

The US Public Sector and Its Adoption of Service Oriented Information Technology

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June 28, 2010
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Overview

- ❑ Policy Problem and Research Question
- ❑ Conceptual Framework
- ❑ Methodology
- ❑ Conclusion and Future Research

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Policy Problem

- ❑ Information Technology (IT) Basis
 - IT changes at rapid rate (Moore's Law)
 - Compared to Industry, Public Sector Institutions challenged to keep up
 - Information Technology → information exchange
 - ❑ IT origins in "better manipulation/storage of data"
 - ❑ IT now includes "better exchange of data/information"
 - Web 2.0 technologies bring more speed, more data and unique challenges
 - ❑ The technology is its own change catalyst
 - ❑ Data is fungible, i.e. it works in all applications
 - ❑ Social Networking is now the norm which begs question "who owns the information?"

Policy Problem - continued

- ❑ Public Sector organizations presumed to serve the public good
- ❑ Investment in IT presumed to make organizations more effective in serving.
- ❑ Failure to exchange information effectively diminishes the public good
 - Organization mission affected, especially where part of mission is to interact with the public
 - Most striking examples include 9/11 and the Virginia Tech tragedy that happened three years ago.

Research Question - Assumptions

- ❑ IT can provide an organization with increases in efficiency, access and effectiveness
- ❑ IT technology growth should enable further gains in these areas
- ❑ Web 2.0 technologies as a particular IT growth area, should enable gains
 - Data fungibility becomes a near reality
 - Reuse of application infrastructure becomes feasible

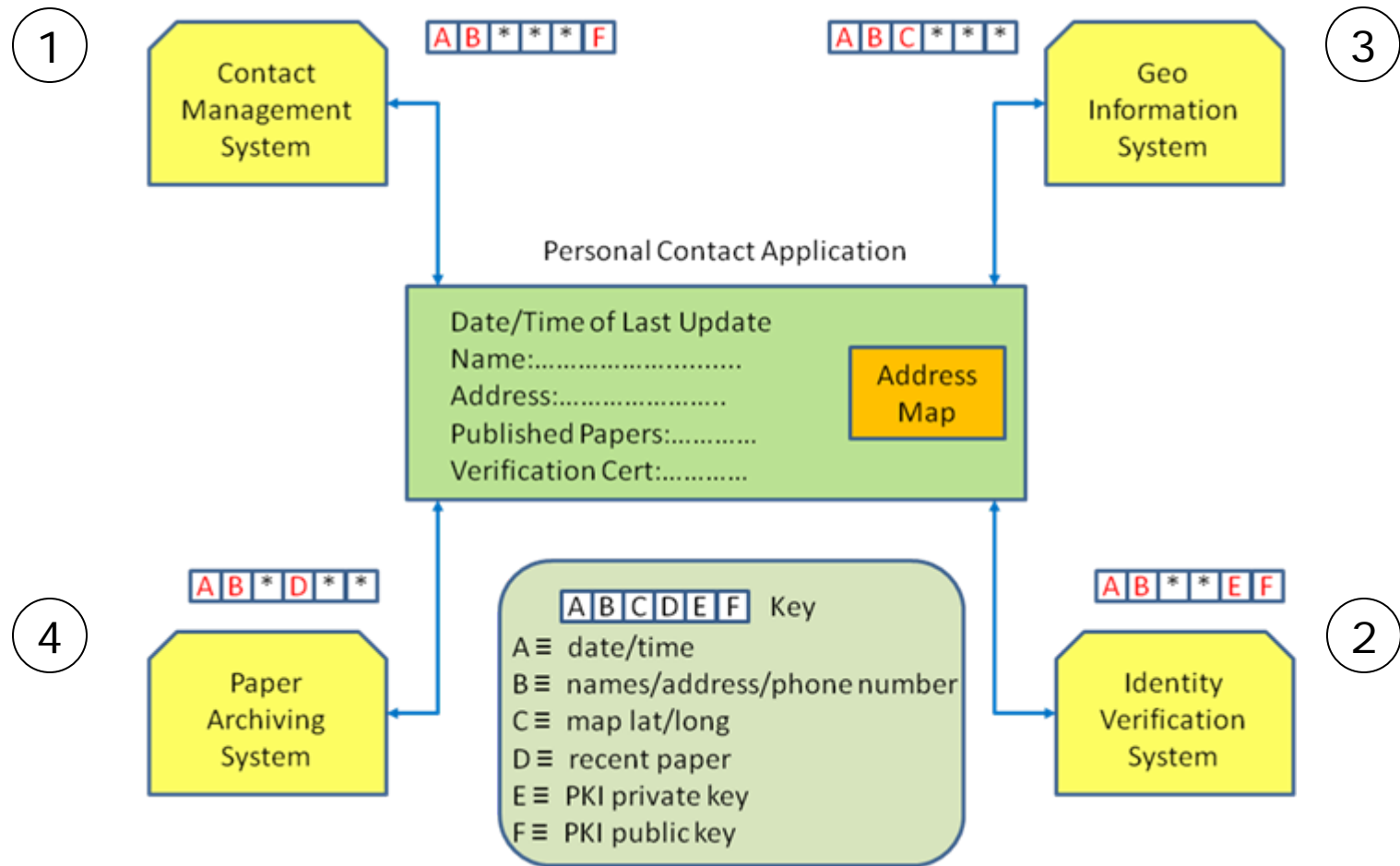
Research Question

- Do organizational attitudes to information sharing have an effect on an organization's implementation of a Service Oriented Environment ?
 - What Empirical Evidence Suggests This Relationship?
 - What Empirical Evidence Suggest Impediments to this Relationship?
 - What is the Boundary of this Relationship?
 - What Effects Are of Interest?

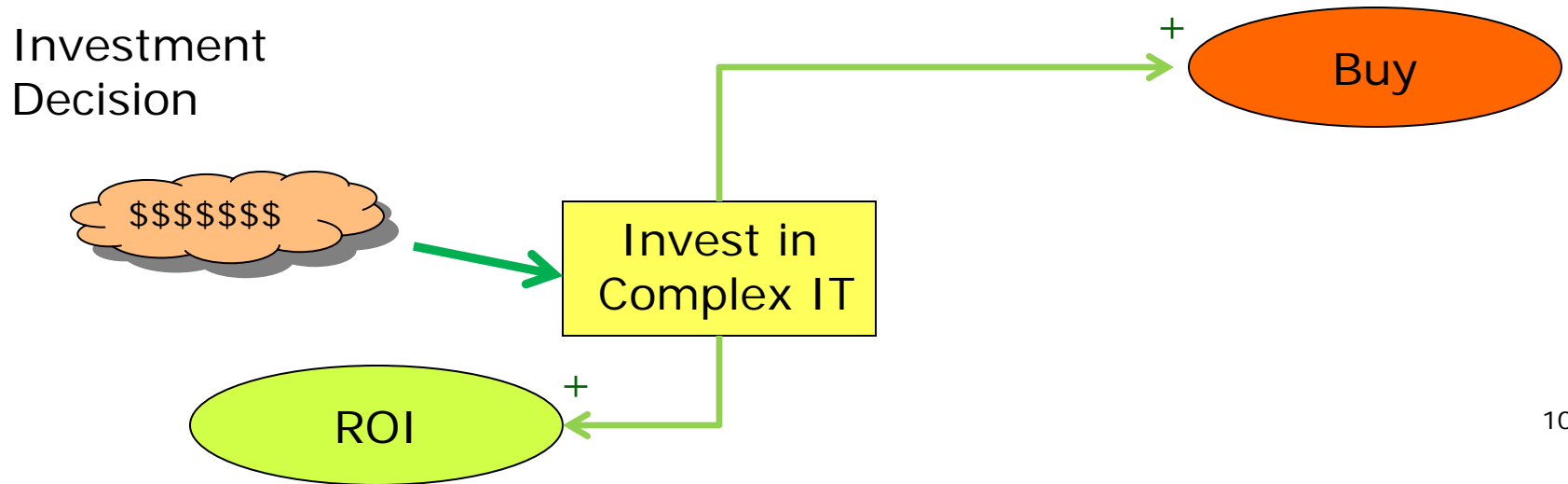
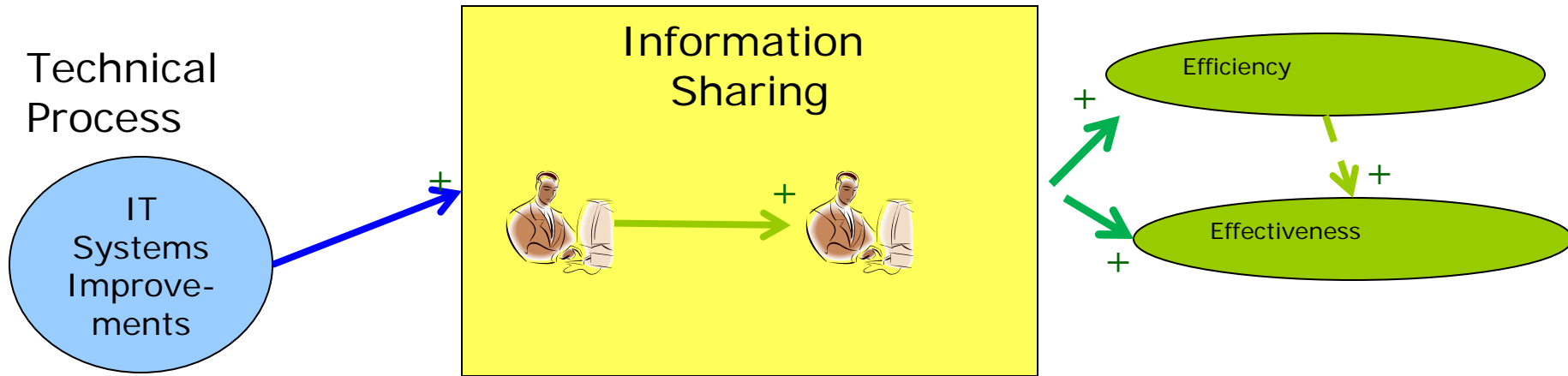
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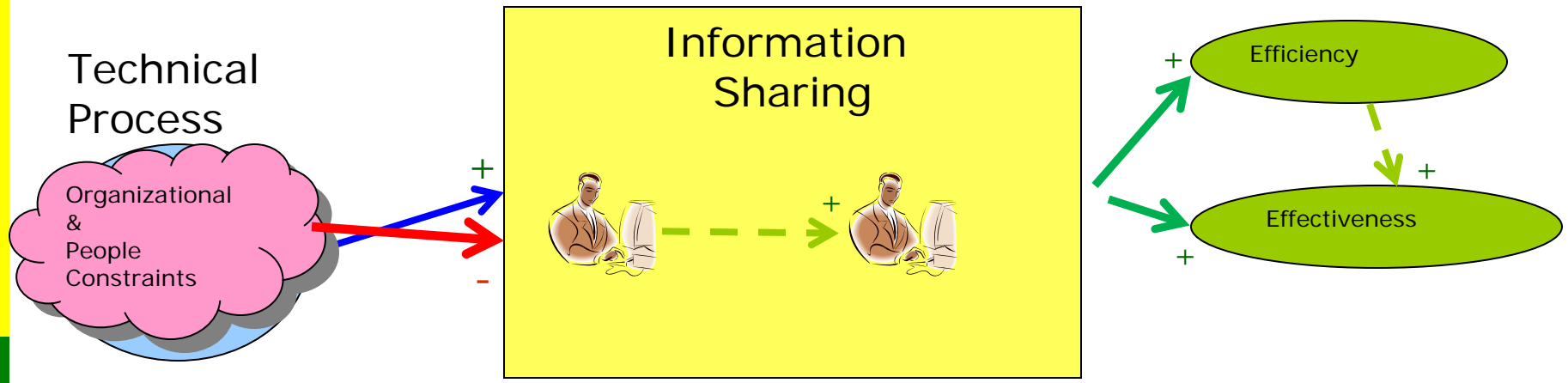
Data Fungibility → Metadata → Data Sharing



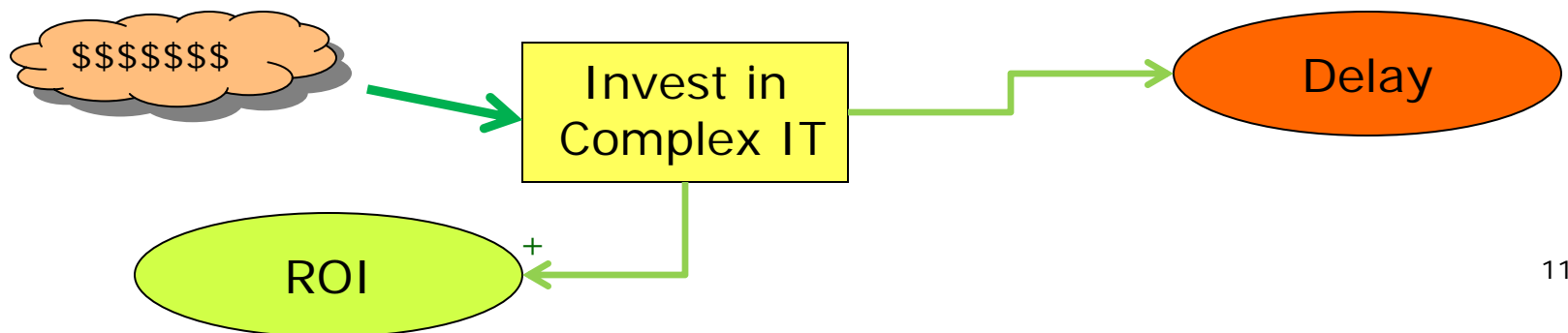
The Logical Link - Information Sharing Implementation and Investment Decision



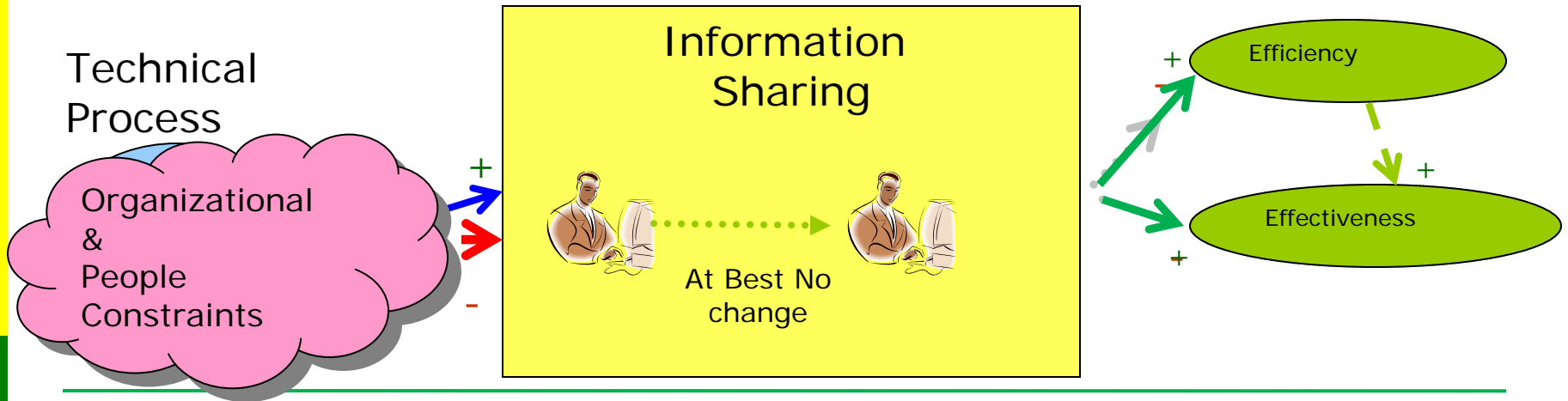
The Logical Link - Information Sharing Implementation and Investment Decision



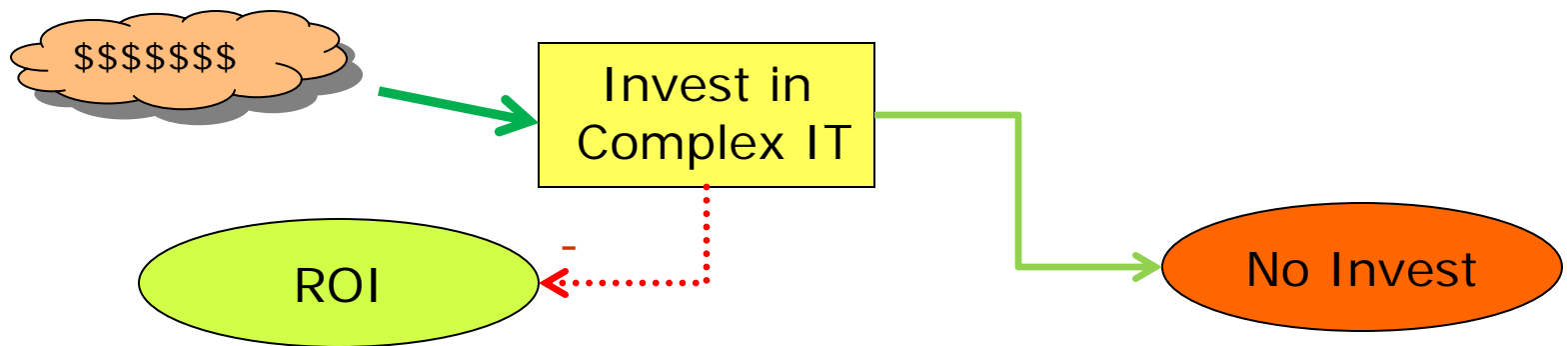
Investment Decision



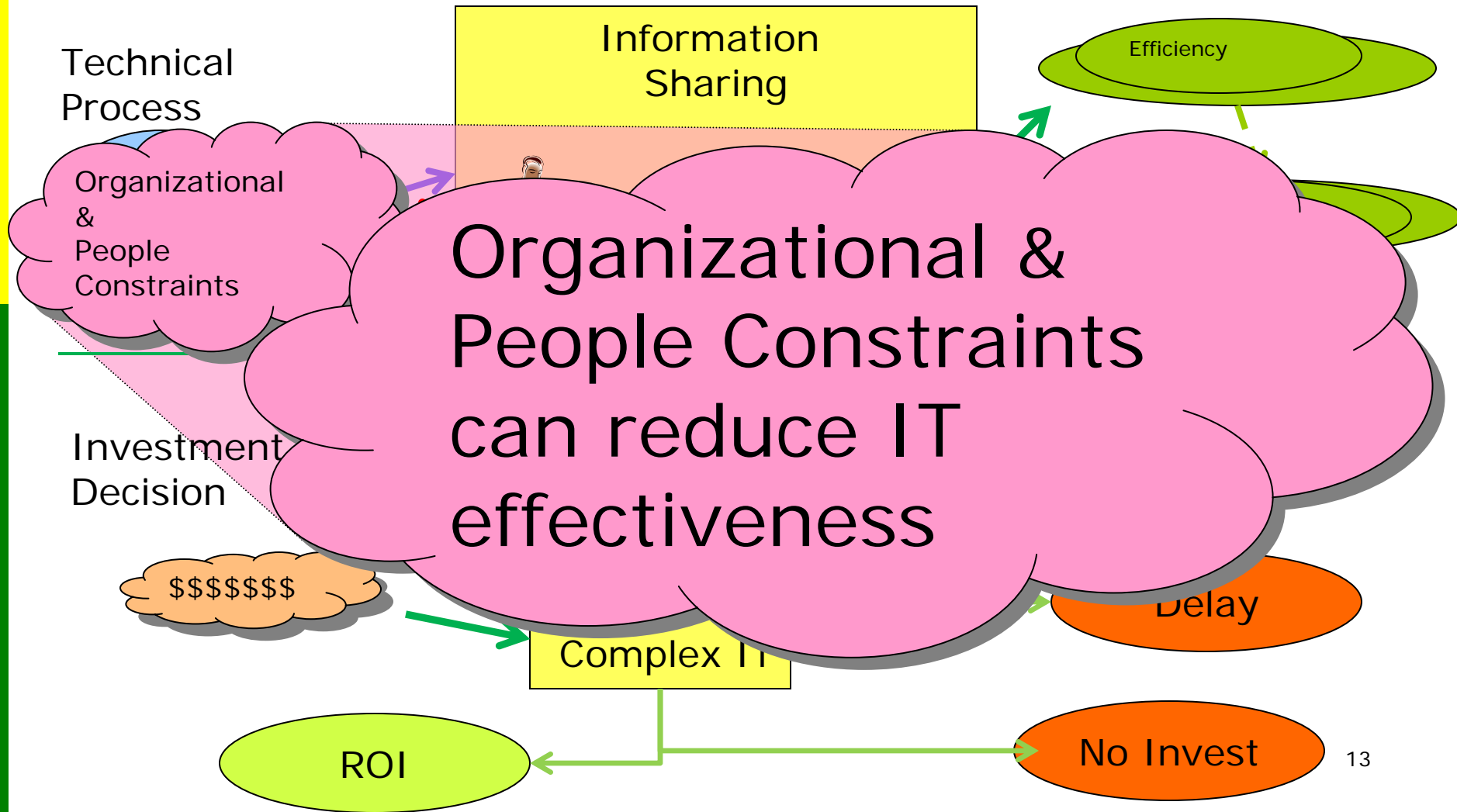
The Logical Link - Information Sharing Implementation and Investment Decision



Investment Decision



The Logical Link - Information Sharing Implementation and Investment Decision

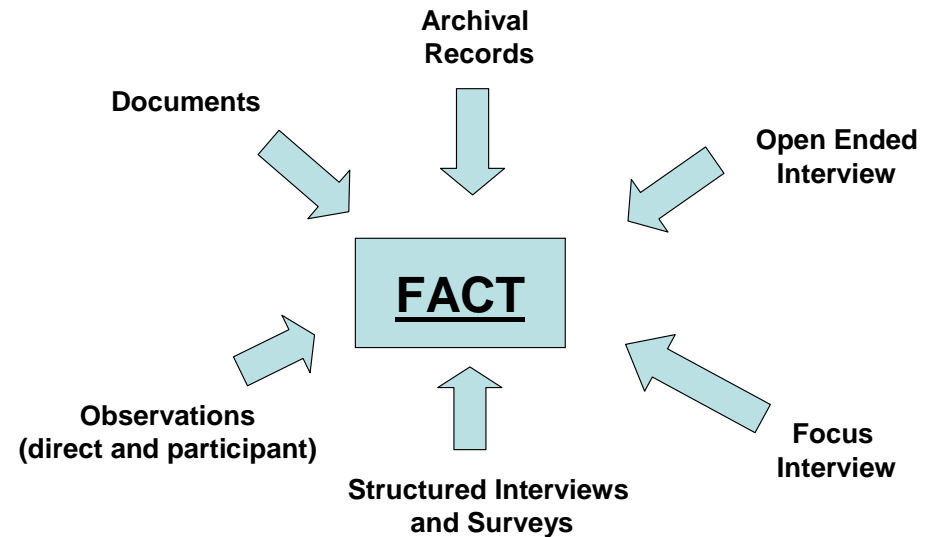


Overview

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- **Methodology**
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The Case Study Approach - Ideal

- ❑ Multifaceted, comparative analysis
- ❑ Systems and analytical boundaries constrain the approach
- ❑ Triangulation of data on facts to accept or not accept the hypotheses

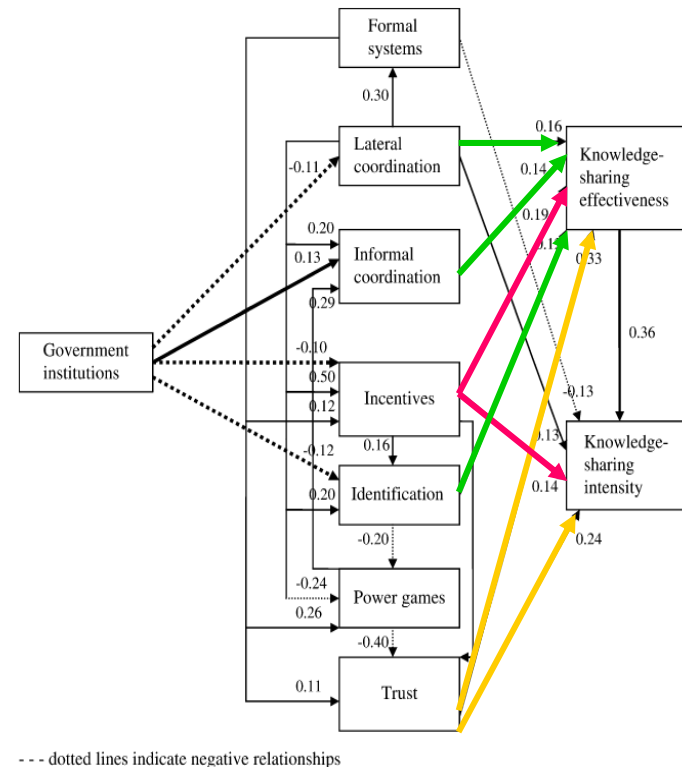


Extracted from Yin, R. K. (2003). *Case study research: design and methods* (3rd ed.). Thousand Oaks, Calif.: Sage Publications. P 100

The Survey Approach – W&B study

- Willems and Beulens study of 2007 (*Knowledge Sharing And Public Sector Organizations: The Effect Of Organizational Characteristics On Interdepartmental Knowledge Sharing*)
 - Belgian Public Sector survey of 90 Belgian organizations
 - Largely derived question set
 - Used Structural Equation Modeling (SEM) for analysis
 - Results:
 - Trust, incentives and lateral coordination had highest regression weights

Figure 1
Path Model for Knowledge Sharing



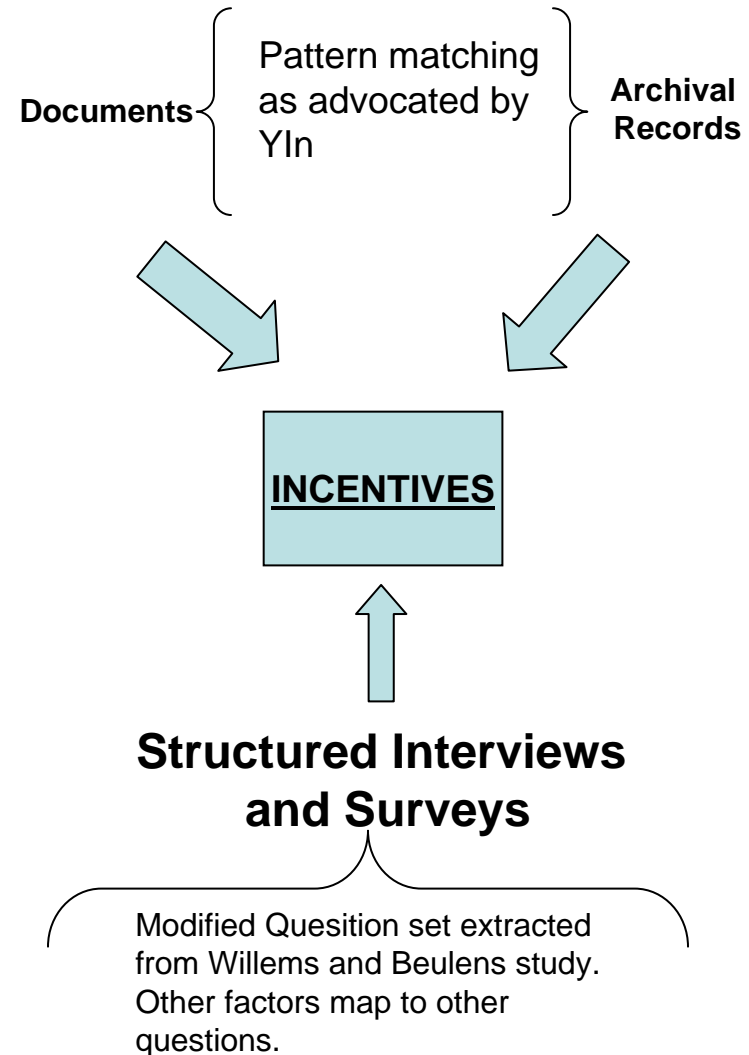
Extracted from: Willem, A, and M Buelens. "Knowledge Sharing in Public Sector Organizations: The Effect of Organizational Characteristics on Interdepartmental Knowledge Sharing." *Journal of Public Administration Research and Theory* (2007).

The Survey Approach – In Progress

- Modified Replication of the W&B survey
 - Online survey vs. Snowball distributed
 - One or two organizations with a larger population set
 - Survey will be oriented towards the entire population of an organization.
 - Focus on Information Sharing (not on Information Intensity)
 - Additional IT experience and use questions (drawn from “reviewed” literature)
- Mechanics
 - QuestionPro online survey is being used
 - Distribution by email
 - Like the W&B study AMOS/SPSS will be the principal statistical tool to provide a path analysis.

The Case Study Approach - Specifics

- Three elements of data collection
 - Documentary review (the literature check)
 - Review of archives with target organizations**
 - Online survey of personnel and/or interviews within target organization(s)
- Figure at right
 - "Incentives" is one of the W&B postulated factors
 - This figure represents what sources can inform on this factor



** the intent is not to pursue if other indicators yield satisfactory information

Measurements

Table 1 - Measurement of Efficiency

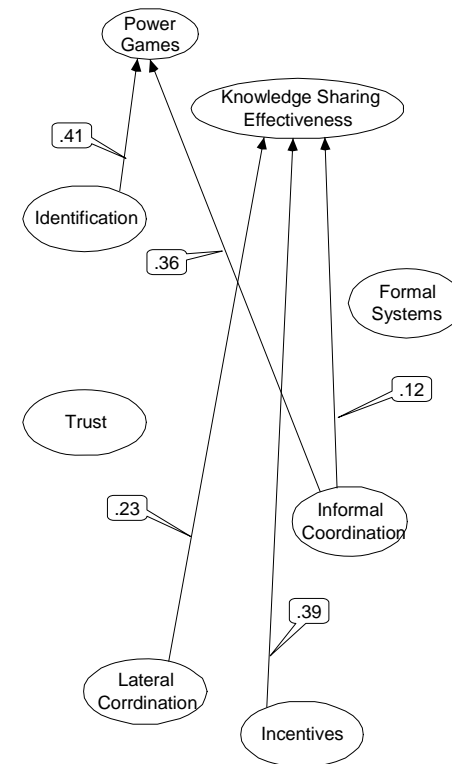
Independent Variable	Data Source	Measures
Technical Performance	Interview	Leadership perceptions of performance on ordinal scale of (better, poorer, neutral)
Technical Performance	Survey	Questions: time for output, amount of output, output for effort
Budget Performance	Archival Records**	Cost recovery, planned vs realized, budget overruns, "seat costs".
Budget Performance	Interview	Leadership perceptions that investment yielded a return on investment.
Temporal Performance	Archival Records**	Management records to indicate non IT project dependencies on IT implementation meeting schedule.

Table 1 - Measurement of Effectiveness

Independent Variable	Data Source	Measurements
Organizational External Goal for IT Systems Performance	Archival Records**	Management records that track organizational external performance (such as access to people and data numbers)
Organizational Internal Goal for IT Systems Performance	Archival Records**	Management records that track organizational internal performance (such as number and duration of physical meeting, numbers of emails, number of written internal correspondence)
Organizational Goal for IT Systems Performance	Survey	Questions: receive knowledge to improve, cooperative knowledge, improve effectiveness
Organizational Goal for IT Systems Performance	Interview	Leadership perceptions on meeting effectiveness goals to include ease of sharing, access

The Survey Approach – A pilot

- A pilot of the survey was conducted within a major organization in the public sector
 - June to Aug 2009
 - 2550 employees surveyed
 - 603 responses, 407 useful
 - Results showed Lateral Coordination, Incentives and Formal systems as having statistically significant regression weights.



Overview

- Policy Problem and Research Question
- Proposed Thesis Statement
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Conclusion and Future Research

□ Premise

- An organization's overall effectiveness can be aided by a successful IT implementation
- An understanding of information sharing will influence an organization's overall effectiveness.
- Policy should reflect this understanding

□ Conclusion

- The Pilot model, while less than a good fit, indicates support for the conceptual framework.
- To date policy has not comprehensively addressed the information sharing impact of organizational incentives/constraints

□ Future Research

- There is a need and value in additional research to identify what if any information sharing factors influence a successful IT implementation
- Efforts are underway to apply the survey to a larger public sector organization
 - The literature for the SEM method indicates a larger sample should yield a better model fit
 - With a new set of survey results the research should be enriched.

Questions?



Model Fit

TABLE 5.1
Model Fit Criteria and Acceptable Fit Interpretation

Model fit criterion	Acceptable level	Interpretation
Chi-square	Tabled χ^2 value	Compares obtained χ^2 value with tabled value for given <i>df</i>
Goodness-of-fit (GFI)	0 (no fit) to 1 (perfect fit)	Value close to .95 reflects a good fit
Adjusted GFI (AGFI)	0 (no fit) to 1 (perfect fit)	Value adjusted for <i>df</i> , with .95 a good model fit
Root-mean-square residual (RMR)	Researcher defines level	Indicates the closeness of Σ to <i>S</i> matrix
Root-mean-square error of approximation (RMSEA)	<.05	Value less than .05 indicates a good model fit
Tucker-Lewis index	0 (no fit) to 1 (perfect fit)	Value close to .95 reflects a good model fit
Normed fit index	0 (no fit) to 1 (perfect fit)	Value close to .95 reflects a good model fit
Normed chi-square	1.0-5.0	Less than 1.0 is a poor model fit; more than 5.0 reflects a need for improvement
Parsimonious fit index	0 (no fit) to 1 (perfect fit)	Compares values in alternative models
Akaike information criterion	0 (perfect fit) to negative value (poor fit)	Compares values in alternative models

Table 5.1 extracted from p 82: Schumacker, Randall E., and Richard G. Lomax. *A Beginner's Guide to Structural Equation Modeling*. 2nd ed. Mahwah, N.J.: Lawrence Erlbaum Associates, 2004.

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	87	1383.363	616	.000	2.246
Saturated model	703	.000	0		
Independence model	37	4330.191	666	.000	6.502

RMR, GFI

Model	RMR	GFI	AGFI	PGFI
Default model	.084	.845	.823	.740
Saturated model	.000	1.000		
Independence model	.146	.460	.430	.435

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.681	.655	.793	.774	.791
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.055	.051	.059	.012
Independence model	.116	.113	.120	.000

Above results are of the pilot study

Validity Analysis – Yin Framework

□ Construct Viability

- Criteria to demonstrate construct viability is to determine if the criteria being examined is sufficiently “operational”.
- Implies change measurement
 - Direct change measurement is presumed varying results between W&B and this study.
 - In addition, presumed different mission areas of organizational units to be surveyed will allow for “difference” analysis

□ Internal Viability

- Criteria is to show: pattern matching, explanation building, logic models and addressing rival explanations.
- A pattern matching methodology is shown in Appendix 2 of the proposal.

Validity Analysis – Yin Framework (cont)

□ External Validity

- Criteria – recognition of the analytical model
- This case study builds on a peer reviewed analytical model (the W&B study)

□ Reliability

- Criteria – a follow on researcher could duplicate results
- The pattern matching approach of literature review can be duplicated assuming literature remains available.
- The modified replicated survey can be re-used as frequently as desired.