Post-implementation learning and ERP impact -From social cognitive and social capital views

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Personal vita

Education

- Ph.D, Dept. of EDPSY, University of Illinois at Urbana-Champaign
  - Studies in Interpretive, Statistical, Measurement and Evaluative Methodologies for Education
- MS, Dept. of Ed Tech, Purdue University, West Lafayette
- BA, Dept. of Chinese Literature, National Taiwan Normal University

Positions currently hold

- Professor & Chair, Dept. of Information Management, NCU

Research areas--

Computer applications in education

- Design, implementation, & evaluation of learning systems
- ***C***omputer ***S***upported ***C***ollaborative ***L***earning
- Design and assessment of instructional interventions
- Small group learning

Research areas--Organizational behaviors

- ERP implementation
- Group dynamics research
- Virtual community study
- IT and organization
- End user learning & outcomes
- Human resources management

Presentation outlines

- Introduction
  - Research motivations
  - Research questions
- Conceptual background
- Research framework
- Hypotheses development
- Contributions

Research motivations[1]

- Huge investments in ERP since 1990s
  - About $300billion in ERP worldwide in last 10 years (James & Wolf, 2000; Gefen & Ragowsky 2005)
  - ERP market grows from $13.4 billion(2003) to a projected $ 15.8 billion(2008), at a 3% growth rate
  - Under-utilization of ERP functional potential (Lorenzo, 2001; Ehie & Madsen 2005; Jasperson et al., 2005)
  - Disappointed about reaching expected goals

Research motivations[2]

- Fail to realize competitive advantage from implementation
  - Failure of proper usage of technology
- Critical issues
  - Not what users have, but
  - How users learn to use it effectively
- The integrated and mandatory natures of ERP
  - Alters work processes, roles, communication patterns, requires an integral linkage
    - Resistance, need to coordinate and obtain integral knowledge

Research motivations[3]

- Without training and learning
  - Unable and unwilling to use
- Learning may derived from
  - Pre-implementation training
  - Post-implementation learning

Research motivations[4]

- Pre-implementation training
  - Increase the ability to use
  - The complex natures of ERP
    - Limit the amount can be absorbed before actual use
    - Force to continually learn new skills

Research motivations[4]

- Post-implementation learning
  - Continuous learning after ERP is in operation
  - Key to realizing ERP's full potential
- The more users learn
  - The more effective use
  - The greater performance impact on users' work

Research motivations[5]

- Prior research
  - Focus on ERP implementation phase
- New concern
  - Focus on ERP post-implementation phase, and how to measure its success
    - A crucial indicator of e-business success (Yu, 2005)
- After ERP implementation
  - Users' knowledge and skills to use ERP

Research questions

- Factors facilitating ERP use among users have seldom been identified
- What factors facilitate post-implementation learning ?
  - Social cognitive theory
    - Self-efficacy
    - Affect behavior when facing a new IT
  - Social capital theory
    - Relationship networks facilitate access to resources
    - Promotes coordination and obtain dispersed knowledge

Conceptual background

- Post-implementation learning
- Social capital
- Post-training self-efficacy
- ERP usage
- Individual performance impact

Post-implementation learning[1]

- Continuous learning after implementation
  - Complex and integrated natures of ERP
    - Learning in working
    - Unsound to separate knowledge from practice (Lave & Wenger 1990; Brown & Duguid 1991)
  - Training environment differs from the working one
  - Know-how vs. know-why
    - Heuristic knowledge

Post-implementation learning[2]

- Three conditions for learning to happen
  (Moran & Ghoshal 1997; Nahapiet & Ghoshal 1998)
  - Learning opportunity
    - The knowing of what others know and accessibility
  - Learning intention
    - Willingness to build new knowledge
  - Learning capability
    - The ability to value, assimilate and use new knowledge

Social capital[1]

- Network of relationship
  - Actors' abilities to secure benefits via membership in social networks (Portes 1998)
    - Facilitates access to other resources (Balatti & Falk 2002)
    - Promotes greater coordination among people and between units
  - Emphasizes informal communication among users
    - Feedback improves the ERP usage (Nah and Delgado, 2006)

Social capital[2]

- Sum of the actual and potential resources
  - Embedded within, available through, and derived from
    - The network of relationships possessed by an individual or social unit
  - Structural
  - Relational
  - Cognitive

Social capital[3]

- Structural
  - The pattern of connections
  - Individual's network of social ties will create opportunities for transactions (Adler & Kwon, 2002)
- Relational
  - The kind of personal relationships (Granovetter 1992)
  - Trust affects interfirm knowledge transfer and creation (Godgson 1993; Doz 1996)
- Cognitive
  - Shared representations and interpretations (Nahapiet & Ghoshal 1998)
  - Shared vision comprises the collective goals and aspirations (Tsai & Ghoshal 1998) 3/27/2009

Post-training self-efficacy

- Derive from social cognitive theory 
- The cognitive evaluation of individual's ability (Bandura 1982)
- Employed in many IS studies
  - Computer self-efficacy, knowledge sharing self-efficacy, software self-efficacy
- Post-training self-efficacy
  - Users' belief on their perceived capability to successfully using ERP in daily work after training

ERP usage[1]

- How extensively an ERP is used after implementation
- IS success measure
  - IT usage (Doll & Torkzadeh 1998; DeLone & McLean 2004)
  - ERP usage (Lorenzo 2001)
- How IT is actually used
  - Performance-related usage
  - Multidimensional concept

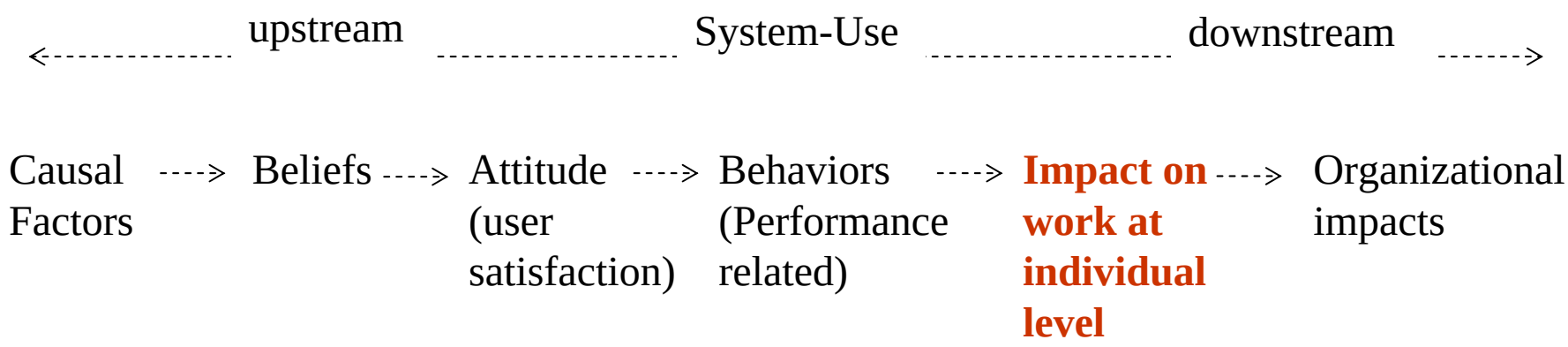
ERP usage[2]

Construct	Dimension
Decision support	Problem solving
	Decision rationalization
Work integration	Horizontal integration
	Vertical integration
Customer service	Customer service

Source: Torkzadeh & Doll 1999

Individual performance impact[1]

- The actual benefits users gain from using ERP
- IT success measure
  - Impact on work at individual user level (Torkzadeh & Doll 1999)

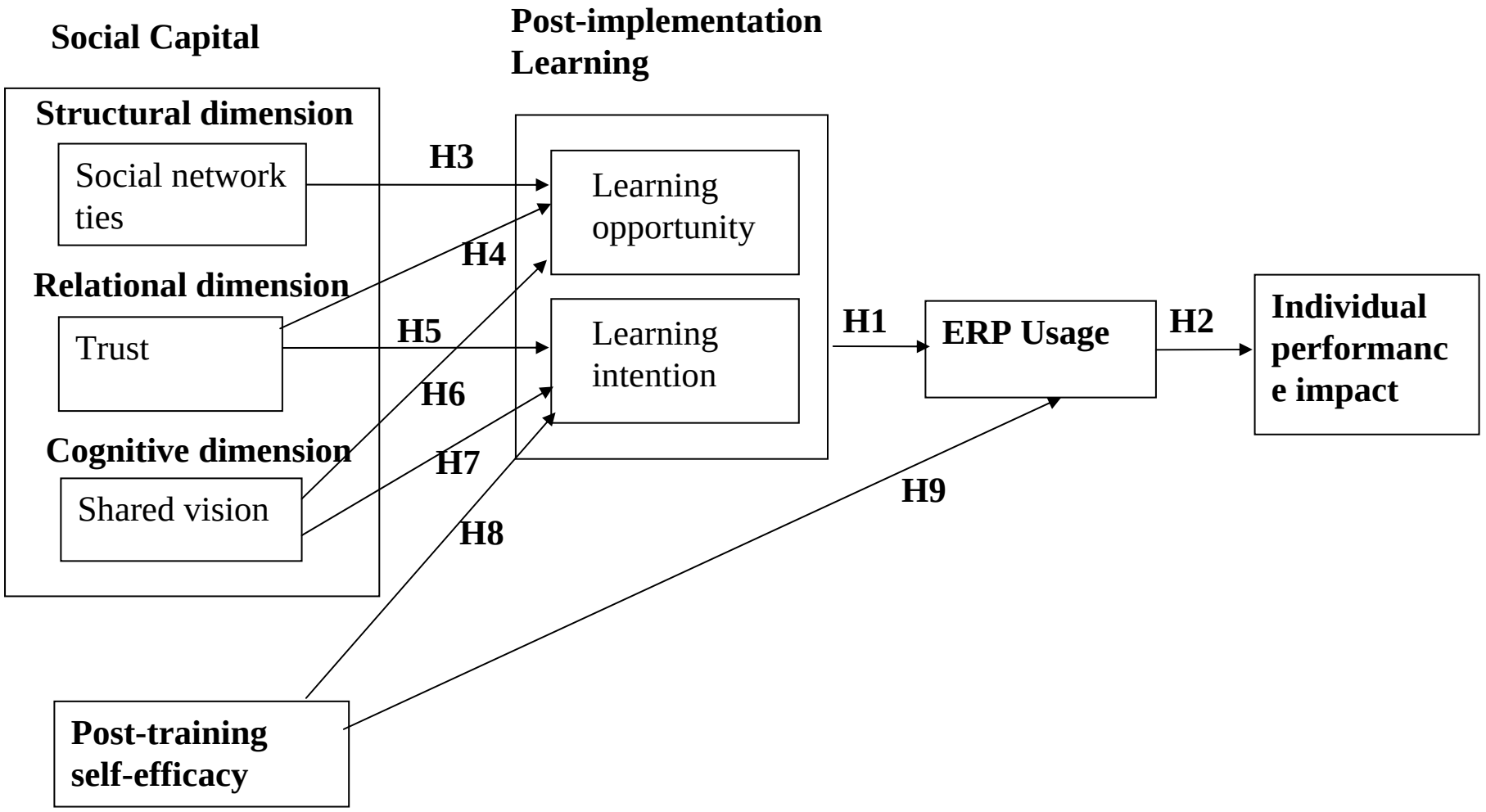


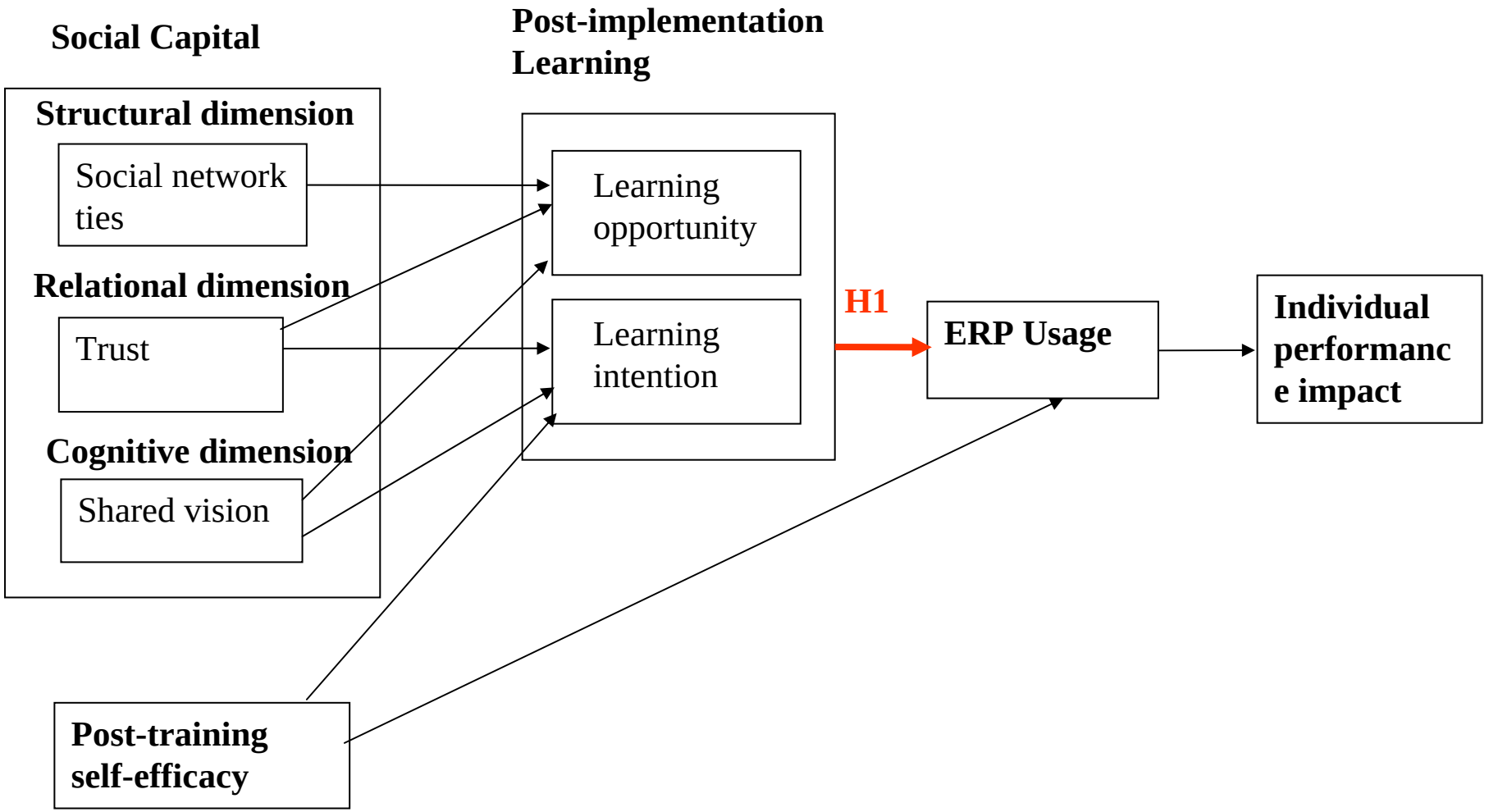
Source: Torkzadeh & Doll 1999

Individual performance impact[2]

Dimensions	Definition
Task productivity	The extent that an IS improves the users
Task innovation	The extent that an IS helps users
Customer satisfaction	The extent that an IS helps the user
Management control	The extent that the IS helps to

Research framework

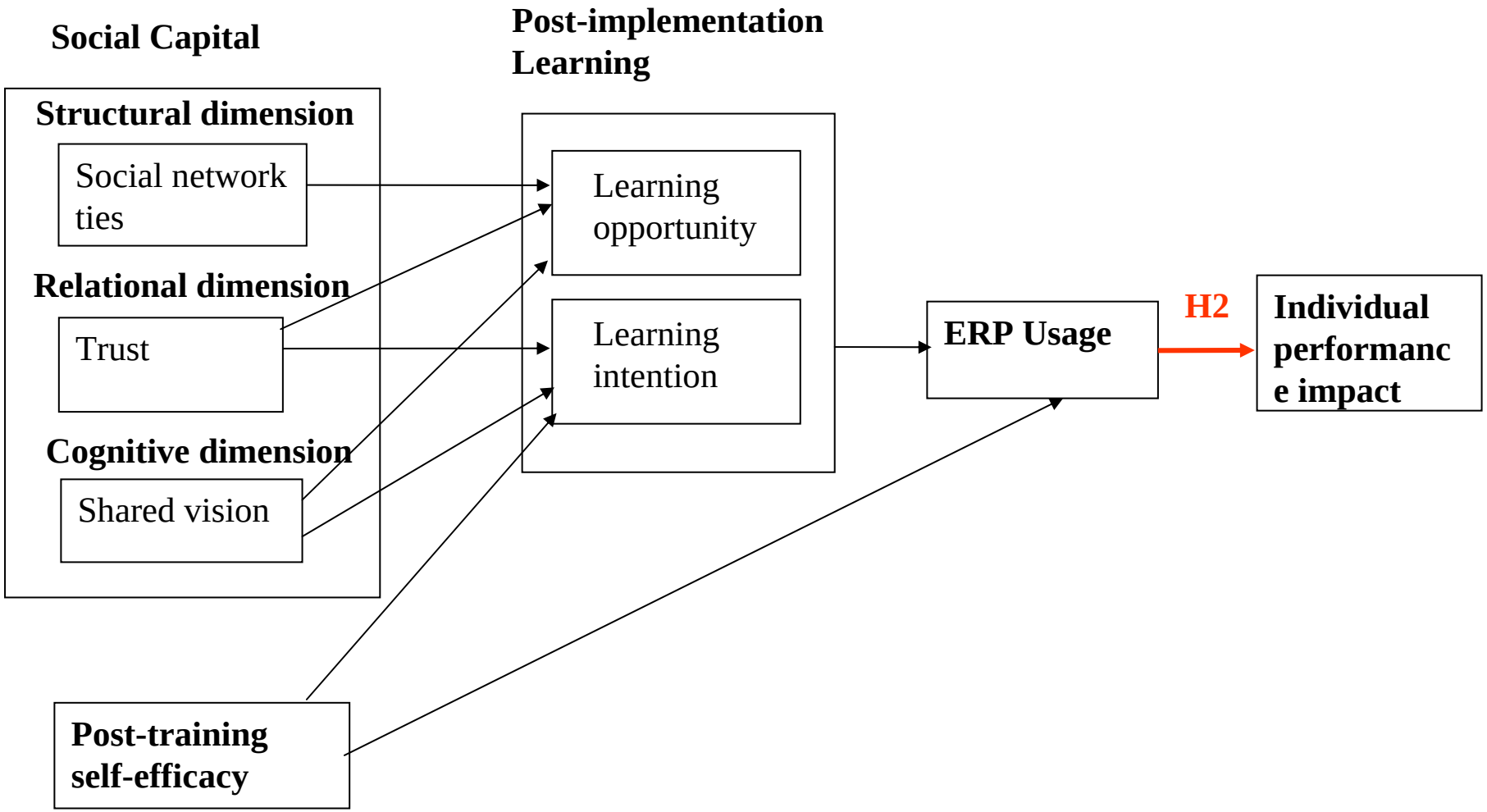



Social Capital
Structural dimension
Social network ties
Relational dimension
Trust
Cognitive dimension
Shared vision
Post-implementation Learning
Learning opportunity
Learning intention
H1
ERP Usage
Individual performanc e impact
Post-training self-efficacy

Hypotheses development[1]

- The more continue to learn, the more effectively IT is used (Doll et al. 2003)
- Post-implementation learning fosters continuous improvements in the effective usage (Doll et al. 2003)
- Continuous learning and gaining knowledge affect ERP usage (Lorenzo 2001)
- Post-implementation learning
  - Learning in working and obtain heuristic knowledge based in action
  - Informal communication among users
    - Through communication and sharing feedback offered by other users could improve ERP usage (Nah and Delgado, 2006)

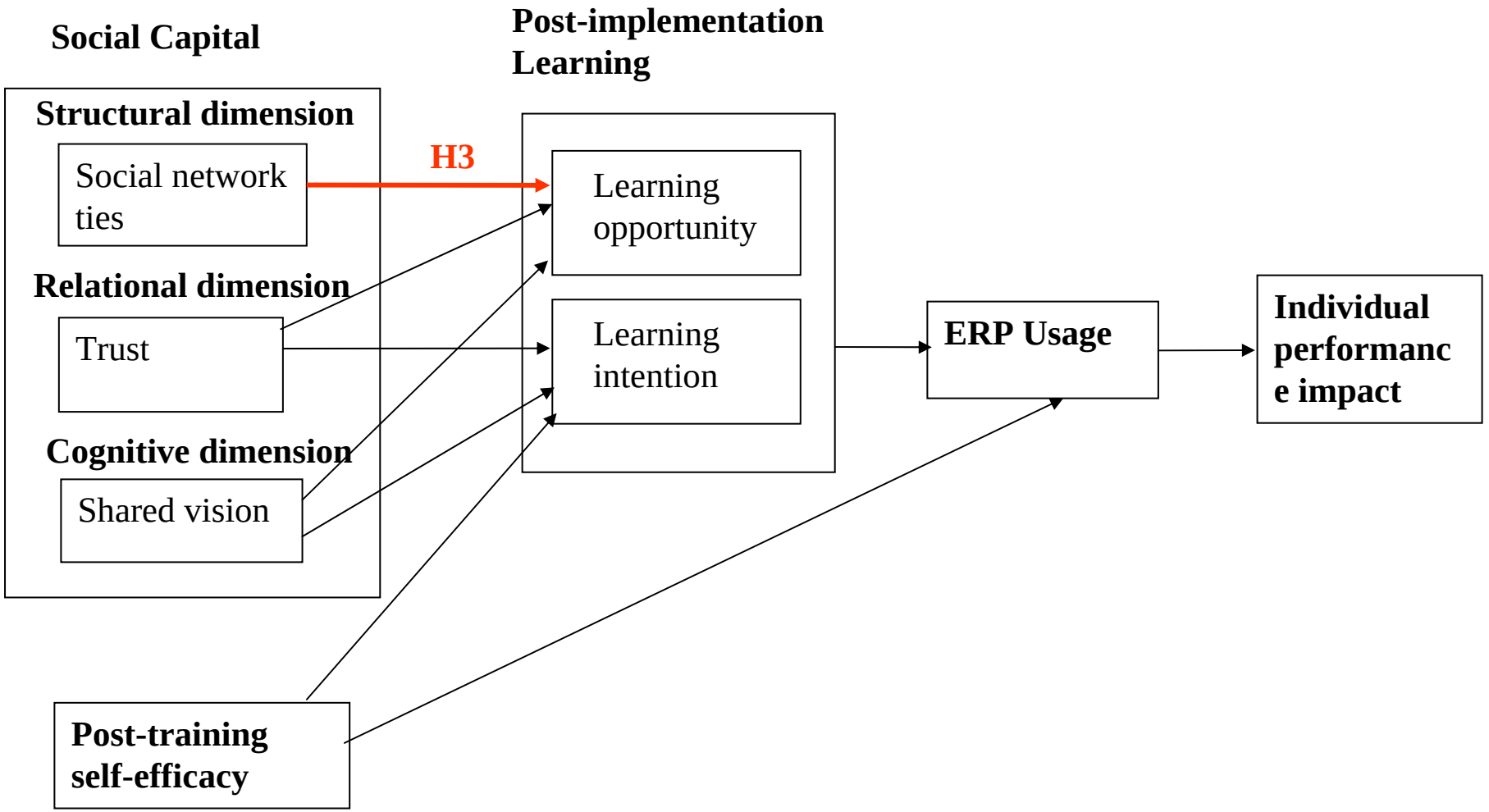
H1: *Post-implementation learning is positively related to ERP usage*


Social Capital
Structural dimension
Social network ties
Relational dimension
Trust
Cognitive dimension
Shared vision
Post-implementation Learning
Learning opportunity
Learning intention
ERP Usage
H2
Individual performance impact
Post-training self-efficacy

Hypotheses development[2]

- Usage affects impact on work at individual level (Torkzadeh & Doll 1999)
- Used effectively, and thus has important impacts on the individual work (Doll et al. 2003)

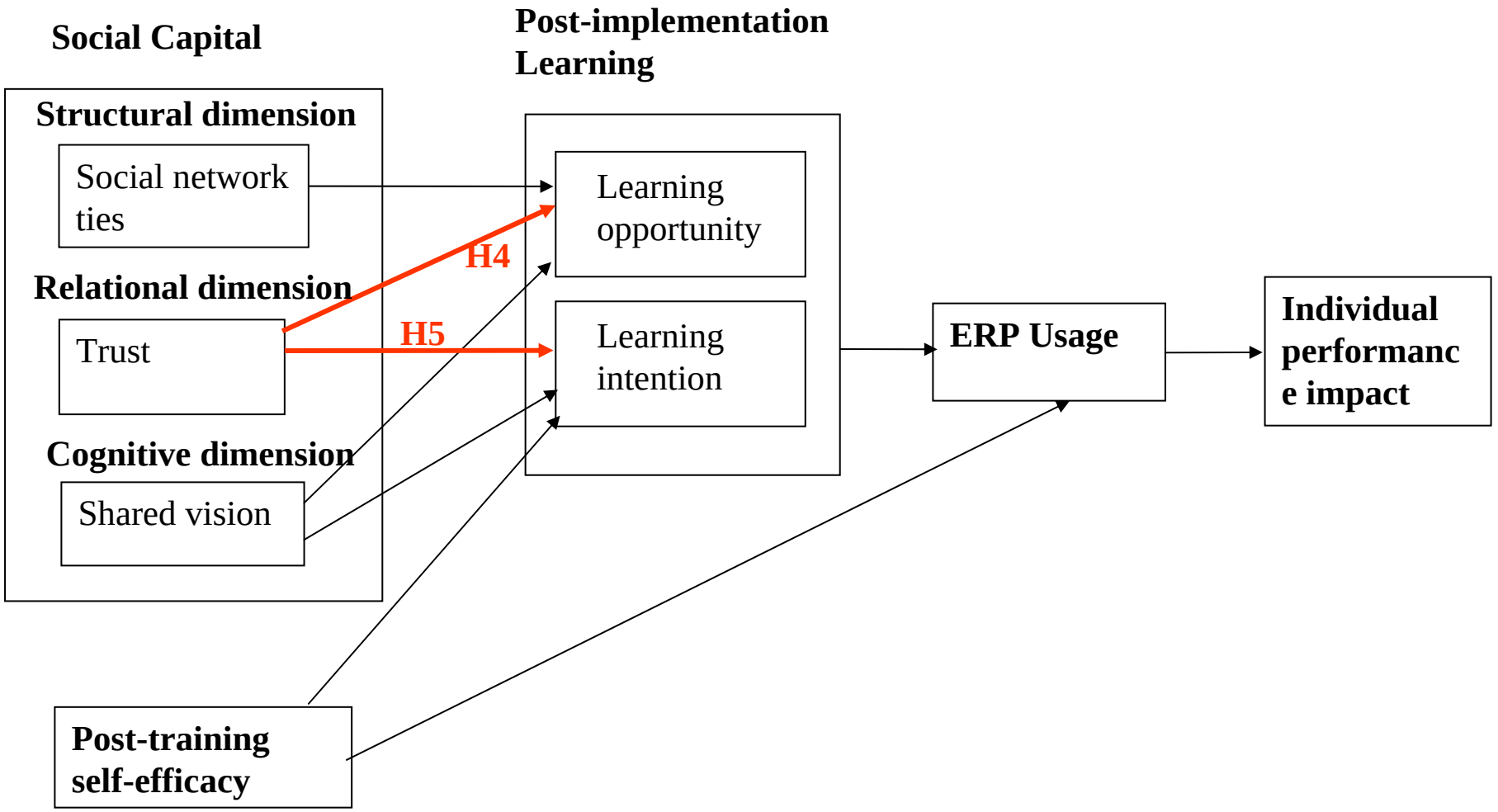
H2: *ERP usage is positively related to Individual performance impact*


Social Capital
Post-implementation Learning
Structural dimension
Social network ties
H3
Relational dimension
Trust
Cognitive dimension
Shared vision
Learning opportunity
Learning intention
ERP Usage
Individual performance impact
Post-training self-efficacy

Hypotheses development[3]

- Access to others' resources through social network ties (Tsai & Ghoshal 1998)
- Structural dimension
  - Increases accessibility
  - Provides opportunities to refer to more knowledge sources (Widén-Wulff & Ginman 2004)
- "Who you know" affects "what you know" (Nahapiet & Ghoshal 1998)

H3: *Social network ties are positively related to learning opportunity*

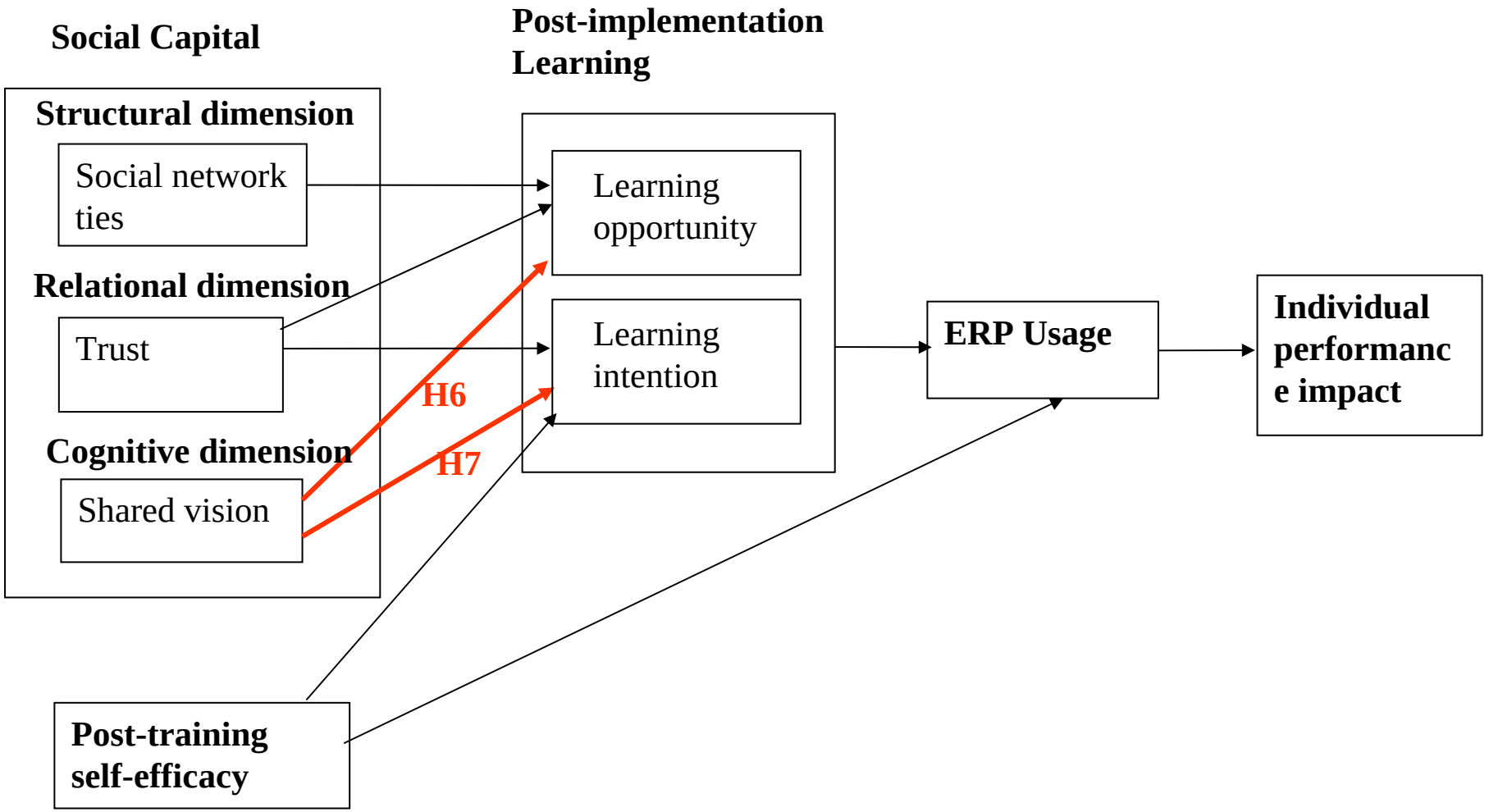

Social Capital
Post-implementation Learning
Structural dimension
Social network ties
Relational dimension
Trust
Cognitive dimension
Shared vision
H4
H5
Learning opportunity
Learning intention
ERP Usage
Individual performance impact
Post-training self-efficacy

Hypotheses development[4]

- Trust open up access to people (Misztal 1996)
- Trust underlies all positive social interactions
  - When people don't trust, they don't learn (Falk 1989)
- Trust exists
  - Willing to share sources (Bradach & Eccles 1989)
  - Willing to wage social exchange and cooperative interaction (Putnam 1993)

H4: *Trust is positively related to learning opportunity*

H5: *Trust is positively related to learning intention*

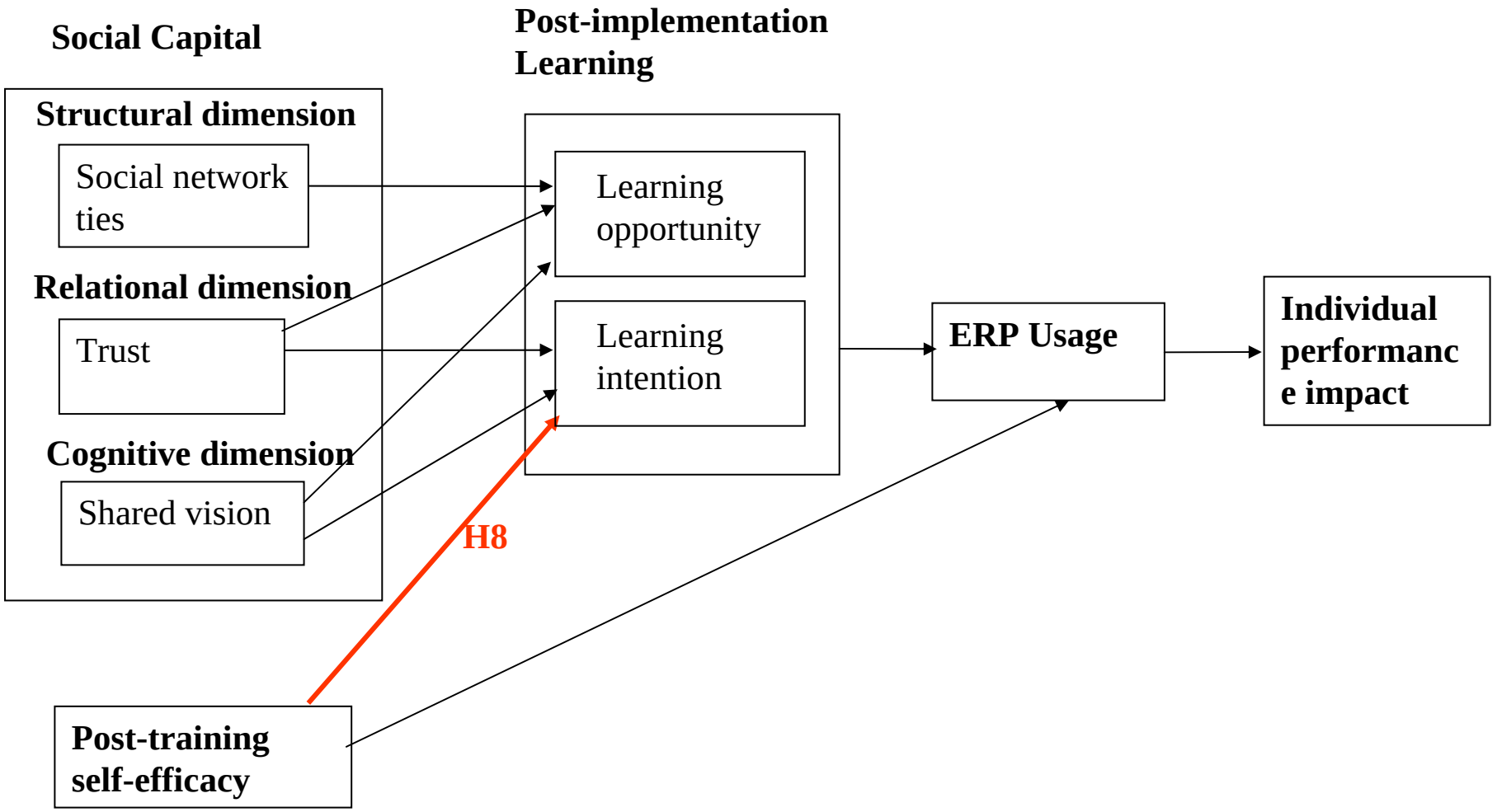

Social Capital
Structural dimension
Social network ties
Relational dimension
Trust
Cognitive dimension
Shared vision
Post-implementation Learning
Learning opportunity
Learning intention
H6
H7
ERP Usage
Individual performance impact
Post-training self-efficacy

Hypotheses development[5]

- Members have same cognitions
  - More opportunities to exchange and combine their resources (Nahapiet & Ghoshal, 1998; Tsai & Ghoshal, 1998)
- Members shared a vision
  - More likely to exchange and combine their resources (Tsai & Ghoshal, 1998)

H6: *Shared vision is positively related to learning opportunity*

H7: *Shared vision is positively related to learning intention*


Social Capital
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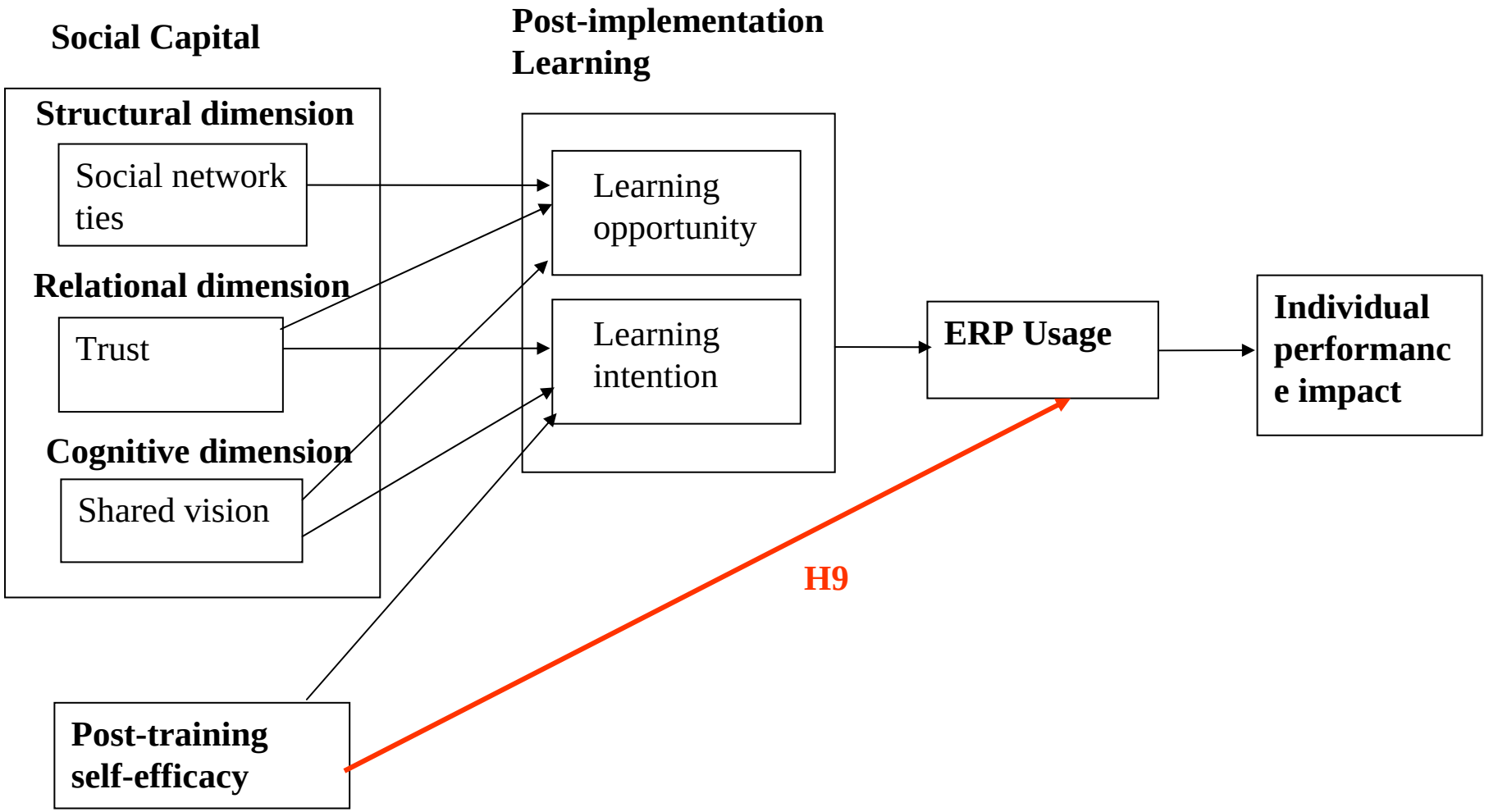
Trust
Cognitive dimension
Shared vision
Learning opportunity
Learning intention
ERP Usage
Individual performanc e impact
H8
Post-training self-efficacy

Hypotheses development[6]

- Self-efficacy is a critical factor
  - Affect one's motivation and behavior (Bandura 1982)
- High self-efficacy
  - Strong intention to maintain learned skills (Gist et al. 1991)
  - Positive learning attitude (Noe & Wilk 1993)

H8: *Post-training self-efficacy is positively related to learning intention*


Social Capital
Structural dimension
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Relational dimension
Trust
Cognitive dimension
Shared vision
Post-implementation Learning
Learning opportunity
Learning intention
ERP Usage
Individual performance impact
H9
Post-training self-efficacy

Hypotheses development[7]

- Self-efficacy is one of the most critical factors
  - Influence the activity of a person (Bandura 1991)
- User's perceptions and belief affect ERP usage (Lorenzo 1991)
- Computer self-efficacy facilitates ERP usage (Shih 2006)

H9: *Post-training self-efficacy is positively related to ERP usage*

Research methodology

- Sample and data collection
  - Cross-sectional mail survey
  - Sample frame
    - 300 companies had implemented ERP (Chou & Yeh, 2007)
  - Informants
    - The users who use ERP in their daily work and have taken training

Measurement

- The measurement items
  - Adapted from previous studies
  - Multiple item measures
  - Seven-point Likert scale
    - 1 (strongly disagree) to 7 (strongly agree)

Post-implementation learning

Learning opportunity Bock et al. (2005) Van den Hooff and de Ridder (2004)	1. 我總是可以從同事身上學習到工作的經驗和竅門 2. 同事總會試著向我分享他們的專業知識 3. 當我詢問同事時，他們總會告訴我他們的技巧 4. 當我詢問同事時，他們總會告訴我他們所知道的一切
Learning intention Bock et al. (2005)	5. 我願意與同事交換工作上的經驗和竅門 6. 我願意與同事分享我的專業知識 7. 當我需要幫忙時，我願意向同事學習解決問題的竅門

Social capital

Social network ties Kim & Lee (2006)	1. 我會透過非正式的聚會與同事交流 2. 我會與同事互動交流 3. 我會主動參與實務社群
Trust Kim & Lee (2006)	4. 我相信同事的技術能力 5. 我相信同事的專業知識 6. 我知道我的同事不會為了自己的利益欺騙我
Shared vision Tsai & Ghoshal (1998) Kim & Lee (2006)	7. 公司的員工都很熱忱地追求公司整體的目標和使命 8. 公司的員工在工作上有相同的目標及願景

Post-training self-efficacy

經過教育訓練後，我相信我有能力
1. 用ERP完成我的工作
2. 即使只有參考系統使用手冊也能用ERP完成我的工作
3. 即使只有系統內建輔助功能的協助也能用ERP完成我的工作
4. 若在我遇到困難時有人可以協助，我可以用ERP完成我的工作

Source: Compeau & Higgins (1995)

ERP usage

1. 我使用ERP系統來分析數據資料
2. 我使用ERP系統來分析問題發生的原因
3. 我使用ERP系統來更快地做出決策
4. 我使用ERP系統來與同事溝通
5. 我使用ERP系統來與同事交換資訊
6. 我使用ERP系統來監督我的績效
7. 我使用ERP系統來計畫我的工作
8. 我使用ERP系統來與我的上司溝通

Source: Deng et al. (2004)

Individual performance impact

1. ERP系統節省了我的時間
2. ERP系統增加了我的生產力
3. ERP系統相較於其他方法，讓我完成了更多的工作
4. ERP系統有助於工作流程的管控
5. ERP系統有助於管控績效的提升

Source: Park et al. (2007)

Contributions[1]

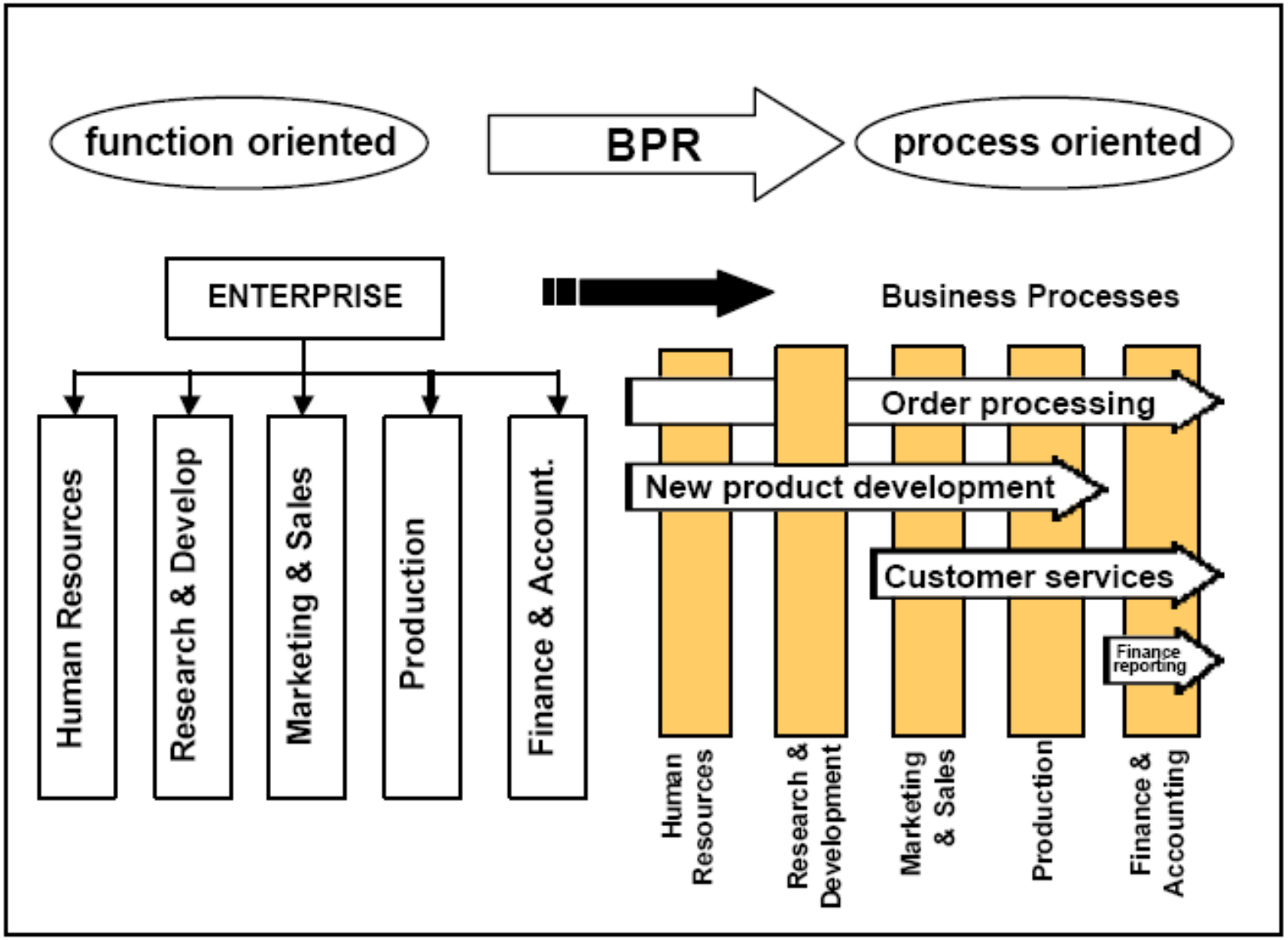
- This study investigates
  - The role of post-implementation learning
  - Factors enhance post-implementation learning
    - From social cognitive theory and social capital theory
- For Practitioners
  - Stimulate the post-implementation learning
  - Effective ERP usage and performance on users' work
- For Academics
  - Empirical research on ERP post-implementation stage
    - ERP usage and impact

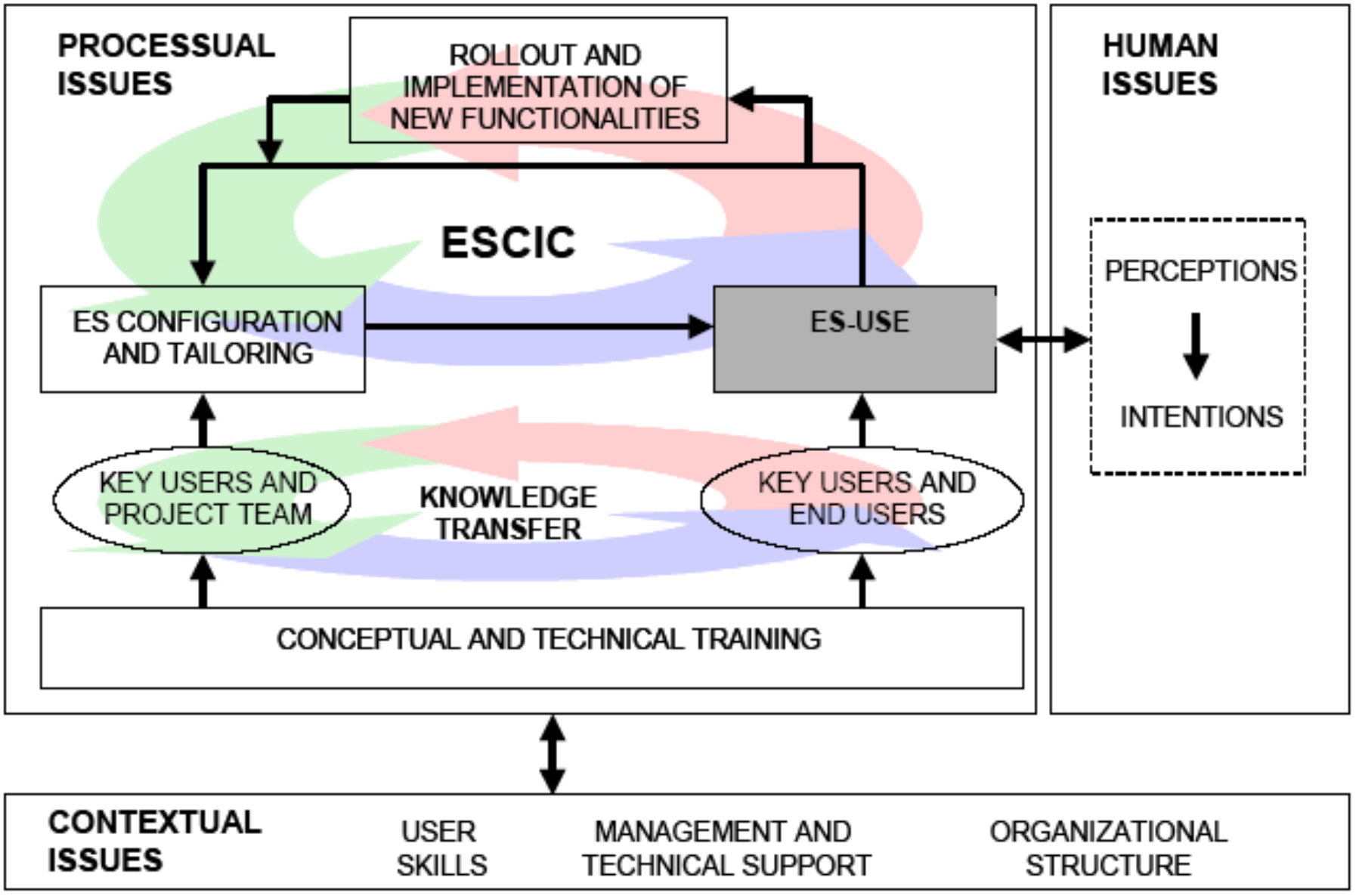
Contributions[2]

- After ERP implementation
  - Whether companies gain benefits
  - Benefits come from effective ERP usage
- It is crucial
  - Measure and maximize the usage and impact
  - How users learn to use

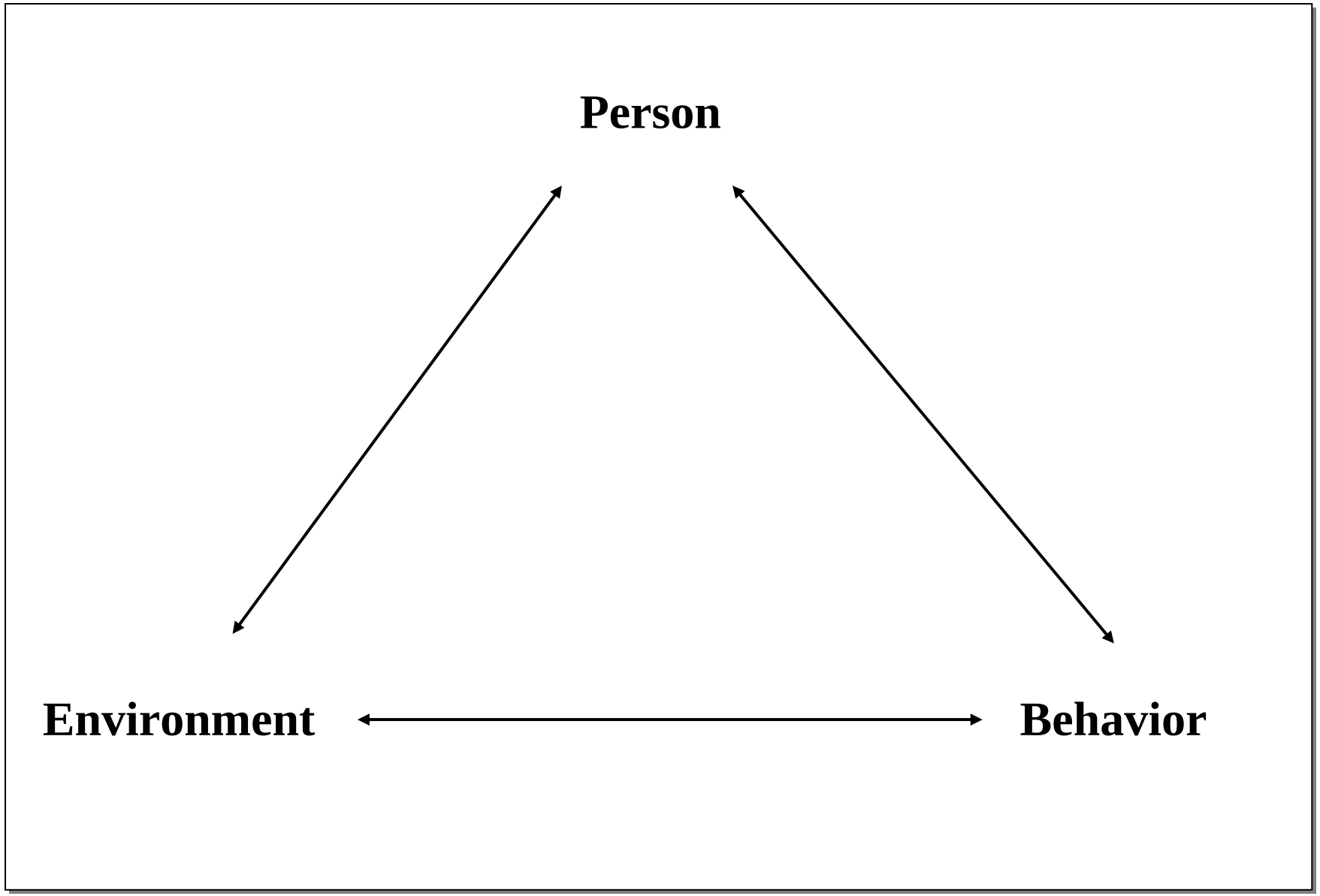
簡報結束

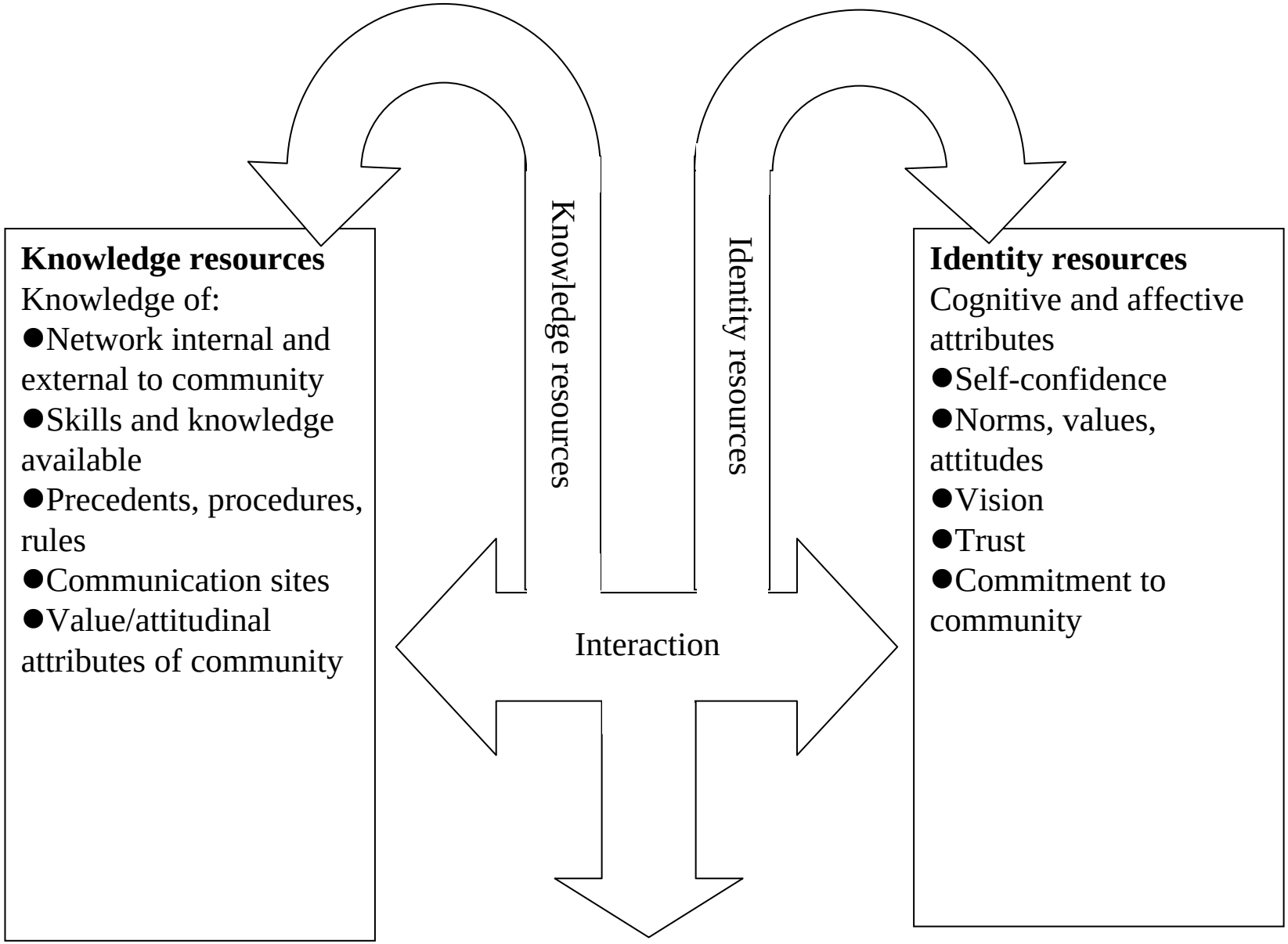
Q & A


function oriented
BPR
process oriented
ENTERPRISE
Human Resources
Research & Develop
Marketing & Sales
Production
Finance & Account.
Business Processes
Order processing
New product development
Customer services
Finance reporting
Human Resources
Research & Development
Marketing & Sales
Production
Finance & Accounting



ESCIC: ES continuous improvement cycle


Person
Environment
Behavior


Knowledge resources
Identity resources
Knowledge resources
Knowledge of:
●Network internal and external to community
●Skills and knowledge available
●Precedents, procedures, rules
●Communication sites
●Value/attitudinal attributes of community
Interaction
Identity resources
Cognitive and affective attributes
●Self-confidence
●Norms, values, attitudes
●Vision
●Trust
●Commitment to community
Action or cooperation for benefit of community and/or its members