Critical Evaluation of a research paper: Implementing a Client/Server System in Korean Organizations

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***Abstract*- a paper study of Client/Server systems as they apply to innovation is reviewed. The reviewer discusses how that innovation is described. That is innovation can be a process or an object. When the innovation is applied to a computer network a study reveals that the outcomes of such a study are difficult to interpret.**

***Index terms* - Client/server, information technology, innovation, IT implementation.**

I. CONCEPTS

THE evaluated paper [5] described the success of the system in terms of the level of satisfaction at various levels and types of innovation. The authors felt that for a firm to innovate you first innovate the Information Technology System. Here they call an IT system an innovation object. That is, a system which allows the users to innovate.

To use an IT system as an innovation object you first must define innovation as it applies to the IT system. The two descriptions of innovation preferred by the author are object and process forms of innovation. In an organization, we define innovation as three different forms.

1) *Organizational Innovation:* Any innovation that results in organization change(s). The concept of radical Vs incremental change is used commonly to describe the level of organizational change.

2) *IT Innovation* is described as "innovation in the organizational application of the digital computer and communication technologies

3) *Interrelated Innovation:* The concept of interrelated Innovation is often defined as a "technology cluster" which consists of one or more distinguishable elements of technology that are perceived as being interrelated.

The innovation process model in organizations is sometimes defined as the process of initiation, adoption, and implementation. Others using similar thoughts but different words defined it as adoption and diffusion.

Push-pull is the most common theory describing the influencing factors on the innovation process. The push pull theory proposes that upper management controls the usage of slack resources, and the slack resources themselves work to pull the product into the company. This is a description of one of the innovation causal factors

The pace of innovation can be gradual Vs rapid, or in other words evolutionary Vs revolutionary. The evolutionary pace is a gradual staged approach. While the revolutionary pace is all at once step. These definitions describe the options that companies have when implementing the IT system.

The client server system is a type of information system in which the C/S model and technologies are implemented as a limited or special form of distributed processing system. The "client/server model" is a mode of computing where an information-processing role is allocated between IS service customers (clients) and IS service providers (servers). A Client/Server system is defined as a system, hardware, and/or software that is based on the client/server model. It could include server computer(s), intelligent personal computers (PC's), and a local-area network as the core components. In addition, network management software, C/S data base management system, and C/S application development tools.

IT Innovation is defined in this paper as "the overall process of initiation, adoption, and implementation of new information technology to improve organizational performance." Their innovation was defined in terms of the range of the innovation that is how wide a range and the rate of the innovation [5].

II. METHODOLOGY

The methodology is a Case Selection technique that is based on the conceptual framework of IT. A case study approach was used to investigate the given research questions and related propositions. A case study approach can better explain "how" and "why" questions for a multiple innovation study due to its conceptual comprehension. While the factor approach studies resulted in inconsistent conclusions and therefore were not used [5].

His study followed these constraints:

1) *Innovation:* this study focused on the process of IT innovation and its two dimensions: scope of innovation and pace of implementation.

2) *Data Collection:* They collected retrospective data and interviewed various employees. Then to provide multiple sources of evidence, the triangle approach was used for collecting valid data.

3) *Level of Analysis:* The level of analysis in MIS research for IT not being used rigorously. In their study, the level of analysis was the organization and its sub units, such as the IS department.

III. CONTRIBUTIONS TO THE LITERATURE

Engineering managers always hope to find a paper that could make a bench mark leap into the Client/Server management issue [1]. It is a crucial issue that is very relevant to today's needs. Client server systems are the backbone of many companies engineering, finance and manufacturing. This paper shows how innovating with an IT system can strongly affect company development.

The paper examined the effects of the contextual factors on the implementation of the client/server system as an interrelated IT innovation. They clarified the concept of IT innovation by distinguishing between IT innovation object and IT innovation process and then they provide the conceptual framework of the innovation process. They develop four types of IT innovation implementations which were classified according to the depth and scope of the implementation.

My study of the literature showed that there are many IT system studies available. [2], [5], [6] Not many papers go to the depths of literature studies that this one does. Not many papers base the study on as many references as this one does. Its research is thorough but the study phase and conclusion phase seem rushed and lacking real substance. The authors needed to do further study to substantiate their claims.

IV. HOW DOES THE PAPER COMPARE WITH OTHER RESEARCH PUBLICATIONS IN THE FIELD?

A.) What have other researchers found that are related to this research? F. Damanpour, in his article "Organizational innovation: A meta-analysis of effects of determinants and moderators " Stated that as information technologies are getting more complex, diverse, and interrelated, the focus of IT innovation research is changing from a single innovation to a set of interrelated innovations. This thought is a basis for the research that is done in this paper.

T.H. Lee [6] in "Adopting interrelated innovations: Understanding the deployment of CASE (computer-aided software engineering) technology in information systems organizations," Pointed out that the effects of interrelated innovations is not clear, and that the process of interrelated innovations is rarely studied. [6] Interrelated IT innovation objects that drive the related organizational innovations has rarely been studied. Interrelated IT innovation objects that drive the related organizational innovations include multimedia networks, client/server systems, computer-aided software engineering technologies, etc. Such technologies are inherently very complex and radical in terms of their overall impact of organizational change.

B. This article agreed with the [2] Damanpour article that the IT technology research must be performed on a multidimensional level in order to adequately describe the innovation process. It also agreed with T.H. Lee that the innovations on a multidimensional level are inherently complex and difficult to study. The authors went beyond that to describe a model that shows the levels of innovation in multiple dimensions. The authors describe Damanpour's total economic summing due to the summing of multiple IT parameters. These effects were economically much stronger than for singular causes of innovation. Damanpour also showed that the interrelated innovations were quite complex and difficult to study. But they were much more like real life and therefore were of much more value.

C. This paper differs from other researchers work because they not only talk about complex innovation but they model it and categorize it into useful though simplistic categories [6]. From these simplistic innovation categories they are able to make conclusions on what level of innovation is best for what type of organization. So that organizations can decide at what rate and what level to install an IT system to get the least painful insertion of this Innovation Technology. The rates of addition of and IT system are evolutionary or revolutionary. That is adding it slowly or quickly. The levels are partial or full implementation of the IT system into the company.

V. WHAT ARE THE STRENGTHS AND WEAKNESSES OF THE PAPER IN TERMS OF CONCEPTS METHODOLOGY AND RESULTS?

The authors concepts are simple, broad and easy to understand. The easy concepts can be quickly understood, but the concepts are too broad and, therefore, cannot be proven. In the study, many users felt that the company purchased IT system was completely incompatible, unfortunately, the broadness of proposition did not allow an adequate description of why it was completely incompatible.

The authors propositions were such broad claims that even the authors felt that their own propositions could not be validated by their study. For example *Proposition 2:* "Relative advantage is likely to be the major influencing factor when IT innovation is implemented with an enterprise-wide scope" Then in their own words from the conclusion "While the findings from the case studies may not statistically prove or disprove the given propositions, we were able to understand the diverse organizational contexts and outcome of the C/S system implementation process." The propositions were so broad that it was difficult to make any conclusion that any corporate improvement were due to the corporate addition of an IT system.

His interview methodology had one notable strength and one notable weakness. First it was based on the interview method with triangulating sources. That is, they interview not only IT managers but also users of the IT systems, and the company officers. The interview method can of course be a good way to get an overall view but it also can be misleading when the interviewees know that their managers may hear what they feel. Thus, the Koreans may not say anything bad about their

company even in private. To counteract that tendency the authors interviewed a number of different people in each organization to provide privacy for each interviewee. The weakness is that they used a number scale of 1 - 5 which does not allow for better resolution. They do one clever thing with the numbers. On their scale of one to five sometimes 5 is good and sometimes 5 is bad. This keeps the responder from treating the numerical estimates lightly.

VI. CONCLUSIONS

"The paper clarified the concept of IT innovation by distinguishing the concept of IT innovation object from the IT innovation process." The conclusion seems inconsistent with the majority of the discussion of the paper. The discussion of these concepts in the paper is both very short and sketchy. Therefore, the authors conclusion is not justified and seems to be an attempt to give the paper a depth that it does not have.

"With the theoretical framework for the IT innovation process, multiple case studies suggest that there may be no single best way in the IT innovation implementation. The results of this study seem to support the contingent choice view of the implementation pace for radical IT innovation " The author's own data shows that this conclusion is not justified. His own data shows that two of three companies that did radical IT innovation felt that the IT system was completely incompatible. The authors needed to support the other side that evolutionary innovation was the preferred choice. That conclusion was the only one that supports their data.

It is clear that their study was inadequate. Analyzing only four companies did not give an adequate data base. There are many other factors that cause IT systems to succeed or fail. To eliminate other factors one needs a very large study which tends to give a clearer picture of whether the IT system helps or hurts.

VII. STUDY OF REFERENCES

The authors have 43 references. At first glance it seems adequate, but if other papers also have vague, false and erroneous conclusions like this paper, then how correct can this paper be? The first test, of course, "are the conclusions intuitively correct." The authors conclusions don't seem to be correct or well proven. Who is wrong, the authors or the references? A quick check of selected reference show that generally the author makes good selection and summation of the references, the problem is in the authors own study, and not his selection or interpretation of the references.

The authors who should be included would be ones that tend to support his study. I saw nothing in his references that tends to support his conclusions [1], [2], [3], [5], [6].

A later paper that is quite relevant is "Alignment of a Firm's Competitive Strategy and Information Technology Management Sophistication: The Missing Link: by Gupta et al. These authors do a broad and complete survey in a more reasonable approach. They defined the categories in which an information system is used, and in what kind of company it is used. That is a revolutionary or evolutionary company. If this paper had been used as a reference would have given credibility and a broader logical base to the authors study and conclusions.

VII. FUTURE RESEARCH

A research team decided to see what effect that aligning new information technologies would have on companies strategies. It is apparent that the closer the hard and software is to the needs of the people the more competitive the company will be. But what effect does faster and more powerful data processing rates have on the companies competitiveness. It is also well know that a companie's technology will be its competitive edge. So the future area of research is how will computers greater speed affect the companies technology, and how will that in tern affect the companies competitive strength [3].

Recently at Celwave we made a technology breakthrough that has caused an enormous growth in our sales. The technology breakthrough was made through the use of high speed computing that found we could use a simple device as an amplifier. Non linear computer simulation made it clear what it would do in terms of performance. Additional simulation has estimated how much additional sales there will be [3].

It is very clear that there is a big gap in simulation capabilities of what affect the technology strength is to what the affect there is on company's strength. Therefore, it appears that further research on the Gupta area of study, that is of combining the competitive strategy and the information technology system than in the Client/server arena [4].

REFERENCES

[1] R. Agarwal, "Assimilating Information Technology Innovations: Strategies and Moderation Influences," *IEEE Transactions on Engineering Management.*, vol. 44, No. 4, pp. 347 - 358 November 1997.

[2] F. Damanpour, "Organizational innovation: A meta-analysis of effects of determinants and moderators," *Acad. Manage. J.*, vol. 32, no. 3, pp. 555-590, 1991.

[3] A. Elazami, "Emerging fast IT technology will change how companies are managed: get on board or get run over," *EM 520 PSU course paper*.

[4] Y. Gupta, "Alignment of a Firm's Competitive Strategy and Information Technology Management Sophistication: The

Missing Link," *IEEE Transactions on Engineering Management.*, vol. 44, No. 4, pp. 399 - 412 November 1997.

[5] G.H. Lee, "Implementing a Client/Server System in Korean Organizations: Interrelated IT Innovations Perspective," *IEEE Transactions on Engineering Management.*, vol. 45, No. 3, pp. 287 - 295 August 1998.

[6] T.H. Lee, "Adopting interrelated innovations: Understanding the deployment of CASE (Computer-aided software engineering) technology in information systems organizations," Ph.D. dissertation, University of Pittsburgh, Pittsburgh, PA, June 1996.

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