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## Innovation of a design method (MoIST) that incorporates non-traditional 'soft' systems science into traditional 'hard' information systems design

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### Abstract

The research explores ways of making the information systems development process more effective. The thesis documents an original design method. This is the method of incorporating Systems thinking into Information Systems Design (MoIST). The thesis demonstrates that MoIST improves information systems design and adds to the effective arsenal of methods that already exist.

The Computer Science literature has identified some weaknesses in the software development methodologies. These weaknesses include premature design decisions taken before major requirements are known. Another is the dearth of options for applying Systems Science and information systems design techniques in a UMLbased context. It was found that these weaknesses sometimes resulted in software failures. These findings have been confirmed in the empirical and the evaluation portion of the research.

The essence of the thesis is that appropriate software development strategies may be chosen at various points in a project. The choice of strategy is based upon the value of particular factors. These factors include confidence in requirements, development environment structuredness, user types and developer types.

In order to achieve the research aims, the MoIST is utilised to preserve the methodological strengths of the hard systems engineering paradigm. It simultaneously attempts to minimise its weaknesses by combining it with a systems science approach called Soft Systems Methodology (SSM). The research incorporates this non-traditional 'soft' Systems Thinking into traditional 'hard' Information Systems Design. The two main contributions of the thesis are the transformation of SSM conceptual models into UML use case diagrams and activity diagrams. Another is the creation of MoIST Project Option Selection Tool (MoPros). This MoIST method has been tested empirically by utilising it in a complex, unstructured setting in a School of Computing and Engineering. Based on the theoretical and practical work conducted, it is concluded that the MoIST method is effective in several ways. It provides coherence and structure to complex software projects and can help to facilitate decisions about improvement strategies. It also successfully incorporates the results of SSM analysis into requirement specification based on the UML. The MoIST method is offered as a viable option to add to the existing development alternatives for successful software development.

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	<p>Ackoff, RL, 1998, A Systemic View of Transformational Leadership, Systemic Practice and Action Research, Vol. 11, No. 1, 1998 Abdel-Hamid, T. K., and S. E. Madnick. 1990. The Elusive Silver Lining: How We Fail to Learn from Software Development Failures. Sloan Management Review 32(1): 39- 48. Ambler, S.W. (2002) Agile Modeling: Effective Practices for Extreme Programming and the Unified Process. 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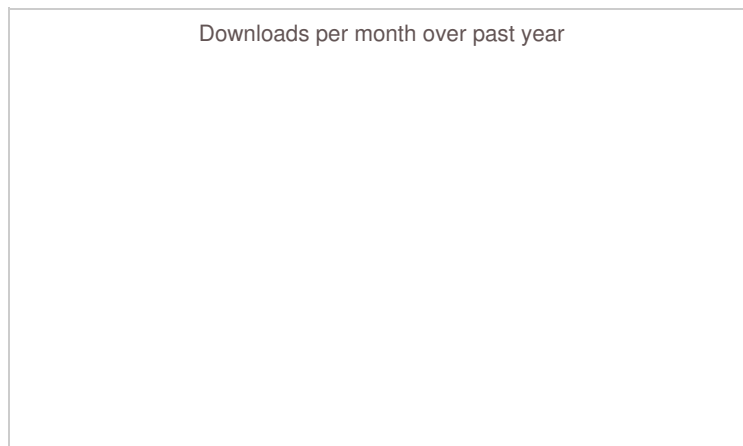
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because it makes sense for disruptors to invest heavily in growth. Process innovation generally refers to the implementation of a new or significantly improved production or delivery method. It may also be indirectly related to the company's products and services, for example in the form of support function processes in HR or finance. For design decision making, listening to the voice of the customer (VOC) can gain the relevant information about matters which should be improved to increase customer satisfaction [5]. Zhang and Von Dran [6] developed a Web site quality model by applying the Kano quality model to a single type of Web site. They find that users of a Web site distinguish three types of quality factors corresponding to their quality expectations; the quality nature of the factors may change over time and the same factor may have different quality identifications in different domains. Lai et al. [7] proposed a robust design method to improve quality perception by reducing the gap between the actual customer feeling and what they desired. This paper presents an innovative Soft Design Science Methodology for improving information systems security using multi-layered security approach. The study applied Soft Design Science Methodology to address the problematic situation on how information systems security can be improved. In addition, Soft Design Science Methodology was compounded with mixed research methodology. This holistic approach helped for research methodology triangulation. In this study, Soft Design Science Methodology was employed in the design and development of a framework for enhancing information systems security. Soft Design Science Methodology was employed in the creation of this artifact.