A Study on Discrete Continuity of Information System, Knowledge System, and e-Business System

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⟨Abstract⟩

Since information systems are pervasive in the business and non-business areas, the issue of extending researches on information systems to knowledge systems and e-business systems is one of the most profitable topics of researches. We propose a historical, discontinuous changes introducing ambiguity in explaining and interpreting innovative nature of three paradigms of systems: information systems, knowledge systems, and e-business systems.

Resorting to the historical perspective in developing ideas into meaningful themes, we proposed a discrete continuity in interpreting changes of paradigms of systems. Discrete continuity may be explained by ambiguously-shared meaningful perspectives applied to different paradigms of systems and interpretive elements of each system. The discrete continuity has been adopted to make ambiguity utilized have instrumental contribution in researches. The engrafted ambiguity in systems design, development, and use could have enduring instrumental value in interpreting the types or variants of systems in each paradigm of systems.

Key Words : IS Discipline, Discrete Continuity, Information System, Knowledge System, e-Business System

Ⅰ. 서론

Information systems[IS] are quickly emerging as critical resources to be leveraged for organizational productivity in many business, social, and economic enterprises[1]. And researches on information systems evolved around the design, development, and use of information systems in organizations. One of the issues of IS researches is the concept of information technology[IT] artifact to keep the identity of IS as a discipline. It may serve to facilitate IS to become a reference discipline to other disciplines. It may also serve IS researchers to cope with the rapid expansion of IS domain.

The information systems field faces the challenges of determining the essential characteristics of IS research and defining its difference from research in fields such as law, communication, and computer science[2]. We are required to keep the identity of IS clear and to facilitate inter-disciplinary researches. But interdisciplinary research tends to include incompatible concepts or

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research methodologies not readily acceptable by other disciplinary standards and procedures. To make matters worse, one of the important problem we are facing as IS researchers is that the IS research focused on inter-operability may not be extended to knowledge systems or e-business systems. In sum, multi-disciplinary integration problems and lack of consistent frameworks to explain the evolutionary nature of IS to e-business system makes the IS researchers to keep coming back to identity problems.

Hence, we address the historical nature of IS to keep the research legacy meaningful to new era of e-business. With historical perspective, we propose the 'discrete continuity' and historical dimensions of IS research to e-business system.

II. LITERATURE REVIEW

2.1 IS CRISIS

IS are facing a different kind of crisis to that of other fields. Contraction or elimination of domain is a kind of general problems that is more common in rapidly changing society. Growing up of IS domain rapidly and incomprehensively is may be too much for us to deal with, in traditional ways of IS researches. That is why many researchers resort to new ways of solving the impending problems, borrowing again from other disciplines.

2.1.1 IS Domain is Expanding Rapidly

The domain defined by the development, use and application of information systems by individuals, organizations and society as a whole is far too large for the IS research community alone[1]. Growing rapidly that is not controllable way may involve extinction level crisis for any entity. In the domain of IS, rapid growth gives rise to the identity crisis, and resulted in the debate about IT artifact[2]. Enhancing the common core properties of IS research may contribute to maintain the external identity. Requiring IT artifact as a requirement to be included in IS research, which is validated as relevant to IS, may become restricting IS flexibility which is already come short of the rapid change of society in general. Restrictions that has not limiting effect on the IS research may be termed as 'reference.' Reference is a kind of connection that is not restricting with irrelevant limitations.

2.1.2 IS Has Lost Some of its Uniqueness

Information systems are not specialized or rare resource any more. General use and ubiquitous placement of information systems require other kind of uniqueness in IS research community to keep its identity. It is suggested that unique understanding of IT and IT artifact may serve the purpose[2]. And as the knowledge on the IS expands to the wide population, the interpretation capability are much in need[1].

2.1.3 Innovation and Its Properties are Not Fully Captured

Much of IS discipline borrowed theories and concepts from other disciplines keeping the some level of contextual relevance, but could not been fully

developed to have systematic interpretive capacity to diffuse IT innovations in consistent and meaningful way to other disciplines. Innovative nature of IT could be explained in new terms, but the predictive technology evaluation did not come from IS researches. Mostly reactive patterns prevailed in IS researches. Innovative nature does not come from inputs or outputs of IT. It is in the change of value-creating process that has proactively driving the new development of IT.

Ⅲ. INFORMATION SYSTEM, KNOWLEDGE SYSTEM, AND E-BUSINESS SYSTEM

Adopting strategic ambiguity[2], we postpone defining Information System, Knowledge System, and e-Business System rigorously, since enhancing the interpretive capacity in IS research with historical perspective is one of the major goals of our research. Predefined systems may not be profitable to other IS researcher who do not share the terminological connotations.

Knowledge management is depicted in the literature in various ways that, taken collectively, define it to encompass almost any activities or systems that involve repositories of information coupled with communications capabilities[2]. Knowledge systems are different from information systems in that it embed or presuppose communication capabilities inside the system.

We propose that IS researches may be more aptly extended to apply in knowledge systems or e-business topics with well-designed ambiguity. Ambiguity may be a source of confusion in information system, but it is a source of new sense-making in knowledge systems, if it is properly coordinated. Dynamic properties may be contained inside a small block of ambiguity in developing and building meanings.

Enhancing ambiguity in information systems has been considered nonsensical. But the knowledge systems require ambiguity instilled in every aspects of systems. Information systems needed reductions and abstractions which are generally characterized by term of 'convergent'. Knowledge systems need resource slacks and divergent elements ingrained. The knowledge community has much to offer in knowledge system, since it involves interactions and collaborations among the related parties.

In e-business systems the value appropriation made the systems identity change, by including the customers as a partner of business systems. e-business systems no longer deliver products of the system to customers, but co-create the value with customers. Customers are parties of e-business system, and share the profits as business models, institutions, and regulations require.

IS strategy tends to adopt focus, relevance, timeliness as an important value[3]. To achieve this values 'specific goals', and 'specific users'[3] are the source of value generation and target of value distribution.

And cost-efficiency has been the major measurement index for performance in IS investment justification. It is based on the assumption that IS is dealing with pre-set value objective in minimum or maximum. But knowledge system has moving target, since it involves high degrees of contribution from users and involved parties. Every system needs goals. But the knowledge system needs different 'specificity' in defining goals. We

need more ambiguity and slacks in knowledge systems qualitatively different from that of information systems. Reductionism involved in information system may not be applied to knowledge systems profitably. Knowledge systems need to focus on people since they are the source of knowledge generation and decision-maker of knowledge distribution. e-business system has customers as its component. We need to find value-creating process with customers inside a system whose value is appropriationable, and exchangeable in monetary value.

IV. SUGGESTED IS RESEARCH DIRECTIONS

While we know IT produces value for firms, knowing where, how, and how much is significant problem[1]. 'Knowing where' can be expressed as locus of value, and 'how' can be interpreted as a design and management issues, 'how much' may be a business value of IT or business viability or profitability issues. Some assert that details do not facilitate creativity. But improper abstraction or aggregation does not accrue appropriationable value either. We need to redirect IS researches to profitable ways in accordance with the digital innovations in technological and social context.

4.1 Focusing on the Expertise in Knowledge Systems

We believe that we are better equipped to create value in specific information systems using expertise than general purpose information technologies. The task-oriented research has been useful through the organizational IS research. Big change came in the interaction level of agents working in computer-mediated work environment, shifting the performance focus on the coordination of information and collaborative work. This implies that knowledge processes are emphasized in that knowledge is the core asset in creating (economic) value in corporations and society in general.

4.2 Ambiguity−instilled system developments and applications

Disambiguation is designing and developing information systems have be reverted to re-ambiguation in the IS design and implementation issues. Disintegrated components of IS may be reconstructed as knowledge systems and finally value-creating and appropriating e-business systems.

4.3 Adapting users to customers in e−business systems

Insights from the researches of traditional IS user and user requirements may contribute the customer's technological aspect analysis. But much of customer's co-creation of value comes from the perspectives of marketing and economics.

And to address the where, how and how-much problems in accordance with traditional IS research, we summarized the evolutionary development of IS to Knowledge System to e-Business System. We are not trying to define prematurely but we suggest a guidance to develop meaningful IS researches to e-Business era.

Ⅴ. DEVELOPING DISCRETE CONTINUITY IN PARADIGMS OF SYSTEMS

Much IS research is apparently ahistorical, that is, it does not attend to the potential effects of time and history[4]. Independent IS development projects were mapped by portfolio analysis, resulting in the combination problem to maximize the effectiveness of IS in each corporation. It has been suggested that IS researches need to have more involvement with history and path dependence[4]. We suggest that time and history factors can be well-represented by organizational learning perspective. Adapting IS researches extensible to e-Business domain is one of the urgent demands of IS researchers. Figure 1 shows an example of discrete continuity of Information System, Knowledge System, and e-Business Systems.

< Figure 1> An Example of Discrete Continuity of Information System, Knowledge System, and e-Business System*

Ambiguously-shared perspectives	Paradigms of Systems		
	Information System	Knowledge System	e-Business System
Management Issues	Artificial system as an asset User as a problem	Knowledge as an asset Sharing as a problem	Customer as an asset Trust as a problem**
Organizational Issues	Engrafting IS into organizations	Business process to knowledge process	Generating new or viable business constantly
IPO-based features	Accurate input Efficient process Compatible output	Explicit or tacit input Sense-making process Extensible output	Resource input Value-creating process Appropriationable, valuable output
Problem-related feature	Problem-solving	Problem- or Opportunity-finding	Opportunity-developing
Organizational learning perspective	Learning bounded to business process	Learning diversified & utilized	Specialized learning exploited
Focus of learning (characteristics)	Optimization of what is already learned (preserving and refreshing learning)	New learning & Empowerment (innovative)	Embedded learning (constantly innovative)

Locus of value	Business process Efficient design and implementation Reductionism Compatibility / Inter-operability	Collaboration Knowledge sharing Utilizing systematic ambiguity Personal expertise	Customer in the system Responsiveness in every part of systems Proactive design in business models Discovering value and its working mechanisms

* Each cell represents Interpretive Elements.
** Trust may be considered to be the component of infrastructure for e-business systems[1].

<Figure 1> is developed to show that the engrafting ambiguity in systems design, development, and use could have enduring instrumental value in interpreting the types or variants of systems in each paradigm of systems. Discrete continuity may be explained by ambiguously-shared sense-making perspectives applied to different paradigms of systems and interpretive elements of each system.

<Figure 2> is developed to show that different values come from differences of systems.

Ambiguously-shared perspectives	Paradigms of Systems		
	Information System	Knowledge System	e-Business System
Different Aspects of value	Efficiency (in time and cost) Consistency	Expanding feasible areas of relevant interactions (enhancing accessibility, density, relevance redefined)	Sustainable business creation: valuable outputs or results Co-creating value with customers in each business model

Ⅵ. CONCLUSION

Researchers working in many of other disciplines have realized that the phenomena of interest are now mediated by information technology[1]. And the mediation need more than correctness and robustness. Increased human and machine interactions and

collaborations may offer much potential value in various ways, but cultivating values in this context requires innovative natures in every aspect of systems. What is unknown has been the source of anxiety and uncertainty, but we are facing issues of managing what is unknown at least partially contributable ways. Managing what is not yet captured explicitly in a profitable way may make difference for any context.

Often IS scholars study very narrow issues and do not see IS phenomena within a wider context[1]. And the transforming our research agendas and clearly explaining the broad value of our research discoveries [1] may provide one way to solve the IS identity crisis.

We need innovativeness in every aspects of systems. Is there a way to extend Information System research legacies to relatively new areas of "Knowledge System, and e-Business System"? we address the historical nature of IS to keep the research legacy meaningful to new era of e-business. With historical perspective, we propose the 'discrete continuity' and historical dimensions of IS research to e-business system. Different species of systems may not have homologous characteristics(that is why, we call it "discontinuous")

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