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EXAMINING ENVIRONMENTAL INFLUENCES ON ORGANIZATIONAL PERCEPTIONS AND PREDISPOSITION TOWARD DISTRIBUTED WORK ARRANGEMENTS: A PATH MODEL

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Abstract

Uncertainty in the external environmental context has been shown to affect organizational change and innovation. Distributed work arrangement is an organizational innovation that has the potential to enable a firm to meet the challenges of an uncertain environment more effectively. This exploratory study employs a structural model to examine how environmental uncertainty affects organizational predisposition (adoption intention) toward distributed work arrangements through shaping organizational perceptions of distributed work arrangements (perceived relative advantage, compatibility and complexity). Environmental uncertainty is assessed in terms of environmental complexity and variability. Data analyses using partial least squares statistical technique revealed that environmental complexity is negatively associated with perceived relative advantage and perceived compatibility, which were in turn positively related to adoption intention for distributed work arrangements. Contrary to past findings, which suggest that distributed work arrangements could help organizations respond better to uncertain conditions in the environment, our study found that decision-makers operating in complex environments do not perceive distributed work arrangements as beneficial and compatible. The results suggest that these organizations could strive to develop expertise to deal with their complex environments by increasing their information processing capacity, thereby enhancing their perceptions of the benefits and compatibility of distributed work arrangements.

Keywords: Organizational environment, remote work, diffusion of innovation, exploratory study, partial least squares.

1. INTRODUCTION

Organizational design involves the structuring of lateral and vertical communications, the division of labor, the choice of physical locations, the streamlining of information and decision processes, and the institutionalizing of equitable reward systems (Galbraith 1977; Nadler and Tushman 1988). One increasingly significant and popular organization design is distributed work
arrangements, made feasible by information technology (IT) and the Internet (Venkatesh and Vitalari 1992). Distributed work arrangements (DWAs) involve the performance of organizational work in geographical locations outside the traditional boundaries of firms (Gupta, Karimi and Somers 1995), including the setting up of satellite and neighborhood work centers, hoteling, and/or the implementation of flextime schemes and teleworking from home (Korte 1988).

Distributed work arrangements (DWAs) have enormous potential for organizations to reduce operating costs, confer competitive advantage, and improve employee flexibility, effectiveness and productivity (e.g., Ruppel and Harrington 1995; Venkatesh and Vitalari 1992). They also have important social and societal implications (e.g., DeSanctis 1984; Gupta, Karimi and Somers 1995; Shamir and Salomon 1985). They could help improve quality of work life, reduce traffic jams, and provide employment opportunities for people who are otherwise unable to work (such as the handicapped, or parents with young children). Indeed, the current debate in the United States on the kind of measures (relaxing immigration quotas versus allowing old timers and housewives to telework) needed to solve the high-technology labor shortage problem manifests clearly the importance of DWAs.

To date, studies of DWA adoption have largely been confined to organizational factors (Ruppel and Harrington 1995; Tomaskovic-Devey and Risman 1993), task and employee characteristics (e.g., Duxbury, Higgins and Mills 1992; Olson 1983), and technological characteristics (e.g., Gupta, Karimi and Somers 1995). Little empirical work has been expended to examine the relations between the environment in which an organization is situated and the adoption of DWA. Environment plays a crucial role in influencing organization design and actions (Galbraith 1977; Nadler and Tushman 1988; Tosi and Slocum 1984; Ward, Bickford and Leong 1996). Managers are often required to restructure their organizations to manage the uncertainties and complexities that are inherent in their environments. For instance, significant environmental changes (e.g., increased demand and competition in the 1960s) prompted the Boeing management to form task forces around major product branches to facilitate interfunctional coordination and introduce a vertical information system to improve the availability and currency of information (Galbraith 1977). Recent empirical studies have found many firms adopting virtual organization-like structures (e.g., outsourcing their programming functions) as part of their strategies to counter the uncertainties and competition in the global market (Ross and Rockart 1996; Sieber 1996). Additionally, few studies have examined how environmental factors could influence organizational perceptions of innovations.

This exploratory study aims to contribute to extant literature on organizational innovation in general, and DWAs in particular. It proposes a path model in which environmental factors affect organizations’ perceptions of distributed work, which in turn affect adoption intentions. This paper reviews literature on organizational innovation and innovation diffusion to identify the relevant factors for study. Through understanding how environment affects organizations’ perceptions of DWAs, this paper could provide practical implications for policy-makers to formulate appropriate policies and target the right segment of organizations for effective diffusion of such work arrangements. The reluctance of organizations to adopt DWA underscores the need to understand factors affecting managerial attitudes and predisposition toward it (Ruppel and Harrington 1995). This study could also provide the basis for organizations to assess the need to assimilate such work-arrangements innovation, by taking into account their environmental realities.

2. THEORETICAL PERSPECTIVES AND HYPOTHESES

An innovation is an idea, product, or process that is new to an adopter (Hage and Aiken 1967; Rogers 1995; Zaltman, Duncan and Holbek 1973). Organizational adoption of distributed work arrangements as an alternative form of work arrangement for employees would necessitate fundamental and radical changes in structure, coordination and control mechanisms, and rewards systems and would thus constitute an innovation. The notion of DWAs, despite being around for a long time, has yet to be widely accepted by organizations (Ruppel and Harrington 1995). This study therefore focuses on potential adopting organizations. It seeks to examine how the external environmental context affects organizational predisposition toward DWAs through shaping the organizational perceptions. The external environmental context is examined primarily from the perspective of environmental uncertainty while organizational perceptions of DWAs are taken primarily from innovation diffusion theory (Rogers 1995). Figure 1 depicts the research model.
2.1 Perceived Innovation Characteristics and Adoption Intention

Innovation diffusion theory (Rogers 1995) posits that five perceived innovation attributes influence adoption: relative advantage, compatibility, complexity, observability, and trialability. Among them, the first three have been consistently found important in influencing adoption behavior (e.g., Grover 1993; Tornatzky and Klein 1982). This study assesses the extent to which these three perceived characteristics could predict organizational predisposition toward DWAs.

2.1.1 Relative Advantage

Relative advantage is the degree to which an innovation is perceived as being more advantageous than its precursor. It is manifested as increased efficiency and effectiveness, economic gains, and enhanced status (Rogers 1995). Adopters of distributed work arrangements have reported clear organizational benefits such as reduced operating costs (e.g., space savings), improved retention of skilled workers, heightened employee performance and productivity, and faster processing time (Duxbury and Haines 1991; Gordon 1988; Tomaskovic-Devey and Risman 1993). Olson (1988) also found that the adopters may receive favorable publicity for their “enlightened” work style, especially if they provide employment opportunities for the physically handicapped. Hence:

\[ H1: \text{ Perceived relative advantage is positively related to adoption intention for DWAs.} \]

2.1.2 Compatibility

Compatibility is the degree to which an innovation is considered consistent with existing organizational goals, values, systems, and experience. Positive empirical association between compatibility and adoption behavior has been found (e.g., Ettlie, Bridges and O’Keefe 1984; Holak and Lehmann 1990; Tornatzky and Klein 1982). Organizations with poor telecommunications infrastructure, highly bureaucratic structures (need to “see” their employees working), and incompetent managers in organizing and managing remote work would be less likely to adopt distributed work arrangements (Olson 1988).

\[ H2: \text{ Perceived compatibility is positively related to adoption intention for DWAs.} \]
2.1.3 **Complexity**

*Complexity* is the degree to which an innovation is perceived as difficult to understand and implement. Being a hybrid innovation with technological (e.g., security and connectivity of computer network) and administrative (e.g., changes to work styles and structures) implications, DWAs have been perceived as a complex innovation (Gordon 1988). Researchers have suggested that a complex innovation requires greater skills and implementation efforts to adopt, thus reducing likelihood of adoption (e.g., Cooper and Zmud 1990; Utterback 1974). Complexity has been widely recognized as an inhibitor to adoption (e.g., LaBay and Kinnear 1981; Rogers 1995). Hence:

**H3:** Perceived complexity is negatively related to adoption intention for DWAs.

2.2 **External Environment Context and Perceived Innovation Characteristics**

The external environmental context has a significant effect on innovation (DePietro, Wiarda and Fleischer 1990; Tornatzky, Eveland and Fleischer 1990). One important aspect of environmental context influencing innovation is environmental uncertainty. Research has established a positive relationship between environmental uncertainty and organizational innovations such as changes in organizational form, strategy, and culture (Huber et al. 1993; Damanpour 1996; Pierce and Delbecq 1977; Swamidass and Newell 1987; Ward, Bickford and Leong 1996). In environments of low uncertainty, organizations have been found neither structurally complex nor innovative. Heightened innovation and complexity would result from environments of relatively high uncertainty. Organizations that perceive a high degree of environmental uncertainty were more likely to pursue an aggressive technology policy (Ettlie 1983). Such organizational changes were carried out to enable organizations to be more responsive and adaptable to external cues (Pierce and Delbecq 1977).

Environmental uncertainty has two components: *environmental complexity* and *environmental variability* (Boyd and Fulk 1996; Duncan 1972). Environmental complexity refers to the diversity and interdependence of environmental factors that organizations have to contend with (Child 1972; Dess and Beard 1984; Duncan 1972; Thompson 1967). Analyzability and predictability of environmental factors are especially difficult in a complex environment (Daft and Weick 1984; Duncan 1972). Environmental variability is the rate and volume of changes in the environmental factors. Rapid and large volume of changes could decrease confidence in predicting outcomes (Daft, Sormunen and Parks 1988). Greater time and effort would be devoted to collecting, analyzing, and interpreting information when the environment is perceived as variable (Milliken 1987).

Galbraith (1977) argued that uncertainty is the core concept upon which organization design frameworks are based. Uncertainty necessitates changes to resource allocations, schedules, and priorities during task execution. These changes require a greater amount of information processing by decision-makers during task performance. Environmental uncertainty thus increases the amount and variety of information about the external environment that an organization has to process. It also increases the time and effort needed to collect and process that information (Galbraith 1977; Goll and Rasheed 1997; Nadler and Tushman 1988). To circumvent uncertainty, organizational forms are designed to the extent that they increase the capacity to process information, reduce the need to process information and increase the flexibility to adapt to environmental changes (Galbraith 1977).

DWAs have been proposed as possible strategies for organizations to manage and adapt to environmental changes (e.g., global competition, changes in work force preferences, skilled labor shortage). Druke, Feuerstein and Kreibich (1988) suggested that DWAs should improve the reacting capability of organizations to adapt to external structural changes, which include shifts in industry structure, changes in customers’ needs, cyclical demand fluctuations, cyclical changes in labor market, technological changes, and others. Some researchers have reported that predominant reasons for DWA adoption include the abilities to cope with varying workload, retain individuals with scarce skills, meet employees’ preference for autonomy to regulate their own work, reduce operating costs, and access a wider pool of professionals with the desired skills (e.g., Korte 1988). If these outcomes are realized, DWAs can position organizations to respond better to an increasingly uncertain environment (Tomaskovic-Devey and Risman 1993). DWAs (decentralized structures) may contribute to increased information processing capacity of an organization through “promoting the processing of information among those organizational units, groups, or individuals who are closest to the work being performed” (Nadler and Tushman 1988, p.110). Gordon (1988) suggested further evidence of increased information processing capacity offered by the adoption of distributed work arrangements (see Table 1).
Table 1. Increased Information Processing Capacity of Distributed Work Arrangements Adopters

<table>
<thead>
<tr>
<th>Evidence of Increased Information Processing Capacity</th>
<th>Examples/Rationales</th>
</tr>
</thead>
<tbody>
<tr>
<td>More hours worked per day</td>
<td>Conversion of travel time to work time.</td>
</tr>
<tr>
<td>More work done per hour</td>
<td>Less distractions and disruptions that are common in office and better match of work hours and personal biological clocks.</td>
</tr>
<tr>
<td>Less work absenteeism</td>
<td>Employees unlikely to absent themselves from work if they have personal matters to attend to.</td>
</tr>
<tr>
<td>Faster processing time</td>
<td>Could exploit time differences to improve work turnaround.</td>
</tr>
<tr>
<td>Better utilization of shared resources</td>
<td>Not everyone needs to be in office to use shared resources at the same time.</td>
</tr>
<tr>
<td>Improved customer service</td>
<td>Could offer round the clock service to customers (e.g., software vendors could offer 24 hour technical support to customers by allowing their employees to answer phone calls at home or respond to customers’ email from home).</td>
</tr>
</tbody>
</table>

Our central argument has been that organizations in uncertain environments are likely to require greater information processing capacity in order to ensure organizational effectiveness and viability. Since DWAs offer or have the potential to offer enhanced information processing capacity, we argue that organizations embedded in uncertain environments are likely to have more positive perceptions of DWAs than those that are not. Specifically, we believe that organizational decision-makers operating in environments of high complexity and high variability are likely to perceive distributed work arrangements as beneficial, more compatible, and less complex. Hence:

\[ H4a: \text{ Perceived relative advantage of DWAs is positively related to perceived environmental complexity.} \]

\[ H4b: \text{ Perceived relative advantage of DWAs is positively related to perceived environmental variability.} \]

\[ H5a: \text{ Perceived compatibility of DWAs is positively related to perceived environmental complexity.} \]

\[ H5b: \text{ Perceived compatibility of DWAs is positively related to perceived environmental variability.} \]

\[ H6a: \text{ Perceived complexity of DWAs is negatively related to perceived environmental complexity.} \]

\[ H6b: \text{ Perceived complexity of DWAs is negatively related to perceived environmental variability.} \]

3. RESEARCH METHODOLOGY

This study employs a questionnaire survey method to gather data on the perceptions and intentions of top-level executives toward DWAs. A literature review was performed on the areas of environmental uncertainty, innovation diffusion theory, and distributed work to generate the survey instrument. The opinions of five executives were then sought to assess the face validity of the instrument. A pilot study involving 20 executives from various industry sectors (insurance, manufacturing, and real estate) was conducted to assess the reliability and validity of the research constructs. The survey questionnaire was administered to the chief executive officers (CEO) of 720 organizations listed in Dun and Bradstreet (1994).
3.1 Survey Instrument

Environmental uncertainty was operationalized with two constructs, environmental complexity (ENVCOM) and environmental variability (ENVVAR). Environmental complexity is the variety of environmental factors that affects organizations (Child 1972; Dess and Beard 1984; Duncan 1972; Thompson 1967). It increases the diversity of environmental information that an organization needs to handle. In this study, environmental complexity is measured by whether the organization environment leads to difficulties in gathering sufficient and necessary information about the environment, analyzing the causes and effects of the environment, and predicting the trends and outcomes of external events. Environmental variability is defined as the frequency of changes in the environmental factors (Dess and Beard 1984). It is measured as the rapidity of changes in external events, in external trends, and the number of possible outcomes in the environment.

Innovation diffusion theory posits five factors that could potentially affect the adoption intention toward an innovation. Perceived relative advantage (RELADV), perceived compatibility (COMPAT), and perceived complexity (COMPLX) were consistent significant predictors of adoption behavior (Tornatzky and Klein 1982). Perceived relative advantage is measured by whether DWAs could increase productivity, responsiveness to customers’ needs and performance (DeSanctis 1984; Duxbury and Haines 1991; Nadler and Tushman 1988; Tomaskovic-Devey and Risman 1993). Perceived compatibility is measured by whether DWAs are acceptable to organizations’ management, supported by organizations’ IT infrastructure and management practices, and consistent with organizations’ human resources policies (Gupta, Karimi and Somers 1995; Nadler and Tushman 1988). Perceived complexity is measured by whether it would be difficult for the organization to coordinate work, build employee’s commitment to the organization, control the quality of work, and achieve organizational learning, when the organization adopts DWA (DeSanctis 1984; Duxbury and Haines 1991; Nadler and Tushman 1988; Tomaskovic-Devey and Risman 1993). Adoption intention for distributed work arrangement (INTDWA) is measured by whether the organization will adopt it within the next two years. All questions were anchored on a seven-point scale from strongly disagree (1) to strongly agree (7).

3.2 Data Collection

The survey questionnaire was sent to 720 CEOs of organizations randomly selected from the Dun and Bradstreet directory. CEOs, the key decision-makers, were chosen because they are likely to be cognizant with many aspects of their organizations.

A definition of distributed work arrangements was included in the questionnaire to minimize confusion. In this study, distributed work arrangements (DWAs) are defined as an organizational scheme whereby employees work away from the office (at home, customers’ sites, or anywhere deemed conducive and appropriate) through the use of information technology. Examples include, but are not limited to, supplying employees with computers, modems, and other equipment so that they can access organizational information while meeting with clients or working from their homes. Besides the questionnaire, a cover letter stating the purpose of the study, a self-addressed return envelope with postage was sent in a parcel to each potential respondent. A hot line was available to respondents to clarify any doubts. Follow-up calls were made to those who had not responded after two weeks. Another round of calls was made two weeks later to help increase the response rate. Among the 720 parcels delivered, 46 were returned because the associated organizations had closed down or relocated. Responses with too much missing information and those from adopters of distributed work arrangements were removed from data analyses. Among 131 usable questionnaires received, 55 were from the manufacturing industry while 76 were from the service industry. This yielded a response rate of 19.4%.

Organization size, in terms of number of employees, was used as the criterion for the response bias test because it could indicate organizations’ willingness to adopt DWAs (Damanpour 1996; Nadler and Tushman 1988). No significant difference was detected between responding and non-responding organizations.
4. DATA ANALYSES

PLS, a second-generation causal modeling statistical technique (Wold 1982), was used in this study. It permits the simultaneous assessment of the measurement model within the context of a theoretical structural model (Fornell 1982). It attempts to maximize variance explanation and theoretical model prediction without the need to have multivariate normal distributions, interval scales, or a large sample size (Fornell and Bookstein 1982). PLS has been extensively employed in information systems (Amoroso and Cheney 1991; Rivard and Huff 1988; Thompson, Higgins and Howell 1991).

4.1 Evaluating the Measurement Model

Convergent and discriminant validity of the research instruments were examined to establish the strength of the constructs used in the research model. Convergent validity of a construct refers to the extent to which two or more attempts to measure the construct are consistent with one another (Cook and Campbell 1979). Convergent validity could be determined using three tests in PLS (Fornell and Larcker 1981): reliability of each item in a scale (the squared loading), the composite reliability or internal consistency of each scale, and the average variance extracted by each scale. In addition, Cronbach’s alphas were also used to establish convergent validity of the constructs. The results of these tests on the measurement model are shown in Appendix A. The individual item reliabilities for all measures in constructs were higher than the threshold value of 0.5 (Fornell 1982; Hair et al. 1992), indicating that each measure had more explanatory power than error. The composite reliabilities of each construct with multiple measures were greater than 0.9, which exceeded the recommended value of 0.8 (Nunnally 1978). These constructs also had average variances extracted exceeding 80% (see Appendix B), and had Cronbach alphas higher than 0.8. Thus, the constructs used in the research model had adequate convergent validity.

Discriminant validity refers to the extent to which measures of each construct are distinct from one another (Campbell and Fiske 1959). This is determined by ensuring that the average variance extracted for each construct is greater than the squared correlations between constructs (Fornell and Larcker 1981; Grant 1989). These statistics are shown in Appendix B. Results showed that correlation between two constructs was less than the square root of the average variance extracted by the measures of a construct for all cases. This indicates that there is satisfactory discriminant validity among the construct measures of the research model. In addition, since the squared correlations in the correlation matrix did not exceed 0.8, and the variance inflation factors in the collinearity diagnostics were not greater than 10, there should not be a problem of multicollinearity between constructs (Amoroso and Cheney 1991; Hair et al. 1992).

4.2 Evaluating the Structural Model

The structural model was assessed for its explanatory power and path significance using the jackknifing technique (Fornell and Barclay 1983). The hypotheses were examined for the sign, size, and significance of the path coefficients. Since this is an exploratory study, a 10% significance level was employed. The descriptive statistics are presented in Table 2, while the results of PLS analyses are shown in Figure 2.

<table>
<thead>
<tr>
<th>Research Variables</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Complexity</td>
<td>3.27</td>
<td>0.89</td>
</tr>
<tr>
<td>Environmental Variability</td>
<td>4.75</td>
<td>1.12</td>
</tr>
<tr>
<td>Perceived Relative Advantage</td>
<td>5.11</td>
<td>1.09</td>
</tr>
<tr>
<td>Perceived Compatibility</td>
<td>4.21</td>
<td>1.18</td>
</tr>
<tr>
<td>Perceived Complexity</td>
<td>4.42</td>
<td>1.04</td>
</tr>
<tr>
<td>Intention to Adopt Distributed Work Arrangement</td>
<td>4.47</td>
<td>2.04</td>
</tr>
</tbody>
</table>
After controlling for organization size (ORGSIZE), the research variables account for 21.5% of the variance in the intention to adopt DWAs. The explained variance exceeded the recommended threshold of 10% (Falk and Miller 1992). This indicates that the research variables could substantially predict the organization predisposition toward the adoption of DWAs. The data analyses revealed that the standardized coefficients of paths between environmental complexity (ENVCOM) and perceived relative advantage (RELADV), and between environmental complexity (ENVCOM) and perceived compatibility (COMPAT), were significant (in the negative direction) at the 10% level of significance. H4a and H5a were significant in the opposite direction. Additionally, the standardized coefficients of paths between perceived relative advantage (RELADV) and adoption intention (INTDWA), and between perceived compatibility (COMPAT) and adoption intention (INTDWA), were significant at the 5% level of significance. H1 and H2 were supported.

5. DISCUSSION

The results of the PLS analyses on the structural model revealed that an organization’s perceptions of environmental complexity could affect its perceptions of the relative advantages and compatibility of DWAs. However, the directions for these correlations were opposite to that hypothesized. The perceptions of the two innovation factors in turn had a positive influence on the adoption intention of distributed work (H1 and H2 respectively). Environmental variability did not have any significant impact on all the innovation diffusion factors investigated in this study. Similarly, the innovation factor perceived complexity did not affect the adoption intention of distributed work.
5.1 Environmental Uncertainty and Perceived Innovation Characteristics

In this study, environmental uncertainty was partially found to have an impact on the innovation diffusion factors. Specifically, environmental complexity had a significant negative influence on both perceived relative advantage and perceived compatibility. Contrary to expectations, a complex environment which tends to increase the amount and diversity of information processing required by organizations (Galbraith 1973; Miller and Friesen 1983) did not result in better perceptions of the relative advantage and compatibility of distributed work in this study. This contradicts past literature that indicates a positive correlation between environmental uncertainty and organizational change/innovation (Damanpour 1996; Pierce and Delbecq 1977). There could be several explanations for the results of this study. First, the positive relationship between environmental uncertainty and the adoption of innovations may be moderated by some other organizational variables, such as structural complexity and organization size (Damanpour 1996; Galbraith 1977). Organization size did not appear to have any impact on the results of this study. Thus, it is likely that the pre-existing structural complexity of an organization could affect the CEO’s perceptions of the relationship between environmental uncertainty and the advantages and compatibility of DWAs. This relationship could be tested in future research. Second, the organizations surveyed may not have considered DWA to be an organizational strategy to manage an uncertain environment, despite the suggestion by recent research to the contrary (e.g., Ross and Rockart 1996). Rather, organizations may have viewed distributed work as merely an administrative (but not strategic) arrangement to help them achieve higher employee productivity and performance. Third, the firms may not be willing to go through an organizational change in an environment of uncertainty. Organizations may perceive greater risk in carrying out such changes in an uncertain environment (Bourgeois 1985; Isabella and Waddock 1994). Concerns such as being unable to directly supervise workers, or the absence of synergism from employees working together at the same place to handle problems in an uncertain environment, could contribute to the negative perceptions of DWAs. Empirically, greater risk has been found as a deterrent to the organizational adoption of a financial electronic data interchange system (Teo, Tan and Wei 1995). This situation could also apply to the perceptions of DWAs in uncertain environments. Conversely, it has been suggested that managers tend to be more confident in their decision making when they can make better sense out of the environment (Milliken 1987). This could have caused the negative correlations between environmental complexity and perceived relative advantage and compatibility.

This study found no significant impact of environmental complexity on the perceived complexity of DWAs. One possible reason for this finding is that the respondents do not consider distributed work arrangements to be a complex concept to understand and to implement. Another reason could be that since they perceive distributed work in a complex environment to be neither advantageous nor compatible to their organizations, the respondents did not consider the complexity issues that are more implementation-related.

The results of this study indicated that environmental variability did not have a significant effect on all the innovation diffusion factors investigated. A plausible explanation could be found in the contention by researchers that as the rate of change increases in the environment, managers tends to be more uncertain and less confident about their decisions (Duncan 1972; Isabella and Waddock 1994). This could have influenced their perceptions of the various innovation diffusion factors.

In summary, the results on environmental uncertainty and innovation diffusion factors indicate that management tends to have a better perception of the advantages of DWAs, and of its compatibility to the organization, when the organizational environment is perceived to be less complex. Environment variability does not appear to have any effect on these perceptions.

5.2 Perceived Innovation Characteristics and Adoption Intention

Perceived relative advantage and perceived compatibility were found positively related to adoption intention for DWAs. This agrees with past innovation diffusion research that found relative advantage and compatibility to be important factors influencing adoption behavior (Ettlie, Bridges and O’Keefe 1984; Grover 1993; Holak and Lehmann 1990; Tornatzky and Klein 1982). The findings of this study suggest that relative advantage and compatibility of distributed work are important predictors of organizational decision-makers’ adoption intention.
Perceived complexity was not found to have a significant impact on the adoption intention of the respondents, despite numerous innovation studies indicating a negative association between complexity and adoption (Grover 1993; Tornatzky and Klein 1982). A plausible explanation could be that DWA was not considered a complex concept among the respondents. Another possible reason could be that respondents did not perceive complexity to be a very important criterion in deciding whether to adopt distributed work. These contentions could be investigated in future research.

5.3 Implications for Practice

The findings in this study provide some suggestions on how policy-makers could encourage the adoption of distributed work arrangements to ease societal problems such as traffic jams and skilled labor shortage. Specifically, the advantages of distributed work and its compatibility to organizations, from the perspectives of the organization, could be explained to organizational decision-makers (Duxbury and Haines 1991). Educating organizations on the advantages and compatibility of distributed work would not be a difficult task, as our results indicate that complexity of the arrangements may not be a particularly important consideration. Since relative advantage and compatibility have been found to be important predictors of adoption intention, top management should actively seek information on the benefits and compatibility of distributed work once an organization has made the decision to adopt. The gathered information, together with the success stories from other organizations, would provide the marketing tool to sell DWA to employees of the organization.

In environments of high uncertainty, successful decision makers tend to engage in comprehensive information processing and cognitive processes (Eisenhardt 1989; Goll and Rasheed 1997) to increase their understanding of environmental conditions (Daft and Weick 1984; Isabella and Waddock 1994). This would increase their confidence during decision making and implementation (Bourgeois and Eisenhardt 1988; Eisenhardt 1989; Milliken 1987, 1990). Lack of capacity (Greenwood and Hinings 1996) to deal with the environment could be an important concern for potential adopters of distributed work arrangements in complex environments, because managers tend to have a strong need for certainty and stability (DiMaggio and Powell 1983). Thus, decision makers could first build up their organizational information processing and learning capability to deal with the complex environment, thereby increasing their confidence and certainty during decision making (Isabella and Waddock 1994) before considering the adoption of distributed work arrangements. This could be achieved either by the establishment of specialized employees or functions to gather and evaluate relevant information (Child 1977), or the institutionalization of flexible organizational structures that facilitate decentralized decision-making (Damanpour 1996).

6. FUTURE RESEARCH

Several avenues of further work could be suggested from the results. First, the risk involved in introducing DWA to organizations in uncertain environments would be an interesting theme for future studies. Bourgeois (1985) noted that dynamic environments tend to increase the risk and difficulty of effective strategy formulation. Thus, the perception of risk among decision-makers could provide interesting insights into their intention to adopt distributed work in environments of varying uncertainties. Second, Eisenhardt (1989) suggested that the certainty resulting from understanding the organizational environment is critical to the decision making of top management teams. Thus, future work could investigate whether the effectiveness of management in successfully interpreting and understanding the organizational environment has an effect on their intentions to adopt DWAIs, under conditions of both environmental certainty and uncertainty. Third, past research mainly sought to establish which of the organizational innovation diffusion factors had an impact on adoption behavior. Very few seek to establish the relative salience of those innovation factors, which is an important criterion proposed by the theory of reasoned action to predict behavior intentions (Ajzen and Fishbein 1980; Fishbein and Ajzen 1975). Fourth, less than widespread adoption of distributed work arrangements has limited the study to that of managerial perceptions on environmental influences and adoption intentions. Thus, future work could investigate the actual impact of the environment on decisions to adopt distributed work when it is more widely accepted, in the tradition of Eisenhardt’s research on high velocity environments (e.g., Eisenhardt 1989).

This study seeks to explore the effect of environmental influences, specifically environmental uncertainty, on the perceptions of decision-makers toward distributed work arrangements. The results indicate that these decision-makers have a positive
perception of distributed work arrangements when their organizational environment is less complex, contrary to popular expectations. Policy-makers who seek to promote distributed work arrangements should focus on their relative advantages and compatibility to organizations. Distributed work arrangement has the potential to be an effective organizational strategy to meet the challenges of an uncertain environment. Systematic research in this area would provide organizational decision-makers with the necessary knowledge to consider their next strategic move.

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## Appendix A

### Results of Tests on Convergent Validity

<table>
<thead>
<tr>
<th>Constructs</th>
<th>Cronbach’s Alpha</th>
<th>Composite Reliability</th>
<th>Item Reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Perceived Environmental Complexity (ENVCOM)</strong></td>
<td>0.9123</td>
<td>0.9338</td>
<td>0.7225</td>
</tr>
<tr>
<td>The organization environment is such that it is difficult to:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) have adequate information on our external environment to assist us in decision making</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) understand the cause and effect of the trends and events in our external environment</td>
<td></td>
<td></td>
<td>0.7987</td>
</tr>
<tr>
<td>(c) predict with good confidence the trends and events in our external environment</td>
<td></td>
<td></td>
<td>0.8021</td>
</tr>
<tr>
<td>(d) capture sufficient information on our external environment before making a major decision</td>
<td>0.7225</td>
<td>0.7063</td>
<td></td>
</tr>
<tr>
<td>(f) provide the reason for the occurrence of an event in our external environment</td>
<td></td>
<td></td>
<td>0.6637</td>
</tr>
</tbody>
</table>

| **Perceived Environmental Variability (ENVVAR)** | 0.8988 | 0.9327 | 0.9002 |
| (a) Events in my organization’s external environment change rapidly | | | 0.8740 |
| (b) Trends in my organization’s external environment vary frequently | | | 0.6932 |
| (c) There is a large number of possible outcomes in my organization’s external environment | | | |

| **Perceived Relative Advantage (RELADV)** | 0.8445 | 0.9059 | 0.8617 |
| Distributed Work Arrangement will: | | | 0.6909 |
| (a) increase our productivity | | | 0.7358 |
| (b) increase our responsiveness to customers’ needs | | | |
| (c) increase our performance | | | |

| **Perceived Compatibility (COMPAT)** | 0.8998 | 0.9321 | 0.8080 |
| Distributed Work Arrangement: | | | 0.8246 |
| (a) is acceptable to the organizational management | | | 0.6437 |
| (b) does not contradict the organization’s human resource policies | | | 0.8232 |
| (c) is supported by the organization’s IT infrastructure | | | |
| (d) is supported by my organization’s management style | | | |

| **Perceived Complexity (COMPLX)** | 0.8607 | 0.9054 | 0.7351 |
| Distributed Work Arrangement will lead to difficulty in: | | | 0.6639 |
| (a) coordination within the organization | | | 0.6579 |
| (b) building employee’s commitment to the organization | | | 0.7648 |
| (c) controlling the quality of work | | | |
| (d) achieving organizational learning | | | |

| **Intention to Adopt (INTDWA)** | N.A. | N.A. | 1.000 |
| My organization intends to adopt Distributed Work Arrangement within the next 2 years | | | |

N.A. - Not Applicable
### Appendix B

**Correlation and Square Root of Average Variance Extracted of Constructs**

<table>
<thead>
<tr>
<th></th>
<th>ENVCOM</th>
<th>ENVVAR</th>
<th>RELADV</th>
<th>COMPAT</th>
<th>COMPLX</th>
<th>INTDWA</th>
<th>ORGSIZE</th>
</tr>
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<tr>
<td>ENVCOM</td>
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<td>RELADV</td>
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<td>0.05</td>
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<td>0.07</td>
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<td>0.23</td>
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<td>0.12</td>
<td>1.00</td>
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