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Abstract

Researchers who study IT innovations aim to understand the relationship between two different loci of adoption[1] – individual adoption and organizational adoption. A first step is diagnosis of the current state of empirical research on IT innovation adoption. We analyzed 486 relationships between independent variables (IVs) and dependent variables (DVs) found in 89 empirical studies of which 45 studied individual adoption and 44 studied organizational adoption. We categorized 135 IVs into 4 classes (organizational variables such as top management support, individual variables such as age, innovation variables such as relative advantage, and environment variables such as external pressure). We classified 25 DVs into 8 classes (perceived systems use, intention to use, adoption, diffusion, rate of adoption, outcomes, actual system use, and time of adoption). We analyzed the 486 relationships between the 4 classes of independent variables and the 8 classes of dependent variables across all 89 studies and also by locus of adoption (individual or organizational). Two classes of independent variables (organizational and innovation characteristics) are systematically used – and more importantly – found to be significant, whether researchers are studying individual or organizational adoption. This suggests that there is indeed a relationship between individual adoption and organizational adoption. We have many other interesting findings (gaps in research, most studied IVs and DVs, most frequently/least frequently found to be significant IVs, etc.), but consider this a work in progress. We anticipate that DIGIT members will use our findings to integrate individual and organizational adoption theories.

Key words: Innovation, Adoption, Diffusion.

[1] For brevity, we call the research domain "adoption" but we include “diffusion” studies in the research domain throughout this paper.

Understanding the Relationship between Organizational and Individual Adoption of IT Innovations: Literature Review and Analysis

1. Introduction

It is widely accepted that current streams of adoption research have not adequately addressed the relationship between individual and organizational adoption of information technology (IT). The 2004 DIGIT conference (http://www.mis.temple.edu/digit), for instance, called upon researchers to examine the micro-macro linkages between individual and organizational adoption of IT innovations. As a first step in responding to that call, we assessed the current state of IT adoption research to determine what the empirical evidence suggests concerning the commonalities and differences between individual and organizational adoption. We analyzed 45 empirical studies on individual IT adoption and 44 studies on organizational IT adoption published between 1992 and 2003. We examined the relationships between eight classes of dependent variables (perceived systems use, intention to use, adoption, diffusion, rate of adoption, outcomes, actual system use, and time of adoption) and four classes of independent variables (organizational, innovation, individual, and environmental characteristics). Overall, our analysis showed that there are commonalities between individual and organizational adoption of IT innovations.

Specifically, studies on individual adoption systematically found organizational, innovation, and individual independent variables to be significant. This is important because only 21 of the 45 studies on individual adoption included organizational independent variables, but those that did include organizational variables found them to be significant. This has particular implications for TAM research, which tends to neglect organizational factors. However, individual adoption studies did not examine environmental factors. Studies on organizational adoption systematically found organization and innovation independent variables to be more frequently significant than other independent variables. Though somewhat under-studied, environmental factors also showed promise on affecting organizational adoption. However, none of the organizational adoption studies included individual level independent variables.

We have many other interesting findings from this analysis, including the most frequently and least frequently studied independent and dependent variables. Before creating our high-level categories, we found 25 dependent variables and 135 independent variables. By considering our findings and distilling the numerous IVs and DVs, IS researchers can move towards an integrated – and hopefully more parsimonious – theory of organizational and individual adoption.

2. Theoretical Foundations

IT adoption and diffusion have received extensive attention in prior research. *Adoption* generally refers to an individual's or organization's decision to either adopt or reject an innovation, whereas *diffusion* refers to the process by which innovations spread to individuals within an organization or organizations within a population over time (Rogers, 1995). As suggested by the definitions, both phenomena have been examined at the level of individuals as well as organizations.

2.1. Individual Adoption

Researchers have proposed several models to examine the adoption behavior of individuals. These include Theory of Reasoned Action (TRA; Fishbein and Ajzen, 1975), Innovation Diffusion Theory (IDT; Rogers, 1983), Social Cognitive Theory (SCT; Bandura, 1986), Technology Acceptance Model (TAM; Davis, 1989), Theory of Planned Behavior (TPB; Ajzen, 1991), Perceived Characteristics of Innovating (PCI; Moore and Benbasat, 1991), TAM2 (Venkatesh and Davis, 2000), and Unified Theory of Acceptance and Use of Technology (UTAUT; Venkatesh et al., 2003). Several IT innovations have been examined using these models, such as email systems (e.g. Straub, Keil and Brenner, 1997), World Wide Web (e.g. Agarwal and Prasad, 1997), microcomputers (e.g. Igbaria, 1993), spreadsheets (e.g. Chau, 1996), and Microsoft Windows 3.1 (e.g. Karahanna et al., 1999).

2.2. Organization Adoption

Different models have been formulated to examine organizational adoption as well. These include Innovation Diffusion Theory for organizations (Rogers, 1995), Diffusion/Implementation

Model (Kwon and Zmud, 1987), and Tri-Core Model of IS Innovations (Swanson, 1994). Using these models, IT adoption has been examined at different levels of the organization, such as functional units (e.g. IS unit; Ravichandran, 2000), and entire organizations (e.g. Premkumar, Ramamurthy and Nilakanta, 1994). Several innovations have been examined using these models, such as EDI (e.g. Ramamurthy and Premkumar, 1995), telecommunications technologies (e.g. Grover and Goslar, 1993), DBMS (e.g. Grover and Teng, 1992), smart-card payment systems (e.g. Plouffe, Hulland and Vandenbosch, 2001), and CASE (e.g. Rai and Howard, 1993).

3. Research Methodology

In order to capture the majority of the empirical research currently in the adoption arena, we included for analysis studies that used surveys, cases, field experiments or laboratory experiments. We considered, and rejected, different methods for our analysis. For instance, we considered meta-analysis methods (e.g. Hunter and Schmidt, 1990) for aggregating findings from empirical research. While meta-analysis is recognized as a rigorous quantitative method for aggregating findings, it requires individual studies to report effect sizes such as Pearson correlations. This has two implications both of which can potentially bias the aggregated findings. First, studies that employ quantitative methods but do not report effect sizes will have to be excluded from our analysis (e.g. studies using structural equation modeling, for instance, may not report Pearson correlations). Second, studies that employ qualitative methods will have to be excluded as well (e.g. interpretive case studies do not involve effect sizes).

Due to the diversity of methodologies, sample sizes, and research methods (multiple regression, structural equation modeling, factor analysis, cluster analysis, discriminant analysis, etc.) employed by individual studies, we adopted a nonparametric, quantitative methodology that entailed:

- Identification of 115 (qualitative / quantitative) empirical studies to include in the review.
- Development of an initial coding scheme of 25 dependent variables (DVs) and 135 independent variables (IVs) based on the definitions used in the empirical studies.
- Coding findings from empirical studies
- Condensation of the 25 DVs into to 8 classes of dependent variables
- Condensation of the 135 IVs into 4 classes of independent variables

- Generation of overall findings based on frequency counts and weights.

3.1. Identification of Empirical Studies for Review

Time Period. We considered the empirical studies on adoption and diffusion of IS innovations published from 1992 through 2003 for review. We selected this time period because we wanted the most recent empirical studies and because Fichman (1992) had already published an excellent review of the literature prior to 1992.

Publication Outlets. We searched leading journals, conference proceedings, and book chapters for candidates. We initially identified articles from 10 major journals: *MIS Quarterly*, *Information Systems Research*, *Journal of Management Information Systems*, *Decision Sciences*, *Omega*, *Decision Support Systems*, *Database for Advances in Information Systems*, *Management Science*, *Information & Management*, and *IEEE Transactions on Engineering Management*. We also searched two conferences proceedings, the *International Conference on Information Systems* and *Americas Conference on Information Systems*. We supplemented our search through online databases such as *ABI/INFORM* and *Social Science Citation Index* using search terms such as "information systems," "adoption," "diffusion," "assimilation," "use," and "infusion." We used the bibliographies in each study as another source for finding more studies.

Selection Criteria. Our initial search identified over 250 candidate studies for possible inclusion in the review. Among these, we selected studies for the review if the study had an empirical component and if the empirical component dealt with either adoption or diffusion of IT innovations. We excluded theoretical and conceptual essays (e.g., Agarwal, 2000; Swanson, 1994), and qualitative and quantitative reviews of prior research (e.g., Fichman, 1992; Legris, Ingham and Collerette, 2003; Prescott and Conger, 1995). We identified a total of 115 empirical studies for further analysis.

3.2. Development of Coding Scheme and Coding Findings

Coding Template. In order to uniformly code the findings between independent variables and dependent variables from all studies, we initially created a coding template. The coding template was organized as "rows" and "columns", in which the rows represented the independent

variables and the columns represented the dependent variables. The intersection points between rows and columns yielded 3375 cells (135 independent variables x 25 dependent variables). A separate coding sheet was used for each study and the cells were populated with relevant values as explained below.

Coding. In order to capture the relationship between independent variables and dependent variables across 115 studies, we developed a generalized coding scheme. This coding scheme (see Table 1) assigned four possible values to the relationship between independent and dependent variables: “+1”, “-1”, “0” and “blank”. This coding scheme accounted for findings from quantitative as well as qualitative studies.

For an example of coding a quantitative study, consider Bergeron et al. (1995). The authors administered a survey and found a significant positive relationship between system use (dependent variable) and satisfaction with information from the system (independent variable) at p<=.05 level. The cell in our coding scheme represented by the intersection of "system use" and "satisfaction with information" was therefore was coded with a +1. For an example of coding a qualitative study, consider Gallivan (2001). He conducted a longitudinal case study of a firm that implemented client/server. He concluded that high levels of resources committed (independent variable) facilitated adoption (dependent variable). This study would was coded with a +1 for the relationship between the IV and DV.

Code	Meaning
+1	• Significant (p<=0.05) positive relationship for quantitative studies • Strong argument by authors for qualitative studies
-1	• Significant (p<=0.05) negative relationship for quantitative studies • Strong argument by authors for qualitative studies
0	Relationship was studied and no significant relationship was found
Blank	Relationship was not studied

Table 1. Coding Scheme and Meaning

Coding was performed in two steps. To ensure consistent coding, all three authors independently coded 25 randomly selected studies. We had identical codes for 20 of the 25 articles. We discussed the differences in coding for the remaining five (Mizruchi and Fein, 1999). In two instances, a coding mistake was made and the codes were easily reconciled. In three instances,

we could not reach a consensus in the relationship of the independent and dependent variables and so the studies were dropped. For the second step, the lead author reviewed all of the remaining articles and the other two authors each reviewed half of the remaining articles. Any discrepancies were resolved through discussion and if we could not agree on the coding of a study, it was eliminated. Appendix A lists the citations and Table 2 lists the publication outlets of the final 89 studies.

Publication Outlet	Count
MIS Quarterly	9
Information Systems Research	7
Journal of Management Information Systems	10
Decision Sciences	6
OMEGA	3
Decision Support Systems	4
Database for Advances in Information Systems	6
Management Science	4
Information & Management	13
IEEE Transactions on Engineering Management	7
ICIS Proceedings	4
Other	16
Total	**89**

Table 2. Publication Outlets of 89 studies in the Review

3.3. Interpretation of Coded Findings

Condensing Dependent and Independent variables. We condensed the original 25 dependent variables into the 8 classes of dependent variables found in Table 3, and the 135 independent variables listed in Appendix B into the 4 categories found in Table 4. This condensation was achieved by first reviewing the definitions for the variables within the individual articles and then categorizing the variables into categories. Once the IVs and DVs were aggregated, the relationships between the IVs and DVs of the 89 studies were re-coded. In all, 486 relationships were tabulated from the 89 studies.

Computing Frequency Counts and Weights. To interpret the findings, we computed the frequency counts as well as the weights of all relationships that were coded from individual studies. We calculated the frequency counts of the number of times the relationships were examined across studies. For instance, perceived system use was examined in 144 relationships across all studies (See Table 3). We also calculated the weights of the relationships between independent and dependent variables as (the number of relationships found to be significant / the

total number of relationships examined). For instance, consider the 246 relationships relating the effect of Organization Factors on innovation adoption (See Table 5). Overall, 162 relationships were found to be significantly related to adoption. The "weight" for these relationships is given by [162 / 246] = 0.66.

Dependent Variable (Code)	Definition	Number of Studies which used DV	Number of Relationships Studied
Perceived System Use (**pUSE**)	The amount of use of an innovation by an individual or organization. This is a self-report of the frequency of use by the individual or organization.	23	144
Intention to Use (**IUA**)	A person's or organization's intention to use or adopt an innovation in the future. This is usually measured using forward-looking statements that capture the intent of the person or organization.	22	106
Adoption (**ADOPT**)	Whether a person or an organization is an adopter or a non-adopter of an innovation. This is usually measured as a binary variable based on self-assessment by the person or organization.	15	106
Diffusion (**DIFF**)	The extent to which a person or an organization exploits an innovation. This is usually measured as a percentage of available features used, possible sites adopted, or possible applications.	15	69
Rate of Adoption (**RoA**)	The diffusion curve over time. This is usually measured as the percentage of adopters in a population.	8	15
Outcomes (**OUT**)	The success of the innovation. This is typically measured as perceived satisfaction or benefits.	8	19
Actual System Use (**aUSE**)	The amount of actual use of an innovation by an individual or organization. This is an objective measure typically obtained from logs.	4	7
Time of Adoption (**ToA**)	A person's or organization's time of adoption. This is typically measured by an absolute (e.g., 2000) or relative (e.g., two years ago) year of adoption.	4	20
Total		**Not Applicable**	**486**

Table 3. Final 8 Classes of Dependent Variables

Independent Variable (Code)	Definition	Number of Studies which used IV	Number of Relationships Studied
Organization Factors (**ORG**)	The factors internal to the organization adopting the innovation.	65	246
Individual Characteristics (**IND**)	The characteristics of the individual adopting the innovation.	51	80
Innovation Characteristics (**INNO**)	The characteristics of the innovation.	33	138
Environmental Factors (**ENV**)	The factors external to the organization but which impact the organization adopting the innovation.	12	22
Total		**Not applicable**	**486**

Table 4. Final 4 Independent Variable Groups

4. Findings on Dependent and Independent Variables across 89 Studies

We computed frequencies and weights across all studies to illustrate the quantity of research on the relationships between dependent and independent variables.

Dependent Variables. Perceived System Use (23 studies) and Intention to Use (22 studies) were the most frequently examined dependent variables with over 51% of the relationships (250/486). Adoption and Diffusion (15 studies each) were the next most frequently examined dependent variables. About 36% of the relationships (175/486) targeted these two dependent variables. Actual system use and time of adoption (4 studies each) were the least frequently examined dependent variables. They accounted for only about 5% of the relationships (27/486).

Independent Variables. Organization Factors (65 studies) was the most frequently examined IV group with over 50% of the relationships (246/486). Individual Characteristics (51 studies) and Innovation Characteristics (33 studies) accounted for about 28% (138/486) and 16% (80/486) of the relationships respectively. Environmental Factors (12 studies) was the least examined IV group accounting for less than 5% of the relationships (22/486).

Relationships between DVs and IVs. Based on the weights and frequency of use across all studies (See Table 5), Organizational Factors was examined most frequently (246/486 = 51%) and found to be significant most frequently (162/246 = 0.66) on innovation adoption. Innovation Characteristics and Individual Characteristics were second and third according to this classification. Environmental Factors was examined least frequently (22/486 = 5%) and found to be significant least frequently (9/22 = 0.41) on innovation adoption.

	IUA	aUSE	pUSE	ADOPT	ToA	RoA	DIFF	OUT	Weight	Significant Relation-ships	Total Relation-ships
	Weight (Count of Total Relationships)										
ORG	0.55 (27)	0.00 (1)	0.69 (59)	0.69 (68)	0.44 (16)	0.79 (14)	0.68 (53)	0.63 (8)	**0.66**	**162**	**246**
INNO	0.65 (55)	0.00 (2)	0.70 (40)	0.43 (23)	0.50 (2)	1.00 (1)	0.38 (8)	0.71 (7)	**0.61**	**84**	**138**
IND	0.57 (23)	0.25 (4)	0.71 (45)				0.00 (4)	0.75 (4)	**0.61**	**49**	**80**
ENV	0.00 (1)			0.40 (15)	0.00 (2)		0.75 (4)		**0.41**	**9**	**22**
Weight	**0.60 (106)**	**0.14 (7)**	**0.70 (144)**	**0.59 (106)**	**0.40 (20)**	**0.80 (15)**	**0.61 (69)**	**0.68 (19)**	**0.63**	**304**	**486**
Studies	**22**	**4**	**23**	**15**	**4**	**8**	**17**	**8**			

Table 5. Overall "Weights" of Relationships: (Sorted by Weights for well utilized IVs)

From Table 5, it is seen that Organization Factors received widespread attention in relationship to only three dependent variables: diffusion (53/69 = 0.77), adoption (68/106 = 0.64), and perceived system use (59/144 = 0.41). Two other dependent variables (rate of adoption and time of adoption) were also examined more frequently using Organization Factors; however, these two variables did not receive much research attention. With other dependent variables, especially intention to use or adopt, Innovation Characteristics and Individual Characteristics received at least comparable attention if not more attention than Organization Factors.

5. Findings segregated by Locus of Adoption

We also computed separate weights for the relationships by locus of adoption (individual adoption or organizational adoption) as shown in Table 6 and Table 7 respectively.

Individual Adoption. Individual adoption studies did not examine two phenomena: time of adoption and rate of adoption. Of the 245 relationships examined by individual adoption studies, perceived system use (110) and intention to use or adopt (83) accounted for about 79% (193/245) of the relationships. The remaining four dependent variables thus accounted for only about 20% of the relationships examined by individual adoption studies.

	IUA	aUSE	pUSE	ADOPT	ToA	RoA	DIFF	OUT	Weight	Significant Relation-ships	Total Relation-ships
	Weight (Count of Total Relationships)										
ORG	0.41 (17)	0.00 (1)	0.69 (26)	0.94 (16)			0.66 (6)	0.75 (4)	**0.67**	**47**	**70**
INNO	0.67 (43)	0.00 (2)	0.69 (39)	0.38 (8)			0.00 (2)	1.00 (1)	**0.64**	**60**	**95**
IND	0.57 (23)	0.25 (4)	0.71 (45)				0.00 (4)	0.75 (4)	**0.61**	**49**	**80**
ENV											
Weight	**0.59 (83)**	**0.14 (7)**	**0.70 (110)**	**0.75 (24)**			**0.33 (12)**	**0.78 (9)**	**0.64**	**156**	**245**
Studies	**18**	**4**	**17**	**3**	**0**	**0**	**2**	**2**			

Table 6. Individual Locus "Weights" of Relationships: (Sorted by Weights for well utilized IVs)
* Totals may not compute due to rounding

Studies on individual adoption did not associate Environmental Factors to any of the dependent variables. Of the 245 relationships examined by individual adoption studies, Innovation Characteristics (95) and Individual Characteristics (80) accounted for more than 70% (175/245) of the relationships. Organization Factors was thus examined in less than 30% of the relationships. Of the 70 relationships involving Organization Factors, perceived system use (26) and intention to use or adopt (17) accounted for more than 60% (43/70) of the relationships.

Organizational Adoption. Studies on organization adoption did not examine one phenomenon: actual system use. Of the 241 relationships examined by organizational adoption studies, adoption (82) and diffusion (57) accounted about 58% (139/241) of the relationships. The remaining five dependent variables together accounted for less about 40% of the relationships examined by organizational adoption studies.

	IUA	aUSE	pUSE	ADOPT	ToA	RoA	DIFF	OUT	Weight	Significant Relation-ships	Total Relation-ships
	Weight (Count of Total Relationships)										
ORG	0.80 (10)		0.70 (33)	0.62 (52)	0.44 (16)	0.79 (14)	0.68 (47)	0.50 (4)	**0.65**	**114**	**176**
INNO	0.58 (12)		1.00 (1)	0.47 (15)	0.50 (2)	1.00 (1)	0.50 (6)	0.67 (6)	**0.58**	**25**	**43**
ENV	0.00 (1)			0.40 (15)	0.00 (2)		0.75 (4)		**0.41**	**9**	**22**
IND											
Weight	**0.65 (23)**		**0.71 (34)**	**0.55 (82)**	**0.40 (20)**	**0.80 (15)**	**0.66 (57)**	**0.60 (10)**	**0.61**	**148**	**241**
Studies	**4**	**0**	**6**	**12**	**4**	**8**	**13**	**6**			

Table 7. Organizational Locus "Weights" of Relationships: (Sorted by Weights for well utilized IVs)

Organizational adoption studies did not associate Individual Characteristics to any of the dependent variables. Of the 241 relationships examined by organizational adoption studies, Organization Factors accounted for 73% (176/241) of the relationships. About 18% (43/241) of the relationships involved Innovation Characteristics and the remaining relationships involved Environmental Factors.

6. Discussion

Based on the findings presented above, it is possible to identify lessons learned and directions for future research.

Extant research on actual system use is sketchy at best. Only four studies in our sample had examined the effects of six unique independent variables on actual system use. All independent variables, except behavioral intention, were found to be non-significant. Thus, it is difficult to conclude anything about actual system use. The fact that perceived system use does not really capture actual system use has been well documented (e.g. Szajna, 1996; Straub, Limayem and Karahanna-Evaristo, 1995). Actual system use is of considerable importance to IS practitioners since it allows organizations to evaluate their IT investments. Research on actual system use needs to be moved forward, methodologically and theoretically, in order to aid such evaluation.

Research on innovation adoption by individuals has emphasized innovation attributes and individual characteristics rather than contextual conditions such as organization factors. Only about half the studies in our sample that examined individual adoption actually included organization factors. This may be attributed partly to the popularity of TAM and the extent to which it has been used in adoption research. However, TAM dispenses greater control and autonomy to the individual in adoption decisions and does not really include the broader context within which the adoption behavior is enacted. In our sample, non-TAM studies found that contextual conditions such as top management support (e.g. Igbaria, 1990), subjective norms (e.g. Taylor and Todd, 1995), and user support (e.g. Igbaria, Guimaraes and Davis, 1995) were important in an individual's decision to adopt innovations.

Extant research on individual adoption has primarily targeted only two dependent variables: intention to use or adopt and perceived system use. Thus, other aspects of innovation adoption are under-researched. For instance, little is known about the time or rate at which individuals *within* a system adopt different IT innovations, despite the general understanding about the S-shaped diffusion curve (e.g. Rogers, 1995). In our sample, time of adoption and rate of adoption by individuals within a system was not examined by any study.

Research on IT adoption has not considered the social networks to which adopters belong. For instance, individuals within an organization are generally organized into different social networks such that individuals with similar interests are members of the same social network whereas individuals with dissimilar interests are members of different social networks. Thus, individuals maintain ties with other members of the same social network or members of other social networks (e.g. Granovetter, 1973; Burt, 1997). Individuals may thus be influenced in their adoption decisions by the behavior of other members in their social networks. Similar arguments can be extended to organizations as well. This particular dynamic has not been considered by adoption studies.

In both individual and organizational adoption studies, Organizational Factors and Innovation Characteristics were found to be most frequently significant than other independent variables. The strength of Organization Factors (overall and both individual and organizational adoption),

in particular, underlines the linkages between individual and organizational adoption and the importance of including it in research on innovation adoption. Thus, individual and organizational adoption research may have a strong overlap, suggesting a common theory may be applicable to both domains. Indeed, we are in the initial stages of formulating such a common model that may be used to inform research on adoption by both individuals and organizations.

We anticipate that DIGIT will provide a forum for further discussion and implication of these findings. We can also report at the individual IV level to show the most frequently significant variables – management support, relative advantage, perceived usefulness, etc. – as well as variables that are frequently used but rarely found significant such as voluntariness. We are limited by page count here but may present several layers of analysis for DIGIT discussion.

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Appendix A. Description of 89 Studies in the Review

Author	Year	Journal	Typ	Loc	IVs
Agarwal & Karahanna	2000	MISQ		I	___S
Agarwal & Prasad	1997	DS		I	_OIS
Agarwal & Prasad	1998	DSS		I	___S
Agarwal & Prasad	2000	IEEE		I	_OIS
Al-Gahtani	2001	IRMJ		I	__IS
Al-Khaldi & Wallace	1999	IM		I	_OIS
Astebro	1995	IEEE	ql	O	_O__
Bergeron, Raymond, Rivard & Gara	1995	DSS		I	_OI_
Bretschneider & Wittmer	1993	ISR		O	E___
Cale & Eriksen	1994	IM		O	___S
Chau	1996	IM		I	__IS
Chau	1996	JMIS		I	_O_S
Chau & Tam	1997	MISQ		O	_O__
Chin & Gopal	1995	DBADV		I	__IS
Choe	1996	JMIS		O	_O__
Compeau & Higgins	1995	MISQ		I	__I_
Compeau, Higgins & Huff	1999	MISQ		I	__I_
Davis	1993	JMMS		I	__IS
Dos Santos & Peffers	1998	IM		O	_O__
Fichman & Kemerer	1997	MS		O	EO__
Gallivan	2001	DBADV	ql	O	_O__
Gefen & Keil	1998	DBADV		I	___S
Gefen & Straub	1997	MISQ		I	__IS
Gordon & Gordon	1992	IM	ql	O	_O__
Grover	1993	DS		O	EO_S
Grover & Goslar	1993	JMIS		O	_O__
Grover & Teng	1992	IM		O	EO__
Grover, Fiedler & Teng	1997	ISR		O	_O__
Grover, Teng, Segars & Fiedler	1998	IM		O	_O__
Guimaraes, Yoon & Clevenson	1996	IM		I	_OIS
Hebert & Benbasat	1994	HHSA		I	_OIS
Hoffer & Alexander	1992	DB		O	_O_S
Hu, Saunders & Gebelt	1997	ISR		O	_O__
Iacovou, Benbasat & Dexter	1995	MISQ	ql	O	EO__
Igbaria	1993	OMEGA		I	_OIS
Igbaria & Tan	1997	IM		I	__I_
Igbaria, Guimaraes & Davis	1995	JMIS		I	_OIS
Igbaria, Parasuraman & Baroudi	1996	JMIS		I	_OIS
Igbaria, Zinatelli, Cragg & Cavaye	1997	MISQ		I	___S
Iivari & Maansaari	1997	ICIS		I	_OIS
Jackson, Chow & Leitch	1997	DS		I	_OIS
Jurison	2000	JEUC		O	___S
Karahanna, Straub & Chervany	1999	MISQ		I	_OI_
Keil, Brenner & Konsynski	1995	DSS		I	___S
Lai & Guynes	1994	IM		O	_O_S
Larsen	1993	JMIS		I	_OI_
Lederer, Maupin, Sena & Zhuang	2000	DSS		I	___S
Libertore & Breem	1997	IEEE		O	_O__
Limayem & Hirt	2003	JAIS		I	_OI_
Loh & Venkatraman	1992	ISR		O	_O__
Moon & Kim	2001	IM		I	__IS
Neo, Khoo & Ang	1994	ICIS		O	EO_S
Pae, Kim, Han & Yip	2002	IM		O	_O__
Parthasarathy & Bhattacherjee	1998	ISR		I	EO_S
Pennings & Harianto	1992	SMJ		O	_O__
Plouffe, Hulland & Vandenbosch	2001	ISR		O	_OIS
Premkumar & Potter	1995	DBADV		O	_O_S
Premkumar, Ramamurthy & Crum	1997	EJIS		O	EO_S
Premkumar, Ramamurthy & Nilakanta	1994	JMIS		O	_O_S
Rai	1995	EJIS		O	___S
Rai & Howard	1993	IRMJ	ql	O	_O__
Rai & Howard	1994	OMEGA		O	_OI_
Rai & Patnayakuni	1996	JMIS		O	_O__
Ramamurthy & Premkumar	1995	IEEE		O	_O__
Ravichandran	2000	DS		O	_O__
Rose & Straub	1998	JGIM		I	___S
Ruppel & Harrington	1995	DBADV		O	_O__
Ruppel & Howard	1998	IRMJ		O	_O_S
Saloner & Shepard	1995	RAND		O	_O__
Saunders & Clark	1992	IRMJ		O	EO__
Straub, Keil & Brenner	1997	IM		I	___S
Straub, Limayem & Karahanna-Evaristo	1995	MS		I	___S
Sultan & Chan	2000	IEEE		I	_O_S
Szajna	1996	MS		I	__IS
Taylor & Todd	1995	ISR		I	_OIS
Teng, Grover & Guttler	2002	IEEE		O	_O__
Teo, Tan & Wei	1995	ICIS		O	_O_S
Thompson, Higgins & Howell	1994	JMIS		I	_OIS
Thong & Yap	1995	OMEGA		O	EO_S
Van Slyke, Lou & Day	2002	IRMJ		I	_O_S
Venkatesh & Davis	1996	DS		I	___S
Venkatesh & Davis	2000	MS		I	_OIS
Venkatesh, Morris, Davis & Davis	2003	MISQ		I	_OIS
Venkatesh, Speier & Morris	2002	DS		I	__IS
Wynekoop	1992	ICIS		I	_O_S
Yan & Fiorito	2002	IJCST		O	EO__
Yoon & Guimaraes	1995	JMIS		I	_OIS
Zelkowitz	1996	IEEE	ql	O	EO__
Zmud & Apple	1992	JPIM	mx	O	_O__

DBADV	Database for Advances in Information Systems
DS	Decision Sciences
DSS	Decision Support Systems
EJIS	European Journal of Information Systems
HHSA	Hospital & Health Services Administration
ICIS	ICIS Proceedings
IEEE	IEEE Transactions on Engineering Management
IJCST	Intl. Journal of Clothing Science and Technology
IM	Information & Management
IRMJ	Information Resources Management Journal
ISR	Information Systems Research
JAIS	Journal of the Association for Information Systems
JEUC	Journal of End User Computing
JGIM	Journal of Global Information Management
JMIS	Journal of Management Information Systems
JMMS	Journal of Man Machine Studies
JPIM	Journal of Product Innovation Management
MISQ	MIS Quarterly
MS	Management Science
OMEGA	Omega
RAND	RAND Journal of Economics
SMJ	Strategic Management Journal

Loc refers to the Locus of Adoption examined by individual studies. "I" represents adoption by individuals and "O" represents adoption by organizations.
Typ refers to the research methodology used by individual studies. Blank cells represent quantitative studies, "ql" represents qualitative studies, and "mx" represents mixed methodologies.

IVs represent the IV categories examined by individual studies. "E" represents environmental factors, "O" organizational factors, "I" individual characteristics, and "S" innovation (system) characteristics.

Note: Complete citations available from the authors upon request.

Appendix B. Categorization of 135 Independent Variables

IV Group	Independent Variables	Number of Studies	Number of unique IVs	Number of Relationships
Environmental Factors	Adaptable Innovation, Competition, Competitor Scanning, Customer Interaction, Customer Power, Customer Support, External Pressure, Government, Industry Type, Influence (Coercive), Influence (Peer), Maturity, Net Dependence, Sector, Vertical Coordination, culture	12	16	22
Organization Factors	Administrative Intensity, Business Computerization, Buying Center Participation, Career Ladder, Centralized Planning And Control, Championship, Communication Amount, Communications Media Quality, Cost, Elapsed Time, Environmental Complexity, Environmental Dynamism, Environmental Instability, Experience, Facilitating Conditions, Information Sources, Information Sources (External), Information Sources (Internal), Infusion, Internal Pressure, Learning Responsibility, Management Risk Perception, Managerial Training, Middle Management Support, Network Externality, Network Size, Org Culture, Org Size, Org Structure (Centralization), Org Structure (Formalization), Org Structure (Integration), Org Structure (Routinization), Org Structure (Specialization), Outsourcing Propensity, Perceived Benefits, Process Integration, Production Scale, Productivity Index, Professionalism, Quality Orientation, Resources, Risk (Operational), Risk (Strategic), Satisfaction, Scope, Slack Resources, Strategic Role Of IS, Strategy, Subjective Norms, Technological Diversity, Technology Policy, Top Management Characteristics, Top Management Support, Trust, Uncertainty, User Involvement, User Participation, User Support, User Training, Voluntariness, Delegation Of It Tasks, Developer Involvement, Evolution Level Of IS, Formalization Of Systems Development, Internal Experimentation, IS Department Size, IS Maturity, IS Planning, IS Slack, IS Structure, Job/Role Definition, Job/Role Rotation, Performance Gap, Professionalism, Quality Orientation, Communication, Opinion Leadership, Response To Risk, Teamwork, Job Task Difficulty, Job Task Variation, Problem Difficulty, Problem Importance	65	83	246
Individual Characteristics	Age, Anxiety, Attitudes, Behavioral Intention, Computer Avoidance, Computer Experience, Computer Self-Efficacy, Consequences, Education, End-User Characteristics, Extrinsic Motivation, Gender, Hierarchical Level, Image, Impact On Jobs, Intrinsic Motivation, Outcome Expectations (Performance), Outcome Expectations (Personal), Perceived Behavioral Control, Personal Innovativeness, Playfulness, Tenure, User Satisfaction	33	23	80
Innovation Characteristics	Communicability, Compatibility, Complexity, Ease Of Use, Information Intensity, Observability, Perceived Barriers, Perceived Usefulness, Relative Advantage, Result Demonstrability, System Quality, Trialability, Visibility	51	13	138
Totals		**Not Applicable**	**135**	**486**