

Research design  
location and research  
time psychology  
essay



This chapter will present the methodological approach and research technique used in this thesis along with how the data will be gathered to find the answer or solutions of the research questions and problems, such as research design, theoretical perspective, data collection method, data analysis method as well as the validity and reliability of the data.

## **Research Design, Location, and Research Time**

This research was planned and designed to obtain answer to research questions. Research design is the framework or plan for study, used as a single guide to collect and analyze the data. It is the blueprint that is followed to complete a study.

According to Sekaran and Bougie (2009, p. 24), a research method or approach/design gives details on the most suitable methods of investigating the nature of the research, instruments, the sampling plan and the type of data to be used. Furthermore, Sekaran and Bougie (2009, p. 24) also report that “ a research method or design forms the framework of the entire research process.”

Therefore, if it is a good method or design, it will thus ensure that the information obtained is important to the researcher’s problem and those objectives and economic procedures in collecting it are all within limits. It simply is a systematic quest for undiscovered truth. In pursuit of this undiscovered truth, a researcher needs facts, published documents from primary sources and secondary sources.

This research was using a cross sectional study which the data are gathered just once (Sekaran & Bougie, 2009, p. 119).

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Research location was done at six locations: Central Jakarta, North Jakarta, South Jakarta, West Jakarta, East Jakarta and Tangerang city to household customers of PT. Perusahaan Listrik Negara between March to July 2012, with the distribution of questionnaires within June 2012.

## **Research Framework**

The research framework of this thesis is shown in Figure 3. 1 below. The first research step is to define the research problem, followed by research objective. The third step is a literature review, followed by data collection, data analysis, hypothesis test, and finally generate conclusion and recommendation.

Source: Author

Figure 3.: Research Framework

## **Research Questions and Hypotheses**

In this study, researcher would like to answer the questions and analyze the hypotheses below:

RQ1: How do cultural factors, social factors, personal factors, psychological factors, and PLN services influence customer decision in using electricity at peak load hours?

H1: From those factors, all factors are positively influence customer decision in using electricity at peak load hours.

RQ2: How is the correlation between the decisions in using electricity during peak load hours with the household customer's behavior towards saving electricity?

H2: There is a correlation between the decisions in using electricity during peak load hours with the household customer's behavior towards saving electricity.

RQ3: How do pro-social intensions, motivations, access to information, and knowledge influence customer behavior in saving electricity?"

H3: From those factors, all factors are significantly influence customer behavior in saving electricity.

RQ4: How is the correlation between customer awareness of consequences, aspiration of responsibility, personal norms towards their pro-social intensions in saving electricity?"

H4: There is STRONG correlation between customer awareness of consequences, aspiration of responsibility, personal norms towards their pro-social intensions in saving electricity?

RQ5: What interventions or instruments are most likely to affect households' saving electricity behavior?"

H5: The intervention or instrument most likely to affect households' saving electricity behavior is by increasing their motivation, knowledge, and access to information about saving electricity programs.

RQ6: From the classification of household segments, which class is the most involved in saving electricity?”

H6: From the classification of household segments, class R1: 2. 200VA is the most involved in saving electricity.

## **Conceptual Framework**

Source: Author (Adapted from Kotler, 1999, and deGroot & Steg, 2009)

Figure 3.: Conceptual Framework

## **Research Data**

### **Type and Source of Data**

There are two types of data that researches collected depending on the purpose. The data of research consists of both primary and secondary data. The primary data are the first-hand information acquired by the researcher on the variables under study while the secondary data refer to information gathered from sources that already exist which may come from archives or organizational files (Sekaran & Bougie, 2009, p. 180).

This research was used both primary and secondary data. The primary data sources were obtained through the survey method by distributing structured questionnaires to household customers of PT. PLN Jakarta Raya and Tangerang Distribution.

The secondary data were obtained from the company internal data such as figures in customer-base segmentation, and existing data in books, journals, publications, reports, and websites.

## **Data Collection Method**

The data collection for primary and secondary data is done through the following methods:

Literature Review.

According to Sekaran and Bougie (2009, p. 38), a literature review is a step-by-step process that involves the identification of published and unpublished work from secondary data sources on the topic of interest, the evaluation of this work in relation to the problem.

In this research, the literature review is done by search and study books, reports, journals, research reports, internet website related to electricity business and customer behavior. The information related to the company is obtained through the company's website and published reports.

Questionnaire.

Sekaran and Bougie (2009, p. 197) define questionnaire is a pre-formulated recorded series of questions to which the respondents giving their answers usually within rather closely defined alternatives. For this research, the questionnaire is formulated and distributed to the respondents in two methods. First method used is by distributing the questionnaire to respondents through email. The second method is the direct questionnaire to respondents, by asking them to give their answer on the questionnaire paper provided.

## Questionnaire Design

Questionnaires are efficient data collection method when the researcher knows the information to gather and how to determine the variables of interest (Sekaran & Bougie, 2009, p. 197). Questionnaire survey is formulated to answer the research questions. It is a tool that may be conveniently distributed personally or electronically to respondent.

According to Burns and Bush (2006, p. 300), there are six key functions of a questionnaire:

To translate the research objectives into specific questions.

To standardize the questions and the response categories to let every participant responds to identical stimuli.

To reinforce cooperation and motivates respondents to respond.

To serve as permanent records of the research.

To speed up the process of data analysis, depending on the type of questionnaire used by the researcher.

To contain the data which may be addressed for reliability and validity.

The first part consists of the demographic attributes questions such as gender, age, education, occupation, annual income, and the second part consists of questions analyzing customer behavior in terms of cultural, social, personal, and psychological factors that base on Griffin and Ebert's model (2006, p. 283).

Part two in the questionnaires use Likert's scale which enables the respondents to give level of the attributes stated in the questions.

A Likert's scale was used in the research, in which respondents were asked to indicate their level of agreement or disagreement on a systematic agree-disagree scale for each of a series of questions (Burns & Bush, 2006, p. 281). Each question in the questionnaire on this part is ranged from 1 to 5, where 1 = Strongly Disagree; 2 = Disagree ; 3 = Neutral or Not Applicable ; 4 = Agree ; 5 = Strong Agree.

The questionnaire format for this research is shown in Figure 3. 3 below.

Source: Author

Figure 3.: Questionnaire Design for This Research

Table 3. 1 shows the distribution of items in order to measure the variables in the questionnaires.

Table 3.: Variable, Scale of Data and Category of Questions

## **Part 1: Respondent Profile**

**No.**

**Variables**

**Scale of Data**

**Category of Questions**

1.

Gender



Nominal

Male

Female

2.

Age

Interval

20-30 years old

30-40 years old

40-50 years old

50-60 years old

â‰¥ 60 years old

3.

Occupation

Nominal

Government employee

Private company employee

Self-employed

Professionals

Retired

Others

4.

Number of Family Members

Interval

Small: 4 members

Medium: 5-6 members

Big: 7 members

5.

Educational background

Ordinal

Basic / Junior High School

Senior High School

College Degree

Bachelor Degree

Master Degree

PhD

6.

Income per month

Ratio

â‰¤ 2 million rupiahs

2 to 5 million rupiahs

5 to 10 million rupiahs

â‰¥ 10 million rupiahs

7.

Classification electricity

Nominal

900 VA

1. 300 VA

2. 200 VA

8.

Domicile

Area

Central Jakarta

West Jakarta

East Jakarta

South Jakarta

North Jakarta

Tangerang City

## **Part 2: Exploratory Questions (Data are in Likert scale)**

### **Customer Decision in using electricity at peak load hours**

**No.**

#### **Variables**

#### **Category of Questions**

A.

Cultural Factors

Regularly using electricity at peak load hours (between 17. 00 to 20. 00).

Household activities were dominated by using electrical equipment.

Regularly using electrical equipment in day time.

B.

Social Factors

The capacity of installed electricity is in accordance with the requirement.

Able to pay if electricity tariff is go up.

Electricity tariffs are still cheap.

It's normal to reduce electricity subsidized and to increase tariffs when oil prices are up.

C.

Personal Factors

Able to pay electricity and can afford the electricity bills.

It is necessary to increase capacity because the need of electricity will increase.

Electricity bills are relatively small compare to the total expenditure.

D.

Psychological Factor

When using electricity at peak time, we will pay more expensive.

Feeling guilty when using electricity at peak time.

Feeling happy if every rooms are bright.

E.

PLN Services

Power failure was rarely, so it is convenient to use it, especially at peak time.

Recording of electricity is on time and the bill is in accordance with the use.

Since electricity is stable, we are not worry to use it at peak time.

## **Part 2: Exploratory Questions (Data are in Likert scale)**

### **Customer behavior towards saving electricity**

**No.**

#### **Variables**

#### **Category of Questions**

A.

Access to Information

Get information about saving electricity from friends, family, neighbor, PLN, or community leaders.

Get information about saving electricity from television, radio, magazine/newspaper, and internet.

Often receiving information about saving electricity.

B.

Knowledge

Knows electricity-saving equipment.

Electrical equipment will be more efficient when 'turned off' than in 'standby'.

Using electrical equipment at its maximum capacity will take more energy.

C.

Motivation

Being motivated to prioritize electricity saving behavior.

Being motivated to respect environment.

D.

Pro-social Intentions

There are negative consequences of any actions that do not respect the environment.

Feel responsible for environmental damage.

Having a moral obligation towards energy efficiency and environmental protection.

## **Questionnaire Format**

In this research, the questionnaires were prepared in printed and online formats using Indonesian language, because some of the respondents were not able to read and speak in English language.

During the pre-test stage, the questionnaire was distributed only through email to 30 respondents to find out the validity and reliability of the data or questions in the questionnaires.

At the post-test stage, the revised questionnaire was printed and distributed door to door. Due to time limitation, researcher employed a strategy by setting up a team consist of 6 (six) members to meet the respondents in 6 (six) different locations (domiciles).

The revised questionnaire was also distributed by email. By using email, it was very convenient in terms of shortening the time spent to send the questionnaire and receiving the responses from the respondents. However, there were difficulties because the respondents were depended on a computer and internet service.

### **Survey Sampling Method**

According to Sekaran and Bougie (2009, pp. 262-263), “ a sample is a subset of the population. It comprises some members selected from it. A sample is thus a subgroup of the population, which represents the whole group of people, actions, or things of interest that the researcher wants to investigate.”

According to Burns and Bush (2006, pp. 372-374), “ the size of the sample affect the sample accuracy of results, thus sample accuracy refers to how close a random sample’s statistic is to the population’s value it represents. The most correct method of determining sample size is confidence interval approach.”



In order to calculate the proper sample size of the survey, Burns and Bush (2006, p. 366) said, there are three items required:

Amount of variability of population

Desired accuracy, and

Required confidence level.

## **Sampling Methodology**

In this research, the population is the total number of customers of PT. PLN Jakarta Raya and Tangerang Distribution from the Household segment, which according to the statistics are 3. 330. 815 number of customers.

For this amount of population, the sample size may be calculated using the formula recommended by Burns and Bush (2006, p. 372):

Where:  $n$  = the sample size

$z$  = standard error associated with the chosen level of confidence (1. 96)

$p$  = estimated percentage in the population

$q$  =  $100 - p$

$e$  = acceptable sample error

Sample population sample size = population sample size  $\times$

In this research, researcher chose to use a probability of 90% with a 95% level of significance equivalent to a “  $z$  value” of 1. 96 and sample error 4%.

The sampling calculation was determined by using a software application, PHStat2. PHStat2 is a Windows-based software that assists students and professionals in learning the statistic concepts while using Microsoft Excel.

Table 3.: Sampling Size Determination

**Data**

**Estimate of True Proportion**

**0.9**

**Sampling Error**

**0.04**

**Confidence Level**

**95%**

Intermediate Calculations

Z Value

-1.95996398

Calculated Sample Size

216.0820587

## **Result**

### **Sample Size Needed**

**217**

### **Finite Populations**

#### **Population Size**

**3. 330. 815**

Calculated Sample Size

216. 0681064

### **Sample Size Needed**

**217**

Source : Data on File

Based on the calculation in Table 3. 2, the minimum number of sample size needed is 217 samples; however in this research the number of samples is added to another 10 percent in order to produce greater accuracy.

Therefore, this research will be used 240 samples.

This research will use a cross sectional-study in which the data are gathered at once in order to answer the research questions (Sekaran & Bougie, 2009, p. 119).

### **Sample Withdrawal Techniques**

The populations in this research were household customers of PT. PLN Jakarta Raya & Tangerang Distribution. Sampling technique was done by using stratified random sampling, involves a process of stratification or

segregation, followed by random selection of subjects from each stratum.

The population is divided into stratum, and then sampling conducted in each stratum (Sekaran & Bougie, 2009, p. 272).

In this research, customers who become household population were stratified based on electrical power and is divided into three groups, namely: 900VA, 1. 300VA and 2. 200VA. It is based on the “ Regulation of the President of Republic Indonesia No. 8, 2011, p. 9” (see Appendix A2).

The sample selection techniques are described in Figure 3. 4.

Source: Author

Figure 3.: Sample Withdrawal Techniques

## **Data Analysis**

After data are obtained through questionnaires, the next step is to analyze them to test the research hypothesis. To ensure that the data obtained are reasonably good and ready for use for statistical analysis, Sekaran and Bougie (2009, pp. 306-330) recommend followings:

Getting the data to be ready for analysis:

Coding and data entry

Coding the responses

Data entry

Editing data

Data transformation

Getting a feel for the data:

Relationship between variables

Correlations

Testing goodness of data

Reliability

Validity

Testing the hypothesis

Hypothesis testing and data analysis will be conducted using appropriate statistical method and based on sample data associated with software such as PHStat2, SPSS version 20, and AMOS version 20.

## **Descriptive Analysis**

Descriptive analysis such as the mean, mode, standard deviation, and range are used by researcher to describe the sample data matrix in such a way as to portray the typical respondent and to reveal the general pattern of responses. Descriptive measures are regarded as the steps undertaken by the researcher earlier in the process of analysis and become foundations for subsequent or more complex analysis (Burns & Bush, 2006, p. 424).

Descriptive statistics were used to portray the main characteristics of a collection of data in quantitative terms and distinguished from inductive

statistics in that they intend to quantitatively review a data set, instead of being used to support reports regarding the population that the data are supposed to represent. Even when a data analysis obtains its major conclusions using inductive statistical analysis, the descriptive statistics are usually presented alongside the formal analyses to show the audience an overall perception of how data being examined.

## **Validity and Reliability Test**

A good quality measurement instrument is needed in order to obtain precise data of this research. The ideal instrument has to be reliable and valid. The researcher must address both validity and reliability of the measures in assessing the degree of measurement error present in any measures.

Any measure designed or adapted for use in any research should both be reliable and valid. A reliable measure is one in which a respondent acts in response to the same or a very similar manner to an identical or nearly identical question (Burns & Bush, 2006, p. 290). The reliability of a measure is a test of how consistently a measuring instrument measures whatever concept it is measuring.

In testing the reliability of the questionnaire, the test-retest reliability test was used which measures the correlation between the same respondents obtained at the two different times (Sekaran, 2010, p. 162).

To achieve reliability of a measure, the researcher was using SPSS software with Cronbach's Alpha as the measurement. Cronbach's Alpha is a reliability coefficient that determines how well specific items of the measurement tools are positively correlated to one another. Cronbach's Alpha is computed using <https://assignbuster.com/research-design-location-and-research-time-psychology-essay/>

the average intercorrelations among the items measuring the concepts. If Cronbach's Alpha is greater than 0.70, it means that the data are more consistent and reliable. The closer the alpha value to 1 indicates the data are most consistent and reliable. A high quality reliable instrument can be used as a guide to draw a conclusion and making decisions (Sekaran & Bougie, 2009, pp. 324-325).

Validity is a test of how fine a developed instrument to measure the particular concept it is planned to measure. In the other words, validity is related to measurement with the right concept and reliability with stability and consistency of measurement (Sekaran & Bougie, 2009, pp. 158-160).

## **Correlation Analysis**

Correlation analysis is an analysis done to trace the mutual influence of variables on one another. A correlation coefficient that indicates the strength and direction of the relationship can be computed by applying a formula. There could be a perfect positive correlation between two variables, which is represented by 1.0 (plus 1), or a perfect negative correlation which would be -1.0 (minus 1) (Sekaran & Bougie, 2009, p. 322).

The formula to calculate the coefficient of correlation is:

Source: Burns & Bush, 2005

Where:

$r$  = coefficient correlation  $n$  = samples

$x_i$  = variable  $X$   $\bar{x}$  = mean  $X$

$y_i$  = variable Y  $\bar{y}$  = mean Y

Table 3. 3 presents the rules of thumb in interpreting the correlation coefficient values.

Table 3.: Rules of thumb of degree of correlation

## **Coefficient Range**

### **Strength of Association**

$\pm 0.81$  to  $\pm 1.00$

Strong

$\pm 0.61$  to  $\pm 0.80$

Moderate

$\pm 0.41$  to  $\pm 0.60$

Weak

$\pm 0.21$  to  $\pm 0.40$

Very Weak

$\pm 0.01$  to  $\pm 0.20$

None

Source: Burns & Bush, 2005



## **Structural Equation Modeling (SEM)**

Structural equation modeling (SEM) is a statistical approach for testing and estimating causal relationship using a combination of statistical data and qualitative causal assumptions. Typically, this theory represents “causal” processes that produce examinations on multiple variables.

The term structural equation modeling expresses two important features of the procedure:

causal processes, represented by a sequences of structural (i. e. regression) equations, and

these structural relationships can be displayed pictorially to allow a clearer conceptualization of the theory.

Then, the hypothesized model can be examined statistically in a simultaneous analysis of the entire variables to conclude the degree of its consistency to the data. If goodness-of-fit is adequate, the model argues for the credibility of hypothesized relations among variables. If it is inadequate, the reasonability of those relations is rejected (Byrne, 2010, p. 3).

Statistical models provide an efficient and convenient way of describing the latent structure underlying a set of observed variables. Expressed either diagrammatically or mathematically via a set of equations, such models explain how the observed and latent variables are related to one another.

Typically, a researcher postulates a statistical model based on his or her knowledge of the related theory, on empirical research in the area of study,

or on some combination of both. Once the model is specified, the researcher then tests its plausibility based on sample data that comprise all observed variables in the model. The primary task in this model-testing procedure is to determine the goodness-of-fit between the hypothesized model and the sample data. As such, the researcher imposes the structure of the hypothesized model of the sample data, and then tests how well the observed data fit this restricted structure. Because it is highly unlikely that a perfect fit will exist between the observed data and the hypothesized model, there will necessarily be a differential between the two; this differential is termed the residual.

The model-fitting process can therefore be summarized as follows:

### **Data = Model + Residual**

Where:

Data represent score measurements related to the observed variables as derived from persons comprising the sample.

Model represents the hypothesized structure linking the observed variables to the latent variables and, in some models, linking particular latent variables to one another.

Residual represents the discrepancy between the hypothesized model and the observed data (Byrne, 2010, p. 7).

Structural equation models are schematically portrayed using particular configurations of four geometric symbols:

a circle (or ellipse),

a square (or rectangle),

a single-headed arrow, and

a double-headed arrow.

By convention, circles (or ellipses; ) represent unobserved latent factors, squares (or rectangles; ) represent observed variables, single-headed arrows ( $\rightarrow$ ) represent the impact of one variable on another, and double-headed arrows ( $\leftrightarrow$ ) represent covariance or correlations between pairs of variables (Byrne, 2010, p. 9).

In building a model of a particular structure in this research, the researcher uses these symbols within the framework of four basic configurations, each of which represents an important component in the analytic process.

These configurations, each accompanied by a brief description, are as follows:

Path coefficient for regression of an observed variable onto an unobserved latent variable (or factor)

Path coefficient for regression of one factor onto another factor

Measurement error associated with an observed variable

Residual error in the prediction of an unobserved factor

## **The Path Diagram**

Schematic representations of models are termed path diagrams because they provide a visual portrayal of relations which are assumed to hold among the variables under study. Essentially, a path diagram depicting a particular SEM model is actually the graphical equivalent of its mathematical representation whereby a set of equations relates dependent variables to their explanatory variables (Byrne, 2010, p. 10).

Using path diagram as a structural equation modeling tool, the pattern of causal relationship can be detected. Causal relationship describes interrelations among a set of latent (unobserved) variables and a set of observed variables.

Path diagram is a relationship structure between the exogenous and endogenous variables. The independent (X) variables are called exogenous variables. The dependent (Y) variables are called endogenous variables.

## **Model Measurement**

According to Hair et. al (2010) measurement model validity depends on “establishing acceptable levels of goodness of fit (GOF) for the measurement which indicates how well specify model reproduces the observed covariance matrices, smaller the difference between covariance matrices estimate with the observe covariance matrices, more fit the model.” (Hair et. al, 2010, p. 639).

The GOF value contains several parameters to be considered by the researcher as stated by Hair et. al (2010, p. 640-650), this thesis confirm the overall model fit the parameter will used the following:

Chi-square (CMIN) or minimum discrepancy (), it is to test whether there is the different covariance matrices estimate within the covariance matrices observe, smaller () shown the different of both not significant and the model more fit.

df (degree of freedom), more positive ( $\geq 0$ ) of the df which shown with “ minimum was achieved” the process of the estimate could be done.

CMIN/DF.

CMIN represents the minimum value of the discrepancy while DF is the degree of freedom. According to Wijaya (2009, p. 45), the model could be accepted if the CMIN/DF is  $\leq 2.00$ .

RMR (root mean square residual), this is called badness of fit whether the value is less than 0.1 than it is better because deference between sample and the estimate is smaller (Hair et. al 2010, p. 642)

GFI and AGFI (Goodness fit index and Adjusted Goodness fit index), GFI and AGFI value between 0 to 1, more closed to 1 more fit the model (Hair et. al 2010, p. 643)