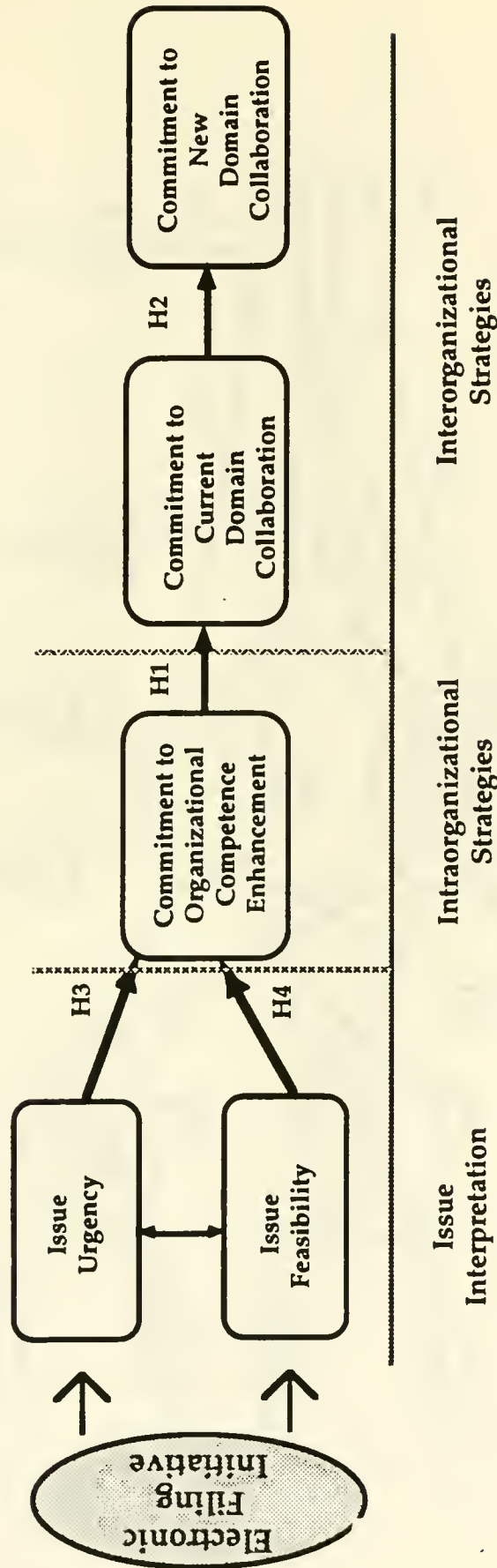
<sup>1</sup> This index is calculated as follows:

$$\rho_c = \left( \sum_{i=1} \lambda_i \right)^2 \text{Variance (A)} / \left( \left( \sum_{i=1} \lambda_i \right)^2 \text{Variance (A)} + \sum \theta_\delta \right)$$

where variance (A) refers to the variance of the measured construct and the  $\lambda_i$  refers to the loadings of the indicators on the construct and  $\theta_\delta$  refers to the error variance (Bagozzi, 1981).



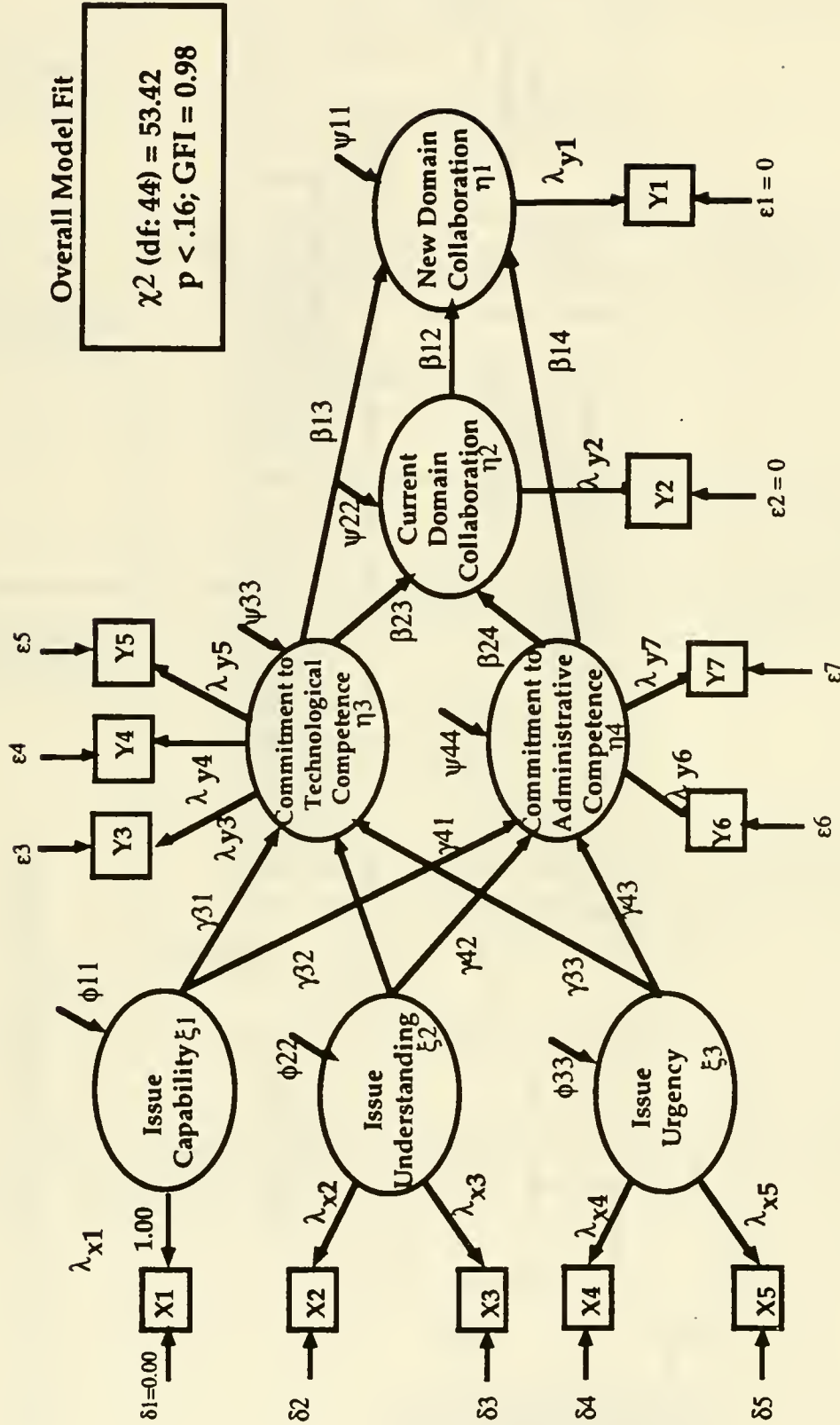
Figure 1  
The Theoretical Model



Note: H1 to H4 refer to the corresponding hypotheses



Figure 2  
The Research Model



Note: The covariances among the three constructs of interpretation and the two constructs of commitment to organizational competence enhancement are not drawn for schematic clarity







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