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## **INVESTING IN NEW INFORMATION TECHNOLOGY: THE ROLE OF COMPETITIVE POSTURE AND ISSUE DIAGNOSIS**

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*This paper investigates the influence of competitive posture and strategic issue diagnosis on firms' investment in new information technology. We analyze responses to technological innovation of close to 300 tax-return preparation businesses confronted with the introduction of electronic filing in the market for tax-related services. Results of path analysis show that issue diagnosis indirectly provokes adoption of new technology by increasing the level of commitment to technological capabilities. Competitive posture, as reflected in firms' efficiency and quality orientations, influenced adoption of newly available technology both directly and indirectly through issue interpretation. These findings suggest that competitive postures influence investment in new technology primarily by establishing institutional rules for innovation rather than by conditioning the process of strategic issue diagnosis.*

### **INTRODUCTION**

Strategy research has only recently begun to shift from a focus on 'tactical' difficulties surrounding the commercialization of new technology to 'strategic' problems of how technology can shape and support corporate strategy (Pappas, 1984; Pavitt, 1986). Within this movement, an important question is: why do firms facing similar situations respond differently—particularly in the way they seize or fail to seize upon the strategic implications of technology innovations? The few theoretical attempts to link strategic responses to technological changes have not led to any integrated, generalizable answers to this question. However, they have pointed to the value of a decision making perspective that directs our attention to managerial interpretations (Morone, 1989).

In advancing an information processing model

of investment in new technology, this paper maintains that managers view technological innovation as a *strategic issue*, that is, as an emerging development that has the potential to affect significantly the total performance of the organization or its position in the environment (Ansoff, 1980). Accordingly, our theory building begins with two key premises: first, that investment in new technology is largely the outcome of the interpretations produced by strategic issue diagnosis; and second, that a firm's competitive posture plays an important role in shaping managers' interpretations of technological innovation as a strategic issue. Independent of their effects on strategic issue interpretation, firms' competitive postures also may influence investment in new technology by creating and sustaining institutional pressures for stability and conformity. Therefore, this study addresses the question of whether competitive postures influence investment in new technology *both directly and indirectly* through their effects on managers' interpretations of strategic issues.

**Key words:** Competitive posture, issue interpretation, information technology, technological innovation, path analysis.

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## **ELECTRONIC FILING OF TAX RETURNS AS A STRATEGIC ISSUE**

The new technology we investigate is the electronic filing of tax returns (hereafter, electronic filing). This innovation is a fundamental technological departure from the traditional paper-based process to a system founded on computer-to-computer exchange of data between the taxpaying community and the IRS (Wedick, 1986). Until the mid 1980s, the return preparation market had experienced limited applications of computer and communication technology. Although larger businesses had adopted computerized operations, computerized tax-return preparation was not commonplace. Typically, returns were prepared manually and mailed to the Internal Revenue Service (IRS) through the U.S. Postal Service. In 1985, the IRS spent over \$1 billion (approximately one-third of its budget) on handling paper returns and transcribing data to machine readable form. Data transcription procedures were prone to errors leading to costly delays in the processing of returns and refund checks (Venkatraman and Kambil, 1991).

In 1986, the IRS responded to the increasing costs of tax collection by offering the capability for professional return-preparers to file returns electronically. This system would reduce the entire set of costs of paper handling as well as the need for data transcription (at the IRS end) by capturing the relevant taxpayer information at the time of return-preparation. The technical feasibility of electronic filing was demonstrated in 1986. By 1988, electronic filing had expanded to over a third of the country, and by 1990 it was available nationwide.

Electronic filing offers firms a chance to redefine the characteristics of products and services and to create new sources of competitive advantage (Venkatraman and Kambil, 1991). It does this 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). Thus, the availability of electronic filing has confronted managers of tax-preparation businesses with an important question: Should their firm aggressively invest in this new information technology, thereby seizing the opportunity to redefine its prod-

uct/market domain or to differentiate itself from other competitors? Or should the firm respond slowly and conservatively to reduce the risks and costs of radical change? To explain why firms will respond differently to this issue, we develop a theoretical model that considers the impact of issue interpretations and competitive postures.

## **INTERPRETING AND RESPONDING TO NEW TECHNOLOGIES**

Investing in new technology is an important component of organizational innovation. New technologies, such as electronic filing, have potential impact on market characteristics, as well as on performance of individual firms (Porter, 1983). However, studies of innovation generally ignore the strategic issues that top managers face when confronted by a new technology (Van de Ven, 1986). As an environmental development that has the potential to affect their organization's performance, the introduction of electronic filing is a strategic issue that top managers must contemplate. Examining the interpretation step may be particularly critical to understanding differences in organizational responses (Milliken, 1990).

### **Evidence from field interviews**

Field interviews with managers provided support for our interpretive approach. At the end of detailed interviews with professional return-preparers, it became clear to us that participants in the marketplace were interpreting the electronic filing initiative in different ways. Some believed that the impact of electronic filing on the marketplace would be profound. One tax preparer with a significant presence in the southeastern region predicted:

This initiative by the IRS will change the way business is conducted in the marketplace. The companies have been sitting pretty not taking advantage of new technologies. Sure tax-laws have been changing, and it is expected that we keep up with it, but nothing significant has happened to our business processes in a long time. Electronic filing will differentiate the men from the boys because you can't make a buck with old skills alone.

An owner of a regional return-preparer chain saw things differently:

My customers would rather that I spend time going over their returns carefully to identify additional possible deductions rather than me being seduced by this technology, which I do not understand well anyway.

...Moreover, we are quite efficient without using these computers, and I think that we will spend more time and incur more costs with this new technology.

During these interviews, it also became clear that some executives saw 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 young tax preparer:

...Electronic filing allows me the opportunity to advertise that I am at the state-of-the-art in using computers; taxpayers will know that the chances of error are minimal and I will be able to attract new customers who have always thought that they could do the forms themselves as well as we guys.

Others saw electronic filing as a potential threat. For example, the owner of a professional CPA practice said:

So far, we did not have as much pressure to computerize our operations. Now, if we do not do it, we are in big trouble: customers will not pay for us to do the tax-returns manually what with all these new software available in the market for the personal computers; they also will want to file electronically so that they can get their refund sooner. So, if I do not have this capability, I might as well say goodbye to my business.

According to Tushman and Anderson (1990), technological innovations may be classified as either competence-enhancing or competence-destroying. However, our interviews suggested that the same innovation (here, electronic filing) could be perceived by senior managers as either competence-enhancing (new ways of differentiating their service offering), or competence-destroying (destroying traditional skills of manual return preparation). We therefore concluded that a managerial interpretation view was an appropriate theoretical lens through which to

examine organizational responses to technological innovation. We turn to the literature on strategic issue diagnosis to direct our conceptualization of managerial interpretations.

### **Strategic issue diagnosis**

As described by Dutton, Fahey, and Narayanan (1983: 307), strategic issue diagnosis refers to those activities and processes by which data and stimuli are translated into focused issues (i.e., attention organizing acts) and the issues explored (i.e., acts of interpretation). Dutton and Duncan (1987) propose that the interpretations and judgements that are the outputs of strategic issue diagnosis play an important role in shaping organizational responses to environmental change.

In this study we examine how the interpretations that emerge from strategic issue diagnosis influence subsequent commitment to, and investment in, electronic filing. Our field interviews suggested the importance of commitment to obtaining and enhancing new technology capability in terms of hardware, software, and communication skills as part of organizations' responses to the introduction of electronic filing by the IRS. Therefore, we analyze two components of new technology investment: (1) *new technology capability commitment*, defined as 'the extent to which there is a commitment to strengthening or acquiring the capabilities that firms need to adopt electronic filing'; and (2) *new technology adoption*, defined as 'the extent to which the firm uses electronic filing.' Phrased as a theoretical proposition, our expectations are as follows:

*Proposition 1: Managers' assessments of the impact of a technological innovation will influence their firms' commitment to invest in new technology capabilities, which, in turn, will influence actual adoption of the new technology.*

### **Strategic issue dimensions**

Strategic issue diagnosis influences response momentum by clarifying the perceived *urgency* and *feasibility* of taking action (Dutton and Duncan, 1987). Response momentum refers to the level of effort and commitment that top-level

decision makers are willing to devote to action designed to resolve an issue (Dutton and Duncan, 1987).

To examine the impact of perceived *urgency* of investing in new technology, we examine *effect significance*, defined as 'the extent to which managers expect implementation of electronic filing to have a significant impact on the marketplace.' Effect significance directly influences issue urgency: assessments of issue urgency depend on the issue's visibility and perceived importance (Dutton and Duncan, 1987; Milliken, Dutton, and Beyer, 1990). We would therefore expect effect significance to influence positively the level of commitment that top managers are willing to devote toward the adoption of a new technology.

*Hypothesis 1A: The more significance top managers attach to the impact on the marketplace of a technological innovation, the greater will be their firms' level of commitment to invest in new technology capability, which, in turn, will increase adoption of the new technology.*

*Issue feasibility* reflects the interaction of two judgements (Dutton and Duncan, 1987): issue understanding, that is, the perception that with some effort, the means for resolving the issue can be identified; and issue capability, that is, the perception that the means for resolving the issue are available and accessible. To examine the impact of the feasibility of investing in new technology, we examine *effect valence*, defined as 'the extent to which managers frame electronic filing as an opportunity for the firm to gain competitive advantage.'

Effect valence is a salient dimension that directly influences issue feasibility. In our context, issue feasibility reflects the perception that managers can capitalize on the coming changes by investing in the new technology to bring about competitive advantages for the firm. This perception closely associates with the perception of opportunity vs. threat. Empirical evidence suggests that framing events or issues as opportunities associates with a strong sense of positive and gain possibility and of competence or control concerning issue resolution; and, threats associate with a strong sense of negative and loss possibility and of inadequacy and disablement concerning

issue resolution (Jackson and Dutton, 1988; Thomas and McDaniel, 1990). Therefore, we expect effect valence to influence positively the level of commitment that top managers are willing to devote to the adoption of a new technology.

*Hypothesis 1B: The more top managers frame the impact of a new technology as an opportunity to achieve competitive advantage, the greater will be their firms' level of commitment to invest in new technology capability, which, in turn, will increase adoption of the new technology.*

## ORGANIZATIONAL STRATEGY AND ISSUE DIAGNOSIS

Organizations' strategies influence the outcomes of issue interpretation processes by encoding theories of action that influence how managers select and interpret environmental stimuli (Daft and Weick, 1984). Competitive posture is a component of organizational strategy that encodes theories of action regarding the competitive advantages that its managers value, and toward which they allocate its resources (Mintzberg, 1988).

By encoding theories of action, competitive postures influence three different aspects of issue diagnosis: First, they affect the *breadth* of information surveillance. For example, Meyer (1982) found that hospitals pursuing conservative strategies typically enacted narrow domains and tended to disregard the tremors that preceded the occurrence of a strike, in contrast to hospitals pursuing entrepreneurial strategies. Similarly, Thomas and McDaniel (1990) found that Chief Executive Officers (CEOs) in organizations with domain offense strategies differed from their counterparts pursuing domain defense strategies in terms of the number of variables considered. Second, they determine the *target* of information gathering. For example, Milliken *et al.* (1990) propose that decision makers in organizations pursuing efficiency strategies will direct their attention internally and to clues for increasing efficiency, as opposed to companies pursuing product differentiation strategies, who are more likely to be focused externally. Third, they shape the *meaning* of examined information. Meyer

(1982) found that hospitals with a set of values that emphasized efficiency, predictability, and self-reliance tended to perceive a strike as a decline in revenue; in contrast hospitals with a set of values that emphasized innovation, pluralism, and professional autonomy, tended to perceive the strike as an opportunity for testing members' adaptive dexterity.

In our study, during our field interviews, we observed that firms competed primarily in terms of their emphasis on efficiency and quality of service. By emphasizing efficiency through high volume and speediness of return preparation and through policies that keep costs down, a firm can charge a lower price for its services and attract those taxpayers who might otherwise bypass these services because of high costs. Indeed, managers in many firms believe that aggressive pricing reflecting an efficiency orientation is essential for survival in this highly competitive and turbulent marketplace (Venkatraman and Kambil, 1991). In contrast, by stressing features of tax-return preparation that reflect a more personal touch, a firm captures customers who are willing to pay more for the quality of the service they receive.

Efficiency and service quality orientations shape the outcomes of issue diagnosis in terms of the three aspects discussed above. Organizations that emphasize efficiency tend to have a narrower range of information surveillance, pay attention to events that hold clues to increasing efficiency, and interpret events that have the potential to increase efficiency as opportunities for competitive advantage. In contrast, organizations that emphasize service quality tend to have a broader range of information surveillance, ignore events that hold clues to increasing efficiency, and are not likely to interpret events that have the potential to increase efficiency as opportunities for competitive advantage. The first two aspects of issue diagnosis influence the extent to which managers will notice the widespread impact of technological innovation. The third aspect of issue diagnosis influences the extent to which managers will interpret a technological innovation as an opportunity. Phrased as theoretical propositions, our expectations are as follows:

*Proposition 2: Firms' competitive postures will influence managers' attention to the significance of a technological innovation, which, in*

*turn, will influence their commitment to invest in new technology capabilities and their firms' subsequent adoption of the new technology.*

*Proposition 3: Firms' competitive postures will influence managers' assessments of the valence of a technological innovation, which, in turn, will influence their commitment to invest in new technology capabilities and their firms' subsequent adoption of the new technology.*

## Competitive posture and effect significance

### Breadth of information surveillance

To understand the nature of competitive posture in our study, we use Mills and Margulies' (1980) classification of service organizations in terms of the features that characterize interaction between employee and customer/client: (1) *maintenance-interactive*, where the interaction is cosmetic and continuous with the objective of building long-term reliability; (2) *task-interactive*, where the employee-client interaction is concentrated and focused; and (3) *person-interactive*, where the interaction focuses on the improvement of the client's direct intrinsic and intimate well-being. Maintenance-interactive firms emphasize high volume and speed and deal with a relatively narrow range of activities, while personal-interactive firms emphasize a highly personal touch that may include personal financial planning and deal with a relatively complex and broad set of activities (Venkatraman and Kambil, 1991). Here the client is less precise not about what is needed, but how to accomplish it. Therefore, the decisions made by the employee are more complex and tend to require novel solutions (Mills and Margulies, 1980). It follows that the more a firm emphasizes service quality, the more complex, judgmental, and creative are its decision-making processes, and the greater, therefore, is its information processing capacity.

Thomas and McDaniel (1990) found that the information processing capacity of top management teams related positively to the quantity of information gathered and used for interpretation. Top management teams characterized by high levels of ability to handle complexity tend to show greater latitude in reading and defining the environment and to use more complex rules and

procedures for gathering information (Ginsberg, 1990; Walsh, Henderson and Deighton, 1988). More complex or differentiated organizational paradigms also reflect greater information variety and a broader stock of interpretations from which to draw (Dutton, 1990). Thus, we expect top managers of firms emphasizing service orientation to be more aware of the significance and diversity of the impact of a new technology (even if the technology is not directly relevant to the competitive advantage their firms are pursuing at present).

*Hypothesis 2A: The stronger their firms' service quality orientation, the more significance top managers will attach to the impact of a new technology on the marketplace.*

#### *Target of information gathering*

The more a firm emphasizes efficiency as a source of competitive advantage, the more its managers will pay attention to technological developments that may hold clues to increasing efficiency (Milliken *et al.*, 1990). Our field research confirmed that managers view the benefits of electronic filing as increasing the efficiency of tax-return preparation. However, they differed in terms of the extent to which they viewed this potential as one that would transform the marketplace for tax services. Accordingly, we expect managers of firms placing a stronger emphasis on efficiency to be more aware of the impact of electronic filing on the marketplace than managers of firms placing a weak emphasis on efficiency.

*Hypothesis 2B: The stronger their firms' efficiency orientation, the more likely are top managers to perceive the impact of a technological innovation on the marketplace as significant.*

#### **Competitive posture and effect valence**

##### *Meaning of information examined*

By exploiting the benefits of volume and speed, firms emphasizing efficiency as a source of competitive advantage are in a better position to capitalize on the potential gains of electronic

filing than firms emphasizing service orientation. In the words of one regional franchisee:

Tax-filing is a taxing time for everyone including us—especially since we can't predict how many will show up in a given day. . . So, computers and communication links will help speed up my work and service more customers than I have been able to do before. This is becoming more important as the price for this service (I mean the standard Form-1040 type of business) is getting very competitive with lots of CPAs around. Electronic filng is a must for me if I have to stay efficient and competitive in this market.

A manager of a firm with a strong emphasis on personal service made the following comment:

Tax-filing service is a people business. It is a time when the customers want to sit down with us and talk about the last year in terms of how much they earned and what they owe IRS. More important, each customer is different and we attempt to service each as a distinct individual. Somehow, the use of computers takes away from the personalized service. We have done market surveys, which have shown us that personal service is considered very important. Although we might use computers in the backroom, we do not believe that they should be used to interact with clients.

Generally, firms emphasizing efficiency as a competitive advantage may be less likely to view environmental jolts as opportunities (Meyer, 1982). However, they should be more attuned to the benefits of volume and experience offered by a specific technology such as electronic filing. We would therefore expect managers of firms that place a strong emphasis on efficiency to view electronic filing as an opportunity to gain competitive advantage. Similarly, we would expect top managers of firms that emphasize service to be less likely to frame electronic filing as an opportunity to gain competitive advantage. Thus, we hypothesized:

*Hypothesis 3A: The stronger their firms' efficiency orientation, the more likely are top managers to frame the impact of a new technology as an opportunity to gain competitive advantage.*

*Hypothesis 3B: The stronger their firms'*

*service quality orientation, the less likely they are to frame the impact of a new technology as an opportunity to gain competitive advantage.*

## INSTITUTIONAL EFFECTS OF ORGANIZATIONAL STRATEGY

Organizational strategies also reflect institutional properties that shape strategic actions more automatically, or directly. Application of the rules and routines expressed by organizational strategies promotes fusion among strategic decisions over time, realization of distinctive competencies, and maintenance of the organization's character (Burgelman, 1991; Nelson and Winter, 1982). Organizational strategies also provide a set of orienting metaphors that enable stakeholders to understand the organization (Chaffee, 1985). As a set of routines that describe what an organization's members believe to be its character, a firm's strategy defines its identity; as a set of attributes that describe what an organization's members believe external stakeholders use to distinguish it from other organizations, a firm's strategy defines its image (Dutton and Dukerich, 1991). Thus, an organization's strategy acts to engender strategic momentum and to sustain institutional reliability and accountability.

Competitive postures reflect the development of institutionalized routines regarding how a firm will compete within the boundaries of its business domain. Internal and external demands for consistency and reliability among these routines endorse certain organizational actions over others (Hannan and Freeman, 1984). As a form of normative control, organizational reputations confer relative competitive advantage and disadvantage upon conforming organizations (Fombrun and Shanley, 1990). When organizations engage in changes that violate institutional reliability and accountability, they face increased risks of failure (Hannan and Freeman, 1984); when organizations engage in activities that stakeholders deem unacceptable, they risk the loss of important competitive advantages (Fombrun and Shanley, 1990). Phrased as a theoretical proposition, our expectations are as follows:

*Proposition 4: Firms' competitive postures*

*will influence their commitments to invest in new technology capabilities and their firms' subsequent adoption of the new technology.*

Firms that emphasize efficiency are more likely to invest in electronic filing because of the volume and speed-oriented rules and procedures set up, and which have shaped stakeholders' expectations. Here, top managers may notice a technological innovation and with little deliberation or interpretation, emit a programmed response to develop new capabilities. Similarly, firms that emphasize service quality are less likely to adopt electronic filing since managers believe that it symbolizes a reduction in personal service to its customers, which may send a negative message to its customers. Thus:

*Hypothesis 4A: The stronger the firm's efficiency orientation, the more extensive will be: (a) its commitment to investing in new technology capabilities and (b) its adoption of the new technology.*

*Hypothesis 4B: The stronger the firm's service orientation, the less extensive will be: (a) its commitment to investing in new technology capabilities and (b) its adoption of the new technology.*

### Direct vs. indirect effects of competitive posture

Implicit in the previous discussion is the expectation that competitive posture influences investment in new technology both directly and indirectly through managerial interpretations of its strategic impact. In specifying the role of managerial interpretation as a mechanism that mediates competitive posture, we have drawn upon cognitive theories of organizational action. Here we have argued that strategies reflect ideologies that affect managers' interpretations of strategic issues, which, in turn, influence commitments to resolving these issues and to subsequent organizational responses. However, in specifying the role of competitive posture as a set of variables that directly constrain organizational action, we have also drawn upon institutional theories of organizational action. Here, we have argued that strategies reflect rules, routines, and metaphors that satisfy stakeholders' demands for consistency and reliability, and

which, thereby, determine the legitimacy of different organizational actions. If a technological innovation is legitimate for an organization, its managers may adopt the new technology with little reflection on the strategic issue it presents; if it is abnormal for an organization, institutional resistance may prevent its adoption even if managers recognize its potential importance to the marketplace.

A question we now raise is whether one or the other of these theories provides a stronger explanation for organizational responses to technological innovation. Behavioral momentum plays a dominant role in all types of organizational actions (Amburgey and Miner, 1990; Boeker, 1989; Fombrun and Ginsberg, 1990; Ginsberg and Buchholtz, 1990). Inertial forces can block the implementation of a radical change or innovation even when a new perspective calling for the need to change has emerged in the information domain of strategic decision makers (Cooper and Schendel, 1976; Ginsberg and Abrahamson, 1991). Institutional momentum is not merely a feature, but a dominant force that leads to the tendency to emit a programmed organizational response to an event with little reflection or interpretation by decision makers (Starbuck, 1983). Thus, we expect the following:

*Proposition 5: The direct effects of a firm's competitive posture on its commitment to investing in new technology capabilities and on its adoption of the new technology will be stronger than the indirect effects of competitive posture through managerial interpretations.*

## METHOD

### Phase one: Detailed field interviews

In the first phase of the study, we carried out detailed field interviews with three sets of participants: (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 the expected effects of the electronic filing initiative on the marketplace; and (c) key providers of the software and communication services, to understand the nature of emerging new products and services.

Interviews with senior IRS personnel were critical in ascertaining the level of regulation involved in the electronic filing initiative: If electronic filing were compulsory for some segments but not for others, then an interpretive perspective would be inappropriate for explaining differences across these segments. The second set of interviews with professional return-preparers helped us understand the importance of this technological shift for their businesses and recognize that this is a major technological change. A third set of interviews with key providers of software and communications services enabled us to appreciate the skills and capabilities required to adapt to the challenges posed by this new information technology.

### Phase two: Structured data collection using questionnaires

In phase two, we developed an instrument that captures the measures of the key constructs that underlie our hypotheses. We pretested the instrument with eight professionals in the market and within the IRS for understandability, wording, and fatigue. More important, it was necessary to develop and test a 1-page scenario describing the electronic filing phenomenon that could serve as the common stimulus for all participants in answering the questions. Appendix 1 shows a copy of the 1-page scenario.

### Data

Using structured questionnaires, we obtained data on indicators of the following constructs: *efficiency-orientation*, *service quality-orientation*, *effect valence*, *effect significance*, and *capability commitment*. Appendix 2 provides a detailed description of the measures. In 1987, we mailed questionnaires to 1000 businesses, stratified according to the population in each zipcode in the country. Each questionnaire was accompanied by a letter explaining that the study seeks to understand the perceptions of the market to the specific initiative of electronic filing, and we had one round of follow-up with an additional copy of the questionnaire. The effective response rate was 43 percent. Approximately 66 percent of the sample consisted of primary tax-return preparers, nearly 20 percent of the sample consisted of individual accountants, and the remainder

represented regional and national accounting firms. We compared this distribution to the original sample along three criteria: (a) the 50 states, (b) the size category maintained by the IRS that was used initially to derive the sample, and (c) the category of the number of returns filed. The sample of completed questionnaires did not differ from the original sample along these three criteria.

A year later (in 1988), following the next return filing season, we collected data from the IRS regarding adoption of electronic filing by each firm in our sample. To examine the extent to which firms invested in this new technology, we measured *adoption of new technology* (our final dependent variable) as the percentage of returns filed electronically during the tax filing season that followed a year later after the IRS had introduced electronic filing. We used the subset of the sample that had the opportunity to file electronically during the next season (291 out of 430) since the dependent variable is irrelevant for those firms that did not have the choice to file electronically.

Table 1 provides means, standard deviations, and intercorrelation coefficients for the variables in the model we examined in our study.

We rely on a single senior informant since we observed during our interviews that nearly all businesses are owner-managed, assisted by one or two tax professionals (average number of tax-professionals in our final sample: between two and three); and even in larger organizations the tax services area was headed by a senior executive directly responsible for managing the business. This approach is consistent with the general recommendation to use the most knowledgeable

informant (Huber and Power, 1985; Venkatraman and Grant, 1986).

### Analysis

We used path analysis to test our hypotheses because of its ability to decompose effects into their direct and indirect components (Alwin and Hauser, 1975; Duncan, 1971; Kenny, 1979). Specifically, we identify the relative magnitude of the direct and indirect effects through managerial interpretations and behavioral intentions of competitive posture on adoption of new technology. (See Figure 1.)

We carried out the required analyses in three steps: First, we estimated a set of four ordinary least squares (OLS) regressions:

$$\begin{aligned} \text{Adoption} = & P_0 + P_{65}\text{Commitment} + P_{64}\text{Valence} + P_{63}\text{Significance} \\ & + P_{62}\text{Service} + P_{61}\text{Efficiency} \end{aligned} \quad (1)$$

$$\begin{aligned} \text{Commitment} = & P_0 + P_{54}\text{Valence} + P_{53}\text{Significance} + P_{52}\text{Service} \\ & + P_{51}\text{Efficiency} \end{aligned} \quad (2)$$

$$\text{Significance} = P_0 + P_{32}\text{Service} + P_{31}\text{Efficiency} \quad (3)$$

$$\text{Valence} = P_0 + P_{12}\text{Service} + P_{41}\text{Efficiency} \quad (4)$$

In the second step, we calculated the indirect effects as a simple multiplicative measure of the magnitude of the relevant path coefficients (standardized beta coefficients) by using the Simon-Blalock technique (Duncan, 1971). For example, we obtained the indirect effect of *efficiency* on *commitment* through *valence* by multiplying the path coefficients between *efficiency* and *valence* ( $P_{31}$ ) and *valence* and *commitment* ( $P_{53}$ ).

Table 1. Descriptive statistics of variables in the model<sup>a</sup>

Variables	Mean	SD	Correlations <sup>b</sup>					
			1.	2.	3.	4.	5.	6.
1. Efficiency orientation	5.12	1.09						
2. Service quality orientation	5.73	0.58	0.150					
3. Effect significance	4.73	1.20	0.172	0.100				
4. Effect valence	5.02	1.51	0.096	0.005	0.023			
5. Capability commitment	4.57	1.73	0.313	-0.027	0.299	0.340		
6. Adoption of new technology	6.09	6.57	0.166	-0.104	0.050	0.126	0.291	

<sup>a</sup> $N = 291$ . <sup>b</sup>Correlation coefficients greater than 0.12 are significant at  $P < 0.05$ .

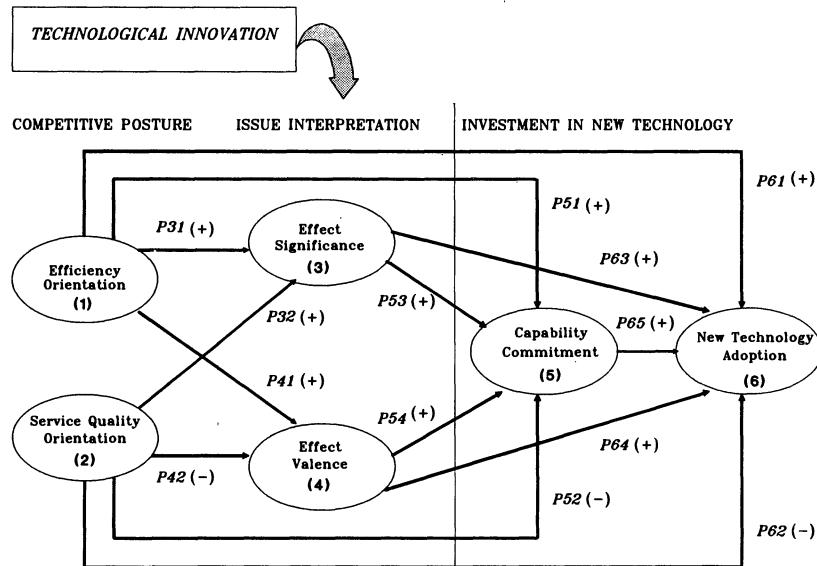


Figure 1. Theoretical model of investment in new technology

In the third step, we calculated the ratio of the indirect effect of efficiency and service orientation on new technology adoption (through capability commitment and issue interpretation) to their direct effect; the ratio of the indirect effect of issue interpretations on new technology adoption (through capability commitment) to their direct effect; and the ratio of the indirect effect of efficiency and service orientation (through issue interpretations) on capability commitment to their direct effect. This analysis provides the basis for examining the indirect effects of competitive posture and issue diagnosis on new technology adoption (through capability commitment). It also allowed us to investigate Proposition 5, which posits that the direct effects of competitive posture on investment in new technology will be stronger than their indirect effects through issue diagnosis. We calculated pseudo *t*-tests for indirect effects involving one mediating variable (Venkatraman, 1989). However, the use of ratios to examine the strength of direct vs. indirect effects is unavoidable since statistical tests of indirect effects involving multiple mediating variables are not available.

## RESULTS

Table 2 summarizes the path coefficients. The results of path analysis completely supported our first two hypotheses regarding the effects of issue interpretation on investment in new technology:

Table 2. Path coefficients for the model in Figure 1

Path	Path coefficient ( $\beta$ )	<i>t</i> -value <sup>a</sup>
P65	0.273	4.03***
P64	0.029	-0.47
P63	-0.031	-0.51
P62	-0.978	-1.64*
P61	0.083	1.34 <sup>t</sup>
<i>R</i> <sup>2</sup> = 0.11***		
P54	0.303	5.70***
P53	0.257	4.78***
P52	-0.091	-1.70*
P51	0.256	4.71***
<i>R</i> <sup>2</sup> = 0.26***		
P42	0.014	1.20
P41	0.158	1.78*
<i>R</i> <sup>2</sup> = 0.013*		
P32	0.078	1.24
P31	0.158	2.47**
<i>R</i> <sup>2</sup> = 0.035**		

<sup>a</sup>Significance levels are one-tailed for hypothesized paths. <sup>t</sup> $p < 0.10$ , <sup>\*</sup> $p < 0.05$ , <sup>\*\*</sup> $p < 0.01$ , <sup>\*\*\*</sup> $p < 0.001$ .

specifically, the more significance managers attached to the new technology's impact on the marketplace, and the more they framed it as an opportunity to gain competitive advantage, the stronger were behavioral intentions to acquire relevant technological capabilities. Table 2 shows that both of these effects ( $P_{53}$  and  $P_{54}$ ) and the effect of capability commitment on new technology adoption ( $P_{65}$ ) were highly significant. Yet, the effects of issue interpretation on new technology adoption ( $P_{63}$  and  $P_{64}$ ) are statistically insignificant. This supports our first proposition that issue interpretations influence adoption of new technology indirectly through their effects on capability commitment.

Our analysis provided partial support for the second set of hypotheses—2A and 2B—regarding the influence of efficiency and service orientation on effect significance. Specifically, the influence of efficiency orientation on effect significance ( $P_{31}$ ) is significant and positive; the influence of service orientation on effect significance ( $P_{32}$ ) is statistically insignificant. Thus, our analysis only supported Proposition 2 (which posited that firms' competitive postures will influence managers' attention to the significance of a technological innovation) with respect to efficiency orientation.

Our analysis also provided partial support for the third set of hypotheses—3A and 3B—regarding the influence of efficiency and service orientation on effect valence. Specifically, the influence of efficiency orientation on effect valence ( $P_{41}$ ) is significant and positive; the influence of service orientation on effect valence ( $P_{42}$ ) is statistically insignificant. Thus, our analysis only supported Proposition 3 (which posited that firms' competitive postures will influence managers' attention to the significance of a technological innovation) with respect to efficiency orientation.

Our analysis completely supported the fourth set of hypotheses—4A and 4B. Specifically, the more firms emphasized efficiency, the stronger were their new technology capability commitments and the more extensive were their adoptions of electronic filing; the more firms emphasized service, the weaker were their new technology commitments and the less extensive were their adoptions of electronic filing. Table 2 shows that the positive effects of efficiency orientation on capability commitment ( $P_{51}$ ) and adoption of new technology ( $P_{61}$ ) are statistically

significant; and the negative effects of service orientation on capability commitment ( $P_{52}$ ) and adoption of new technology ( $P_{62}$ ) are statistically significant. This supports our fourth proposition that firms' competitive postures will influence their commitment to invest in new technology capabilities and their firms' subsequent adoptions of the new technology.

Although we could not test statistically Proposition 5 in the same way as we did the previously posited hypotheses, the results of path analysis supported our expectation that the direct influence of efficiency and service quality orientation on investment in new technology will be stronger than their indirect effects through issue interpretation. Table 3 shows that the direct effects of both efficiency and service quality orientation on adoption (B) are stronger than their indirect effects through issue interpretation (D and E). Only when we combine the indirect effects through issue interpretation on adoption with the indirect effects through capability commitment (C and F) is the ratio of direct to indirect effects smaller than 1. This is because the direct effect of efficiency orientation on capability commitment (0.256) is much stronger than its direct effect on adoption (0.083). In contrast, the direct effect of service quality orientation on adoption (B) is even stronger than its combined indirect effects (C + D + E + F) because its direct effect on adoption (-0.098) is slightly larger than its direct effect on capability commitment (-0.091). For all the competitive posture and issue interpretation variables influencing responses, the proportion of analyzed effects to total association is quite low; in other words, the proportion of unanalyzed effects is very good. These findings suggest that competitive postures may influence organizational responses to strategic issues more intensely through their generation of institutional support or resistance than through their conditioning of issue interpretation processes.

## DISCUSSION AND CONCLUSIONS

We began this paper with an important question: Why do firms facing similar situations respond differently—particularly in the way they seize or fail to seize upon the strategic implications of technology innovations? Researchers have

Table 3. Analysis of direct vs. indirect relationships

Antecedent factor	Efficiency	Service quality	Effect valence	Effect significance
Total association with adoption (A)	0.166*	-0.104 <sup>t</sup>	0.126*	0.050
Direct effect on adoption (B)	0.083 <sup>t</sup>	-0.098 <sup>t</sup>	0.029	-0.031
Indirect effect on adoption through capability commitment (C)	0.070 <sup>t</sup>	-0.025	0.083 <sup>t</sup>	0.071 <sup>t</sup>
Indirect effect on adoption through effect significance (D)	0.003	-0.002	N/A	N/A
Indirect effect on adoption through effect valence (E)	0.003	0.000	N/A	N/A
Indirect effect on adoption through issue interpretation and capability commitment (F)	0.019	0.000	N/A	N/A
Total indirect effects (C + D + E + F)	0.097	-0.027	0.083	0.071
Ratio of direct (B/[C + D + E + F]) to indirect effects	0.856	3.630	0.349	-0.451
Unanalyzed effects (A - [B + C + D + E + F])	-0.014	0.021	0.014	0.014
Total association with capability commitment (G)	0.314***	-0.028	0.340***	0.300***
Direct effect on capability commitment (H)	0.256***	-0.091	0.303***	0.257***
Indirect effect on capability commitment through effect significance (I)	0.040	0.019	N/A	N/A
Indirect effect on capability commitment through effect valence (J)	0.029	0.000	N/A	N/A
Total indirect effects (I + J)	0.069	0.019	N/A	N/A
Ratio of direct to indirect effects (H/[I + J])	3.710	-4.736	N/A	N/A
Unanalyzed effects (G - [H + I + J])	-0.011	0.043	0.037	0.043

<sup>t</sup>p < 0.10, \*p < 0.05, \*\*p < 0.01, \*\*\*p < 0.0001.

examined the adoption of new technologies as a function of organizational properties that enhance or hinder organizational innovativeness (Kimberly, 1986). This approach emphasizes the importance of variables that shape institutional support or resistance to innovativeness, which is more accurately represented when researchers consider multiple rather than single innovations (Damanpour, 1991).

In attempting to explain investment in new technology from a decision making perspective, we saw the potential value of two different theories. Evidence that technological innovations afford early adopters a rare opportunity to secure competitive advantage pointed to the value of a cognitive approach to address this question. According to this approach, how managers assess environmental events through processes of information acquisition and sense-making explain why they may respond differently to similar events (Daft and Weick, 1984). Specifically, the more importance and positive valence managers

attach to the meaning of an environmental development, or strategic issue, the more effort will be devoted to resolve the issue, and the more likely the organization is to engage in a radical response (Dutton and Duncan, 1987). Therefore, we expected the decision to invest in electronic filing to be influenced by managers' interpretations of its significance to the market place and the extent to which it presents an opportunity to gain competitive advantage.

Evidence that some organizations are less likely to adopt radical innovations than others, despite the possibilities of competitive advantage (Zucker, 1987), also points to the value of an institutional perspective of organizational responses to technological innovation. According to this approach to organizational action, the rules and routines that organizations build up over time determine the legitimacy of different actions and explain why organizations may respond differently to similar events (Hannan and Freeman, 1984; Zucker, 1987). Specifically,

the more firms emphasize rules that legitimize the regularity of an organizational response to an external event, the more likely they are to embrace that response and vice versa. Therefore, we expected the decision to invest in electronic filing to be influenced by the extent to which such behavior might be considered routine for firms emphasizing competitive norms of efficiency and extraordinary for firms emphasizing competitive norms of service quality.

The results of our study suggest that both of these approaches are useful in addressing our original question: both managerial interpretations and competitive postures influenced investment in new technology. This suggests that research on investment in new technology warrants an integrative approach that includes the effects of managerial interpretations and institutional contexts in shaping organizational responses. The former may play a more important role in initiating change and innovation, while the latter may play a more important role in implementing change and innovation. This is consistent with two-stage 'ambidextrous' models of the process of innovation adoption (Damanpour, 1991). It is also congruent with research on strategic change: organizational tendencies toward containment appear less related to managers' abilities to interpret pressures for change than to the institutional baggage that managers accumulate over time (Ginsberg and Buchholtz, 1990). Thus, even after consultants have introduced frame-breaking ideas into strategic decision making processes, radical changes may be impeded unless organizations resort to political and symbolic actions to overcome institutionalized forces of resistance (Ginsberg and Abrahamson, 1991).

Table 2 shows that the combined effects of competitive posture and managerial interpretations on the level of capability commitment are considerably stronger ( $R^2 = 0.26$ ) than their combined effects on the extent to which the new technology is adopted ( $R^2 = 0.11$ ). This supports the arguments of organizational theorists who maintain that inertial forces inhibit responsiveness to environmental change despite managers' awareness and behavioral intentions (Hannan and Freeman, 1984). The predominance of inertial tendencies also might explain why analysts have characterized the return preparation industry as having limited applications of information technology even though it is a highly information

intensive business (Venkatraman and Kambil, 1991).

Like previous research, our study supports the importance of strategy in influencing managers' information gathering and sense-making activities (Meyer, 1982; Thomas and McDaniel, 1990) and the importance of such activities in provoking momentum for change (Dutton and Duncan, 1987). However, previous research has neglected to show whether institutional contexts directly influence strategic responses or indirectly influence them through interpretation (see Schneider and De Meyer, 1991). In a recent study of one organization's response to a nontraditional and emotional strategic issue, Dutton and Dukerich (1991) found that organizational identity influenced action both indirectly through issue interpretation and directly by providing guidelines for evaluating success, recipes for solutions, and parameters for acceptable ways of resolving the issue. However, their study did not examine the relative importance of direct vs. indirect effects in influencing action. In contrast, this study found the direct influence of firms' competitive postures on their responses to technological innovation to be more powerful than their indirect influence through managerial interpretations. These results support the arguments of organizational theorists regarding the predominance of institutionalized responses and the tendency to use issue interpretations to justify, rather than to inform, organizational action (Starbuck, 1983).

Our findings also suggest that the ways in which competitive postures influence organizational responses may depend on what aspect we are examining. Service quality orientation may be more sensitive to pressures of reliability and accountability than a dimension such as efficiency orientation. This is because the employee/customer interactions and repertoires involved in developing an emphasis on, and reputation for, high quality service are more intrinsic, intimate, and complex than those involved in developing an emphasis on, and reputation for a simple and narrow range of activities, such as providing low prices and quick service (Mills and Margulies, 1980). Our interview data also support this conclusion: managers of firms with a strong efficiency orientation tended to talk about electronic filing as an opportunity for attracting new customers who would now see professional tax form preparation as a more error-free process

than before; or they tended to see the availability of electronic filing as a threat unless their firm offered it because they feared customers would go to those competitors that can get them their refunds sooner. In contrast, managers of firms with a strong service quality orientation tended to talk about their customers' preferences for more careful analysis to identify additional possible deductions and their employees' lack of comfort in using the new technology. To these managers, electronic filing represented an intrusion to their firm's *modus operandi*.

### Limitations and future directions

Future research could improve the generalizability of the results in several ways. First, studies should broaden the examination of organizational responses by including other types of responses, such as strategic alliances. Although we implicitly assumed that adoption of the new technology reflects a strategic response given the strategic nature of the challenges posed by electronic filing, we did not examine how firms actually leveraged adoption of the new technology to gain competitive advantage. We leave it to future studies to examine this aspect of new technology adoption in greater detail.

The nature of the firms we studied allowed us to examine interpretations at the individual level of analysis. Equivalent to those of the dominant coalition in larger firms, the managers' perceptions we examined constitute an important link between environmental events and organizational actions (Carter, 1990). However, researchers have also studied interpretation at the group and organization levels (see, e.g. Isabella, 1990; Meyer, 1982; Walsh *et al.*, 1988). Investigating the impact of collective interpretations on organizational responses to technological innovation should provide an important challenge for the future.

Finally, future research should use research methodologies that better account for the processes of interpretation involved in strategic issue diagnosis (see, e.g. Dutton and Dukerich, 1991). This is particularly important for examining the extent to which stages in the process of issue diagnosis follow a logical sequence from scanning to action (Milliken, 1990). Studies should also broaden their examination of issue dimensions. For example, work by Denison *et al.* (1991)

suggests that threat and opportunity may represent two distinct dimensions of issue assessment. Future research examining issue feasibility or issue valence can be enhanced by using more robust measures, such as those suggested by Denison *et al.* (1991). By employing a design that examines responses over multiple time periods, future research also can examine the influence of strategic posture and managerial interpretations on the time it takes to respond (see, e.g. Ginsberg and Buchholtz, 1990). Directions such as the above should lead to greater understanding of the forces that influence organizational responses to technological innovation.

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## APPENDIX 1: DESCRIPTION OF THE 1-PAGE SCENARIO USED IN THE STUDY

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: DETAILS OF QUESTIONNAIRE MEASURES

Questionnaire measures were worded as follows:

### Efficiency orientation

Different organizations emphasize different factors in their business strategies. Please indicate

the degree of importance that you generally place on the following factors in your business strategy (1 = not at all important, 7 = extremely important).

1. Low cost of operations.
2. Large volume of business.
3. Speed of return preparation.
4. Competitive pricing.

*Measure:* The aggregate of these four indicators was used to measure this construct. The measure of reliability is given by Cronbach's  $\alpha$ , estimated at 0.782.

### Service quality orientation

Different organizations emphasize different factors in their business strategies. Please indicate the degree of importance that you generally place on the following factors in your business strategy (1 = not at all important, 7 = extremely important).

1. Personalized service.
2. Accuracy and completeness of return.
3. Service quality.

*Measure:* The aggregate of these three indicators was used to measure this construct. The measure of reliability is given by Cronbach's  $\alpha$ , estimated at 0.741.

### Effect significance

When electronic filing is fully implemented, how would you rate its impact competition in the market for tax-related services for individuals (1 = low impact, 7 = high impact)?

1. Financial service firms (retail banks)
2. Software firms
3. Telecommunication providers

4. Service bureaus
5. Tax-return preparer firms.

*Measure:* The aggregate of these five indicators was used to measure this construct. The measure reliability is given by Cronbach's  $\alpha$ , estimated at 0.762.

### Effect valence

Please indicate the degree of opportunity or threat posed by the following factor for your business operations. An opportunity implies that your business can exploit it to gain relative advantage over competitors. A threat implies that your business is likely to be more negatively affected by it (1 = great threat, 4 = neutral, 7 = great opportunity).

*Measure:* Only one indicator was used as a measure of this construct since we sought to measure the perceived attractiveness of a specific technological innovation on a specific firm. A higher score indicates a more positive effect valence.

### Capability commitment

Please indicate the likelihood that your organization will adopt each of the following responses (1 = not at all likely, 7 = extremely likely).

1. Strengthening, or acquiring computer processing facilities.
2. Strengthening, or acquiring software capabilities.
3. Strengthening, or acquiring communication capabilities.

*Measure:* The aggregate of these three indicators was used to measure this construct. The measure reliability is given by Cronbach's  $\alpha$ , estimated at 0.933.