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# **A COMPARISON OF VOICE MAIL AND INFORMATION RETRIEVAL SYSTEMS ON TECHNOLOGY ACCEPTANCE AND INFORMATION CHARACTERISTICS**

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Voice mail and electronic mail have been compared on several communication characteristics (Adams, Todd, and Nelson, 1992). The applicability of media richness theory (MRT) in determining individual preferences for these two technologies was studied in [El-Shinnawy and Markus, 1992].

In the technology acceptance model (Davis, Bagozzi, and Warshaw, 1989), perceived usefulness and ease of use are the two variables that determine the adoption and usage of information technology. While MRT can be used to compare information technologies with respect to resolving equivocality or reducing uncertainty [El-Shinnawy and Markus, 1992], the technology acceptance model (TAM) can provide a comparison of technologies with respect to their acceptance and usage. Such a comparison is necessary in evaluating different technologies with varying capabilities that can perform a particular organizational function such as providing customer service support.

Information accessibility and information accuracy are two important information characteristics [Culnan, 1983; O'Reilly, 1982; Swanson, 1987] in determining information usage behavior. As these two information characteristics influence information usage, it is important to compare different information technologies such as voice mail and information retrieval systems on information accessibility and accuracy.

Electronic mail (email) is shown to be preferred over voice mail (vmail) by users in situations involving the resolution of equivocality [El-Shinnawy and Markus, 1992]. Email is preferred over vmail in communication situations involving the exchange of information to reduce uncertainty [El-Shinnawy and Markus, 1992]. Based on these findings, information retrieval systems, which is also a written media like email, would be expected to be preferred over vmail. If individual technology preference can be extrapolated to technology acceptance, information retrieval systems can be expected to be more acceptable than vmail and hence would be rated better in perceived usefulness or ease of use. Hence, we hypothesize:

H1: Information retrieval systems are perceived to be more useful than vmail.

H2: Information retrieval systems are perceived to be easier to use than vmail.

A study by Stewart and Finn (1985) found that the call pick-up function can cause voice mail to be perceived as a barrier to communication if callers suspect that individuals rely on the pick-up function rather than answering the telephone. Eckerson (1989) reports that in some cases "top executives have ordered the systems to be turned off because staff members become virtually inaccessible behind the automated system". As computer access is not subject to these barriers, information retrieval systems could be rated to provide more accessible information than vmail. Hence, we hypothesize:

H3: Information obtained through information retrieval systems is more accessible than the information from vmail. It is also argued that email messages promote accuracy as senders of these messages can take their time in composing and editing while vmail users cannot [El-Shinnawy and Markus, 1992]. Thus, email is argued to foster more accurate information as it is based on a written medium. So, information retrieval systems would also be rated to provide more accurate information than vmail.

H4: Information obtained through information retrieval systems is more accurate than the information from vmail.

Two organizations were chosen for a survey with one organization using voice mail and the other using an information retrieval system. Both the organizations used these different technologies to help their distributors obtain information from the customer service department. This system for support of distributors in both these organizations can be classified as a system primarily used to access large amounts of accurate, objective, or numerical data to reduce uncertainty using the MRT classification (Daft and Lengel, 1986). The survey obtained information on perceived usefulness, ease of use, information accessibility, and information accuracy.

## **Reliability and Validity of the Instruments**

Davis, Bagozzi, and Warshaw (1989) presented an instrument to measure perceived usefulness and ease of use. The instrument had high reliability and validity and its psychometric properties were confirmed by Davis (1989) and Adams, Nelson, and Todd (1992).

A confirmatory factor analysis of all the measures in [Adams, Nelson, and Todd, 1992] resulted in a model with poor fit [(Adams, Nelson, and Todd, 1992); (Segars and Grover, 1993)] and pointed to a need for respecification of the measurement model (Segars and Grover, 1993; authors). The standardized residuals for "works more quickly", "improves performance", and "useful in job" for the usefulness scale in Davis, 1989 had high standardized residuals (greater than the cutoff value of 2.58 - Joreskog and Sorbum, 1989) between themselves and with two to four other measures suggesting that their inter-correlations are not well-modelled. The pattern and magnitude of their correlations also support their elimination. The usefulness construct in this research uses the two measures (Easier to do job, Job productivity) that were also confirmed in Segars and Grover, 1993 and has job effectiveness as the additional measure for usefulness.

The standardized residuals for "easy to do" and "interaction clear and understandable" for the ease of use scale in Davis, 1989 had high standardized residuals (greater than the cutoff value of 2.58 - Joreskog and Sorbum, 1989) between themselves and with at least two other measures suggesting that their inter-correlations are not well-modelled. The pattern and magnitude of their correlations also support their elimination. The ease of use construct in this research had flexibility as an additional measure to the three measures that were also confirmed (Easy to use, Learning to operate, Skillful) in Segars and Grover, 1993. The cronbach alpha for the perceived usefulness instrument in this research was 0.9589 and the alpha for perceived ease of use in this research was 0.9161. All the factor loadings in the confirmatory factor analysis were significant thus demonstrating convergent validity. Discriminant validity was assessed for these two constructs by constraining the estimated correlation between them to 1.0 and then performing a chi-square difference test on the values obtained for the constrained and unconstrained models. A significantly lower chi-square value for the constrained model indicated that discriminant validity was achieved.

O'Reilly and Roberts (1976) presented an instrument to measure perceived information accuracy and communication openness in an hospital setting. We use the term accessibility instead of openness as accessibility is more appropriate for communication technology. Their instrument had high reliability and validity associated with it. The O'Reilly and Roberts (1976) instrument was modified for our research. The modified instrument uses four measures for information accuracy and four measures for information accessibility. The cronbach alpha for information accessibility instrument in this research was 0.7964. The alpha for information accuracy instrument in this research was 0.7393. The alpha values for all the constructs were quite close to the alpha values for the original instruments.

All the factor loadings in the confirmatory factor analysis were significant demonstrating convergent validity. Discriminant validity was assessed for these two constructs by constraining the estimated correlation between them to 1.0 and then performing a chi-square difference test on the values obtained for the constrained and unconstrained models. A significantly lower chi-square value for the constrained model indicated that discriminant validity was achieved.

## **Hypotheses testing results**

Analysis of variance was used to test the four hypotheses in this research. Hypotheses 1 and 3 were supported while hypotheses 2 and 4 were not supported. Information retrieval systems are perceived to be more useful than the vmail systems. Ease of use is not significantly impacted by the type of information technology - vmail or information retrieval systems. The two technologies do not differ significantly on ease of use. Information retrieval systems are considered to be more accessible than vmail systems. Information retrieval and vmail systems do not differ significantly on the accuracy of information conveyed through these technologies.

## **Discussion**

Information retrieval systems are perceived to be more useful than the vmail systems. Since the major need of the distributors is access to accurate, objective information for uncertainty reduction (Daft and Lengel, 1986), the written information retrieval medium would be preferred over the oral vmail medium according to MRT. Again, the written information retrieval medium would be preferred for clarifications and explanations to resolve equivocality (El-Shinnawy and Markus, 1992). Hence, it is not surprising that information retrieval is rated to be more useful than vmail.

Ease of use is not significantly impacted by the type of information technology - vmail or information retrieval systems. The two technologies do not differ significantly on ease of use. If the technology by its inherent nature is relatively easy to use, ease of use would not be a significant factor as evident in the results reported in (Adams, Todd, and Nelson, 1992). One reason for the relative ease of use could be that voice mail or information retrieval systems come with far less user documentation than other software packages like Harvard Graphics. Both voice mail and information retrieval systems were in use for about one-and-half years before the conduct of this study. Ease of use is an important determinant only in the earlier stages of the use of the system and becomes non-significant with prolonged exposure to the system (Davis, 1989). This could also explain the result that ease of use was not significant.

Information retrieval systems are considered to be more accessible than vmail systems. Due to computer access and the absence of the customer representative, information access is completely controlled by distributors in the information retrieval system. Human control of information access by the customer service representative, however, results in shared control of information access. Vmail is perceived as a barrier to communication due to the call pick-up function (Stewart and Finn, 1985) and the vmail systems could make staff members inaccessible (Eckerson, 1989). Continuous availability with no barriers to computer access makes information more accessible through the information retrieval system.

"Vmail introduces verbal cues and thus bring in distortions. Voice could also be harder to understand and interpret" [El-Shinnawy and Markus, 1992]. It is also argued that written media such as email or information retrieval systems promote information accuracy [El-Shinnawy and Markus, 1992]. However, the results do not indicate that information is more accurate in the information retrieval systems than in vmail. Information accuracy is more a function of the origination of information (customer service representative) and the voice distortions may not be present with vmail in our research. Thus, information accuracy would not be dependent on the type of technology as long as the technology does not distort the information.

## **Conclusion**

The results of this study are specifically relevant to managers making decisions on choosing information retrieval or vmail systems to support their customers. The managers would be better off choosing information retrieval systems over vmail as information retrieval systems are rated to be more useful and also more accessible. Information retrieval systems are perceived to be more useful for organizational functions that primarily require large amounts of information to reduce uncertainty. Vmail is still perceived as being little more than an adjunct to the telephone (Adams, Todd, and Nelson, 1992). Managers who use vmail need to pay close attention to accessibility problems associated with vmail as reported in (Stewart and Finn, 1985; Eckerson, 1989).

Ease of use and information accuracy did not depend on the type of information technology and hence did not differ significantly between information retrieval systems and vmail. It is clear from this study and previous research that ease of use of technology is significant only when the technology is not relatively easy to use or when the technology is new to the organization. Information accuracy is not affected by technology as long as technology does not distort the information from its original source.

MRT predicts that individuals would prefer written- media based technology such as information retrieval systems in situations that require uncertainty reduction (Daft and Lengel, 1986). Individual technology preference does result in technology acceptance as observed in the finding that information retrieval systems are perceived to be more useful in situations that require uncertainty reduction. There is convergence in findings between MRT and TAM theories.

Care should be exercised in applying this study's results and conclusions. The study is relevant specifically to customer service support applications and generally to applications that primarily require the use of large amounts of information for reducing uncertainty.

References available upon request from Girish Subramanian\_