APPLYING DESIGN THINKING INTO INFORMATION SYSTEMS DESIGN

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Extended Abstract

Design Thinking is a concept that applied in both theory and practice. There are two distinct discourses on design thinking works, one can be found in design-based scholarly literature and another one can be accessed in management and business applications (Johansson & Woodilla, 2010; Johansson-Skoldberg et. al, 2013). The first discourse is called 'designerly thinking', which refers to "the academic construction of the designer's practice (practical skills and competence) and theoretical reflections around how to professional interpret and characterize this non-verbal competence of the designers" (Johansson-Skoldberg et. al, 2013, p. 123). The other discourse is called 'design thinking', which refers to "…design practice and competence are used beyond the design context (including art and architecture), for and with people without a scholarly background in design, particularly in management" (Johansson-Skoldberg et. al, 2013, p. 123).

Designerly thinking can be further categorized in five detailed sub-courses, based on theoretical contributions made by scholars before. They are: (1) Simon (1969) described design and designerly thinking as the creation of artifacts; (2) Schon,(1983) described design and designerly thinking as a reflexive practice; (3) Buchanan (1992) based on Rittel and Webber (1973), described design and designerly thinking as a problem-solving activity; (4) Lawson (2006 [1980]) and Cross (2006, 2011) described design and designerly thinking as a way of reasoning or making sense of things; and (5) Krippendorff (2006) described design and designerly thinking as creation of meaning. (Johansson-Skoldberg et. al, 2013).

Similarly, the design thinking discourse can be further divided into three sub-discourses, based on the management applications in the practice. They are: (1) Kelley (2001, 2005) and Brown (2008, 2009) described design thinking as design company IDEO's way of working with design and innovation; (2) Dunne & Martin, (2006) and Martin (2009) described design thinking as a way to approach indeterminate organizational problems, and it is a necessary skill for practicing managers; and (3) Boland & Collopy (2004) described design thinking as part of management theory (Johansson-Skoldberg et. al, 2013). This paper focuses on this management based, or design thinking discourse.

Brown (2008) is a known practitioner of design thinking methodology. His company, IDEO, promotes and utilizes the idea of design thinking to all corporate projects. IDEO's website displays their core approach as:

> "*Design thinking is a human-centered approach to innovation that draws from the designer's toolkit to integrate the needs of people, the possibilities of technology, and the requirements for business success.*" (IDEO, 2016)

Design thinking is a methodology that has been used in product design, branding design, service design (IDEO, 2016; Lockwood, 2010) and other areas such as information systems design (Vetterli et al., 2016). Based on these studies, it shown that design thinking methodology can be used to generate new and innovative products and systems.

IDEO (2016) described the design thinking process as a system of overlapping spaces rather than a sequence of steps. Design thinking methodology is "scalable and can be applied incrementally to improve existing ideas or it can be applied radically to create disruptive solutions that meet the needs of people in entirely new ways" (Brown, 2016). Design thinking methodology can integrate technologies, innovative thinking, design process, and available

resources into human's desire to build up a new and innovative product. Design thinking is a deeply human process that taps into abilities we all have but get overlooked by more conventional problem-solving practices. It relies on our ability to be intuitive, to recognize patterns, to construct ideas that are emotionally meaningful as well as functional, and to express ourselves through means beyond words or symbols.

Design thinking method has been applied to areas such as strategy setting, product design, organization design, and social innovation and entrepreneurship system design. Design thinking approach has also been applied to organization such as IDEO (Brown 2008, 2009; Kelley 2001), HP (Sato et al., 2010), IBM (Clark & Smith, 2008), SAP AG (Holloway, 2009) and 3M (Porcini, 2009). Most organizations mentioned above applied design thinking into their organizational design process. However, specific applications to information system design was rare.

Information systems (IS) design is an important stage in systems design life cycle (SDLC). During this process, information systems project team needs to identify the needed components in an information system and the final goal of this process is to create an ideal and innovative software for users and business needs. The design process is to build an information system, includes the work of configuring hardware, operating system, programming languages, and designing of user interfaces, system interfaces, and security.

A variety of IS design processes or methodologies have been used in the IT industry, they are structured (waterfall) design, prototyping, iterative, spiral model, rapid application development (RAD), agile development methods, modeling, and object-oriented development. Some of these methods are related to design thinking approach, in there a few concept or

approach might be overlapping to each other. This paper will compare the similarities among these IS design methods and processes.

This paper will introduce an innovative information systems design process through adopting design thinking method. Specific stages of this innovative IS design process are identified and illustrated.

This paper will conduct a case analysis to illustrate an innovative IS design project based on design thinking method. This case analysis will be used to analyze the cost and benefit of applying such new design approach in information systems project.

A conclusion section will be provided at the end of this paper.

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