CHAPTER IV

RESEARCH METHOD

4.1. Type of Research

Based on the background and the research questions, the characteristics of the issues examined in this study can be classified as a research hypotheses by using explanatory research approach. This method is describing a causal relationship between the variables of the study with the hypotheses test (Singarimbun & Effendi, 1995). In the explanatory research, the approach used in this study is a survey method; the research is done to get the facts about the phenomena that exist within the object of investigation and collect actual and systematic information.

4.2. Research Location

This study will be carried out in Magelang Municipality. The reasons for research locations is the implementation of procurement of goods and services electronically (e-procurement) since 2011. With the quality of e-procurement system, it can be seen the deficiency in the implementation of e-procurement in Magelang Municipality and identified to improve the quality of e-procurement system. Moreover, since in the implementation of e-procurement in Magelang Municipality, has not been found research on the quality of e-procurement to the implementation of principles of good governance in public procurement.

4.3. Unit of Analysis

The unit of analysis is defined as something that is related to a focus / component studied. The unit of analysis was conducted by researchers in order to study the validity and reliability can be maintained. Units of analysis in social research can be individuals, groups, or even non human entities (Babbie, 2008). From the way uncover the data analysis unit by specifying criteria for these respondents, researchers will gain whom and what was to become the subject of research.

In this study, using the individual unit of analysis in the form of the user of e-procurement system in Magelang Municipality to get the most suitable personal result. Users of e-procurement are taken from civil servants who have experience in using the certificate procurement and e-procurement system.

4.4. Population and Sample

Population in this study are Civil Servants in Magelang Municipality that have a public procurement certificate (118 people). A sampling of this study is the procurement Certified Civil Servants who have experienced in e-procurement system. Consist of members of the ULP Working Group, Committing Officer (PPKom) and LPSE Administrator as many as 35 people.

4.5. Sampling Methods

In this study using purposive sampling methods. Reasons sampling with purposive sampling method (judgment sampling) because it will select a sample

that met the study criteria so that they can provide answers that can support the course of this study.

Research samples criteria were civil servants in Magelang Municipality who have certified procurement of goods and services. In addition, the supporting criteria are civil servants who have experienced in e-procurement system in Magelang Municipality. Basic considerations are civil servants are able to identify and determine the appropriate response to the questionnaire related to the study variables.

4.6. Data Source

The data source is anything that can provide information about the data. Based on the source, the data can be divided into two, namely primary data and secondary data.

1. Primary data is data created by researchers for the particular purpose resolve problems that are being handled. Data were collected by researcher directly from the first source or object where research is conducted.
2. Secondary data is data that has been collected for purposes other than resolve the problems being faced. This information can be found quickly. In this study, the source of secondary data is literature, articles, journals and websites on the internet about research conducted (Sugiyono, 2009).

In addition to the primary data, the data source used by researchers is the source of secondary data, secondary data obtained through the following sources

of literature articles, as well as sites on the internet concerning the research conducted.

4.7. Data Collection Method

Data collection methods in this research will be carried out through the means and the following stages:

a. Documentation

   Documentation method in this study is intended to obtain data using documentation, which is studying the documents relating to all the data needed in the research. In the performance of the methods of documentation, researchers investigated objects such written reports and other materials in the implementation of public procurement in Magelang Municipality relevant to his research interests.

b. Questionnaires

   The questionnaire is a document containing questions and other types of items designed to solicit information appropriate for analysis (Babbie, 2008). This research will use the closed-ended questions with Likert scale. According to (Babbie, 2008) closed-ended questions is a survey question in which the respondent is asked to select an answer from among a list provided by the researcher. These are popular in survey research because they provide a greater uniformity of responses and are more easily processed than open-ended questions.

From the results of questionnaires are expected to get obtained data about the effect of good governance principles in public procurement towards e-procurement success in Magelang Municipality.

4.8. Variables

Based on the conceptual framework (Figure 3.2.), The model used in this research that the IS success model updated created by (Delone & McLean, 2003). Variables and definitions in this study are as follows.

4.8.1. Independent Variables (Exogenous Variables)

The independent variables in this study are system quality, information quality, and service quality. Further explanation of these three variables will be described below.

1. Information Quality

The quality of the output of information to measure the quality of information systems (Jogiyanto, 2007). Similarly with the quality of the system, the quality of the information is the quality of information that is measured subjectively by the user, from now on referred to as the perception of information quality (perceived information quality). (Livari, 2005) using scales of measurement as follows: completeness, precision, reliablility, currency and format of output.

2. System Quality

The quality system is used to measure the quality of the information system itself, both software and hardware. The quality of the performance of the system is the system that refers to how well the capabilities of the hardware, software, policies, procedures of information systems can provide the information needs of users (DeLone & McLean, 1992).

The quality system is measured subjectively by the user so that the quality system used is a perceived quality system. Indicators used to replicate from the study (Livari, 2005) consists of system flexibility, system integration, time to respon, error recovery, convinience of access, and language.

3. Service Quality

The quality of service as a comparison of customer expectations with perceptions of real services they receive. According to (Delone & McLean, 2003), there are three components that affect the service quality which guarantees a given quality systems, system empathy that concern the system to users, system responsiveness is the quality of the system responds to actions by the user.

4.8.2. Dependent Variables (Endogenous Variable)

The dependent variables (endogenous) in this study based on the IS Success Model Updated are as follows:

1. Intention to Use

In (Jogiyanto, 2007) to distinguish the use into the use of outputs (information use) and the use of the system which means the use of information and the use of the information system itself. Replicate the items utilized in the study (Livari, 2005), this article, using two indicators, namely the daily used time and the frequency of use of the system during the work.

2. User Satisfaction

Satisfaction of users of the system is a response and feedback that appear after the user using information systems. The users attitude of information systems is a subjective criterion of how we prefer users to the system being used. Adopting from (Delone & McLean, 2003) This article uses two items, namely:

a. Information Satisfaction (Repeat Purchase)

   The difference between the information required and the information received. In general satisfaction as a result of the comparison expected information or information system requirements with system performance is acceptable.

b. Comprehensive Satisfaction (Repeat Visit)

   One form of global satisfaction on all systems that have been presented and conducted interaction on the level of satisfaction of information services and systems. As well as benefits in the process the received input-output process.

3. Net Benefit

According to (Petter, et al., 2008) the net benefit is a measure contributing to the success of information systems users of the system. The indicators in this variable using the principles of good governance in public procurement mentioned in Presidential Regulation No. 54/2010 are efficient, effective, transparent, open, competitive, fair, and accountable. This indicator is a replication of the study (Jacob & Susilowati, 2014) which stated the implementation of good governance principles in public procurement as required in Presidential Regulation No. 54/2010 is high (compliance).

Table 4. 1. Latent Variables Indicators

No.	Latent Variables	Source	Symbol	Indicators
1.	Information Quality (IQ)	(Livari, 2005)	IQ1	Completeness
			IQ2	Precision
			IQ3	Reliability
			IQ4	Currency
			IQ5	Format of Output
2.	System Quality (SQ)	(Livari, 2005)	SQ1	System Flexibility
			SQ2	System Integration
			SQ3	Time to Respond
			SQ4	Error Recovery
			SQ5	Convinience of Access
			SQ6	Language
3.	Service Quality (SV)	(Delone & McLean, 2003)	SV1	Assurance
			SV2	Empathy
			SV3	Responsiveness
4.	Intention to Use (IU)	(Livari, 2005)	IU1	Daily Used Time
			IU2	Frequency of Use
5.	User Satisfaction (US)	(Delone & McLean, 2003)	US1	Repeat Purchases
			US2	Repeat Visits
6.	Net Benefit (NB)	(Jacob & Susilowati, 2014)	NB1	Efficient
			NB2	Effective
			NB3	Transparent

No.	Latent Variables	Source	Symbol	Indicators
			NB4	Open
			NB5	Competitive
			NB6	Fair
			NB7	Accountable

Source: DeLone & McLean (2003); Livari (2005); and Jacob & Susilowati (2014)

4.9. Statistical Analysis

4.9.1. SEM Parameter Estimates with PLS

The data analysis tools used in this research is Structural Equation Model (SEM), with the PLS (Partial Least Square) software. Partial least squares analysis is a multivariate statistical technique that allows comparison between multiple response variables and multiple explanatory variables. Partial least squares is one of a number of covariance-based statistical methods which are often referred to as structural equation modeling or SEM. It was designed to deal with multiple regression when data has small sample, missing values, or multicollinearity. Partial least squares regression has been demonstrated on both real data and in simulations (Garthwaite, 1994);(Tennenhaus, 1998).

The reasons for the use of PLS in this study, are as follows:

1. PLS is a standard method for estimating path latent variable models using the multiple indicators.
2. PLS is an analysis method that can be applied to all scales of the data, does not require a lot of assumptions and the sample size not necessarily significant. Recommended sample size ranged from 30 s / d 100 cases (Ghozali, 2011).

3. PLS is a causal-analytical method for predictive analysis in situations of high complexity and poor theory support.
4. PLS handle reflective and formative models, even construct the single indicator (Ghozali, 2011) The construct thoughtful assumes that constructs / latent variables were affecting the indicators (the direction of causality of the construct to the indicator). The construct implies that the formative influence indicator constructs / latent variables (direction of causality of indicators to construct).

However PLS method also has weaknesses as stated by (Pirouz, 2006) are as follows:

1. Difficulty in interpreting loadings of independent latent variables (based on crossproduct relations with response variables, as in conventional factor analysis, on correlations among manifest independents)
2. Distributional properties of estimates not known. Can't get significance unless run bootstrap
3. Lack of model test statistics

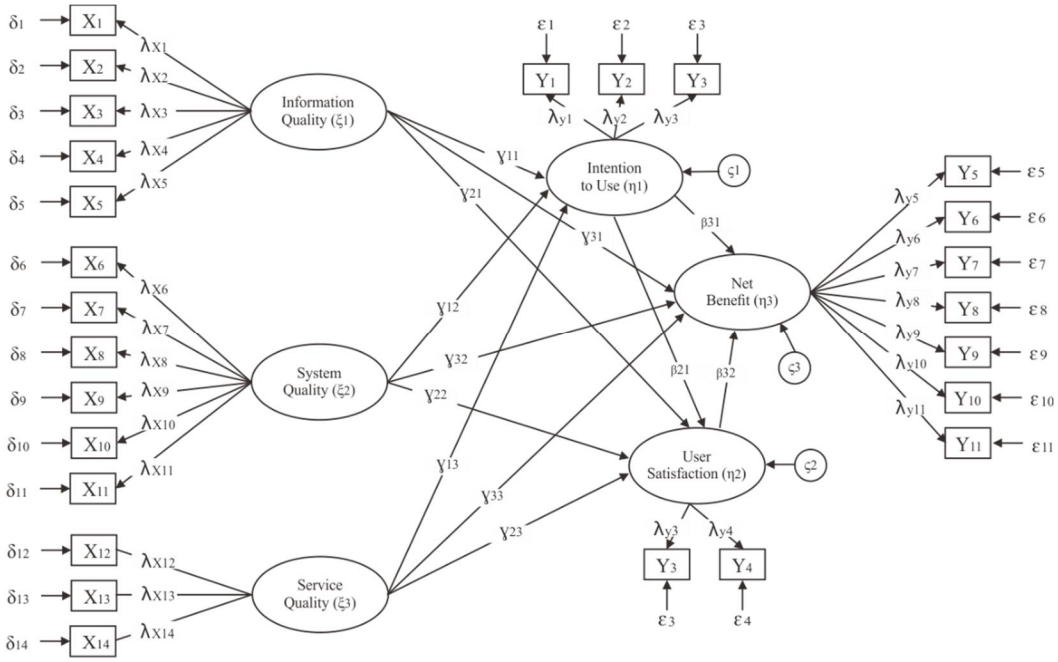
In this study using a model of reflexive indicators. This model was developed based on classical test theory which assumes that the variations in measurements scores construct a function of the true score plus error.

The characteristics of the reflective indicator model is:

1. The direction of causality as if from the construct to indicators
2. Indicators are correlated expected (have internal consitency reliability)

3. Eliminate one indicator of the measurement model will not change meaning and construct
4. Calculate the measurement error at the level of the indicator

Illustration of structural equation modelling and PLS notation can be seen in figure 4.1.



Source: Author (2016)

Figure 4. 1. Structural Equation Model with SEM-PLS

The notations used are:

ξ : Ksi, exogenous latent variables

η : Eta, endogenous latent variables

λx : Lamnda (small), loading factor exogenous latent variables

λy : Lamnda (small), loading factor endogenous latent variables

β : Beta (small), the coefficient of endogenous variables influence the endogenous variables

γ : Gamma (small), the coefficient of influence of exogenous variables on endogenous variables

ς : Zeta (small), error models

δ : Delta (small), measurement error in the manifest variables to an exogenous latent variables

ε : Epsilon (small), measurement error in the manifest variables to an endogenous latent variables

From figure 4.1, path diagram can be converted into the equation as follows:

1. Outer Model

   In this study using a reflexive indicator model, equation can be written as follows:

$$x_1 = \lambda_{x1}\xi_1 + \delta_1$$

$$x_2 = \lambda_{x2}\xi_2 + \delta_2$$

$$x_3 = \lambda_{x3}\xi_3 + \delta_3$$

$$x_4 = \lambda_{x4}\xi_4 + \delta_4$$

$$x_5 = \lambda_{x5}\xi_5 + \delta_5$$

$$x_6 = \lambda_{x6}\xi_6 + \delta_6$$

$$x_7 = \lambda_{x7}\xi_7 + \delta_7$$

$$x_8 = \lambda_{x8}\xi_8 + \delta_8$$

$$x_9 = \lambda_{x9}\xi_9 + \delta_9$$

$$x_{10} = \lambda_{x10}\xi_{10} + \delta_{10}$$

$$x_{11} = \lambda_{x11}\xi_{11} + \delta_{11}$$

$$x_{12} = \lambda_{x12}\xi_{12} + \delta_{12}$$

$$x_{13} = \lambda_{x13}\xi_{13} + \delta_{13}$$

$$x_{14} = \lambda_{x14}\xi_{14} + \delta_{14}$$

$$y_1 = \lambda_{y1}\eta_1 + \varepsilon_1$$

$$y_2 = \lambda_{y2}\eta_2 + \varepsilon_2$$

$$y_3 = \lambda_{y3}\eta_3 + \varepsilon_3$$

$$y_4 = \lambda_{y4}\eta_4 + \varepsilon_4$$

$$y_5 = \lambda_{y5}\eta_5 + \varepsilon_5$$

$$y_6 = \lambda_{y6}\eta_6 + \varepsilon_6$$

$$y_7 = \lambda_{y7}\eta_7 + \varepsilon_7$$

$$y_8 = \lambda_{y8}\eta_8 + \varepsilon_8$$

$$y_9 = \lambda_{y9}\eta_9 + \varepsilon_9$$

$$y_{10} = \lambda_{y10}\eta_{10} + \varepsilon_{10}$$

$$y_{11} = \lambda_{y11}\eta_{11} + \varepsilon_{11}$$

In which x and y are the indicators for exogenous latent variables (ξ) and endogenous (η). While λx and λy are loading matrix that describes a simple regression coefficient linking latent variables with the indicator. Residual measured by δ and ε can be interpreted as an error measurement or noise.

2. Inner Model

In the PLS model Figure 4.1 inner model expressed in the following equation:

$$\eta_1 = \gamma_{11}\xi_1 + \gamma_{12}\xi_2 + \gamma_{13}\xi_3 + \varsigma_1$$

$$\eta_2 = \gamma_{21}\xi_1 + \gamma_{22}\xi_2 + \gamma_{23}\xi_3 + \beta_{21}\eta_1 + \varsigma_2$$

$$\eta_3 = \gamma_{31}\xi_1 + \gamma_{32}\xi_2 + \gamma_{33}\xi_3 + \beta_{31}\eta_1 + \beta_{32}\eta_2 + \varsigma_3$$

Where γ is the path coefficient linking endogenous latent variables (η) with exogenous (ξ). whereas β is the path coefficient linking endogenous latent variables (η) with endogenous (η). Parameters ς is the residual of inner variable.

4.9.2. PLS Model Evaluation

PLS evaluation model based on measurement predictions that have non-parametric attributes. Therefore, the model evaluation is done by assessing outer model, and inner model. Further explanation is as follows:

1. Evaluation of the measurement model (Outer Model)

   Evaluation of the size model or outer model carried out to assess the validity and reliability of the model. According to (Ghozali, 2011) there are three criteria for measuring the outer models:

   a. Convergent Validity

      Convergent validity test with the reflexive indicators PLS program can be seen from the loading factor for each indicator constructs. Rule of thumb is commonly used to assess convergent validity; value loading factor must be greater than 0.70 for studies that are confirmatory and the value of the loading factor between 0.60 to 0.70 for research that is exploratory still received as well as the amount of average variance extracted (AVE) must be greater than 0.50.

   a. Discriminant Validity

      To test the discriminant validity with a reflexive indicator is to look at the value of cross loading for each variable should be > 0.70. As another way

is to compare the square root of the AVE for each construct with the correlation between the constructs in the model. If the square root of AVE is greater than the correlation between the constructs in the model then said to have good discriminant validity. Recommended AVE value must be greater than 0.50.

b. Composite Reliability

Rule of thumb commonly used to assess the reliability construct composite reliability value must be greater than 0.70 for studies that are confirmatory and the value of 0.60 to 0.70 is acceptable for research that is exploratory.

2. Evaluation of structural models (Inner Model)

As for the assessment of structural models or inner models aim to predict the relationship between latent variables. Inner models evaluated by looking at the magnitude of the percentage of variance explained by looking at the value of R-square for latent endogenous constructs, Stone-Geisser Q-square test to examine and t-test predictive relevance and significance of the coefficient parameters of structural lines. In this phase begins with seeing R-square for any endogenous latent variables. Changes in the value of R-square can be used to assess the effect of exogenous latent variables unique to the endogenous latent variable does have a substantive effect (Ghozali, 2011). Besides seeing the value of R-square, the PLS model can also be evaluated with a view of the square X^2 predictive relevance for constructive models. X^2 measure how well the observed values generated by models and parameter estimation.

According to (Ghozali, 2011) at this stage of weight relations, outer and inner provide specifications that are followed in the estimation algorithm PLS.

Estimation of latent variables is linear aggregate of indicators that the value weight obtained by the estimation procedure PLS to be specified by the inner and outer model where Ƞ is the vector of endogenous variables and ξ is a vector of exogenous variables, ζ is a residual vector, as well as the B and Γ, is the coefficient matrix path (path coefficient). As for testing the hypotheses (β and γ) was performed using bootstrap resampling method developed by Geisser and Stone.

3. Hypotheses Testing

   Hypotheses testing is done by t statistical test (t-test). If in this test was obtained p-value < 0.05 (α 5%), means significant testing, and vice versa if the p-value > 0.05 (α 5%), means insignificant. When the results of testing the hypotheses on models outer significantly, it indicates that the indicator is viewed can be used as a measuring instrument latent variables. Meanwhile, when the test results on the inner models are significant, it means that there is a significant influence of the latent variables to other latent variables.