Synthesizing a Soft System Methodology Use in Information Systems Research Field: A Systematic Review

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Abstract—A systematic review is practically necessitated to understand a whole view of the research. It is a type of research that is previously able to be done before conducting a main research activity. The purpose of this paper is to investigate soft system methodology (SSM) use in the research field of information systems (IS). The method systematic review was operated in this study, particularly to systematically review numerous papers. Four simple main stages were performed here; review identifying, previous article screening, further articles screening, and articles evaluation. The results of the study show the precise position of SSM use in research related to IS field.

Keywords—soft system methodology, systematic review, information systems, articles screening, articles evaluation

I. INTRODUCTION

In conducting the studies, understanding a research comprehensively is one condition that has to be satisfied by researchers. A systematic review is one of efforts to fulfil. It is a method associating to a literature review that is related to the question should be answered by investigators. It is realistically done by identifying, selecting, and assessing the relevant research literatures being focused to be discussed [1].

Numerous systematic reviews have been previously conducted by researchers in many research fields. In health care field, where systematic review activity was introduced firstly, [2] conducted a systematic review and meta-analyzes by changing the guidance QUORUM to PRISMA statement. The PRISMA itself consists of 27-items checklist and four stages (i.e. identification, screening, eligibility, and included). The review result was structurally delivered in explanatory document. In addition, to identify features of clinical decision support systems (CDSS) in clinical practice improving purpose, [3] performed a systematic review. Here, seventy studies were included. It concluded that CDSS is expressively able to practically enhance the quality of clinical system. Also [4], they conducted a systematic review to assess a current understanding of multiple sclerosis for information regarding disease-modifying drugs (DMDs) provided during the standard healthcare system. The study results said that many patients

does not provide satisfactory understanding of risks and benefits of DMDs.

In particularly nurse studies field, [5] identified 825 studies in the selected database for systematic review. It was conducted to offer a synthesis and overview of empirical research comparing the quality of working life of professional care workers between small-scale and large-scale nursing homes. The study determined that, in the nursing home sector, the small-scale homes are a good starting point for creating a higher quality of working life. Moreover, [6] did a systematic review to identify validated instruments evaluating the clinical learning environment, evaluate the methodological quality of the psychometric property estimation used, and compare psychometric properties across the instrument available. It decided that the instruments evaluating the quality of the settings are recommended deeply. [7] made a review about review (review of reviews) to appraise the impact of simulation-based education in nursing students. They acquired the review sources coming from 2010 – 2015 (with twenty five systematic reviews). The review concluded that the students are satisfied to the implementation of simulation-based education and there is an improvement in critical thinking practically.

On the other hand, regarding soft system methodology (SSM), it theoretically is a technique used to solve complex and unclear problems. Its complexity and ambiguity commonly occur as it is associated with human characteristics. According to [8], SSM is appropriate to solve a wicked problem. This method can also be used with multi-discipline by mapping the overall problem. This statement is similarly mentioned by [9]. Primarily, SSM was mentioned in 1981 by [10]; where ideally, it consists of seven stages: define the situation that is problematic, express the situation (e.g. top mapping, rich picture, etc.) possible, select concepts that may be relevant iteration, assemble concepts into an intellectual structure, use this structure to explore the situation, define changes to the situation (i.e. problems to be tackled), and implement change processes [11].

SSM is currently operated in several cases and a lot of studies. Thus, this paper intends to theoretically create a systematic review for specific purpose. It is to determine the SSM use in anything; particularly, it will be realized to answer research problems in the field IS. The introduction section of the paper is followed sections research methodology, results of review, and conclusion and further works.

II. RESEARCH METHODOLOGY

Mainly, the stages of systematic review in this study are adopted from [3]. It is combined with [12] then. The review activities are sequentially delivered in Fig. 1, where it consists of review identifying, previous articles screening, further articles screening, and articles evaluation. Here the single investigator is clearly configures as an actor of the research.

Fig. 1. Research stages

A. Initiation and Identification of Review

This study aims to answer the research problem “as a main method, is SSM employed in IS research field?” The research problem is used to obviously direct the researcher in conducting a systematic review. It is done by firstly selecting the definitive literature journal that is possibly able to be used.

B. Data Sources for Selection

The literature data based used in this study is “Science Direct”. Its website is on www.sciencedirect.com, where the search data is achieved only on 23th January 2017. The term used here consisting of three words, “soft system methodology”, with lowercase letter for each word. The fields (of database) considered in searching are relating to three types of field; abstract, title, and keywords. Precisely the search is refined only for journal and book, and it is realized for all obtainable years (1984-2017). This search process is considered as a process of previous articles screening.

Selecting several articles based on criteria (e.g. type of specific journal) is done then. The criteria is categorized as inclusion and exclusion criteria [3]. We assigned it as step further articles screening (see Fig. 1).

III. RESULTS OF REVIEW

Based on a simple statistical view, the result of term “soft system methodology” searching through fields abstract, title, and keywords was 93 papers and books, with 89 papers and 4 books composition. The articles were classified in 33 years (1984 – 2017). They were described through the graphical view in Fig. 2. The chart describes that there is one article as a paper candidate in 2017, while the highest number was resulted in 2012, 8 articles.

Fig. 2. The number of articles by year

For next articles screening, five criteria used to select. The five criteria were determined based on journal name (see Table 1), where they are International Journal of Information Management, Information Processing and Management, Information and Software Technology, Information System, and The Journal of Strategic Information System.

TABLE I. BASED ARTICLE NUMBER ON FIVE SELECTED JOURNAL

No.	Journal Name	Number
1.	International Journal of Information Management	3
2.	Information Processing & Management	1
3.	Information and Software Technology	1
4.	Information System	1
5.	The Journal of Strategic Information System	1

Finally, “soft system methodology” was found in seven articles from 1989 to 1996. Mostly, the articles talked regarding SSM in purpose of IS development. Based on seven types of article, specific research area that where SSM was used as main method was determined. [13] envisaged that a recognition of information system designer (as an agent of organizational change) to become information engineer (as an addition role) in requirement analysis stage of IS design that has to deal with the complex situations of organizational context. Here, [13] operated SSM as a method to reasonably tackle such recognition.

In 1991, one article was found. At this point, [14] outlined SSM use in a course of systems analysis and design (at the University of Sheffield). In the course, SSM combined with structured systems analysis and design method (SSADM) in developing a system. The combination is supported by the computer assisted systems engineering (CASE) tool Excelerator and the rational database management systems R:Base.

In 1993, two articles were successfully discovered. The first, [15] concluded that in tackling complex problem situations (specifically in creating an activity model of relevant systems), where SSM is used as a main method, cognitive categories should be identified clearly. Those categories are possibly detected from the definition of the system. The identification may be regarded as the first step of data analysis. The second one is [16]. [16] reviewed book [17]. Can be summarized that information is as a key aspect of information management, where this management will be operated as an active learning process in computer based technology. SSM can be used to show the process of information management technically. Where it can be benefitted to manage learning and change. The book also talks about modeling human activity systems.

Furthermore, [18] learnt regarding a flexible and extensible methodological framework (as an eclectic methodology) for business process redesign (BPR). Such methodology has been strongly influenced by most notably SSM. The BPR itself necessitates management change in several aspect; e.g. politic, culture, information technology, etc. Also, [19] pointed out the importance of IS development via analyzing eight IS development approach; one of them studied is SSM. Be concluded here that SSM is grouped into newer approaches in IS development. SSM frequently emphasizes the social nature of IS and seems to stress the inter subjective nature of information requirements as well, exclusively in the case of information requirement.

IV. CONCLUSION AND FURTHER WORKS

There are 93 articles found in activity of previous screening. Through the further screening, by selecting the journal types into five categories, seven final selected articles were lastly determined. Thus, the detailed review of each article was conducted to answer the purpose of study (to observe the SSM use in IS research field). Mostly, the researcher operated SSM in the purpose for constructing IS, particularly in information requiring and data analyzing.

The result of journal article screening is scientifically influenced by several aspects: review (study) purpose, searching time, and type of literature database. Where, the literature database is also can be classified in more detail into year type, type of literature (used to define book and journal), and type of journal (or journal). All correlations can be configured by Fig. 3. The figure shows the interconnections among entities involved in activity of review that consisting of: Review, ReviewPurpose, SearchingTime, LiteratureDatabase, Year, Literature, Book, and Journal.

The use of more than one literature database will strengthen the study. It will give more articles to be reviewed that will answer the study purpose more accurately. Also, the methodical justification will be fruitful to select the type of literature (journal in this case). As the strong scientific reason is academically required to do so.

Fig. 3. The configuration of interconnected entities in systematic review study

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