CHAPTER III

RESEARCH METHODOLOGY

This chapter will explain the steps applied in conducting the research. Locating studies also study selection and evaluation which have been explained in Chapter II will be repeated briefly in this chapter.

3.1 Locating Studies and Selection

Relevant literatures in the research are found by using electronic database which is Elsevier (sciencedirect.com. Researches about expert system, fuzzy logic, and artificial neural network applications are searched from the last five years, research articles that were published from 2015-2019. This research only focuses on research articles that discuss about expert system, fuzzy logic and artificial neural network applications from five years ago.

In terms of search strings, the keywords that used in this research are (expert system), (fuzzy logic) and (artificial neural network), then combined with the keyword on each application, service and manufacturing industry. Manual checks were performed based on the abstract on the papers to avoid inappropriate research articles, which will remove the research articles that are not addressed the topic of expert system, fuzzy logic

and artificial neural network applications on each category that were outside of the scope. This research also only uses the research articles that published in academic journals and proceeding of international conferences because they are the most useful and reliable for literature review (Saunders et al., 2012). A final sample of 55 research articles based on criteria in this research were identified.

3.2 Conceptual Model

This section will explain the steps to conduct systematic literature review and also the tools used are shown in figure below.
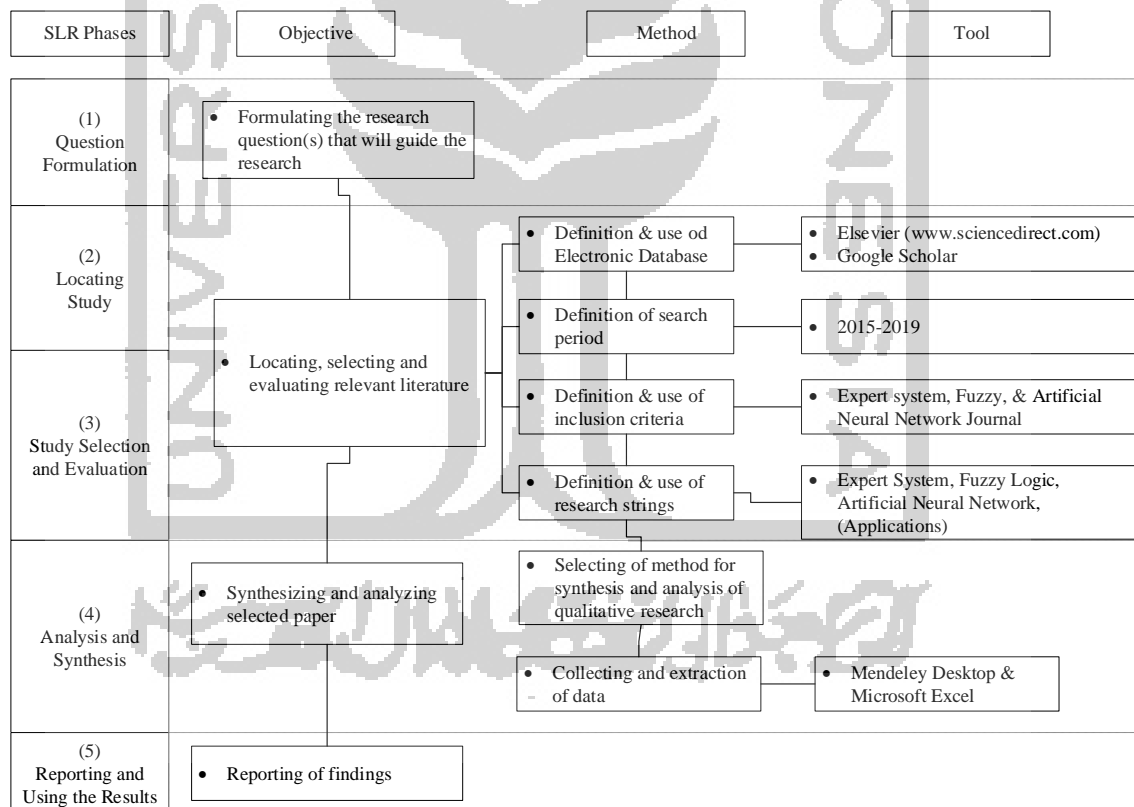

Figure 3. 1 Step, method and tools for Systematic Literature Review

Figure above shows the steps to conduct systematic literature review, objective and the methods or steps for locating, selecting and evaluating relevant literature. It shows the electronic database, the publishing year of the research article, the search strings, and

the tools or software used to carry out this research. The five steps are explained as follows:

1.   Question Formulation

Question formulation step is used to define chapter introduction, background, problem formulation, research objective, research limitation and research benefit. It will guide the research about expert system, fuzzy logic and artificial neural network applications.

2.   Locating Study

Choose of the electronic database which is Elsevier (www.sciencedirect.com) to find the research articles and the search period is 2015 until 2019.

3.   Study selection and evaluation

This phase will define inclusion criteria and search strings. Search strings included are, the research article used are only the published academic journals and proceedings of international conferences with refer to expert system, fuzzy logic and artificial neural network applications.

4.   Analysis and synthesis

This phase will analyse and synthesize the selected research articles. The research articles will be synthesized into expert system application, fuzzy logic application, artificial neural network application, publication journal and publication year. It will also determine each application of expert system, fuzzy logic and artificial neural network.

5.   Reporting and using the report for further research

This phase will report the analysis and use for further research.

3.3 Tools Analysis

This research uses several tools in order to conduct the study synthesis and analysis, which are mentioned as follows:

1.   Microsoft Excel

        This tool is used for the synthesis of data and research. The formula used is basic
        formula to sum and make graphics, diagram and also chart that has been provided
        by this software.

2.   Mendeley Desktop

        The tool is used to collect and arrange research articles, then select and analyse
        these research articles, it also helps to create the references and citations.

3.4 Flow of Research

The flow of research will be shows in figure 3.2 below, it shows all steps in conducting
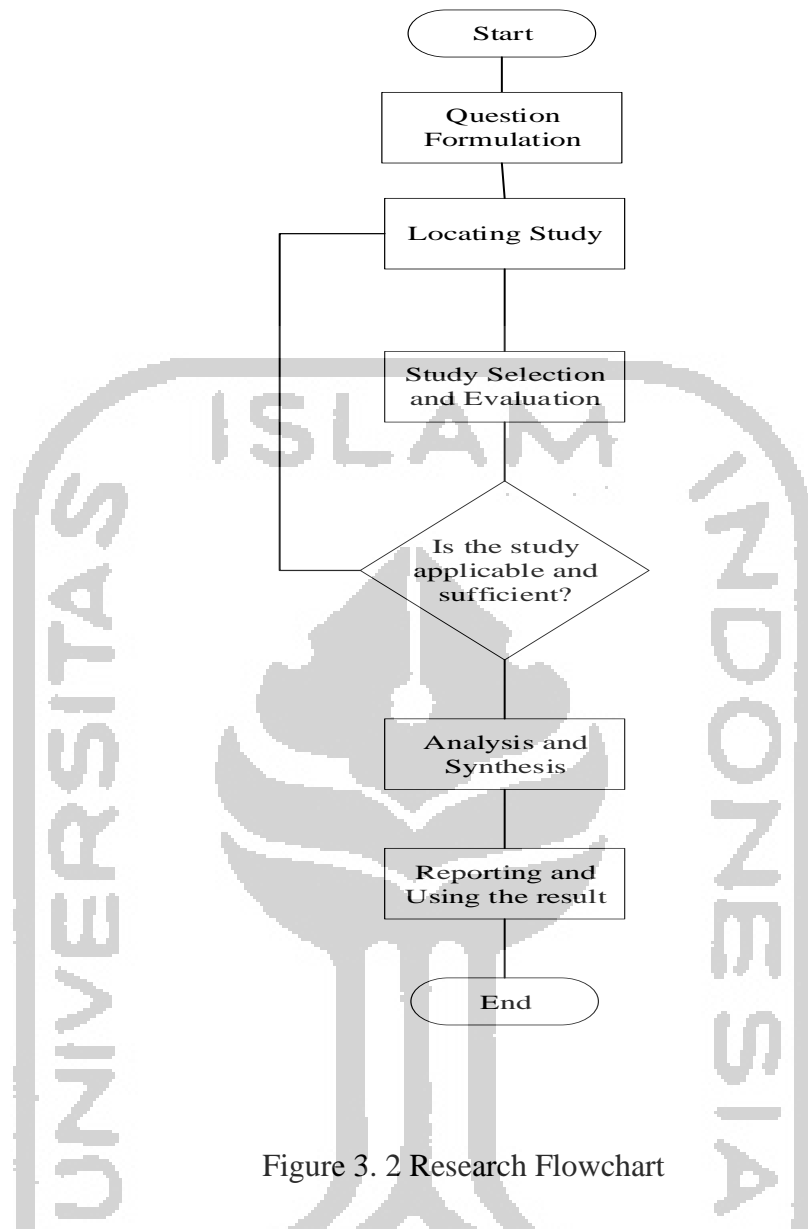systematic literature review on this research.

Figure 3. 2 Research Flowchart

The research starts from problem from question formulation to know the objective of the research. Then, there will be locating study, study selection and evaluation to find related studies with the topic addressed. The related studies will be analysed and synthesized to obtain the objective of the research. The result report with be obtained and can also be used for the further research.