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Recommended Citation

Carr, Christopher L.; Bateman, Patrick J.; and Navlakha, Saral J., "They Call for Help, But Don't Always Listen: The Development of the User-Help Desk Knowledge Application Model" (2008). *AMCIS 2008 Proceedings*. 387.

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They Call For Help, But Don't Always Listen: The Development of the User-Help Desk Knowledge Application Model

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ABSTRACT

The IS help desk function plays a central role in boundary spanning knowledge exchanges within organizations. Help desk employees provide technical support to users in an effort to transfer knowledge and enable users to autonomously apply this knowledge in the future. However, despite their importance, little is known about the factors that affect knowledge application within this context. Adopting interpersonal influence theory, this paper develops a model that examines how dimensions of source credibility - expertise, trustworthiness, and attractiveness impact users' knowledge application in a help desk environment. The model is tested using a sample of working adults at a large Midwestern hospital who had significant experience requesting help from an IS help desk. Results indicate that all three dimensions of source credibility predict users' ability to apply the knowledge transferred from a help desk employee. The implications of these results are discussed.

Keywords

Help Desk, Management Information Systems, Knowledge Application, End-User Computing

INTRODUCTION

The use of information systems (IS) in organizations today are critical to the performance of core business activities, including managing processing, supporting decision making, and facilitating communication. Furthermore, IS plays an important role in reducing costs, improving operations, and enhancing customer services (Leung and Lau 2007). While providing a variety of benefits, this reliance has led to an increase in the number of technical and functional problems that users have encountered. For example, every two days, critical network failures occur that adversely impact more than 30,000 users (Bayrak and Brabowski 2006). As a result, the knowledge transfers between IS employees to business users aimed at troubleshooting these problems are crucial to overcoming these issues and can enhance employee productivity (Bruton, 1995). For this reason, help desk functions within organizations play an integral role in both ensuring that organizational information systems are working properly and assisting organizations in achieving their operational objectives.

The IS help desk function plays a central role in boundary spanning knowledge exchanges within organizations. Through multi-stage, interpersonal technical support interactions, these units transfer complex technical and business knowledge to users within the firm. Specifically, these interactions involve transfers of declarative, procedural, and conditional knowledge from IS consultants (sources) to IS users (recipients) in response to a perceived knowledge gap on the part of the user (Bruton, 1995; Czegel, 1994; Wilson, 1991). However, despite their importance, little is known about the factors that affect knowledge application by users within this context. This is an issue because users tend to ignore or reject knowledge from the formal IS help desk, asking others for help instead. This is perceived as a costly and ineffective circumvention of established business processes (Wilson, 1991).

Organizational knowledge transfer processes can be impacted by properties of the source-recipient communication process, including properties of the source, channel, message, recipient, and context (Argote, 1999; Argote & Ingram, 2000;

Szulanski, 2000). Understanding the factors that affect users' knowledge application can help managers improve IS help desk quality. This paper draws on interpersonal influence theory to explicate how the perceived properties of the source impact knowledge application by the recipient in the context of the IS help desk.

KNOWLEDGE TRANSFER

Knowledge transfer is the process through which one organizational unit (e.g. person, group, department, or division) is affected by the experience of another (Argote, 1999; Argote & Ingram, 2000; Argote, Ingram, Levine, & Moreland, 2000; Szulanski, 2000). One conceptualization of knowledge transfer at the individual level is the process by which the knowledge source creates a partial or exact replica of a complex and causally ambiguous practice in the knowledge recipient (Szulanski, 2000). The source possesses the original exemplar of the practice and, through one or more knowledge transfer interactions, the effort is made to facilitate the recipient's replication of the practice. Assuming some level of autonomy on the part of the knowledge recipient, the success of the knowledge transfer is dependent upon the recipient's decision to accept or reject the knowledge sent by the source.

Barriers to Knowledge Application

Certain factors exist that can exacerbate the recipient's application of knowledge obtained from the source. Stickiness is the level of difficulty encountered during the knowledge transfer process that negatively affects the application of the knowledge by the potential recipient. It can occur at any stage in the knowledge transfer process and may involve different sets of factors at different stages (Szulanski, 2000).

The initiation phase of knowledge transfer involves the recognition, on the part of an organizational actor (here, the recipient), of a gap in the actor's own existing knowledge and the location of a source of knowledge necessary to address that gap. By definition, this process involves considerable uncertainty and causal ambiguity concerning the efficacy of the new knowledge as perceived by the recipient. In the presence of such uncertainty concerning the knowledge itself, properties of the source become paramount (Argote & Ingram, 2000; Szulanski, 2000).

Knowledge transfer can be conceptualized as a person-to-person communication process. As such, its level of "stickiness" is caused by the same factors that promote or retard any communication process. When two factors exist simultaneously, namely: (1) uncertainty concerning the efficacy of a potential knowledge transfer, and (2) an inability of the recipient to evaluate the new knowledge a priori. Initiation of a particular transfer depends upon the extent to which the recipient is persuaded that the source will provide the knowledge necessary to successfully address the recipient's knowledge gap (Szulanski, 2000). It has been suggested that in any communicative knowledge transfer process at least two source attributes affect initiation stickiness, impacting the willingness of the recipient to accept the knowledge transfer. They are source expertise in or mastery of the knowledge domain and the trustworthiness of the source (Szulanski, 2000), which are also the same two factors thought to impact message acceptance in any persuasive communication context.

Persuasion is an attitude change process (Eagly & Chaiken, 1993; Eagly & Himmelfarb, 1978). The process means moving from the recipient's default attitude of neutrality or extreme or casual skepticism to one of a positive desire to initiate the knowledge transfer process and eventually accept the knowledge from the source. Existing communication research suggests that certain attributes or characteristics of a communication source, as perceived by the recipient, contribute to a judgment of source credibility which in turn influences the recipient and either promotes or retards the attitude change necessary to initiate knowledge transfer (Giffin, 1967; Hovland, Janis, & Kelley, 1953; Hovland & Weiss, 1951; McGuire, 1985; Strong, 1968; Strong & Schmidt, 1970).

INTERPERSONAL INFLUENCE THEORY FRAMEWORK

Interpersonal influence theory posits the existence of an innate resistance on the part of the knowledge recipient to accept knowledge transfers from a given knowledge source. This innate resistance can be seen as a source of inherent stickiness in the interpersonal knowledge transfer process. The innate resistance is posited to be primarily dependent on the perceived level of credibility possessed by the knowledge source and is thought to affect the willingness of the recipient to accept and apply the knowledge provided by the knowledge source. As the factors comprising source credibility are perceived by the recipient to increase, the recipient's resistance to the knowledge transfer will decrease. Hence, the recipient is more willing to accept and apply the knowledge provided by the source. Source credibility is conceptualized as a multi-dimensional construct consisting of the following three dimensions: source expertness, source trustworthiness, and source attractiveness.

Source Credibility and Knowledge Receptivity

Researchers in many academic fields, including advertising, marketing, counseling, and speech communication, have sought to understand source credibility and its influence on knowledge transfer. In communications research, the term “source credibility” commonly refers to a set of characteristics or attributes possessed by a message source that affect the receiver’s acceptance of the message source (Giffin, 1967; Hovland et al., 1953; Hovland & Weiss, 1951; McGuire, 1985; Strong, 1968; Strong & Schmidt, 1970). Modern source credibility research originated with a seminal study by Hovland and his colleagues (Hovland et al., 1953; Hovland & Weiss, 1951). Their analysis of the factors leading to perceived credibility of a communicator concluded that two factors, source “expertness” and source “trustworthiness”, are strong correlates of source credibility. Expertness is defined as “the extent to which a communicator is perceived to be a source of valid assertions,” and trustworthiness as “the degree of confidence in the communicator’s intent to communicate the assertions he considers most valid.” Extant research has suggested that there exists a third correlate of source credibility, namely, source attractiveness (McGuire, 1985).

Source Trustworthiness

A message recipient’s confidence in a source’s intent to communicate valid assertions is influenced by the message recipient’s confidence in and level of acceptance of the source (Giffin, 1967). It has been demonstrated that a message is more readily accepted when the source is perceived to be trustworthy (Miller & Baseheart, 1969). Research has also suggested that a trustworthy source is more persuasive than a non-trustworthy source, irrespective of expertness (McGinnies & Ward, 1980). Research on counseling communication has demonstrated the reliability and validity of trustworthiness as a measure of the client’s perceptions of the counselor’s intent to communicate valid assertions and has been found to be a stable correlate of the client’s (recipient) compliance with behavioral modification recommendations provided by the counselor (source) (Atkinson & Wampold, 1982; Bachelor, 1987; Barak & LaCrosse, 1975; Barak & Lacrosse, 1977; Corrigan & Schmidt, 1983; Dorn & Jereb, 1985; Epperson & Pecnik, 1985; Heesacker & Heppner, 1983; LaCrosse, 1980; Rucker, 1983; Strong, 1968; Strong & Schmidt, 1970; Subich, 1984; Tracey, Glidden, & Kokotovic, 1988; Tryon, 1987).

Source Expertness

The extent to which a communicator is perceived to be a source of valid assertions has been termed “expertness” (Strong, 1968; Strong & Schmidt, 1970), “expertise” (Hovland et al., 1953; Hovland & Weiss, 1951), “competence” (Whitehead, 1968), and “qualification” (Berlo, Lemert, & Mertz, 1970) by various communications researchers. Previous studies have demonstrated that perceptions of source expertise are correlated with message recipient’s attitude change (Horai, Naccari, & Fatoullah, 1974; Maddux & Rogers, 1980; Mills & Harvey, 1972). Perceived source expertness has been demonstrated to influence behavioral compliance (Crisci & Kassinove, 1973; Crisci, 1973) and level of message agreement (Crano, 1970). In the selling context, expertness of salespersons positively influenced purchase behavior (Woodside & Davenport, 1976). Expertness has also been found to be a stable correlate of the client’s (recipient) attitude change and compliance with behavioral modification recommendations provided by the counselor (source) (Atkinson & Wampold, 1982; Bachelor, 1987; Barak & LaCrosse, 1975; Barak & Lacrosse, 1977; Corrigan & Schmidt, 1983; Dorn & Jereb, 1985; Epperson & Pecnik, 1985; Heesacker & Heppner, 1983; LaCrosse, 1980; Rucker, 1983; Strong, 1968; Strong & Schmidt, 1970; Subich, 1984; Tracey et al., 1988; Tryon, 1987).

Source Attractiveness

Source attractiveness is defined as the likeability, friendliness, sociability, and warmth exhibited by the source as perceived by the recipient (McGuire, 1985). Although source attractiveness has been associated with physical attractiveness, particularly in advertising, it is most often defined as the extent to which the recipient perceives the source to exhibit “liking” for or to be friendly toward or to positively regard the recipient. Attractiveness has also been found to be a stable correlate of the client’s (recipient’s) evaluation of the credibility of the counselor (source) and a correlate of the client’s (recipient’s) attitude change and compliance with behavioral modification recommendations provided by the counselor (source) (Atkinson & Wampold, 1982; Bachelor, 1987; Barak & LaCrosse, 1975; Barak & Lacrosse, 1977; Corrigan & Schmidt, 1983; Dorn & Jereb, 1985; Epperson & Pecnik, 1985; Heesacker & Heppner, 1983; LaCrosse, 1980; Rucker, 1983; Strong, 1968; Strong & Schmidt, 1970; Subich, 1984; Tracey et al., 1988; Tryon, 1987).

THEORETICAL CONCLUSION

Based on the above discussion, one important predictor of the effectiveness of the knowledge transfer is the recipient’s perception of the credibility of the knowledge source. Source credibility is a composite of three attributes of the knowledge source (i.e. attractiveness, expertness, and trustworthiness) as perceived by the knowledge recipient. Recipient perceptions of

source credibility influence message receptivity, which in turn, impact knowledge application. Typically, perceptions of source attributes can be based on inference from communication with others, actual behavioral experience, and general recipient knowledge and assumptions about a specific source. There need not be association between source credibility and the actual efficacy of the eventual knowledge transfer.

METHODS

Respondents

The context for this study involves the knowledge transfers provided to requesting IS users by consultants working at the IS help desk of a large Midwestern hospital. The sample frame for this study is working adults who had significant experience using IS and requesting help from an IS help desk. Five-hundred instruments were mailed out, 256 were returned, and 205 were usable, resulting in a usable response rate of 40.41%. Respondents ranged in age from 18 years to 67 years, and held titles ranging from secretarial, to professional, to top executive. Respondents averaged 11.5 years of computer use with a standard deviation of 4.24 years. The number of days since a respondent had experienced a knowledge transfer from a help desk consultant ranged from less than 1 day to 39 days with a median of 15 days. Means, standard deviations, skewness and kurtosis parameter estimates are shown in Table 1.

	Mean	St. Dev.	Skewness	Kurtosis
K_APPLY1	4.748	1.523	-0.662	-0.203
K_APPLY2	4.726	1.505	-0.618	-0.243
ATTR1	4.828	1.817	-0.667	-0.594
ATTR2	4.843	1.805	-0.692	-0.565
ATTR3	4.928	1.756	-0.789	-0.318
ATTR4	4.843	1.791	-0.673	-0.547
EXP1	4.915	1.367	-0.626	0.223
EXP2	4.855	1.324	-0.401	0.036
EXP3	4.666	1.365	-0.233	-0.202
EXP4	4.601	1.380	-0.174	-0.212
TRUS1	4.658	1.388	-0.353	-0.214
TRUS2	4.703	1.374	-0.424	-0.155
TRUS3	4.648	1.410	-0.423	-0.178
TRUS4	4.738	1.369	-0.495	-0.049

Table 1. Descriptive Statistics

Conceptual Model

The conceptual model is depicted in Figure 1. The three constructs hypothesized to positively impact users' knowledge application (K_APPLY) are attractiveness (ATTRACT), expertness (EXPERT), and trustworthiness (TRUST).

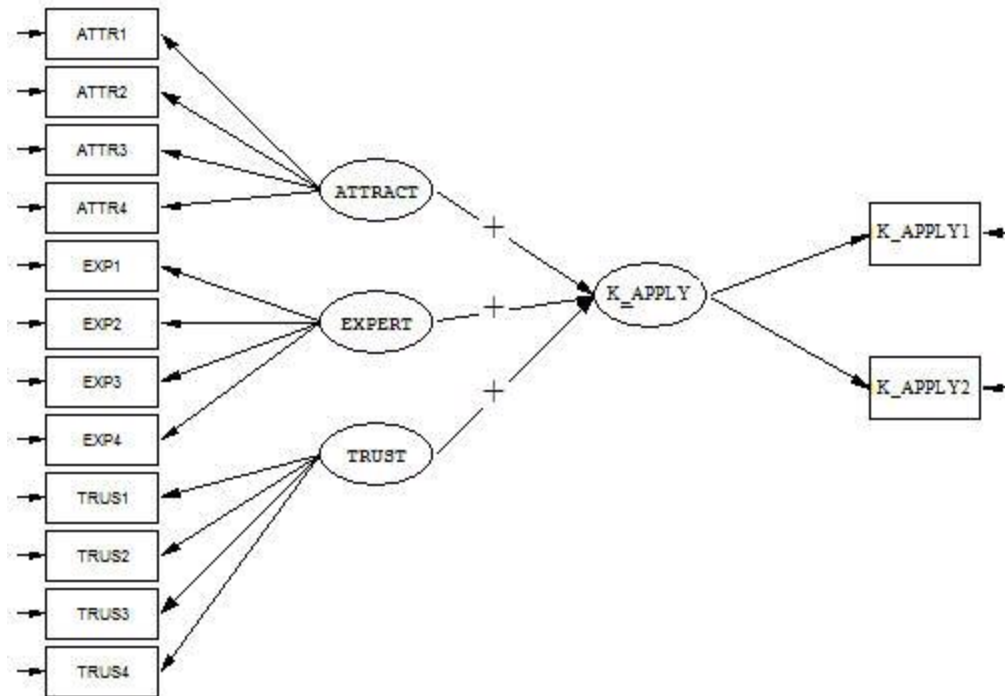


Figure 1. Knowledge Application Model (KAM)

Measures

The Counselor Rating Form (CRF) is a 36 item instrument measuring three constructs, namely, attractiveness, expertness, and trustworthiness (Barak & LaCrosse, 1975; LaCrosse & Barak, 1976). The instrument was developed and validated over a series of studies (Barak & LaCrosse, 1975; Barak & Lacrosse, 1977). Since then, the reliability and validity of the CRF has been established to a substantial degree. A shortened form of the instrument (CRF-S) containing 12 items has recently been developed and undergone validation through a series of studies (Corrigan & Schmidt, 1983; Dorn & Jereb, 1985; Epperson & Pecnik, 1985; Johnson, Pierce, Baldwin, Harris, & et al., 1996; Lawson, Gaushell, McCune, & McCune, 1995; Tryon, 1987; Wachowiak & Diaz, 1987; Wilson & Yager, 1990). The CRF-S exhibits even higher levels of reliability and construct validity than the CRF and possesses the added advantage of being 1/3 the length of the CRF. The items of the CRF-S instrument (Appendix 1) serve as measures of the dimensions of source credibility. The CRF-S was chosen because of its history of psychometric quality, its brevity, and its use in person-to-person counseling situations, in which complex, problem-solving knowledge is transferred from the counselor to the person being counseled. This model is similar to that of help desk interactions.

The latent dependent variables, knowledge application, was measured as the willingness of the recipient to apply the knowledge gained from the knowledge transfer interaction (Appendix 1).

ANALYSIS OF RESULTS

The following analysis will test and evaluate a model of source credibility and its effect on knowledge application in the IS help desk context. The full model will be tested for plausibility. Each construct in the model will be tested for construct validity and the predicted associations among the constructs will be tested for plausibility using structural equation modeling techniques.

Model Fit

Table 2 contains the fit indices for both the measurement and full structural models. The asymptotic covariance matrix was calculated and included in the analysis allowing for correction of the chi-square for non-normality. The model fits the data very well, as indicated by the insignificant p values on the chi-square corrected for non-normality as well as the other fit indices.

Fit Index	Full Structural Model	Measurement Model
Degrees of Freedom Full Structural Model	71	71
Minimum Fit Function Chi-Square	155.27 (P < 0.00)	149.29 (P < 0.00)
Normal Theory Weighted Least Squares Chi-Square	166.54 (P < 0.00)	161.38 (P < 0.00)
Satorra-Bentler Scaled Chi-Square	108.66 (P < 0.0027)	106.30 (P < 0.0042)
Chi-Square Corrected for Non-Normality	81.98 (P < 0.18)	70.28 (P < 0.50)
Root Mean Square Error of Approximation (RMSEA)	0.051	0.049
Normed Fit Index (NFI)	0.97	0.97
Non-Normed Fit Index (NNFI)	0.98	0.98
Comparative Fit Index (CFI)	0.98	0.98
Incremental Fit Index (IFI)	0.98	0.98
Relative Fit Index (RFI)	0.96	0.96
Root Mean Square Residual (RMR)	0.056	0.056
Standardized RMR	0.025	0.025
Goodness of Fit Index (GFI)	0.90	0.90
Adjusted Goodness of Fit Index (AGFI)	0.85	0.85

Table 2. Fit Indices for SEM Analysis

	Lambda	Error	Average Variance Extracted	Construct Reliability
K_APPLY1	0.96 (p < .01)	0.08 (p < .05)	0.94	0.97
K_APPLY2	0.97 (p < .01)	0.05 (p < .05)		
ATTR1	0.98 (p < .01)	0.04 (p < .05)	0.96	0.99
ATTR2	0.98 (p < .01)	0.03 (p < .05)		
ATTR3	0.98 (p < .01)	0.04 (p < .05)		
ATTR4	0.97 (p < .01)	0.06 (p < .05)		
EXP1	0.92 (p < .01)	0.15 (p < .05)	0.90	0.97
EXP2	0.96 (p < .01)	0.08 (p < .05)		
EXP3	0.96 (p < .01)	0.08 (p < .05)		
EXP4	0.94 (p < .01)	0.11 (p < .05)		
TRUS1	0.96 (p < .01)	0.08 (p < .05)	0.91	0.98
TRUS2	0.98 (p < .01)	0.05 (p < .05)		
TRUS3	0.94 (p < .01)	0.12 (p < .05)		
TRUS4	0.95 (p < .01)	0.10 (p < .05)		

Table 3. SEM Parameter Estimates

	K_APPLY	ATTRACT	EXPERT	TRUST
K_APPLY	1.00			
ATTRACT	0.80	1.00		
EXPERT	0.62	0.59	1.00	
TRUST	0.70	0.66	0.58	1.00

Table 4. Latent Variable Correlation Matrix

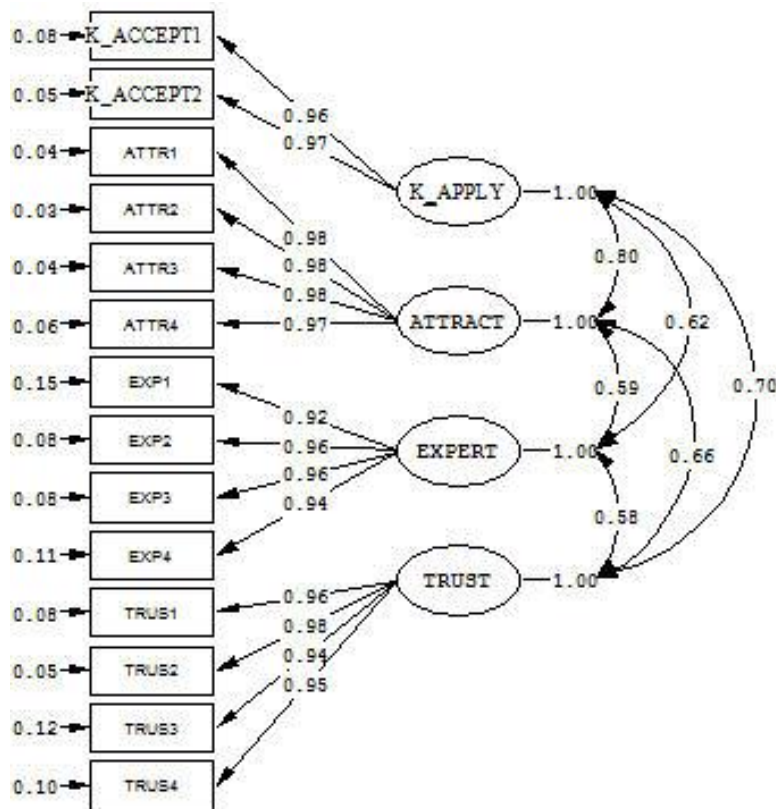


Figure 2. CFA of Knowledge Application Model (KAM)

Convergent and Discriminant Validity

All regression coefficients and error terms are positive and significant in the CFA model (see Table 3 and Figure 2) and the average variance extracted for each of the latent variables is high and well over 0.50. Thus, all the measure clusters exhibit a high degree of convergent validity. None of the 2σ confidence intervals surrounding latent variable correlations includes 1.0. The chi-square difference test was significant for each pair of latent variables, indicating that the correlation between any pair is significantly different than 1.0. Finally, the average variance extracted for each latent variable is much larger than the square of the correlation between any pair of latent variables. Thus, the measure clusters exhibit strong discriminant validity.

Nomological Validity and Theoretical Inferences

Nomological validity is established by assessing the sign and significance of the structural parameters in the full structural model and determining whether or not they agree with the hypothesized relationships predicted by the theory. Hypotheses

indicated in the original theoretical model (see Figure 1) predicted that the structural parameters would all be positive and significant and these are supported by the results of fitting the full structural model to the data (see Figure 3).

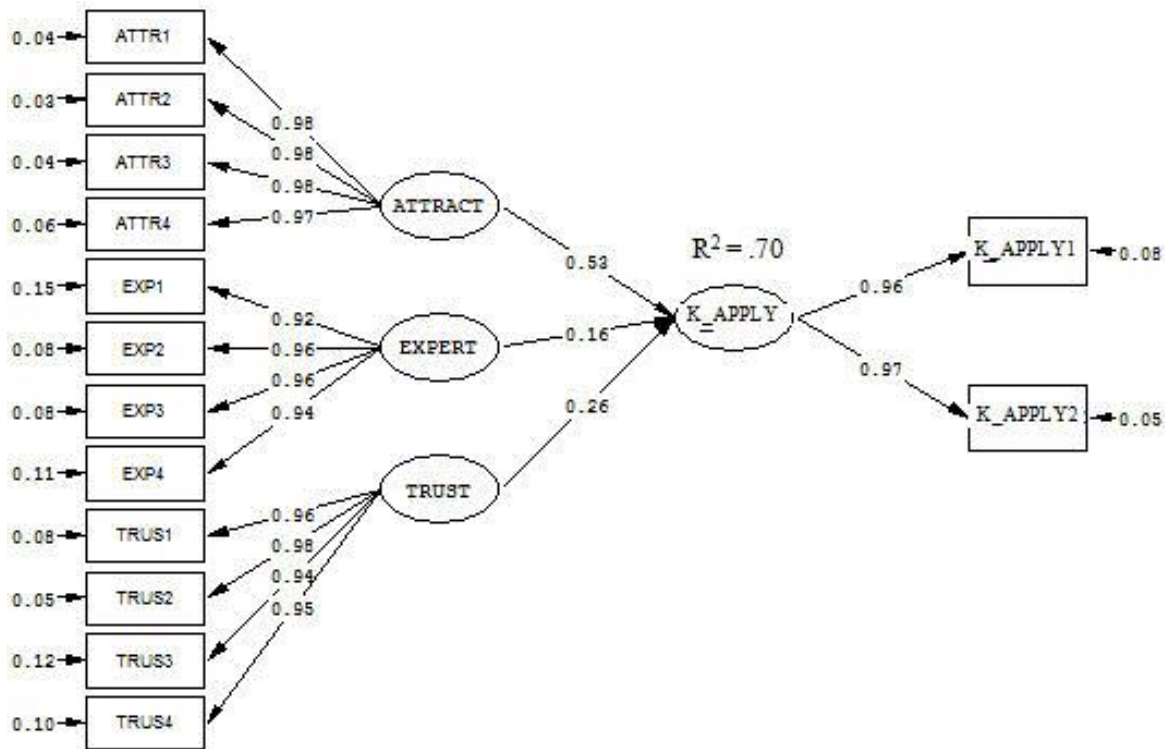


Figure 3. Full Structural Model of the Knowledge Application Model (KAM)

R^2 for dependent variable in the model is .70, indicating that the dimensions of source credibility explain a large amount of the variance in knowledge application. The Chi-squared difference tests of the structural parameters indicate that the latent variable regression coefficient representing the attractiveness-knowledge application relationship is greater in magnitude ($p < .01$) than either the expertness-knowledge application or the trustworthiness-knowledge application regression coefficients. The trustworthiness-knowledge application regression coefficient is significantly ($p < .05$) greater than the expertness-knowledge application regression coefficient. Thus, although all are significant predictors of knowledge application, our results indicate that source attractiveness is the strongest predictor, followed by source trustworthiness and source expertness.

DISCUSSION

All fit indices, parameter estimates, and construct validity tests indicate that the knowledge application model (KAM) fits the sample data in this study; therefore, KAM is a plausible model of knowledge application in this context. The plausibility of the KAM model and the parameter estimates indicate that knowledge application is dependent upon the knowledge recipient's perceptions of at least three characteristics of the knowledge source: trustworthiness, attractiveness, and expertness. All three dimensions were positively and significantly related to the dependent variable (i.e. knowledge application) and explain 70% of its variance.

In this sample, source attractiveness, perceived as source friendliness, likeability, sociability, and warmth, was the strongest predictor of knowledge application. Source trustworthiness, perceived as source honesty, reliability, and sincerity, was the second strongest predictor of knowledge application. Source expertness, perceived as source experience, expertness, preparedness, and skillfulness, was the weakest predictor of knowledge application. While no hypotheses were advanced on the relative strength of the associations among the dimensions of source credibility, this paper suggests that the order of importance of the dimensions in the KAM model is somewhat counter-intuitive. Specifically, in the organizational environment, intuition might suggest that the overriding importance of job performance criteria might lead knowledge

recipients to favor expert knowledge sources over friendly knowledge sources because expertise is more closely associated with correct, efficient solutions than friendliness. Intuition also suggests that expertise leads to correct efficient solutions which allow knowledge recipients to overcome knowledge gaps and get back to productive use of their information systems, leading to increased overall productivity. Thus, the predictive strength of attractiveness vis-à-vis expertness in this study suggests that the reality of the situation is somewhat counter-intuitive.

Implications for Theory

Because interpersonal knowledge transfers can be conceptualized as one individual's attempts to influence the thoughts and/or behavior of another, the KAM model provides the outline of a framework through which to structure a larger theory of interpersonal knowledge transfer. Interpersonal influence theory posits an inherent resistance on the part of the message recipient to accept and apply knowledge received from the message source. The results reported in this study indicate that interpersonal influence theory is applicable in this knowledge transfer context and that knowledge transfer recipients are in fact influenced by the three posited measures of source credibility in making the knowledge application decision. This paper advances theory by successfully empirically testing the KAM model and providing the basic structure for future theories of knowledge application resulting from knowledge transfer attempts. Future research should investigate the actions and communications that contribute to positive perceptions of the source by the recipient.

Managerial Implications

Knowledge management practices are aimed at facilitating interpersonal knowledge transfers between employees. In this study, IS users (recipients) sought interpersonal knowledge transfers from IS consultants (sources) to fill some perceived gap in their technical knowledge. Thus, the knowledge to be transferred was relatively complex and uncertain to the recipient. In such contexts, the KAM model predicts that the recipient will evaluate properties of the knowledge source and depend on this evaluation of the source to make the knowledge application decision.

For managers, an interesting question that ensues is how to enhance the source credibility of the knowledge-disseminating employees. Source perceptions are based on the amount and nature of the evidence available to the recipients. For instance, an employee may possess high levels of expertness, but evidence of the extent of this expertness may not be available to the recipient. Thus, managers may need to engage in training activities to enhance the actual expertness of the employees and in promotion activities within the organization to publicize the qualifications of the employees to enhance knowledge application. The KAM model suggests that providing all employees with both interpersonal skills and domain knowledge training, and providing potential knowledge recipients with evidence of the attractiveness, trustworthiness, and expertise of the knowledge disseminators, will enhance the effectiveness of knowledge transfers during interpersonal, knowledge transfer interactions.

Conclusion

This paper presents a parsimonious model for understanding factors that contribute to successful knowledge transfer interactions between help desks and IS users.

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APPENDIX 1

Items in Counselor Rating Form - Short Form (CRF-S)

Attractiveness

- Friendly
- Likeable
- Sociable
- Warm

Expertness

- Experienced
- Expert
- Prepared
- Skillful

Trustworthiness

- Honest
- Reliable
- Sincere
- Trustworthy

Items Measuring the Latent Dependent Variable: Willingness of the recipient to apply the knowledge gained from the knowledge transfer interaction.

- When I have a technical problem in the future, I would follow my help desk consultant's directions on how to solve it.
- I would not hesitate to apply the technical information my help desk consultant gives me in the future.