

Knowledge Sharing

Can Social Exchange Theory Explain Individual Knowledge Sharing Behavior? A Meta Analysis

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Table of Content

- ✓ Introduction
- ✓ Theoretical Development
- ✓ Methodology
- ✓ Results
- ✓ Discussion and Conclusion



Background

- **Knowledge management (KM) is critical to the operation of modern organizations.**
 - KM can help businesses retain their valuable intangible assets that are kept in the mind of their employees.
- **New forms of virtual organizations such as Internet-enabled virtual communities (VCs) have attracted much interests in knowledge sharing**
 - The concept of Web 2.0 drives the rapid increase of knowledge sharing in virtual communities (VCs), such as open source software, Wiki systems, and Weblogs.
- **Theoretically, knowledge sharing is unnatural.**
 - People think that their knowledge is valuable and important.
 - Generally, people are unwilling to share their knowledge unless there are enough incentives



Motivation

- **Knowledge sharing has been an increasingly important research topic in information systems.**
- **Several theories have been applied to study the knowledge-sharing behavior.**
 - These theories include social exchange, social capital, social cognitive, expectancy theories, and theory of reasoned action/theory of planned behavior (TRA/TPB).
- **Social exchange is the most popular theory in explaining knowledge sharing behavior. Many papers that uses SET to study knowledge sharing have been published.**
- **However, research findings from studies using the theory are often inconsistent.**
 - Different studies tend to adopt different factors to fit the theory.
 - Different studies may examined different IT infrastructure and different organizational context



Research Questions

- The goal of this study is to investigate:
 - What factors in the social exchange theory can explain individual's knowledge sharing behavior
 - Whether contingent variables such as the nature of organization and IT support moderate the effect of social exchange?



Table of Content

✓ Introduction

✓ **Theoretical Development** ↓

✓ Methodology

✓ Results

✓ Discussion

✓ Conclusions

- Research Model
- Social Exchange Theory
- Social Exchange Factors
- Contingent Factors



Key Concept is Social Exchange Theory

- A goal oriented human behavior is directed by the goal of profits
 - Profits = Rewards minus the Cost of Invested Behavior
 - Rewards
 - Material (Economic)
 - Symbolic (Attention, advice, status)
 - Diminished Marginal Utility: The reward is received so often; it no longer has value.
 - Scarcity: Increases the value of reward
 - Power: Possessing a skill that is scarce or highly coveted
 - Principle of the Least: The person least interested in the reward; has the most power.



Social Exchange Theory (SET)

- **According to SET, individuals interact with others based on a self-interested analysis of the costs and benefits, as below:**
 - Maximize their benefits and minimize their costs.
 - These benefits need not be tangible.
 - People help others with an expectation of future return.
- **For knowledge sharing, individuals may build social relationships with others by sharing their knowledge with an expectation of future returns.**



Factors in the Social Exchange Theory

- **Factors that have been used in existing literature for studying the social exchange theory include:**
 - **Individual cognition**
 - Organizational commitment
 - Perceived benefits
 - **Interpersonal interaction**
 - Social interaction
 - Trust
 - **Organizational effort**
 - Organizational support
 - Reward systems



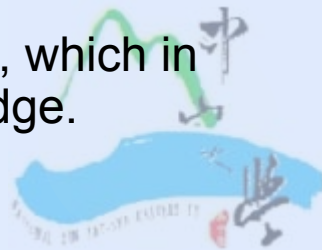
Individual Cognition Factors

- **Organizational Commitment (OC)**
 - Definition: “the level and type of psychological attachment an employee has with an organization.” (O’Reilly and Chatman, 1986).
 - One’s commitment may encourage him or her to share knowledge due to a sense of responsibility to help others within that collective.
 - Prior research provide evidence that OC is a strong determinant of individual knowledge sharing (Cabrera et al., 2006).
- **Perceived Benefits (PB)**
 - Definition: “the individuals’ subjective perception of gain from their behaviors.” (Forsythe, 2006).
 - An individual can benefit from active participation in a social group.
 - Some people may expect that their contributions will help them build a good reputation and improve their status within their social group.



Interpersonal Interaction Factors

- **Social Interaction (SI)**
 - Definition: The strength of the relationships, the amount of time spent, and the frequency of communication among members.
 - Social interaction may lead to a series of exchanges between parties.
 - Social interaction provides the opportunity to combine and exchange knowledge.
- **Trust (TR)**
 - Definition: A set of specific beliefs primarily pertaining to the integrity, benevolence, and ability of another party (Chiu et al., 2006).
 - When trust exists between two parties, they are more willing to engage in cooperative interaction.
 - Trust creates and maintains exchange relationships, which in turn may lead to the sharing of good quality knowledge.



Organizational Context Factors

- **Organizational Support (OS)**
 - Definition: The general perception that an organization cares for the well-being of its employees and values their contributions (Eisenberger et al., 1997).
 - The relationship between employees and their employer is built on the trade of effort and loyalty for benefits such as pay, support, and recognition.
 - Organizational support, direct or indirect, is an essential factor in the theory.
- **Reward Systems (RS)**
 - Definition: The incentives provided by an organization to its members for shaping their behaviors (Cabrera and Bonache, 1999) or driving employees' performance (Lee and Kim, 2001).
 - Organizational rewards are typically based on performance and can motivate employee.
 - Explicit/hard rewards that organizations provide to motivate employees to share knowledge are popular.



Contingent Factors

- **A potential problem in SET-based knowledge sharing research is that the effect of these factors may vary in different contexts.**
 - Knowledge sharing in a computer-facilitated environment may be different from that in a non-facilitated situation
 - Knowledge sharing in a real organization may be different from that in a virtual community (VC).
- **Two contingent factors are adopted:**
 - IT Support (Using IT vs. Non-IT)
 - Organizational type (VC sites vs. Not VC)



Knowledge Sharing Behavior

- **Knowledge Sharing Behavior (KSB)**
 - Definition: the degree to which one actually shares one's knowledge to other persons, groups or organizations.
 - In previous studies, researchers used several variables to measure knowledge-sharing behavior such as:
 - Frequency, quantity, time spent on knowledge sharing (King and Marks, 2008); Chiu et al., 2006; Burgess, 2005; Wasko and Faraj, 2005).
 - Individuals share task-relevant ideas, information, and suggestions with each other (Ferrin and Dirks, 2003).
 - Knowledge sharing is also the process where individuals mutually exchange implicit and explicit knowledge (van den Hooff et al., 2003; Yuan et al., 2007).



Research Model

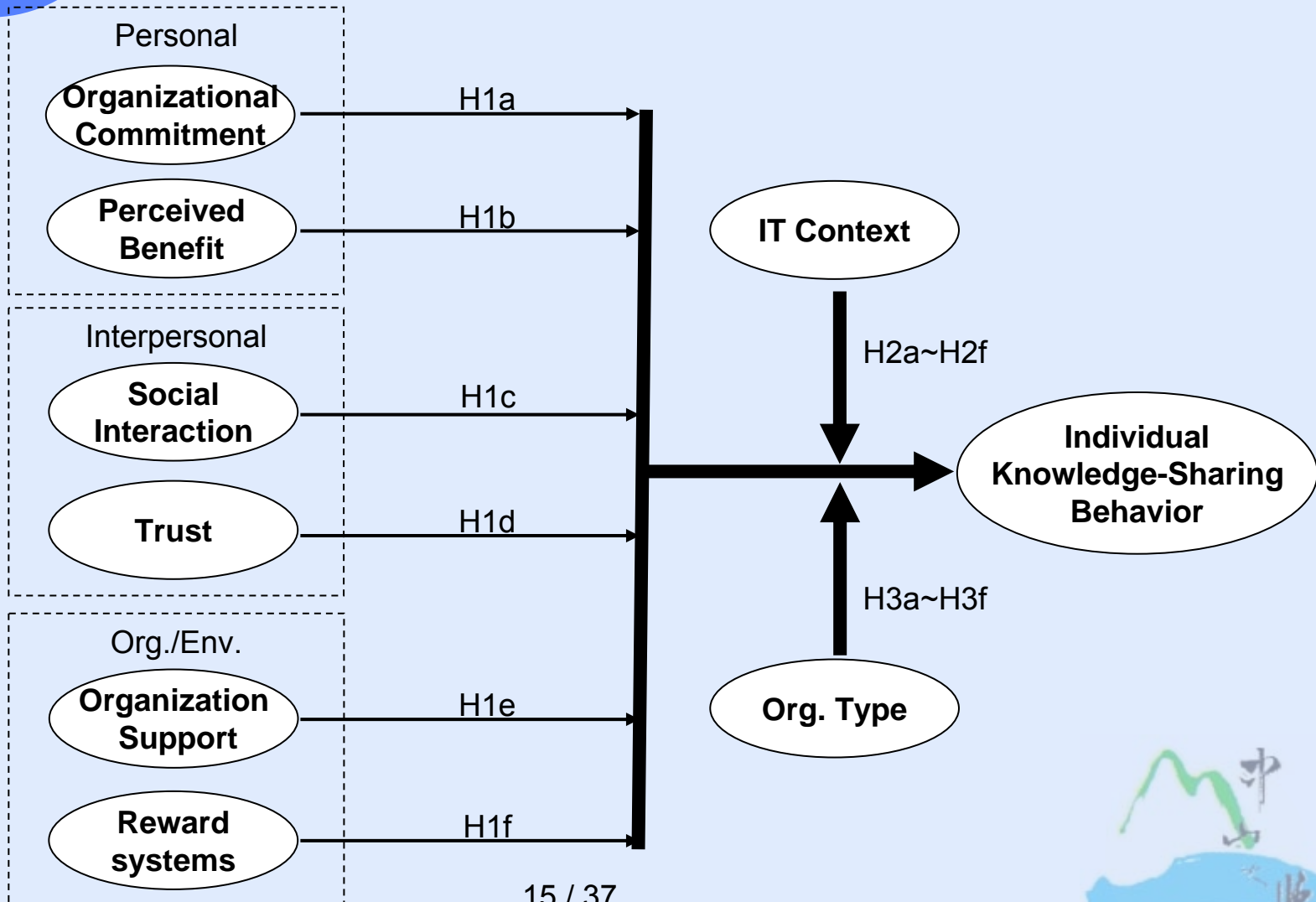


Table of Content

- ✓ Introduction
- ✓ Theoretical Development

- ✓ **Methodology** ↓

- ✓ Results

- ✓ Discussion

- ✓ Conclusion

- Meta Analysis
- Data Collection
- Variable Coding
- Data Analysis



Meta Analysis

- Meta analysis is a technique that enables researchers to cumulate findings from multiple studies in order to draw valid conclusions and explain variability in findings across multiple studies.
- The meta-analysis techniques employed here are similar to those employed in existing IS literature (e.g., Alavi and Joachimsthaler 1992; Dennis et al. 2001; Kohli and Devaraj 2003; Sharma and Yetton 2003, 2007; Sabherwal et al., 2006).



Data Collection

- **Sample:**
 - Empirical studies published in journals and conference proceedings, but omitted unpublished dissertations and working papers.
- **Data Source:**
 - Journal: ABI/INFORM, Science Direct, and EBSCOhost.
 - Conference: ICIS, AMCIS, PACIS, HICSS and ECIS.
- **Keyword Search:**
 - Search keywords: knowledge sharing, contribution, information sharing, and distribution.
 - Search scope: searched titles, author's keywords, and the abstract of papers.
- The initial search results 493 papers.



Data Filtering

- **Three criteria for cleaning:**
 - First, the study must be empirical and report the correlation (r) between knowledge-sharing behavior and the independent variables.
 - Second, it must provide adequate descriptions of the sharing environment and/or IT tools used and/or the type of organizations (VC or not).
 - Third, only one was selected if the same study were reported in multiple papers.
- **This resulted in over 54 studies published between 1994 and January 2008.**
- **20 conference papers were added to alleviate the potential problem of only selecting journal papers.**



Final Sample Papers

- **After carefully reading and coding all previously selected papers, two more criteria were used to choose the papers for analysis:**
 - The study should be targeted at the individual level of knowledge sharing.
 - Constructs must be defined comparably
- **This results in a final sample size of 28 studies for the meta analysis, which include 23 journal articles and 5 conference papers.**
- A total of 117 bi-lateral relationships available for testing hypotheses. One journal article contributed multiple data sets.



Coding of Personal Factors

- **Organizational Commitment (OC), including three types of commitment** (van Knippenberg, 2006):
 - Continuance commitment from necessity;
 - Normative commitment from obligation; and
 - Affective organizational commitment from emotional attachment.
- **Perceived Benefits (PB), including**
 - Some benefits, such as outcome expectations, knowledge collecting and acquisition, information need, and perceived usefulness, are employed as measures of perceived benefit.
 - One's self-perceptions (e.g. enjoyment, playfulness)
 - Perceived relationships with others (e.g. reputation)
 - Individual motivations, such as intrinsic rewards, satisfaction, and organizational influence.
 - Negative factors (e.g. perceived risk and fear of losing value) were inversely coded the correlation of all these factors.



Coding of Interpersonal Factors

- **Social Interaction (SI), including**
 - The strength of the relationships, the amount of time spent, and the frequency of communication among members (Chiu et al., 2006).
 - Measurements include mutual understanding, influence, communication, reciprocity with each other, individual's social skill, connection and network.
- **Trust (TR), including two types of trust (McAllister, 1995):**
 - Cognition-based trust: a rational evaluation of an individual's ability to carry out obligations;
 - Affect-based trust: an emotional attachment that stems from mutual care and concern that exist between individuals.



Organizational Context Factors

- **Organizational Support (OS), including two major aspects of organizational support (Lu et al., 2006):**
 - Formal support, e.g. train;
 - Informal sanction and help from top management, supervisors, and coworkers.
- **Reward Systems (RS), including**
 - Monetary incentives such as increased salary and bonuses.
 - Nonmonetary awards such as promotions, advancement, and other tangible rewards.
 - Extrinsic rewards that the organizations provide to motivate employees or members to share knowledge.
 - But excludes “intrinsic reward”.



Descriptive statistics

Pairwise relationship	No. of studies (k)	Var.	Range of correlations		Range of sample sizes		Cumulative sample size	Average sample size
			Lower	Upper	Lower	Upper		
OC – KSB	9	0.0116	0.11	0.506	530	118	2660	295
PB – KSB	29	0.0388	0.03	0.62	530	112	9392	323
SI –KSB	22	0.0494	-0.01	0.652	500	112	6275	285
TR –KSB	26	0.0364	0.04	0.60	430	91	5734	220
OS –KSB	16	0.0203	0.002	0.433	430	165	3881	242
RS –KSB	15	0.0366	0.10	0.625	480	112	4217	281
Total Instance	117 (from 28 studies)							

OC: Organizational Commitment; PB: Perceived Benefits; SI: Social Interaction; TR: Trust; OS: Organizational Support; RS: Reward Systems; KSB: Knowledge Sharing Behavior



Coding Moderating Variables

- IT Support (Using IT vs. Non-IT): Whether an IT-based tool was included in the knowledge sharing study.
- Organizational type (VC sites vs. Not VC): Whether the organization under study was a real one or a virtual community (such as blogs or online community).
- **The sample includes:**
 - 16 studies using IT in knowledge sharing and 12 non;
 - 7 studies using virtual communities as target, and 21 real organizations.



Testing the Main Effect

- **Two indices are used to test the main effect for each pairwise relationship.**
 - **File drawer test: The fail-safe N statistic (Nfs):**
 - The number of insignificant correlations (studies) that have to be included in the sample to reverse the conclusion that a significant relationship exists.
 - The significant threshold of fail-safe N in 95% confidential level is:
$$Nfs > 5 * k + 10$$
where k is the total number of studies in each pairwise relationship.
 - **Combined Z scores (Zw):**
$$Zw = \sum w_j \cdot Z_j / \sqrt{\sum w_j^2}$$
where w is the sample number of Study j, Zj is the Z score of Study j
- **The relationship is supported if both indices are significant.**



Testing the Moderating Effect

- **The total sample was divided in two subsamples for comparison**
- **Three indices are used to test the moderating effect**
 - **Difference of pairwise relationship significance:**
 - The method of data analysis is same as the test for main effect.
 - **Difference of residual variance from the original model:**
 - The average residual variance of sub-samples was required to be less than the residual variance in the combined samples.

$$\text{Var}(C_{\text{res}}) - \sum \text{Var}(G_{j\text{res}}) / N_G > 0$$

Where $\text{Var}(C_{\text{res}})$ is the residual variance in the combined samples

$\text{Var}(G_{j\text{res}})$ is the residual variance of sub-samples G_j

N_G is the number of group

- **t Test of the difference in their effect sizes**
- **Voting Method: The relationship is supported if two or more indices are significant.**

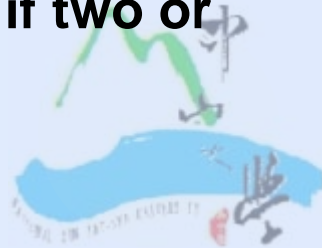


Table of Content

- ✓ Introduction
- ✓ Theoretical Development
- ✓ Methodology
- ✓ **Results** ↓
 - ✓ D • Correlation Analysis
 - ✓ O • Moderating Analysis
 - IT Context
 - Organization Type

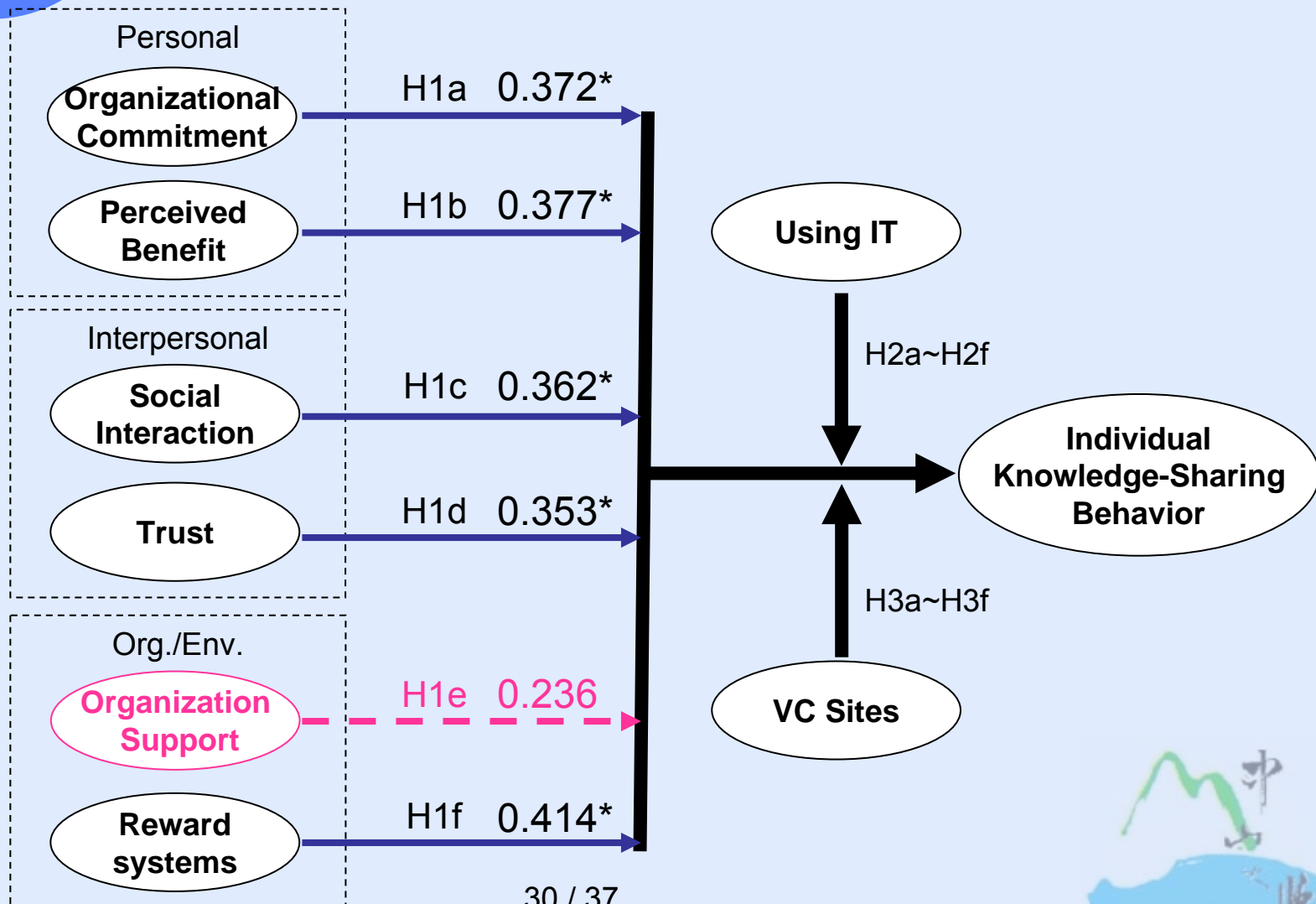


Correlation Analysis

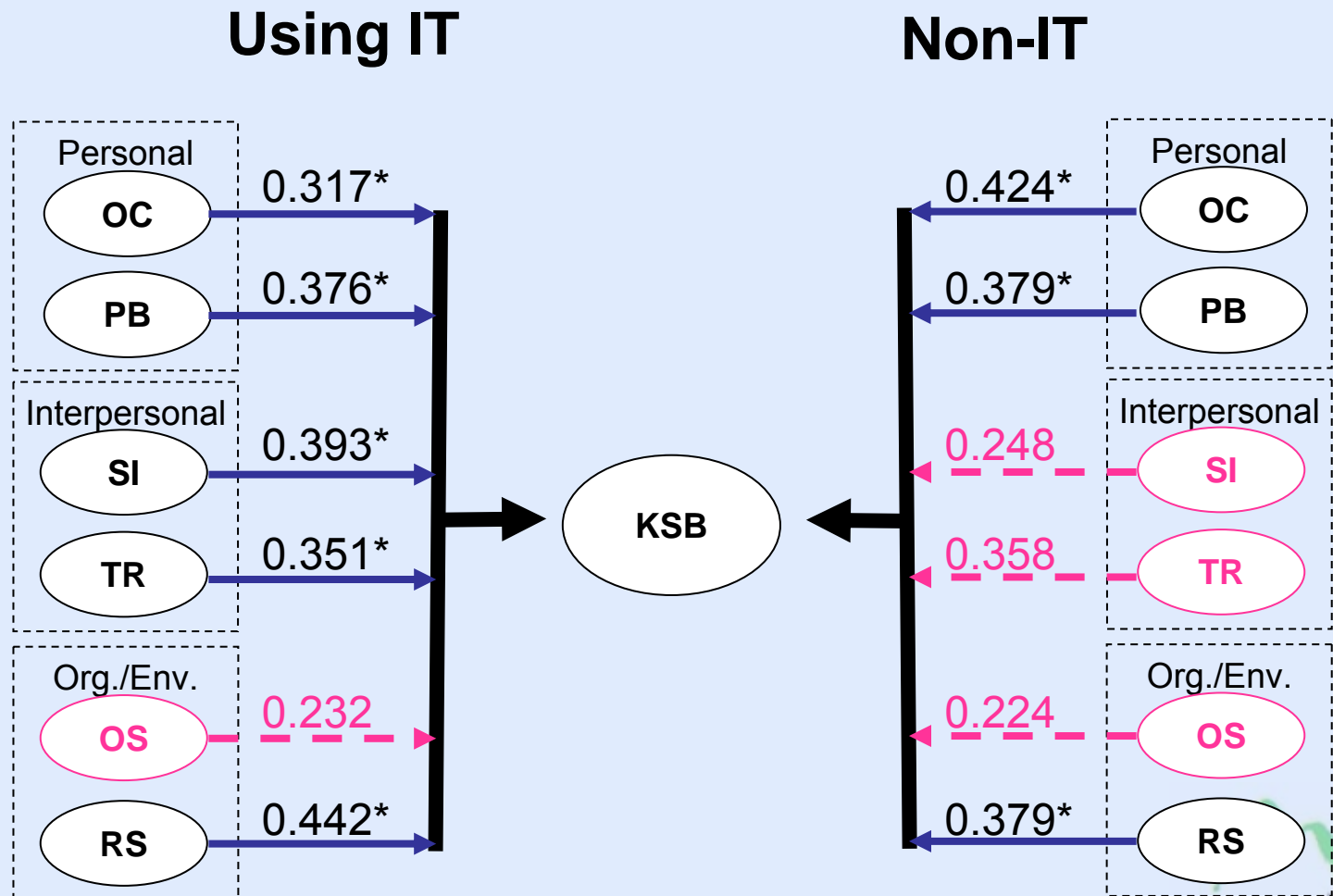
- The results are as follows:
 - All combined Z scores are significant ($p < 0.001$).
 - The pairwise relationships between organization support (OS) and knowledge sharing-behavior (KSB) did not pass the file-drawer test.
 - All other pairwise relationships passed the test and were good enough to conclude significant relationships across studies.

Hypotheses and Pairwise Relationship	True Population Effect Size (r)	Combined Z Scores	Fail-safe N ($p=0.05$)	Threshold of Fail-safe N in 0.05	Hypothesis Supported
H1a: OC–KSB	0.372	19.916***	58.02*	55	Yes
H1b: PB–KSB	0.377	37.947***	189.69*	155	Yes
H1c: SI–KSB	0.326	26.569***	121.54*	120	Yes
H1d: TR–KSB	0.353	27.639***	157.68*	140	Yes
H1e: OS–KSB	0.236	14.928***	59.61	90	No
H1f: RS–KSB	0.414	28.152***	109.20*	85	Yes

Results of Main Effect



Moderating Effect of Using IT

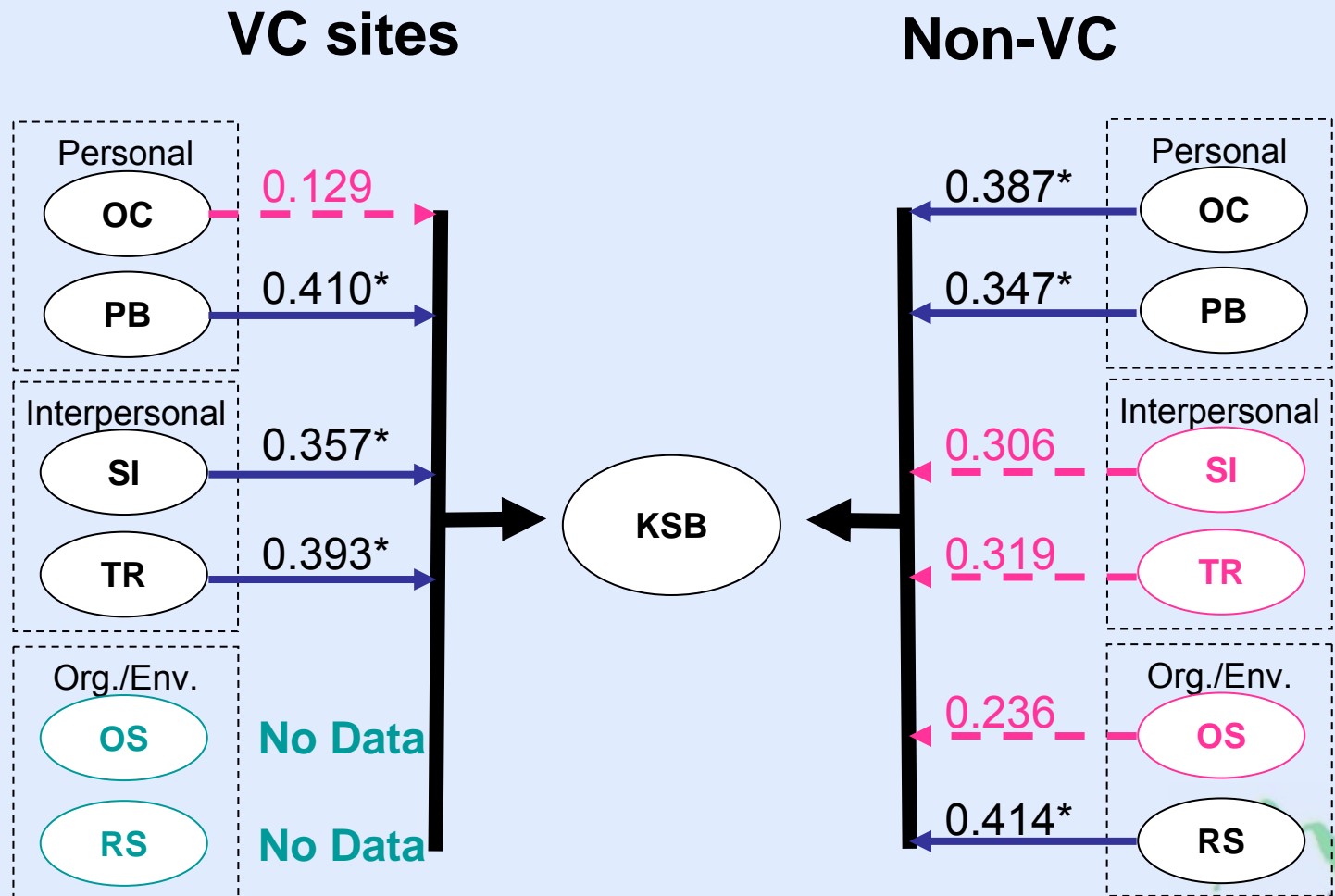


Moderating Effect of IT

- Using IT or not can moderate the effect of organizational commitment, social interaction and trust on KSB.
- Therefore, hypotheses H2a, H2c, H2d are supported, but H2b, H2e, H2f are not.

Hypotheses and Pairwise Relationship	# of Instance	True Effect Size (r)	Significant difference	Difference of Residual Variance	p Value of t Test (+: p < 0.1)	Hypothesis Supported
H2a: (Non-IT) OC–KSB (IT)	3 6	0.424 0.317	Yes Yes	0.002615	0.0665+	Yes
H2b: (Non-IT) PB–KSB (IT)	9 20	0.379 0.376	Yes Yes	–0.00166	0.4855	No
H2c: (Non-IT) SI–KSB (IT)	8 14	0.248 0.393	No Yes	0.00381	0.0550+	Yes
H2d: (Non-IT) TR–KSB (IT)	7 19	0.358 0.351	No Yes	0.00262	0.4660	Yes
H2e: (Non-IT) OS–KSB (IT)	6 10	0.224 0.232	No No	0.001735	0.4545	No
H2f: (Non-IT) RS–KSB (IT)	7 8	0.379 0.442	Yes Yes	0.00152	0.2573	No

Moderating Effect of Organization Type



Moderating Effect of Organization Type

- Hypotheses H3c and H3d are supported. It seemed that social interaction and trust were keys in VCs.
- Lack of study on the effect of organizational commitment, organizational support and reward systems

Hypotheses and Pairwise Relationship	# of Instance	True Effect Size (r)	Significant?	Difference of Residual Variance	p Value of t Test (+: p < 0.1)	Hypothesis Supported
H3a: (Non-VC) OC–KSB (VC)	8 1	0.387 0.129	Yes No	0.00839	---	(Lack of Data)
H3b: (Non-VC) PB–KSB (VC)	14 15	0.347 0.410	Yes Yes	0.000825	0.188	No
H3c: (Non-VC) SI–KSB (VC)	14 8	0.306 0.357	No Yes	0.004155	0.2988	Yes
H3d: (Non-VC) TR–KSB (VC)	17 9	0.319 0.393	No Yes	0.00144	0.1614	Yes
H3e: (Non-VC) OS–KSB (VC)	14 0	0.236 ----	No ---	---	---	(Lack of Data)
H3f: (Non-VC) RS–KSB (VC)	15 0	0.414 ----	Yes ---	---	---	(Lack of Data)

Table of Content

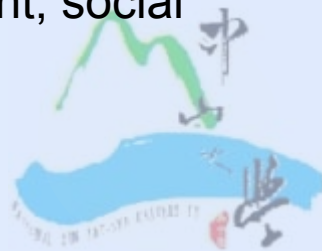
- ✓ Introduction
- ✓ Theoretical Development
- ✓ Methodology
- ✓ Results
- ✓ **Discussion and Conclusion**

- Summary of Findings
- Conclusion



Summary of Findings

- **Most constructs in SET have significant effect on individuals' knowledge-sharing behavior. Hence, SET seems to be an adequate theory for explaining individual knowledge sharing behavior.**
- **The effect of organizational support is weaker than many would believe it has in knowledge sharing.**
 - One possible explanation is that task accomplishments often take priority over knowledge sharing; hence, management support may affect user attitude but its effect may not strong enough to change behavior (Lu et al., 2006).
- **IT context plays a significant moderating role in interpersonal factors.**
 - three significant factors - organizational commitment, social interaction and trust are moderated by IT use.



Conclusion

- **This study developed and tested a contingent model that helps us understand the complex process in which social exchange factors influence knowledge sharing in different IT context.**
- **Our results show the value of using SET to explain the behavior of individual knowledge sharing.**
- **It also demonstrates that IT context is a vital factor that should be considered when studying knowledge sharing.**



Q & A

