CHAPTER 3
RESEARCH METHODOLOGY

3.1. Current Research

The research of Information System Success Model Evaluation on Manually Organized (Cluster 2) Small Scale Medium Enterprises (SMEs) at Yogyakarta is a testing out research which improve the model of Sinaga et.al (2015) which were using ISM methodology that resulted four clusters of information system success model (Manually Unorganized, Manually Organized, Semi Computerized, and Computerized) without weighted impact of the criteria while this research results the interplay and weighted impact of the criteria. In addition, the researches of Putra (2015), Putri (2015), Wulandari (2015), and Kusferyano (2015) were conducted in several SMEs based on particular basic raw material while Putra (2015) in wood industry; Putri (2015) in pottery industry; Wulandari (2015) in leather industry; and Kusferyano (2015) in metal industry. Therefore, this research selects one cluster which is Cluster 2 (Manually Organized Information System) by selecting four SMEs of various basic raw material industry to be studied.

3.2. Research Methodology

This research requires several stages to identify information system success correlations and evaluate information technology needs. There are two general stages which are preparation stage and exploratory survey. The research methodology flowchart is shown in Figure 3.1.

3.2.1. Preparation Phase

There are several stages in the preparation phase which are

a. Literature Review

   Do a literature review to find the appropriate reference to the theoretical model of information system success;

b. Literature Review Mapping

   This step is done to find a gap in previous researches to check this research authenticity can be conducted. After mapping, it is known that the enterprises information system success model by Gable, et al. has been studied for SMEs by Sinaga et al. (2015), using ISM method which is used to identify the relationship among criteria and the dominant criteria with a structural level. A research by Sinaga et al. (2015) resulted four clusters of

information system success model in SMEs. So that, there is a lack of systematic evaluation to measure information system technology success specifically on interrelation among criteria and weighted impact with dependence factors and feedback.

3.2.2. Exploratory Survey Phase

This Exploratory Survey phase is an important phase to construct a model for success information systems in SMEs. Here are the stages of exploratory survey:

a. DEMATEL Questionnaire Preparation

   Making a questionnaire to identify the existing information system criteria in SMEs and also identify the impact among the criteria by pairwise comparison according to what the respondent perceived. Once the research gaps and methods have been decided, DEMATEL questionnaire can be developed by describing all of the criteria based on Gable's information system model as the first step. Secondly, design questions to identify whether each criterion has influence or not in the industry. Thirdly, question for each criterion are paired off to identify correlation between them with 0-4 scoring range which denotes no impact, low impact, medium impact, high impact, and extremely high impact respectively. Later on, this questionnaire will guide the interview process. The results of the questionnaire can be found in Appendix 1.

a. Research Object Survey and Identification

   Find the research objects which are handcraft SMEs in Yogyakarta. Researcher visit 13 SMEs however 4 of them already use computer, 3 of them has no business recapitulation, and the remaining 6 SMEs use manual information system.

b. Research Object Selection

   Based on survey identification, two manual information system SMEs are objected to be interviewed, observed, and answer the questionnaires. So that, four handcraft SMEs which currently apply manual information system are selected which are Yoni Arts, Budenx Art Stone, Warung Perak, and Kartika while their figures are shown in Appendix 2. Moreover, these four SMEs record the information in form of paper and also logbooks.

c. Interview and Observation for DEMATEL

   After obtaining the questionnaire based on information system success model criteria from literatures, the data is collecting by interviewing,

observing, and giving questionnaire to four SMEs which manually organize information system with various basic material used. The interview and observation processes are asking whether any influence of the criteria in the enterprise and how the impact among them by pairwise comparison according to what the respondent perceived. The respondent from each SME is the owner who responsible and manage the entire information, because none of the employees manage the information such marketing and finance. Perform analysis and scoring during the interviews. Observation covers the documents used in the process of their information systems by taking some photos as documentation that can be seen in Appendix 3 as well as interview processes are recorded in Appendix 4. Moreover, the answers of questionnaire are shown in Appendix 5.

d. Decision Making Trial and Evaluation Laboratory (DEMATEL)

Based on criteria of information system success model evaluation as stated above, this study further employed the DEMATEL methodology to indicate the complex relationship and identify the significant information success model evaluation perspectives and criteria.

i. Original Mean Impact Matrix (A)

Generate an original mean impact matrix based on interview and observation result which is a score ranged from 0 to 4. Because the interview and observation are conducted in four different SMEs, so that the perceived criteria impact may vary depends on each enterprise experience and situation. The original impact matrix can be obtained by averaging the summation of the expert answer matrices (original impact matrix) in Appendix 6.

ii. Direct Impact Matrix (M)

Calculate the direct matrix to find priority ranking of the direct impact matrix among criteria.

iii. Total Impact Matrix (T)

Total impact matrix is calculated in order to determine and judge the correlation among the criteria using a threshold value.

iv. Structural Correlation Analysis

Analyze the impact relations of the value of (D－R) and the value (D+R) from Matrix T by diagram to obtain the structural correlation impact.

e. Build Analytical Network Process (ANP) Model

Determine the goal, criteria, and alternatives are the most important step in this stage. Furthermore, DEMATEL results criteria correlations in which as reference to construct the relation among ANP network model for information system dimension.

f. ANP Questionnaire Preparation

After obtaining the correlations of information system success criteria from DEMATEL and constructing ANP model, the next step is designing questions to evaluate information technology needs. Firstly, build ANP model in Super Decisions software. Secondly, connect the correlations along the nodes, and then ANP questionnaire can be obtained from Super Decisions. The data is collecting by interviewing and observing one of four SMEs. The interview and observation processes are asking importance preferences according to what the respondent perceived. 1-9 scoring range is based on importance criteria preferences. The interviews are recorded as shown in Appendix 4 and the questionnaire is shown in Appendix 7.

g. Interview and Observation for ANP Pairwise Comparison

Based on the model constructed, a questionnaire is designed to guide the interview and observation. Interview is done by selecting one SME's expert to answer the questions.

h. Consistency Ratio (CR)

Input the ANP pairwise comparison to Super Decisions Software, after that analyze the Consistency ratio (CR).

i. Check Consistency Ratio (CR)

Once a CR results less than 0.1, a confirmation step should be conducted by re-interviewing and deeply observing the importance preferences with the respondent regarding the inconsistent cluster.

j. Analytical Network Process (ANP)

A Super Decisions software is used to process ANP methodology by inputting answers from the experts.

   i. Generate Un-weighted Matrix;
   ii. Generate Weighted Matrix;
   iii. Generate Limit Matrix; and
   iv. Synthesized

k. Conclude the results of DEMATEL and ANP.

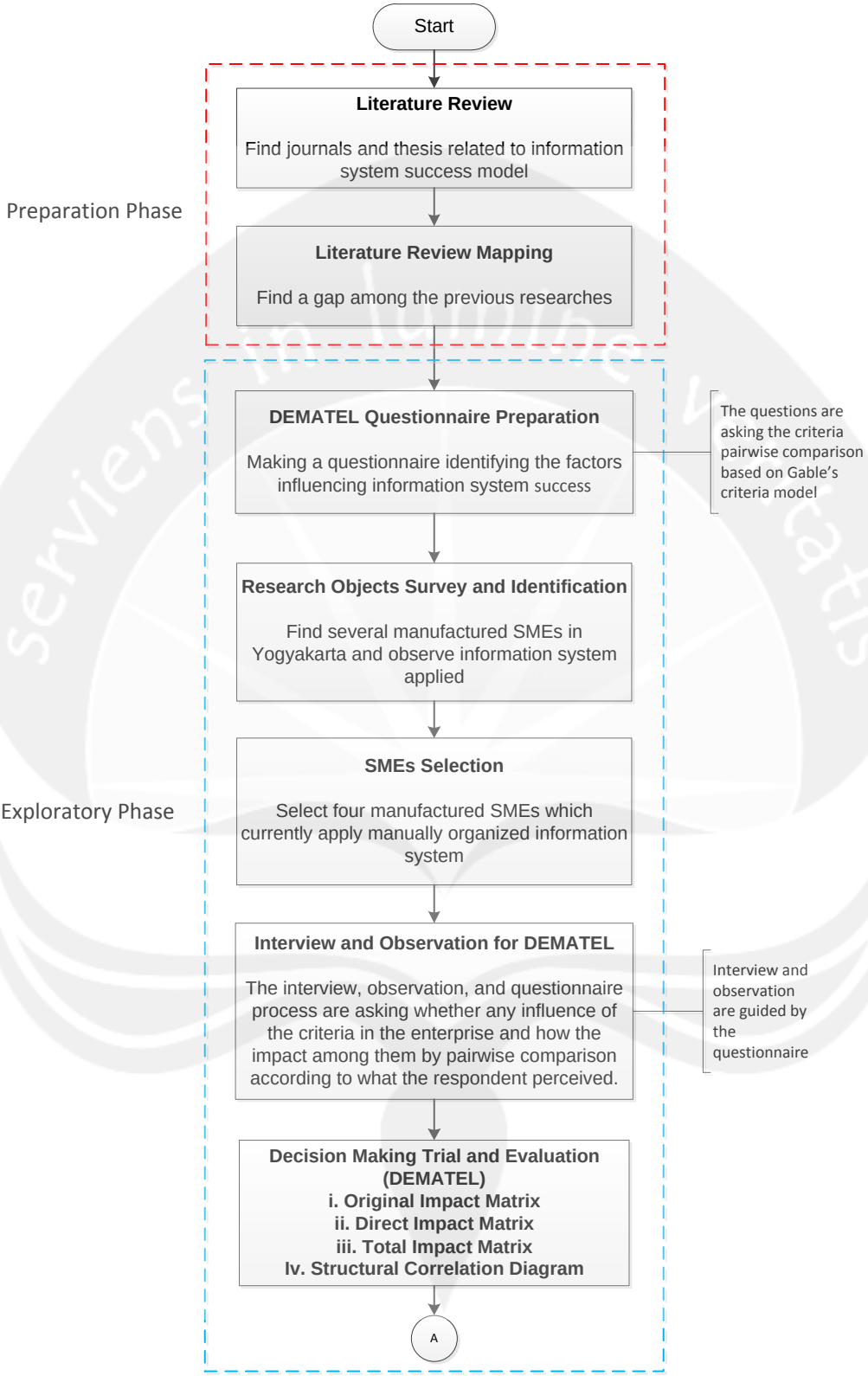

Figure 3.1. Research Methodology

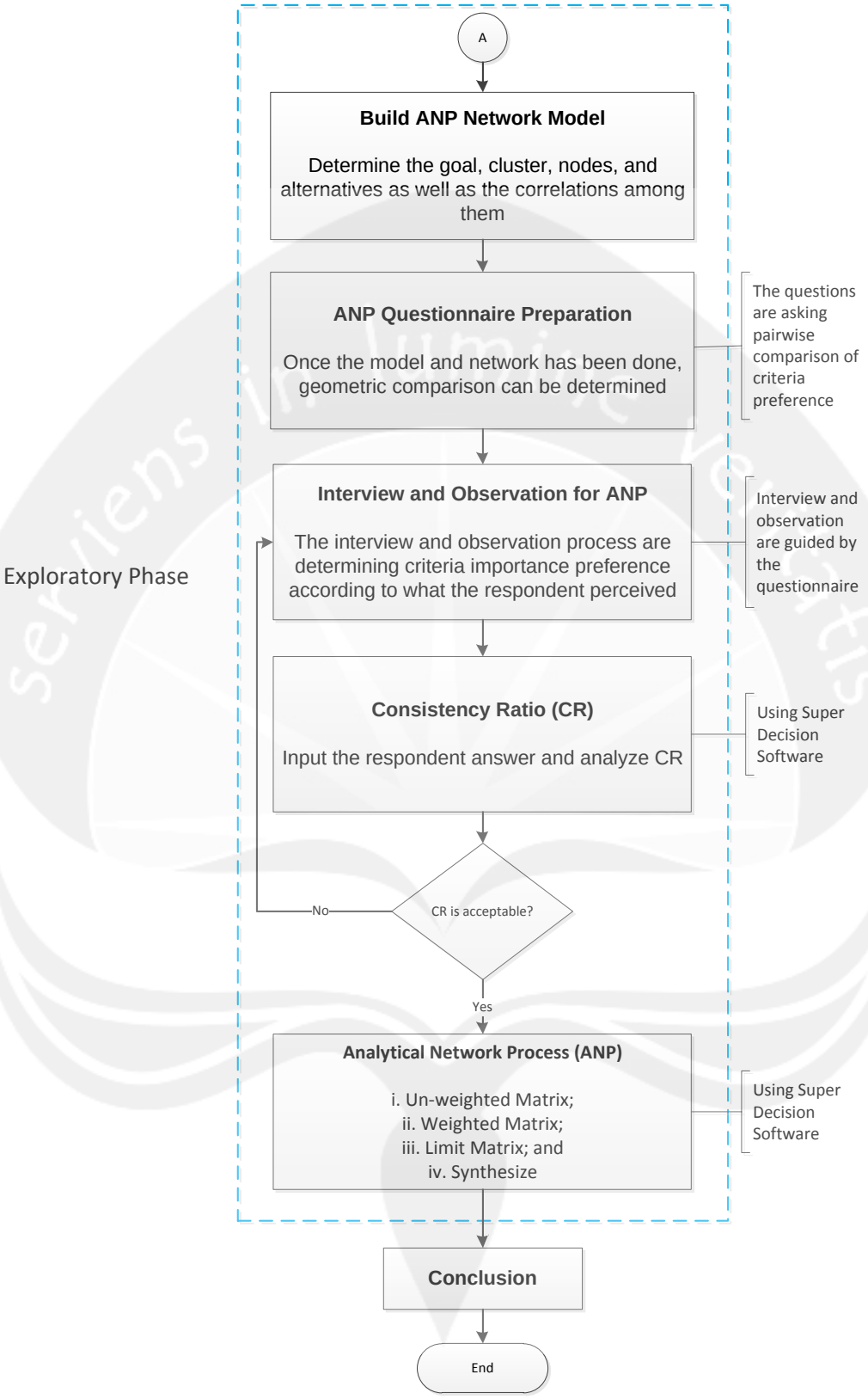

Figure 3.1. Research Methodology (Continued)