



FINAL PROJECT – TI 141501

## **DEMAND SUPPLY ANALYSIS FOR ECO-SANITARY PRODUCTS IN SURABAYA**

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Surabaya 2017



# **APPROVAL SHEET**

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### **FINAL PROJECT**

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Department of Industrial Engineering

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**SURABAYA, JULY 2017**



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# **DEMAND SUPPLY ANALYSIS FOR ECO-SANITARY PRODUCT IN SURABAYA**

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## **ABSTRACT**

The water consumption in Surabaya is considered higher than Jakarta and Singapore. This situation could lead to water crisis in 2018. The use of eco-sanitary products (ESP) is one way to reduce water usage, thus delay the water crisis. However, up to now there is no any study addresses the implementation or the use of eco-sanitary products in the society. This study analyzes the demand and the supply side of ESP product in Surabaya city. Statistical model approach with logistic binary regression was used for analyzing of the influence factors in the demand side analysis by using sample of 440 households. Meanwhile, the willingness to change and to pay analysis in the demand side is using mathematical scoring and mode approach respectively. Data crosstabulation was used to process the data of the supply side analysis. The findings shows that there are only 14.3% from the total surveyed households which is categorized as eco-household. There are four factors identified that may influence the ESP usage, which are household income level, household spending, awareness to water crisis and ESP knowledge. In addition, only medium income level that do not influence the ESP usage. The willingness to change analysis results that there are three drivers for the people to change, which are sanitary product price, product impact on water savings and government subsidy. From the supply side survey, the market of faucets is ready to provide eco product to the customer because of the high availability of eco-faucets in the market. Most of the salesman has lack of knowledge about eco-sanitary product and the eco features on water saving is not the main concern for the selling strategy.

Key words: supply side, demand side, logistic binary regression, eco products, water crisis

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# **CHAPTER I**

## **INTRODUCTION**

In this chapter, the basic reason and problem identification of the research will be explained thoroughly. This chapter explains in detail about research background, problem identification, research limitations, research purposes, research benefits, and writing methodology.

### **1.1 Background**

Water is an unlimited source yet crucial to the living and it is used in everyday life. Water is commonly used for household needs such as for drinking, cooking, cleaning, bathing, and watering. In worldwide, industries use twice amount of water than households. In Indonesia, water is classified into four levels (BPPT, 2015). The level indicates the purity of the water quality. Level 1 is used for drinking while level 4 is used to irrigation and watering plants.

Surabaya, the biggest city in Indonesia, has reached more than 2,8 million of population in 2014. There are many programs developed by the city mayor in order to improve this big city. Recently, “Smart City” and “Green and Clean Kampung” are the programs offered by the government in order to improve the city. Meanwhile, water problems never been exposed to the the public. Water is the main component of human living and it is our responsibility to maintain the sustainability of clean water.

Water crisis is the first global risk based on impact to society, as announced by the World Economic Forum in January 2015 (WEForum, 2015). According to Water Environment Partnership in Asia (WEPA), Indonesia water resources accounted for almost 21% of total water resources in the Asia Pacific region but in fact, clean water is becoming serious problem in Indonesia, especially in Surabaya (WEPA, n.d.). Water demand in Indonesia, especially in Surabaya, is mostly influenced by religion and culture. Since Surabaya is dominated by Moslem and most of the citizen uses bucket instead of shower when bathing, the average daily water consumption could reach 180-200 liters. This number is considered as high

consumption compared to Jakarta and Singapore which have average daily water consumption 150 liters and 151 liters respectively.

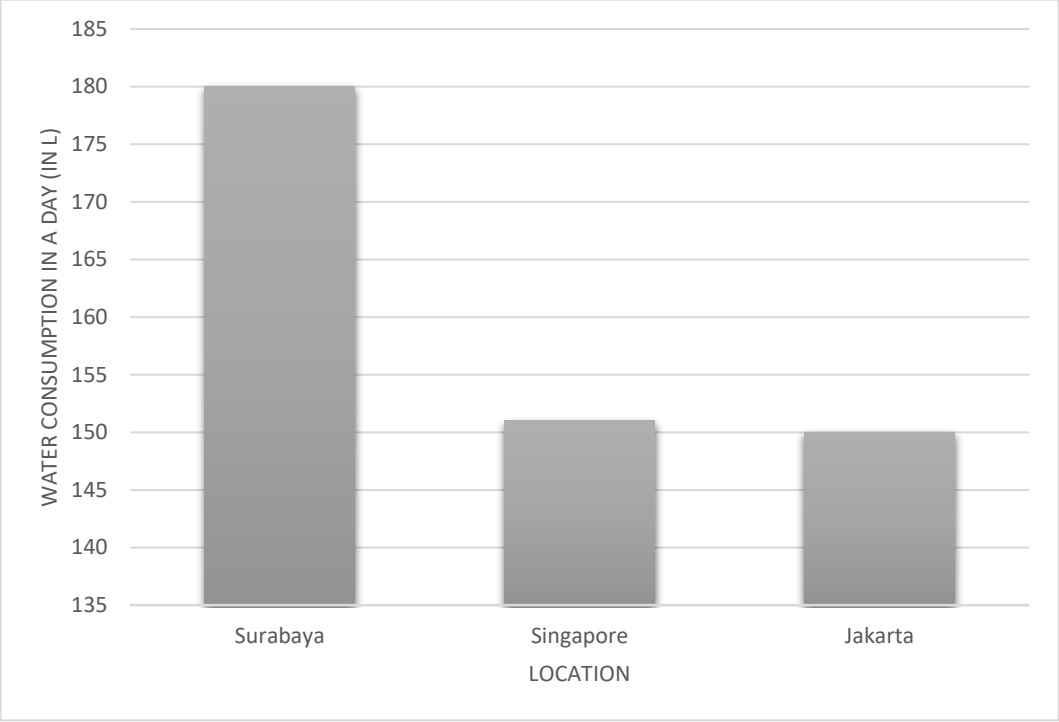


Figure 1.1 Water Consumption (SurabayaNews, 2014)

In Surabaya, clean water supply is maintained by clean water company or *Perusahaan Daerah Air Minum* (PDAM). The water consumption in Surabaya is then projected and leads to a water crisis in 2018 (SurabayaNews, 2014).

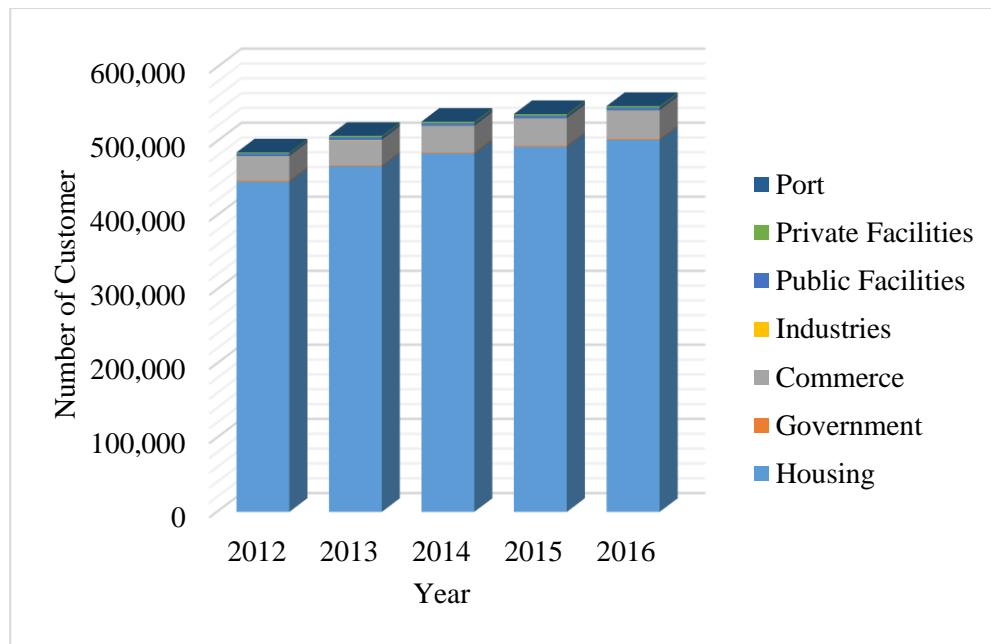


Figure 1.2 Number of PDAM's Customer (PDAM, n.d.)

Since the largest customer of PDAM is household, it could be stated that household influences the most on water consumption (PDAM, n.d.). Therefore, higher efficiency of water usage, particularly in household, has to be strived. Sanitary product manufacturers have developed eco-sanitary products. The main feature of eco-sanitary products is to reduce the use of water. Eco-toilet, for an example, replaces conventional 4 gallons per flush (gpf) with 1.6 gpf. It will save approximately 12 gallons of water per day per person, which translates into over 4000 gallons each year (PennState, 2017).

In a nutshell, eco-sanitary products have been developed to lessen water footprint (water consumption) either direct or indirect. Water footprint is a measure of human's appropriation of fresh water in volumes of water consumption and/or discharge. The water footprint can also tell how much water is being consumed by a particular country (WaterFootprint.org, n.d.).

The use of eco-sanitary products is one way to reduce water usage, thus delay the water crisis. However, up to now there is no study addresses the implementation or the use of eco-sanitary products in the society. This research tries to investigate the use of eco-sanitary products in society by investigating both demand and supply sides.

## **1.2 Problem Identification**

The problem that will be investigated in this research is twofold. The first part is to investigate the level of eco-sanitary utilization in Surabaya. Included in this part is the question to what extent society aware and understand about the water condition in Surabaya, and to what extent they are willing to change the way they use and treat water. The second part is to assess the supply side of eco-sanitary products in Surabaya. Without adequate supply, it is not possible for society to purchase and utilize the eco-sanitary products.

## **1.3 Purposes of Research**

The purpose of the research are:

1. To understand the demand side of the eco-sanitary products in Surabaya.  
The demand side will be measured by the level of awareness/level of concern towards water crisis in Surabaya and the level of utilization of the eco-sanitary products.
2. To understand the factors that influences the eco-sanitary usage.
3. To understand the willingness to change of the society toward eco-sanitary products.
4. To assess the supply side of eco-sanitary products in Surabaya.
5. To recommend policies and action plans to increase the use of eco-sanitary products in Surabaya.

## **1.4 Benefits of Research**

The benefits of the research are:

- a. For Government:
  1. Knowing the the main cause or behavior for water crisis.
  2. Mapping and identifying the main problem of eco-sanitary products supply chain in Surabaya.
- b. For Customer:
  1. Understand more about water crisis issue in Surabaya 2018.

2. Understand the function of eco-sanitary wares and how much the savings of using eco-sanitary wares.
- c. For Distributor and Retailer:
  1. Knowing the end-user perspective or voice of customer (VoC) of eco-sanitary products.
  2. Knowing the availability (supply) of eco-sanitary products in retailer/building stores in Surabaya.

## **1.5 Scope of Research**

The scope of the research is the boundaries that will be used during the research. The scope of the research is then classified into limitations and assumptions.

### *1.5.1 Limitations*

The limitations in research are determined in order to narrow the scope and focusing the research on the key problem. The limitations in this research are:

- a. Sanitary products to be discussed in this research are:
  - Bathroom faucets;
  - Urinals and toilets;
  - Showers;
  - Toilet spray;
- b. 31 kecamatan in Surabaya will be the main focus for the project Supply Demand Analysis for Eco-Sanitary Products.
- c. The demand in this research is limited only for household.
- d. The supply in this research is limited only for sanitary retailer and distributor.

### *1.5.2 Assumptions*

This subchapter explains about the assumptions used in the research. The assumptions are:

- a. There are 5 (five) people consist in one household.

- b. Faucet with aerator has maximum 8 liter/minute flowrate.
- c. The household is classified as “eco” user when they install one or more than one ESP in their home.
- d. Significant level used is 5%.
- e. e value (irrational number for regression calculation) is 2.71.
- f. Awareness to water crisis and ESP knowledge represents as one household.

## **1.6 Writing Methodology**

This research consists of six chapters, which will be explained below.

### **CHAPTER I INTRODUCTION**

In this chapter, the basic reason and problem identification of the research will be explained thoroughly. This chapter explains in detail about research background, problem identification, research limitations, research purposes, research benefits, and writing methodology.

### **CHAPTER II LITERATURE REVIEW**

Literature review scrutinizes theories that will be used in this research. This chapter explains about water overview, sanitary products, eco standards for snaitary products, transition of people decision, survey design, data display and summary, and supply/demand assessment including the forecasting method.

### **CHAPTER III METHODOLOGY**

Research methodology gives guidance of the steps or activities that are involved in the research in order to do the supply chain assessment for eco-sanitary products in Surabaya. The methodology will be explained through flowchart and description of conducted activities in the research.

### **CHAPTER IV DEMAND SIDE ANALYSIS**

Demand side analysis captures the existing demand condition. The data are collected using survey and interviews to all districts in Surabaya. The demand side

analysis includes the data of demographic profile, awareness to water crisis, sanitary facility ownership and willingness to change from the ordinary sanitary ware to eco-sanitary ware.

## **CHAPTER V SUPPLY SIDE ANALYSIS**

Supply side analysis explains about the condition of the eco-sanitary product in stores, especially in Surabaya. The data of supply side are collected using survey and interviews to the retailers and distributors. The supply side analysis includes the data of eco-sanitary market overview, monthly sales, product selling price, retailer locations, and sanitary ware manufacturer and/or importer.

## **CHAPTER VI CONCLUSION AND SUGGESTION**

This chapter contains conclusion from the research regarding the objectives of the research. The suggestion for the research will be also included in this chapter.

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## CHAPTER 2

### LITERATURE REVIEW

Literature review scrutinizes theories that will be used in this research. This chapter explains about water, sanitary products, transition of people decision, and supply/demand assessment including the forecasting method.

#### 2.1 Water Overview

Water is an unlimited source that is provided by the earth but it is not distributed evenly to the globe. This subchapter explained about the global water situation, water usage, water classifications, and water distribution.

##### 2.1.1 Global Water Situation

Less than 3% of the world's water source is fresh water, while the rest of it, is seawater and it is undrinkable (UNWater, 2006). As explained in the Figure 2.1 below, 3% over 2.5% is frozen water and it is not available for human living. The 0.5% of fresh water is stored underground and has been exploited by human to support drinking water (50%), industrial water usage (40%) and water irrigation needs (20%).

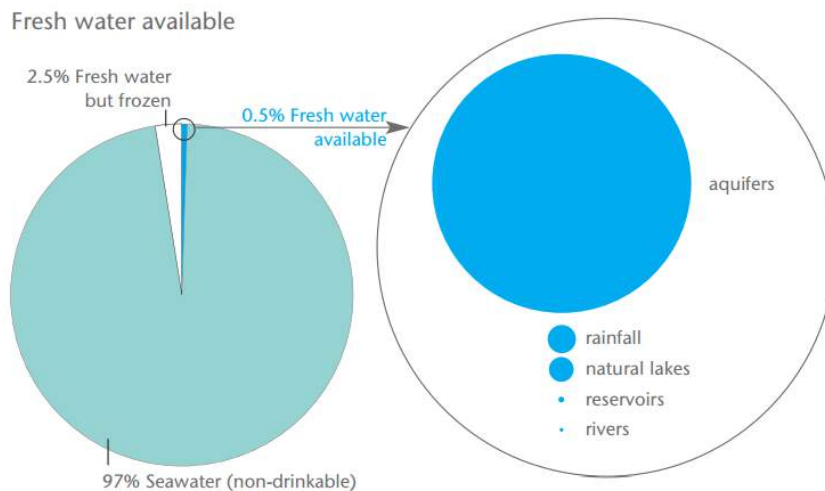


Figure 2.1 The Global Situation of Fresh Water (UNWater, 2006)

### 2.1.2 Water Cycle Process

The fresh water were created through a cycle called water cycle. The water cycle is the continuous process of water evaporating, becoming cool and condensing, and then returning to the earth in the form of precipitation (SciLearningHub, n.d.). Warm energy from the sun heats our planet that makes the water molecules at the surface of the bodies of water absorb heat and may escape into the air as water vapor. This transformation of a liquid to gas is called evaporation. The water moves up and away from the evaporation surface. The vapor molecules go up in the air and get contact with areas of low pressure. This situation makes the air expands and become cooler. The air may cooled by heat loss and form minute droplets. This transition of a gas into a liquid is called condensation. The droplets collect and form larger particles and they fall to earth. This falling droplets is calling precipitation. These droplets that fall to the earth may run off the surface or soak into the ground. Water molecules may thus be involved in evaporation, condensation, precipitation and run-off in a continuous cycle.

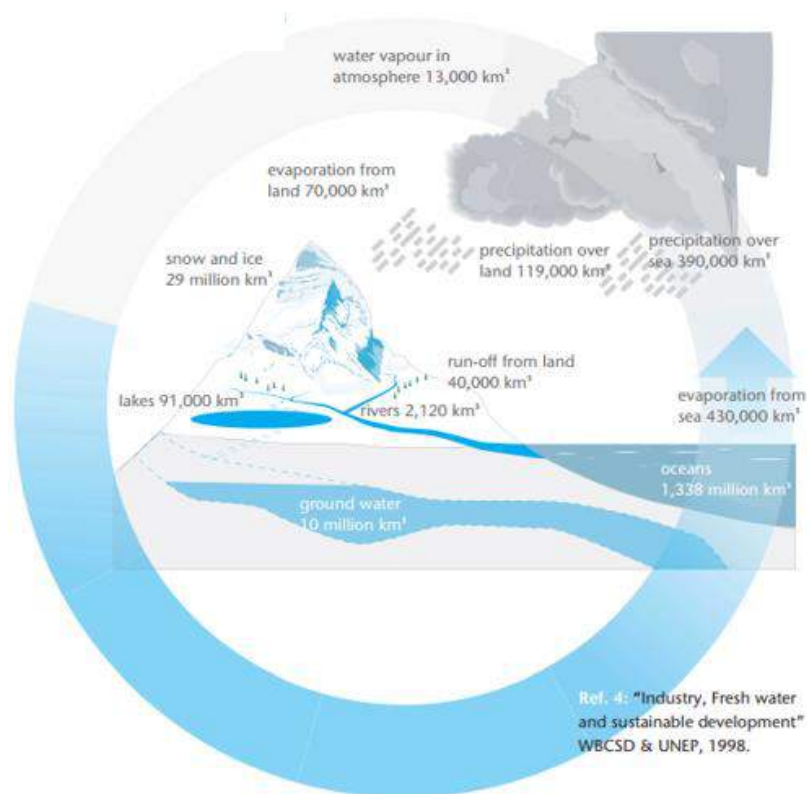


Figure 2.2 The Big Picture of Water Cycle (UNWater, 2006)

## 2.2 Sanitary Products

Sanitary refers to facilities and services for the safe disposal of human excreta, maintenance of hygienic conditions, through services such as garbage collection and wastewater disposal (UNESCO-IHE, n.d.). The two main purposes of the sanitation system are:

- Protect and promote health

Sanitation system carry the disease included in the waste away from people, toilets and homes. Using a good sanitation system means it can break the spread of the disease and prevent the spreading of water borne diseases. By reducing the spread of the disease, the health and the quality of life are improved.

- Protect the environment against pollution

The sanitation system is part of waste management. It maintains the disposal process of the waste and it could prevent the environmental pollution (air, soil, emission). Since sanitation is related to water, it could prevent contamination to the surface and ground water.




### 2.2.1 Sanitary Product Classification

The sanitary wares include hardware (facilities) and software (rules, regulation and hygiene). The sanitary hardware refers to infrastructure to support human disposal, conveyance, and solid waste. The sanitation wares are divided into three main groups, which are:

- a. Direct Sanitary Products

The direct sanitary products are sanitary products that delivers water directly to the user. These product concern about the quality of the water that will be consumed by the user. The products are described in Table 2.1 below.




Table 2.1 Direct Sanitary Products Description

| Product Figure and Name  | Description  |
|--|--|
|  <p data-bbox="260 667 587 705">Figure 2.3 Water Faucets</p>    | <p data-bbox="710 376 901 409"><b>Water Faucet</b></p> <p data-bbox="710 432 1279 795">The water faucet is commonly placed at the bathroom or kitchen sink. It is used to deliver water from the pipes to be used directly by the user. Some faucet has aerator that is placed in the faucet head, it creates no-splashing stream and often delivers a mixture of water and air.</p> |
|  <p data-bbox="240 1153 480 1191">Figure 2.4 Shower</p>        | <p data-bbox="710 813 815 846"><b>Shower</b></p> <p data-bbox="710 869 1279 1227">Shower is a tool to spray water that is used to bath. The water sprayed is either warm or cold water. There are many types of shower available in the stores. The showers are facilitated with several types of sprays so that the user can feel different sprays in one unit of shower.</p>       |
|  <p data-bbox="240 1507 544 1545">Figure 2.5 Toilet Spray</p> | <p data-bbox="710 1256 882 1290"><b>Toilet Spray</b></p> <p data-bbox="710 1312 1279 1568">Toilet spray are mostly used for wet toilets. This product is also easily found in outdoors and garden. It could spray water with high pressure according to the pressure capacity of each spray.</p>   |

b. Indirect Sanitary Product

The indirect sanitary products are sanitary products that deliver water to the user but the water is not touching in direct with the user. The product classified into indirect sanitary product is explained in Table 2.2.

Table 2.2 Indirect Sanitary Product Description

| Product Figure and Name  | Description   |
|--|---|
|  <p data-bbox="336 645 576 680">Figure 2.6 Urinals</p>                      | <p data-bbox="786 376 879 407"><b>Urinal</b></p> <p data-bbox="786 432 1356 680">The urinal is used primarily used by males. It can take the form of a container or simply a wall, with automatic or manual flushing. This urinals is intended to be utilized from a standing position.</p>   |
|  <p data-bbox="312 1021 735 1057">Figure 2.7 Western Style Toilets</p>      | <p data-bbox="786 707 884 739"><b>Toilets</b></p> <p data-bbox="786 763 1356 958">The toilets are commonly used in every building and construction. It is used for the storing or disposal of human urine and feces.</p>  |
|  <p data-bbox="312 1279 679 1368">Figure 2.8 Indonesian Squat Toilets</p> | <p data-bbox="786 987 1356 1400">There are two types of toilets used in Indonesia as shown in the Figures. The western style is commonly used in modern houses and buildings. While the squat toilets are more common in private houses rather than the public places. These toilets are provided with flushing and no-flushing system.</p> |

### 2.2.2 Sanitary Product Supply Chain

In East Java, the market of sanitary products creates its own supply chain diagram. The supply chain diagram of sanitary products in East Jawa will be explained through Figure 2.14 for imported latrine products and Figure 2.15 for local latrine products. This section summarizes the flow of sanitary product from manufacturers to end-customer.

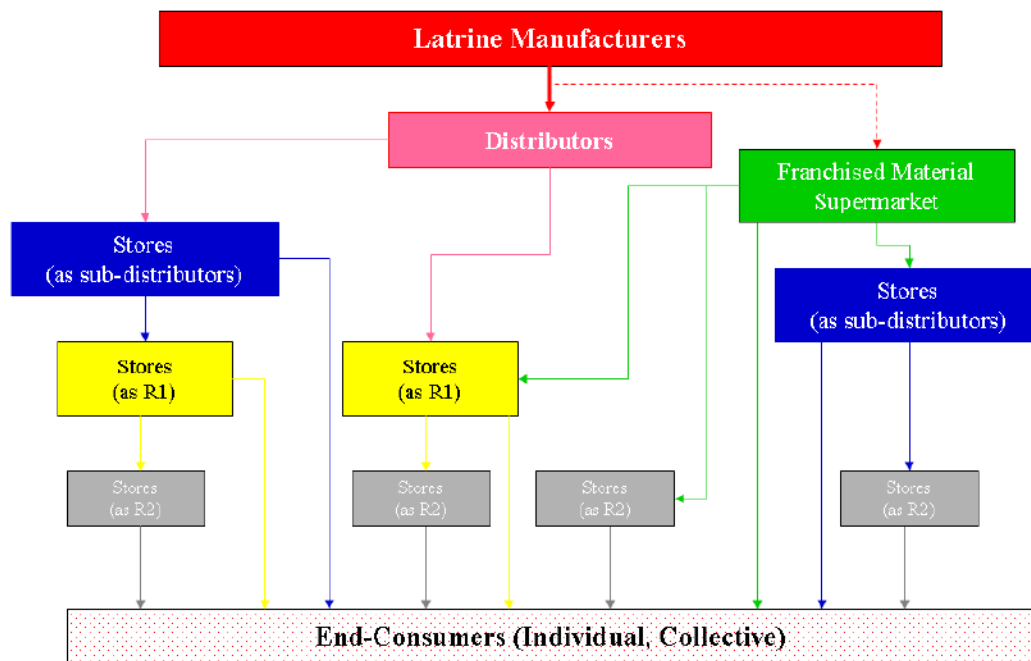


Figure 2.9 Latrine Supply Chain Map for Foreign Products in East Java (Nielsen, 2009)

The Figure 2.14 shows the supply chain of latrine of imported products that are spread in East Java. Distributor of latrine manufacturers for foreign brands become their main channel to distribute the latrine products to the end-customer. The franchised material supermarkets such as Mitra10 also function as distributors and provide products for smaller stores or end-customers. The distributor and sub-distributor generally have sales team that will act as a bridge between them. The sales teams are responsible for handling orders, deliveries as well as part of payment collection. The sales team in the supply chain will also actively approach retailers and build working relationship with partners.

The local brands that located in East Java has supply chain as shown in the Figure 2.15. The manufacturers located in East Java usually do not have specific distributors but the sales person who will approach directly the stores or retailers and build working relationship. These stores and retailers will also function as sub-distributors according to their scope and consumer base.

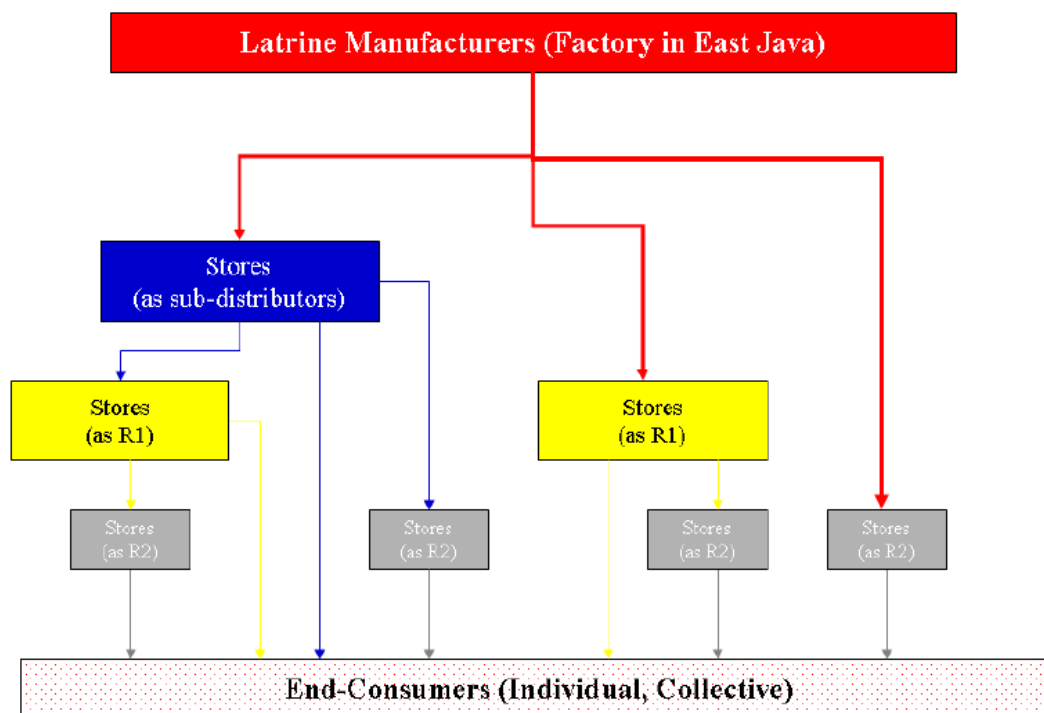


Figure 2.10 Latrine Supply Chain Map for Local Products in East Java (Nielsen, 2009)

The end-customer of the latrine supply chain diagram is differentiated into two types, which are individual buyer and collective buyer.

### 2.3 Eco Standards for Sanitary Products

All of the products shown in the previous Tables has their own specification of energy and/or water use. The next tables, Table 2.3 until Table 2.5, shows the eco standards comparison between Indonesia, California, Hongkong, Australia and USA. The USA followed two standards that are slightly the same, those are EPAct and WaterSense.

Table 2.3 Eco Standards for Sanitary Products

| No | Sanitary Product | Eco Standards   |   |   |
|----|------------------|---|---|---|
|    |                  | Standard Nasional Indonesia   | USA EPAct   | USA WaterSense  |
| 1  | Water Faucet     | [SNI 03-7065-2005] SNI about plumbing installation planning. There is no specific explanation about standardization of water flowrate | [EPAct 1992, EPAct 2005] for Residential Bathroom Faucets 2.2 <i>gpm</i> at 60 psi  | [WaterSense or ENERGY STAR] for Residential Bathroom Faucets   1.5 gpm at 60 psi (no less than 0.8 gpm at 20 psi)   |
|    |                  | [Peraturan Menteri Pekerjaan Umum dan Perumahan Rakyat No.2 PRT M 2015   about Green Building Standards] 8 L/minute or 2.1 gpm        | [EPAct 1992, EPAct 2005] for Commercial Faucets   2.2 gpm at 60 psi   Note: For all public lavatories 0.5 gpm maximum. 0.25 gallons per cycle for <i>metering faucets</i> |   |
| 2  | Urinoir/Bidet    | [SNI 03-7065-2005] SNI about plumbing installation planning. There is no specific explanation about standardization of water flush    | [EPAct 1992, EPAct 2005] for Urinals   1.0 <i>gpf</i>   | None  |
|    |                  | [Peraturan Menteri Pekerjaan Umum dan Perumahan Rakyat No.2 PRT M 2015   about Green Building Standards] 4 L/flush or 1.05 gpf        |   |   |
| 3  | Toilets          | [SNI 03-7065-2005] SNI about plumbing installation planning. There is no specific explanation about standardization of water flush    | [EPAct 1992, EPAct 2005] for Residential Toilets 1.6 <i>gpf</i> / for Commercial Toilets 1.6 gpf  | [WaterSense or ENERGY STAR] for Residential Toilets 1.28 gpf with at least 350 gram waste removal   for Dual Flush 1,40 gpf in reduces flush mode and 2.00 gallons per flush in full flush mode |
|    |                  | [Peraturan Menteri Pekerjaan Umum dan Perumahan Rakyat No.2 PRT M 2015   about Green Building Standards] 6 L/flush or 1.58 gpf        |   |   |
| 4  | Shower           | [SNI 03-7065-2005] SNI about plumbing installation planning. There is no specific explanation about standardization of water flowrate | [EPAct 1992, EPAct 2005] for Residential Showerheads   2.5 gpm at 80 psi  | None  |
|    |                  | [Peraturan Menteri Pekerjaan Umum dan Perumahan Rakyat No.2 PRT M 2015   about Green Building Standards] 9 L/minute or 2.37 gpm       |   |   |



Table 2.4 Eco Standards for User Interface Sanitary Products (cont.)

| No | Sanitary Product | Eco Standards               |  |                |
|----|------------------|-----------------------------|--|----------------|
|    |                  | Standard Nasional Indonesia | USA EPAAct   | USA WaterSense |
| 5  | Toilet Sprays    | None                        | [EPAAct 1992, EPAAct 2005] for Pre-Rinse Spray Valves   Flow rate $\leq$ 1.6 gpm (no pressure specified) | None           |

Table 2.5 Eco Standards for User Interface Sanitary Products (cont.)

| No | Sanitary Product | Eco Standards   |   |   |
|----|------------------|---|---|---|
|    |                  | California  | Hongkong  | Australia   |
| 1  | Water Faucet     | [Federal and State Standards for Federally-Regulated Appliances] for Lavatory 1.2 gpm at 60 psi   for Kitchen Faucets 1.8 gpm at 60 psi   for Public Lavatory Faucet 0.5 gpm at 60 psi   for Metering Faucets 0.28 gallons per cycle                  | None  | [Water Efficiency Labelling and Standards] less than 6 L/minute (1.58 gpm) with aerating model faucets or flow restrictor faucets |
| 2  | Urinals/Bidet    | [Federal and State Standards for Federally-Regulated Appliances] for Wall Mounted Urinals 0.125 gpf   for Other Urinals 0.5 gpf   | None  | [Water Efficiency Labelling and Standards] 1.5 L/flush (0.39 gpf) for urinoir products.   |
| 3  | Toilets          | [Federal and State Standards for Federally-Regulated Appliances] for Gravity Tank-Type Water Toilets 1.6 gpf   for Flushometer Tank Water Toilets 1.6 gpf   for Electrimechanical Hydraulic Water Toilets 1.6 gpf   for Blowout Water Toilets 3.5 gpf | [Government - WSD Circular Letter No. 4/2000 of 31 October 2000] for Single Flush toilet less than 7.5 litres/flush | [Water Efficiency Labelling and Standards] 5.5 L/flush (1.45 gpf) for closet products   |
| 4  | Shower           | [Federal and State Standards for Federally-Regulated Appliances] for Showerheads 2.5 gpm at 80 psi  | None  | [Water Efficiency Labelling and Standards] 6-7 L/minutes (1.58 gpm) for three star rated showers                                  |
| 5  | Toilet Sprays    | None  | None  | None  |

## 2.4 Survey Design

Data can generally be classified into two categories: populations and samples (Evans & Olson, 2003). A population consists of all item of interest for a particular decision or investigation. A sample is a subset of a population. Since a wide variety of data cshould be obtained, survey data have numerous uses. Surveys are the most flexible means of obtaining data from respondents. Surveys are primary means of obtaining information about respondents' motives, attitudes, and preferences (Malhotra, et al., 2002). The survey is done to all District and Kelurahan in order to be able to represent the existing condition of Surabaya. The survey is done by interviewing every respondent that meets the requirement. The survey is conducted to obtain data from both supply and demand side. Surveys are also useful for determining product image, measurement and positioning.

Before conducting the survey, the sample size is calculated in order to determine how many surveys should be done. The data gathered using stratified sampling. Stratified sampling refers to the sampling designs where the finite population is partitioned into several subpopulations, called strata, and sample draws are made independently across each strata (Kim, n.d.). A stratified sample would choose a sample of individuals in each ward proportionate to its size (Malhotra, et al., 2002). The benefit if stratified random sampling is its ability to facilitate meaningful comparisons between strata. Strata can be defined as the different levels of supply and demand, different facility types, or different ownership of the facilities (USAID, 2009).

Sampling plan is a description of the approach that will be used to obtain samples from population prior to any data collection activity (Evans & Olson, 2003). The method that is used to determine the sample size of the survey is using the formula as explained below.

*Formula for calculating a sample for proportions:*

$$n_0 = \frac{Z^2 pq}{e^2} \quad (1)$$

Where:

$n_o$  = sample size  
 $Z$  = confidence level  
 $p$  = probability of picking a choice  
 $q$  = probability of not picking a choice  
 $e$  = margin of error

## **2.5 Data Display and Summary**

Statistical measures provide an effective and efficient way of obtaining meaningful information. In order to inform the survey result, the data should be displayed using the right tables or charts and summarized appropriately using the correct method. The descriptions below explain the theory used to display and summarize the data gathered in this research.

### *2.5.1 Descriptive Statistics*

Statistics are summary measures of population characteristics from samples. Descriptive statistics refers to a collection of quantitative measures and ways of describing data (Evans & Olson, 2003). This includes frequency distributions and histograms, measures of central tendency (mean, median, mode), and measures of dispersion (range, variance, standard deviation).

### *2.5.2 Graphical Display Methods*

To illustrate the use of descriptive statistics, the graphical display methods is provided in this research.

#### a. Bar Chart

Bar charts are commonly used and it is a clear way of presenting categorical data or any ungrouped discrete frequency observations. It also provides a simple method of quickly spotting simple patterns of popularity within a discrete data set.

#### b. Histograms

Before computing any statistical measures, frequency distribution is helpful to summarize the data. Frequency distribution is a tabular summary showing the frequency of observation in each class. While histograms is

a graphical depiction of a frequency distribution in the form of a column chart. Producing a histogram is much like producing a bar chart and in many respects can be considered to be the next stage after producing a grouped frequency table.

c. Pie Chart

Pie chart is a simple diagram for displaying categorical or grouped data. It shows the proportions of a whole. A pie chart consists of a circle divided into segments, one segment for each category. The size of each segment is determined by the frequency of the category and measured by the angle of the segment.

d. Time Series Plot

Time series plot is data collected over time and connected by lines. This plot clearly shows two things. First, there is an upwards trend to the data. Second, There is some regular variation around this trend

### 2.5.3 *Crosstabulations*

Crosstabulation, also known as contingency table analysis, is one of the most useful analytical tools and is a mainstay of the market research industry. Crosstabulation is analysis of data in tables and is also called contingency table analysis. It deals with analysis of tabular data, which implies analysis of categorical variables (Garson, 2012). Crosstabulation procedure is designed to summarize two columns of attribute data. It constructs a two-way table showing the frequency of occurrence of all unique pairs of values in the two columns.

The Chi-square statistic is the primary statistic used for testing the statistical significance of the crosstabulation table. Chi-square tests whether or not the two variables are independent. If the variables are independent, or have no relationship, then the result of the statistical test will be “non-significant”. It means that there is no relationship between the variables.

## 2.6 **Categorical Response Data**

Categorical variable has a measurement scale consisting of a set of categories. The development of methods for categorical variables was stimulated

by research studies in the social and biomedical sciences. Categorical scales are soaked in the social sciences for measuring attitudes and opinions. Categorical scales are also frequently occur in the behavioral sciences, epidemiology and public health, genetics, zoology, education, and marketing (Agresti, 1990). Categorical variables are many types. The types are explained below.

a. Response-Explanatory Variable Distinction

Most statistical analyses distinguish between response (or dependent) variables and explanatory (or independent) variables. For instance, regression models describe how the mean of a response variable, such as selling price of a house, changes according to the values of explanatory variables, such as footage and location.

b. Nominal-Ordinal Scale Distinction

Categorical variables have two primary types of scales. Variables having categories without a natural ordering are called nominal. Meanwhile, many categorical variables do have ordered categories. Such variables are called ordinal.

c. Continuous-Discrete Variable Distinction

Variables are classified as continuous or discrete, according to the number of values they can take. Actual measurement of all variables occurs in a discrete manner, due to precision limitations in measuring instruments.

d. Quantitative-Qualitative Variable Distinction

Nominal variables are qualitative in which distinct categories differ in quality, not in quantity. Interval variables are quantitative in which distinct levels have differing amounts of characteristic of interest.

## **2.7 Independence Test (Pearson Chi-Square)**

The chi-square test for independence of two variables begins with a cross classification table which illustrates conditional probability and the independence or dependence of particular events. The chi square test of independence allows the researcher to determine whether variables are independent of each other or whether there is a pattern of dependence. The chi-square test of independence is very

general, and can be used with variables measured on any type of scale, nominal, ordinal, interval, or ratio. The only limitation to use this test is that the sample sizes must be sufficiently large to ensure that the expected number of cases in each category is five or more. This rule can be modified, butas with all approximations, larger sample sizes are preferable to smaller sample sizes. The chi square statistic can be used to test any contingency or cross classification table for independence of the two variables.

The test for independence of X and Y begins by assuming that there is no relationship between the two variables. The hypotheses are:

Ho: No association between X and Y

Ha: There are some association between X and Y

The chi square statistic computed from the observed and expected values is calculated, and if this statistics is in the region of rejection of the null hypothesis, then the assumption of no relationship between X and Y is rejected. If the chi square statistic is not in the critical region, then the null hypothesis of no relationship is not rejected.

## 2.8 Logistic Binary Regression

The logistic binary regression is appropriate when the response takes one of only two possible values representing success and failure, or more generally the presence or absence of an attribute of interest. The response of this type of regression (Y) is binary, assuming only two values that for convenience coded as one or zero (Agresti, 1990). Generally, logistic regression is well suited for describing and testing hypotheses aboutrelationships between categorical outcome variable and one or more categorical or continous predictos variables (Peng, et al., n.d.). The logistic regression model is:

$$\pi_i = \frac{e^{(\beta_o + \beta_1 X_{1i} + \beta_2 X_{2i} + \dots + \beta_k X_{ki})}}{1 + e^{(\beta_o + \beta_1 X_i + \beta_2 X_{2i} + \dots + \beta_k X_{ki})}} \quad (2)$$

Rather than focusing only on values of the parameter estimates, focus for a logistic regression is often on odds and odds ratio. An odds ratio greater than 1 is an indication that the odds for A are larger than the odds for B. Since odds and odds ratios are constructed from probabilities, it can never be negative.

Goodness-of-fit statistics assess the fit of a logistic model against actual outcomes. The inferential goodness-of-fit test is Hosmer-Lemeshow test suggesting that the model was fit to the data well. In other word, the null hypothesis of a good model of fit to data was tenable (Peng, et al., n.d.).

## **2.9 Demand/Supply Assessment**

Supply/demand assessment is used for understanding of markets. It is critical to maximize the potential and minimize risk. The supply/demand assessment includes two tools, which are the supply/demand analysis and gap analysis process.

In this research, the supply/demand assessment is to understand the demand side by investigating the level of eco-sanitary utilization in Surabaya and also the supply side of eco-sanitary products in Surabaya. This research also includes the forecasting method in order to predict the future condition of eco-sanitary product supply and demand. The forecasting is based on the data collection from questionnaire.

### **2.9.1 Demand Analysis**

The forecasting method is done in this analysis in order to capture the future demand condition of sanitary product. The stakeholders of the demand analysis are the end-consumer. The end-consumer are divided into two, which are individual buyer and collective buyer. Individual buyers are household owners who buy sanitary products in small numbers for personal use. Meanwhile, collective buyers are contractors who buy sanitary products in a larger number for a specific construction project such as public facilities, residences, office buildings, etc.

The data collected in the demand side are:

- a. Demographic Profile

The demographic profile is a socioeconomic characteristic of a population expressed statistically. The information that contained in demographic profile are gender, age, religion, education, occupation, income, spending, building ownership and the environment type.

b. Awareness to Water Crisis

Water crisis is the next milestone that Surabaya will face in the nearly future. Therefore, the citizen should be more aware to this issue and expected be more conserve to the clean water in Surabaya.

c. Sanitary Facility Ownership

Sanitary facility ownership shows what is the most compulsory ware that is being used for every user and also put more attention on what type of preferable brand for sanitary ware.

d. Willingness to Change

Willingness to change or the ability to change is the measure of the cognitive buy-in to the change. In this research, the willingness to change refers to the measure of sanitary user for willing to change to use eco-sanitary wares.

### 2.9.2 *Supply Analysis*

In supply analysis, the supply source is determined at the early stage. The supply curve is constructed after the database of all current capacity is constructed. The forecasting method is necessary to be done in this analysis in order to explain the future condition of the supply of the sanitary product.

In this research, the supply side stakeholders are retailer, manufacturer and/or distributor. Retailers are defined as stores that sell sanitary products components to end-customer and/or smaller retailers. Manufacturers are defined as the company that is responsible to produce the product and be able to sell them to the direct customer or the retailer through distributors.

The data collected in the supply side are:

a. Sanitary Market Overview

The sanitary market overview includes the system which let the purchaser and seller to invent various informations and accomplish an



exchange of commodity and service. The market overview of sanitary wares take place in Surabaya. The data is collected through survey and interview.

b. Sales and Pricing of Sanitary Products

The sales and pricing of sanitary products informs the differences between sanitary ware and eco-sanitary wares in terms of pricing and sales in each period.

c. Retailer Classification and Locations

The retailer is then classified into three types, which are low-level, middle-level, and upper-level of retailer. The spread of those three levels will be captured in Surabaya locations in order to map the location of the sanitary product retailer and the residence (customer).

d. Sanitary Ware Manufacturer and Importer

The sanitary ware manufacturer and importer is interviewed to give producer perspective about sanitary market.

### 2.9.3 *Gap Analysis*

The gap analysis synthesizes the data gathered in the demand analysis and supply analysis. The result to the gap analysis will identify how much the gaps and surpluses in the nearly future.

A gap indicates a future shortage of the product required. By identifying the gap well in advance, the strategies can be appropriately planned to prevent the projected gap from becoming a problem. Meanwhile, the surplus indicates the excess product required. Again, an advance planning will allow strategies to be implemented in order to minimize the adverse impact in the nearly future.

## 2.10 **Summary of Previous Researches**

This part explains the summary of the previous researches about the supply demand analysis which use the similar method as it used in this research.

Table 2.6 Summary of Previous Researches

| Parameter | Previous Research  |   |   |  |
|-----------|--|---|---|--|
| Year      | 2008   | 2009  | 2011  | 2013   |
| Type      | Field Note   | Research Report   | Master Thesis   | Research Report  |
| Author    | Water Sanitation Program   | Nielsen Indonesia   | Dian Titi Indrasari   | World Bank Group   |
| Title     | Sanitation Demand and Supply in Cambodia   | Total Sanitation and Sanitation Marketing Research Report   | Analisa Supply-Demand Kapasitas Bandwidth Internasional dalam Penyelenggaraan Jasa Interkoneksi Internet (NAP) di Indonesia | Bandar Lampung Water Supply and Demand Assessment  |
| Object    | Water Sanitation Program in Cambodia   | Water Sanitation Program in East Java   | Jasa Interkoneksi Internet (NAP) in Indonesia   | Australian AID in Bandar Lampung   |
| Method    | Surveys in both rural and urban settings using interviews and FGD, Supply and demand initiatives                     | Quantitative and qualitative analysis in demand-side, Supply-side analysis  | Supply-demand forecasting using time series, Supply-demand balance  | Water demand projections, Willingness to connect, Future supply sources  |
| Output    | Increase latrine purchase and installation via market forces on both the demand and supply dimensions of the market. | Market diagnostic and assessment of constraining factors of sanitation markets, definition of marketing goals, formulation of marketing strategies, development of plans, implementation of program activities and monitoring, and evaluation of program performance. | Analysis of future supply-demand projections. Recommendation on NAP regulation.   | Identifying and studying current and future demand projections and water supply sources taking into the capability to meet current or future additional demand, sustainability of supply, competing uses, relevant regulations and availability of obtaining abstraction permits and likely costs of implementing the proposed strategy. |

There are 4 researches that summarized in this subchapter. The 3 out of 4 research objects took place in Indonesia. The approach used in the researches to analyze the supply-demand balance is by collecting data for both supply and demand balance side using interview and surveys.

There are two researches that go further by implementing the forecasting method in order to forecast the future condition. The supply-demand assessment in Bandar Lampung used arithmetic and geometric forecasting method while in supply-demand analysis for bandwidth capacity used the time series forecasting method. None of this research highlight about eco-sanitary product and the method to forecast with insufficient historical data.

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## **CHAPTER 3**

### **METHODOLOGY**

The research methodology provides guidance of steps or activities that involved in the research in order to do the supply chain assessment for eco-sanitary products in Surabaya.

#### **3.1 Preliminary Literature Study**

The purpose of preliminary study is to identify and formulate the problem of Supply-Demand Analysis of Eco-Sanitary Products in Surabaya. This phase consists of two main activities which are literature review and direct observation.

##### *3.1.1 Literature Review*

Literature review is done to collect any relevant information and gain knowledge or deeper insight regarding the existing problem in the research. The information in literature review relates to the main topic in the research such as the sanitary products, eco standards for sanitary products, survey design, data display and summary, transition of people behavior, and supply-demand assessment.

##### *3.1.2 Direct Observation*

The direct observation captures the real or current situation of the object observed by interviewing all observed objects. The situation is observed from two sights which are the demand side and the supply side.

- Demand Side

The demand side observation aimed to obtain consumer point of view and also the level of usage of eco-sanitary product. The demand side observation objects are the households, commercial facilities, and public facilities.

- Supply Side

The supply side observation aimed to obtain the supplier point of view about selling the eco-sanitary product. The supply side observation objects are retailer or wholesaler, manufacturer and distributor of eco-sanitary products.

### **3.2 Questionnaire and Survey Design**

The survey design was made in the early stage of the research and it was part of planning process before conducting survey to household nor supply side. The survey design starts with the questionnaire design. Since the survey method is one-by-one interview, the questionnaire was made to be the outline of the interview process in the survey. There are three surveys done in this research which are household survey, retailer survey, and distributor survey. Each of the survey has different questionnaire design. After the questionnaire was made, the sample size is determined at the design phase in order to determine how many samples should be surveyed.

### **3.3 Data Collection**

Data collection aimed to show the process of data collecting that will be used in the research. The data collection will be divided into two types, which are primary data and secondary data. The data gathered is from questionnaire that is spreaded to demand side and supply side. The survey was done by interview.

#### *3.3.1 Data Collection from Supply Side*

In order to obtain sufficient data from the supply side, the information should be collected completely in this process. The data needed for the supply side is the product brand, product type, product selling price, the retailer locations, manufacturer and importer of eco-sanitary products.

#### *3.3.2 Data Collection from Demand Side*

The demand side goes further to the end-customer or the user of eco-sanitary products. The data needed to support the demand side is the demographic profile,

awareness to water crisis, sanitary facility ownership, willingness to change from ordinary sanitary wares to eco-sanitary wares and willingness to pay.

### 3.4 Data Processing and Tabulation

Data processing and tabulation includes all process that are used to arrange the collected data into a useful information. The data processing has several process which are identifying factors that can affect the ESP usage using logistic binary regression so it can be used as forecasting for future state of the supply-demand for eco-sanitary products. In order to classify the sanitary product into eco or not, the standards that were used are described in Table 3.1.

Table 3.1 Eco Standards for Sanitary Product

| No | Sanitary Products | Standard Used   | Specification |
|----|-------------------|---|---------------|
| 1  | Faucets           | Indonesia – Peraturan Menteri<br>Green Building Standards | 8 L/minute    |
| 2  | Urinals           | Indonesia – Peraturan Menteri<br>Green Building Standards | 4 L/flush     |
| 3  | Toilets           | Indonesia – Peraturan Menteri<br>Green Building Standards | 6 L/flush     |
| 4  | Showers           | Indonesia – Peraturan Menteri<br>Green Building Standards | 9 L/minute    |
| 5  | Toilet Sprays     | USA – EPAct   | 6 L/minute    |

#### 3.4.1 Influencing Factor for ESP Usage

ESP usage is affected from several factors. The factors that are suspected to affect the ESP usage is tested. Before testing the influencing factors, the factors are determined based on the questions that represent household.

#### 3.4.2 Willingness to Change and Willingness to Pay

Since there are no historical data for the eco-sanitary use in Surabaya, the approach to do the forecasting is by using static forecasting by calculating the willingness to change. In this part of process, the drivers are affecting people to

change from using ordinary sanitary to eco sanitary. The willingness to pay shows how much the increased price to afford eco-sanitary product to the customer/user.

### **3.5 Data Analysis**

The data analysis and the interpretation consist of the discussion of the previous process, data processing and tabulation. In this discussion, it will explain supply-demand balance and the gap analysis.

#### *3.5.1 Supply-Demand Analysis*

The demand analysis discuss which factors that were the main driver for people using eco-sanitary product. The discussion also focuses on the supply side analysis. The supply analysis captures the retailer and distributors of the sanitary product. The supply-demand balance will analyze the balance between supply and demand in the current state and the future state, considering the forecasting method that is done using logistic binary regression.

#### *3.5.2 Gap Analysis*

The gap analysis discuss about the effect of the gap between supply and demand to the supply-demand actors. This discussion also analyze the possible reason of the unwanted gap between supply and demand and how to overcome the problem by applying new scenarios.

### **3.6 Conclusion and Suggestions**

The last step of the research is the formulation of research conclusion. The conclusion of the research is formulated from the problem identification deployed at the early stage of the research. Beside the conclusion, the suggestion should be formulated as well. The suggestion not only addressing the current condition but also for the future condition in regrads to eco-sanitary products in Surabaya.

### **3.7 Research Methodology Flowchart**

The methodology consists of the research activities from the beginning until the end. Through the flowchart shown in Figure 3.1 and Figure 3.2, the detailed



procedure for this research is explained. The first activity is problem identification and followed by preliminary literature study. The problem identification process is the very first activity in order to capture the main problem and determining the scope of the research. Meanwhile, the preliminary literature study is divided into two, which are literature review and direct observation. The literature review is conducted parallel with the direct observation in order to support each activities and be the baseline for the next activities.

After that, the data collection will be done using survey questionnaires to get data from demand side and supply side. The mapping of the existing supply-demand could be done only if the data collection are done. The forecasting method will use static forecasting method using Logistic Binary Regression method approach. The willingness to change and the willingness to pay is analyzed in order to know how far people will change from using ordinary sanitary to eco-sanitary product. After the demand is analyzed, the supply side analysis will discuss further about the current condition of the eco-sanitary product available in the market. The last step of this research is analyzing the gap between the supply and the demand. Improvement with suggestion is desired as the output of this research.

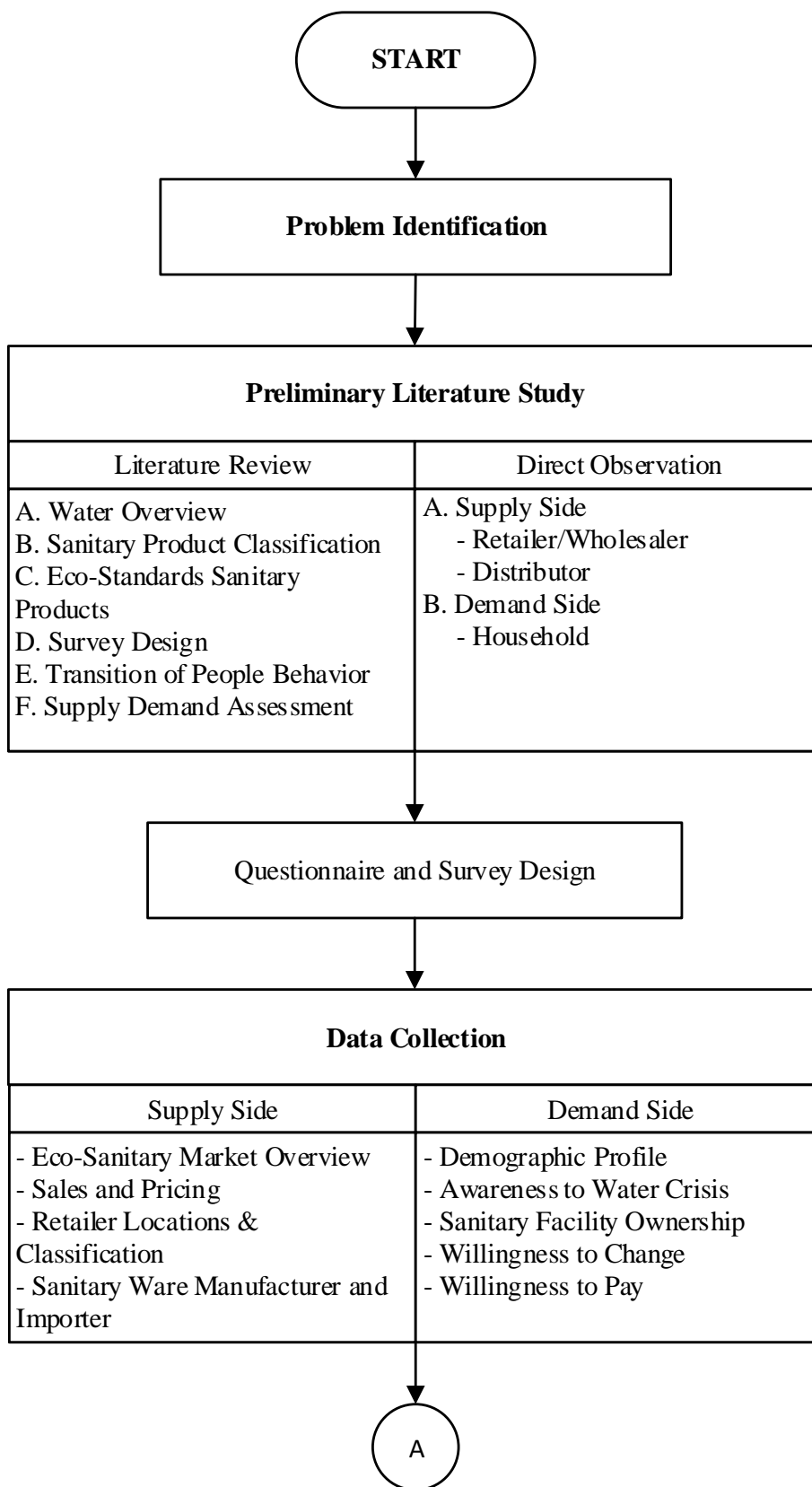


Figure 3.1 Research Methodology Flowchart

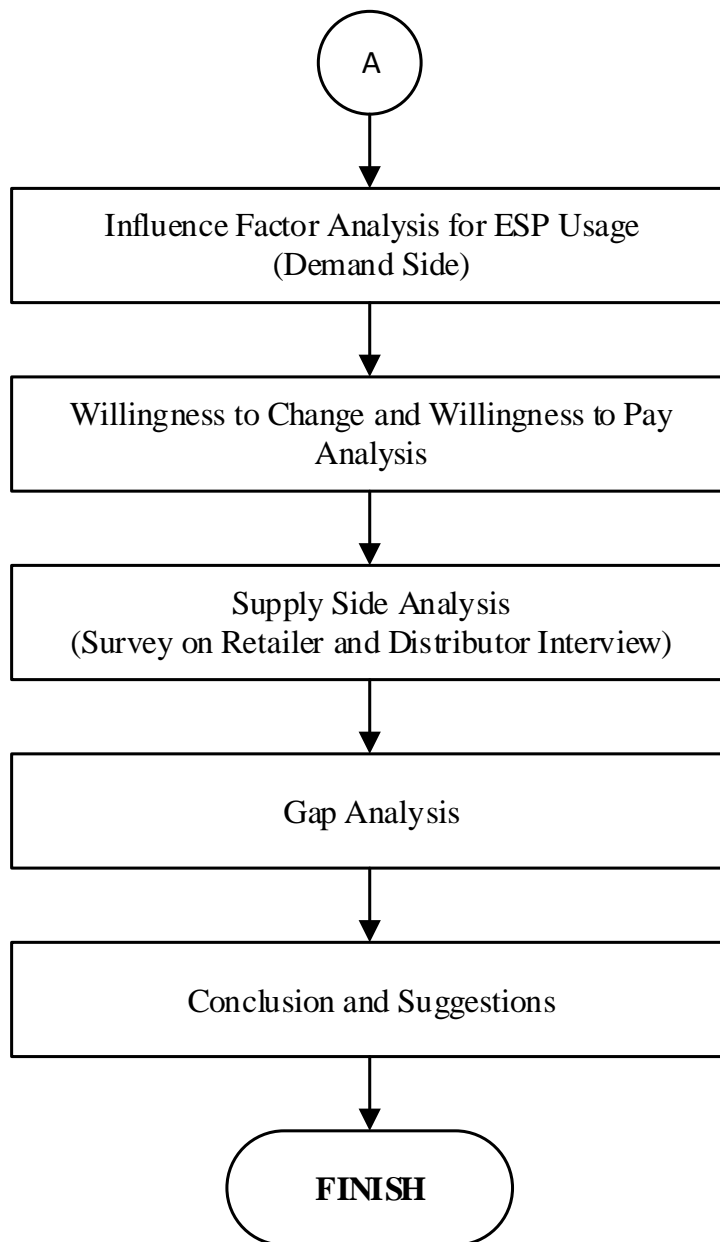


Figure 3.2 Research Methodology Flowchart (cont.)

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## **CHAPTER 4**

### **DEMAND SIDE ANALYSIS**

The user of eco-sanitary is dominated by household user. Therefore, survey was done from with household. Household consists of people in a family or other group that are living together in one house.

Demand side analysis captures the existing demand condition which means that the demand analysis captures the condition in household. The data are collected using survey and interviews to all districts in Surabaya. In subchapter 4.1 there will be explanation of the survey design and the determination of the sample size of household survey. The survey was done to gather information from the demand side. The demand side analysis includes the data of demographic profile, water usage, monthly water bill, awareness to water crisis, sanitary facility ownership, willingness to change and the main driver to change from the ordinary sanitary ware to eco-sanitary ware.

#### **4.1 Household Survey**

Since this research is included as exploratory research, there is no sufficient primary data provided in journals or other official reports. The data collection method for this research should be done using surveys to get the primary and secondary data. The survey purpose is to get the information related to the topic in the research. In order to conduct qualified survey, the the questionnaire should be designed before doing the survey. In this subchapter, there will be further explanation about the questionnaire design and the survey design.

##### *4.1.1 Questionnaire Design*

Questionnaire is very important to make outline for the survey. The questionnaire is used not only for this research but the questionnaire is designed for bigger scope of research which has cooperation with LPPM. So, only several sections of questionnaire that will be used as the main discussion for this research.

The other sections which belong to another research has close relation with water crisis problem.

The questionnaire is used to gather information needed in this research. The questionnaire consists of three pages. The whole questionnaire that is used for three researches. The questionnaire is provided in Appendix I.

Questionnaire was used to obtain the primary data of this Supply and Demand Analysis research. The questionnaire was designed before conducting survey and consist five sections, which are:

- Section A: Respondent Information and Demography
- Section B: Drinking Water and Clean Water Usage
- Section C: Sanitary Product Usage
- Section D1: Willingness to Change
- Section D2: Willingness to Pay

The factors determination for the questionnaire is using references from the previous researches/journals/articles. The references used is recapitulated in Table 4.1.

Table 4.1 Questionnaire Factor Determination

| No | Journal/Report/Article Title                                 | Factors used in Questionnaire for WTC  |
|----|--|--|
| 1  | Total Sanitation and Sanitation Marketing Research Report    | Government program for better sanitation   |
|    |  | Social and economic condition  |
|    |  | Geographical condition   |
|    |  | Funding/subsidy that might be given by World Bank or government                                    |
|    |  | Knowledge and information about sanitary   |
| 2  | Cerdas Memilih Produk Saniter (Tempo.co Article 2013)        | The availability and accessibility of comprehensive overview of eco sanitary product in the market |
| 3  | Efficiency Standards from International Solar Energy Society | Limitation of clean water usage  |
|    |  | Indonesian buildings permit requires the installation of eco-sanitary products                     |

This research explore more on the how the relation between demography information (section A) to other section in the research questionnaire. In the otherhand, not all questions from section B, C, and D will be used in this research.

Only questions related to eco-sanitary product usage that will be used in the data calculation and data analysis.

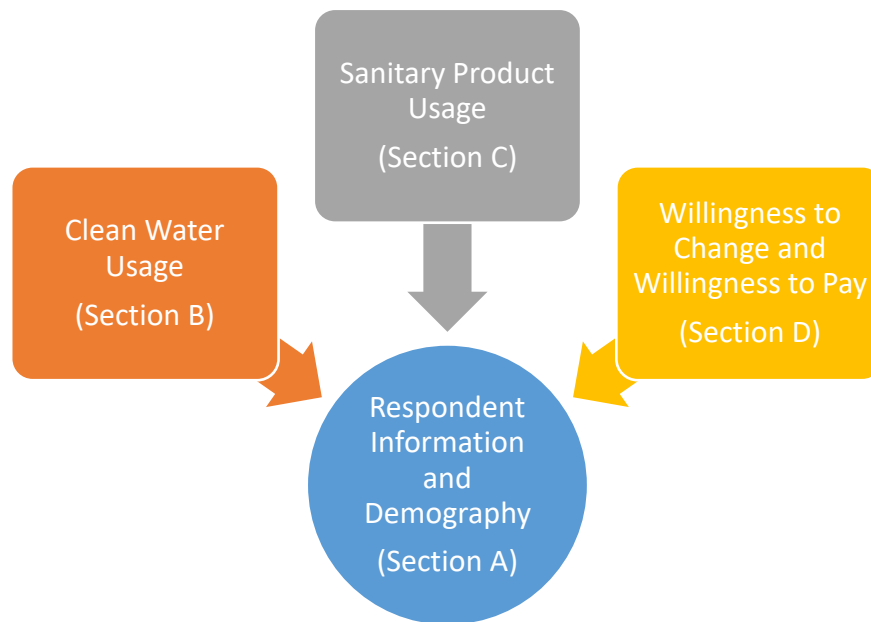


Figure 4.1 Relationship between Section in Questionnaire

#### 4.1.2 Survey Design

The survey design was done before the survey. The survey design includes determining number of sample size and the time needed to conduct the survey. The determination of the sample size is done to determine how many of the respondents should be put in the survey. The sample size is calculated using formula of sample size with proportion. The formula explanation is provided in subchapter 2.5. The survey was held to all household in Surabaya, which includes 31 district. The district included in this research are Tegalsari, Genteng, Bubutan, Simokerto, Pabean Cantian, Semampir, Krembangan, Kenjeran, Bulak, Tambaksari, Gubeng, Rungkut, Tenggilis Mejoyo, Gunung Anyar, Sukolilo, Mulyorejo, Sawahan, Wonokromo, Karang Pilang, Dukuh Pakis, Wiyung, Wonocolo, Gayungan, Jambangan, Tandes, Sukomanunggal, Asemrowo, Benowo, Pakal, Lakarsantri, and Sambikerep.

The sample size is calculated in order to determine the number of respondents should be listed in the survey. The total population of each district is

obtained from Dinas Kependudukan dan Pencatatan Sipil (Dispendukcapil) Surabaya. The population of each district is explained in the Table 4.1. The number of population are obtained from Dispendukcapil data report in year 2014. The total population includes Surabaya people from all ages.

In order to determine the total number of household, it is assumed that each household has five people.

$$\text{Number of Household in Tegalsari} = \frac{\text{Total population in Tegalsari}}{5}$$

$$\text{Number of Household in Tegalsari} = \frac{101,716}{5} = 20,343.2 \text{ households}$$

The calculation for the number of household is done for all district (district) in Surabaya. So, the total number of household in Surabaya is 570,732 households.

$$n_0 = \frac{Z^2 p (1 - p)}{e^2}$$

Which:

Confidential Level = 95% (which means Z value is 1.96)

e = 5%

p = 0.5

$$n_0 = \frac{Z^2 p (1-p)}{e^2} = \frac{1.96^2 * 0.5 (1-0.5)}{0.05^2} = 384.16$$

$$n = \frac{n_0 N}{n_0 + (N+1)} = \frac{384.16 * 570,732}{384.16 + (570,733)} = 383.9$$

Table 4.2 Sample Size Calculation for Survey Design for each District

| No. | District       | Total Population | Number of Household | Household Percentage | Sample Size |
|-----|----------------|------------------|---------------------|----------------------|-------------|
| 1   | Tegalsari      | 101,716          | 20,343              | 3.56%                | 14          |
| 2   | Genteng        | 59,273           | 11,855              | 2.08%                | 9           |
| 3   | Bubutan        | 101,812          | 20,362              | 3.57%                | 14          |
| 4   | Simokerto      | 97,713           | 19,543              | 3.42%                | 14          |
| 5   | Pabean Cantian | 82,383           | 16,477              | 2.89%                | 12          |
| 6   | Semampir       | 182,531          | 36,506              | 6.40%                | 25          |
| 7   | Krembangan     | 115,638          | 23,128              | 4.05%                | 16          |
| 8   | Kenjeran       | 146,757          | 29,351              | 5.14%                | 21          |
| 9   | Bulak          | 40,642           | 8,128               | 1.42%                | 6           |
| 10  | Tambak Sari    | 217,100          | 43,420              | 7.61%                | 30          |



Table 4.3 Sample Size Calculation for Survey Design for each District (cont.)

| No.          | District         | Total Population | Number of Household | Household Percentage | Sample Size |
|--------------|------------------|------------------|---------------------|----------------------|-------------|
| 11           | Gubeng           | 136,621          | 27,324              | 4.79%                | 19          |
| 12           | Rungkut          | 104,046          | 20,809              | 3.65%                | 15          |
| 13           | Tenggilis Mejoyo | 54,861           | 10,972              | 1.92%                | 8           |
| 14           | Gunung Anyar     | 52,120           | 10,424              | 1.83%                | 8           |
| 15           | Sukolilo         | 104,893          | 20,979              | 3.68%                | 15          |
| 16           | Mulyorejo        | 82,773           | 16,555              | 2.90%                | 12          |
| 17           | Sawahan          | 201,721          | 40,344              | 7.07%                | 28          |
| 18           | Wonokromo        | 159,964          | 31,993              | 5.61%                | 22          |
| 19           | Karang Pilang    | 70,322           | 14,064              | 2.46%                | 10          |
| 20           | Dukuh Pakis      | 58,429           | 11,686              | 2.05%                | 8           |
| 21           | Wiyung           | 65,742           | 13,148              | 2.30%                | 9           |
| 22           | Wonocolo         | 78,337           | 15,667              | 2.75%                | 11          |
| 23           | Gayungan         | 44,092           | 8,818               | 1.55%                | 7           |
| 24           | Jambangan        | 47,548           | 9,510               | 1.67%                | 7           |
| 25           | Tandes           | 89,469           | 17,894              | 3.14%                | 13          |
| 26           | Sukomanunggal    | 97,909           | 19,582              | 3.43%                | 14          |
| 27           | Asemrowo         | 42,973           | 8,595               | 1.51%                | 6           |
| 28           | Benowo           | 55,754           | 11,151              | 1.95%                | 8           |
| 29           | Pakal            | 48,484           | 9,697               | 1.70%                | 7           |
| 30           | Lakarsantri      | 53,472           | 10,694              | 1.87%                | 8           |
| 31           | Sambikerep       | 58,566           | 11,713              | 2.05%                | 9           |
| <b>TOTAL</b> |                  | <b>2,434,581</b> | <b>570,732</b>      | <b>100.00%</b>       | <b>405</b>  |

From the sample size calculation, the total number of respondents should be 384 to represent the Surabaya household. The total number of respondents is then multiplied by the household percentage in order to obtain the sample size for each district in Surabaya.

*Sample size for Tegalsari = total number of respondents \* household percentage*

*Sample size for Tegalsari = 384 \* 3.56%*

*Sample size for Tegalsari = 13.7 households*

The result of sample size calculation are always in decimal numbers and are rounded up. So, the total number of sample size is 405 respondents. The survey should also represented from all Kelurahan in one District. The number of sample size determination is described in Appendix II.

## 4.2 Household Survey Result

In total, there are 440 respondents in the household survey. Overall, the number of surveyed respondents is bigger than designed sample size. The household survey result explains the current condition of the sanitary product usage, the characteristics of the user who install ESP, and the main driver to ESP usage. The questions used as the research primary data are included in Section A, B, C, D1 and D2. The questions and the result of the survey will be explained further in this subchapter. The data of the survey result is provided in Appendix III.

The survey method is using personal (one-by-one) interview to the respondents. The survey was done in January 2017. It took one month to collect 440 respondents. The number of surveyed respondents is recapitulated in Table 4.2.

Table 4.4 Number of Surveyed Respondents

| No. | District       | Designed Sample Size | Surveyed Respondents |
|-----|----------------|----------------------|----------------------|
| 1   | Asemrowo       | 6                    | 7                    |
| 2   | Benowo         | 8                    | 8                    |
| 3   | Bubutan        | 14                   | 15                   |
| 4   | Bulak          | 6                    | 6                    |
| 5   | Dukuh Pakis    | 8                    | 7                    |
| 6   | Gayungan       | 7                    | 7                    |
| 7   | Genteng        | 9                    | 9                    |
| 8   | Gubeng         | 19                   | 20                   |
| 9   | Gunung Anyar   | 8                    | 9                    |
| 10  | Jambangan      | 7                    | 9                    |
| 11  | Karang Pilang  | 10                   | 14                   |
| 12  | Kenjeran       | 21                   | 21                   |
| 13  | Krembangan     | 16                   | 17                   |
| 14  | Lakarsantri    | 8                    | 9                    |
| 15  | Mulyorejo      | 12                   | 15                   |
| 16  | Pabean Cantian | 12                   | 13                   |

Table 4.5 Number of Surveyed Respondents (cont.)

| No.          | District         | Designed Sample Size | Surveyed Respondents |
|--------------|------------------|----------------------|----------------------|
| 17           | Pakal            | 7                    | 7                    |
| 18           | Rungkut          | 15                   | 20                   |
| 19           | Sambikerep       | 9                    | 9                    |
| 20           | Sawahan          | 28                   | 31                   |
| 21           | Semampir         | 25                   | 25                   |
| 22           | Simokerto        | 14                   | 14                   |
| 23           | Sukolilo         | 15                   | 22                   |
| 24           | Sukomanunggal    | 14                   | 14                   |
| 25           | Tambak Sari      | 30                   | 31                   |
| 26           | Tandes           | 13                   | 13                   |
| 27           | Tegalsari        | 14                   | 15                   |
| 28           | Tenggilis Mejoyo | 8                    | 8                    |
| 29           | Wiyung           | 9                    | 9                    |
| 30           | Wonocolo         | 11                   | 13                   |
| 31           | Wonokromo        | 22                   | 23                   |
| <b>TOTAL</b> |                  | <b>405</b>           | <b>440</b>           |



Figure 4.2 Survey Execution

In this subchapter, the result of the household survey will be explained using descriptive interpretation through graph and charts. Before analyzing the data collected should be validated using validation test. The test was done in order to know the validation of the surveyed data. This validation test is compulsory to be done before the data tabulation process. The data validation test will be divided into two steps, which are the direct validation test and statistical validation test.

#### a. Direct Validation Test

Direct validation test was done using phone call to the surveyed respondents. This test involves 10 randomly picked respondents. As the result, the test to 10 respondent confirmed that they were surveyed consciously. It can be concluded that the surveyed data is valid but this should be also proven statistically using statistical validation test.

b. Statistical Validation Test

Statistical validation test purpose is to determine the level of validity of instrument. The instrument is valid when it is able to measure the desired question or information (Agresti, 1990). The statistical validation test is using SPSS Software by using Pearson correlation test and looking at the r-value. The statistical validation test is to ensure that the data tabulated is reliable by checking the level of understanding of respondents to the question given in the questionnaire. The statistical validation test was done only on perception type of questions to ensure that the questions are well understood by the respondents.

The validation test was done using SPSS Software with bivariate correlation between “Total Score” and question X13, X14 and WTC. Question in X13, X14 and WTC are the perception type of question. Those three questions were used in the validation test. The “Total Score” is the total score of the questions (X13, X14 and WTC) from each respondents.

*Ho: Respondents has different meaning in variable attribute (not valid)*

*Ha: Respondents has no different meaning in variable attribute (valid)*

The r-table used in this validation test is 0,123 with  $df = 439$ . If the  $r\text{-table} \leq r\text{-xy}$ , reject  $H_0$  which mean that the data is concluded as valid. Meanwhile, the data is invalid (accept  $H_0$ ) when the  $r\text{-table} > r\text{-xy}$ .

Table 4.6 Pearson Correlation Test Result

| Correlations                |                     | ScoreTotal |
|-----------------------------|---------------------|------------|
| Awareness to Water Crisis   | Pearson Correlation | .658**     |
|                             | Sig. (2-tailed)     | .000       |
|                             | N                   | 440        |
| ESP Knowledge               | Pearson Correlation | .587**     |
|                             | Sig. (2-tailed)     | .000       |
|                             | N                   | 440        |
| Willingness to Change (WTC) | Pearson Correlation | .699**     |
|                             | Sig. (2-tailed)     | .000       |
|                             | N                   | 440        |

Table 4.4 shows the result from SPSS Software Pearson Correlation Test that were used to validate the data from questionnaire. The  $r_{xy}$  value is signed with yellow shading. The result to the *Pearson Correlation Test* is recapitulated in Table 4.5.

Table 4.7 Statistical Validation Test Result

| No | Tested Factor                        | $r_{xy}$ | Conclusion |
|----|--------------------------------------|----------|------------|
| 1  | Awareness to water crisis (X13)      | 0.658    | Valid      |
| 2  | Eco-sanitary product knowledge (X14) | 0.587    | Valid      |
| 3  | Willingness to change (WTC)          | 0.699    | Valid      |

The value of  $r_{xy}$  factor-1 (Awareness to Water Crisis) is 0.658, which mean that reject  $H_0$ . The conclusion is that factor-1 (Awareness to Water Crisis) is valid. The overall result of the statistical validation shows that all the data gathered in the survey are valid. So, the respondents understood the type of question answered.

#### 4.2.1 Descriptive Household Survey Result

In section A of the questionnaire, there are demography and user basic information. From 440 respondents, there are 321 (73%) female respondents and 119 (27%) male respondents. The gender of the respondent is obtained from question A-1.

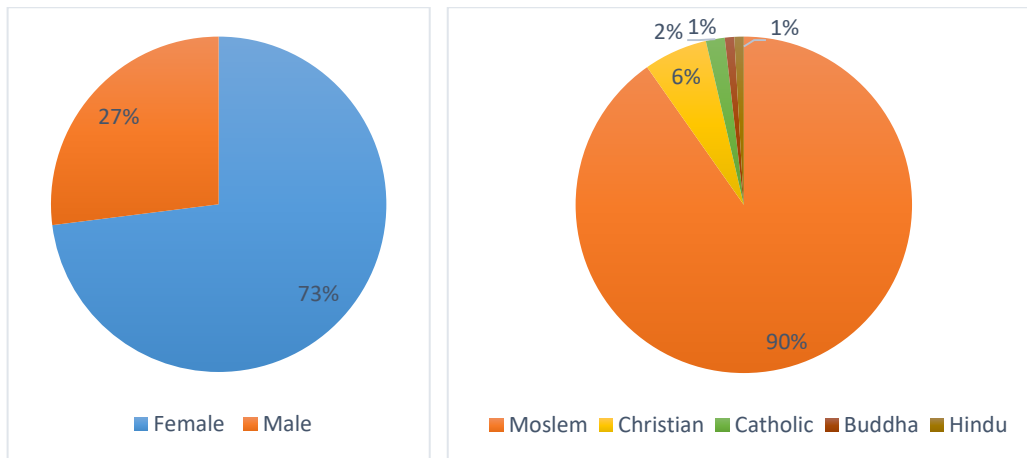


Figure 4.3 Gender (A-1) and Religion (A-3) of Surveyed Respondents

The religion was obtained from question A-3. From the survey, there are 398 Moslem, 37 Christian, 8 Catholic, 4 Buddha and 4 Hindu. The data shows that there most of the respondents are dominated by Moslem religion.

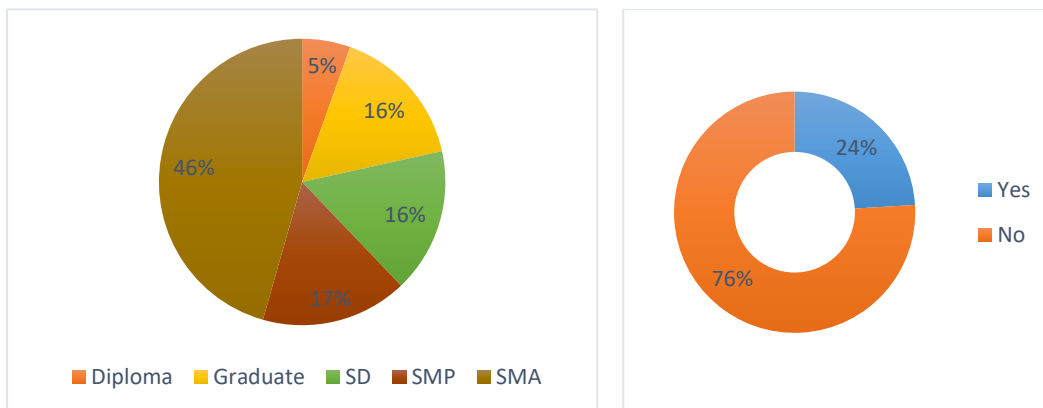


Figure 4.4 Education Level (A-4) and Infant Availability (A-8) of Surveyed Respondents

The education and infant information is explained in Figure 4.5. There are 201 respondents that has SMA (Senior High School) as their last education, 73 respondents last educated in SMP (Junior High School), 72 respondents last educated in SD (Elementary School), 71 respondents graduated from college, and

24 respondents graduated from diploma school. There are also about 106 respondents that have infant (babies under 5 years) at home.

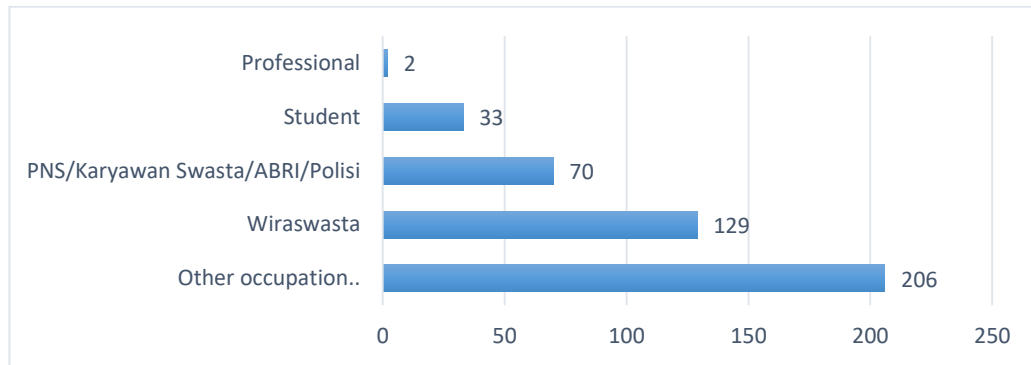


Figure 4.5 Occupation of Surveyed Respondents

The occupation of the respondents are mostly dominated by housewives, which is listed in “Other occupation..”. The housewife had the highest availability to be surveyed because they stayed at home during the survey and the housewives completely understand the installation nor the monthly spendings in their house. There are 129 respondents with occupation as Wiraswasta and 70 respondents as PNS/Karyawan Swasta/ABRI/Polisi. The number of students and professional surveyed are 33 and 2 respectively.

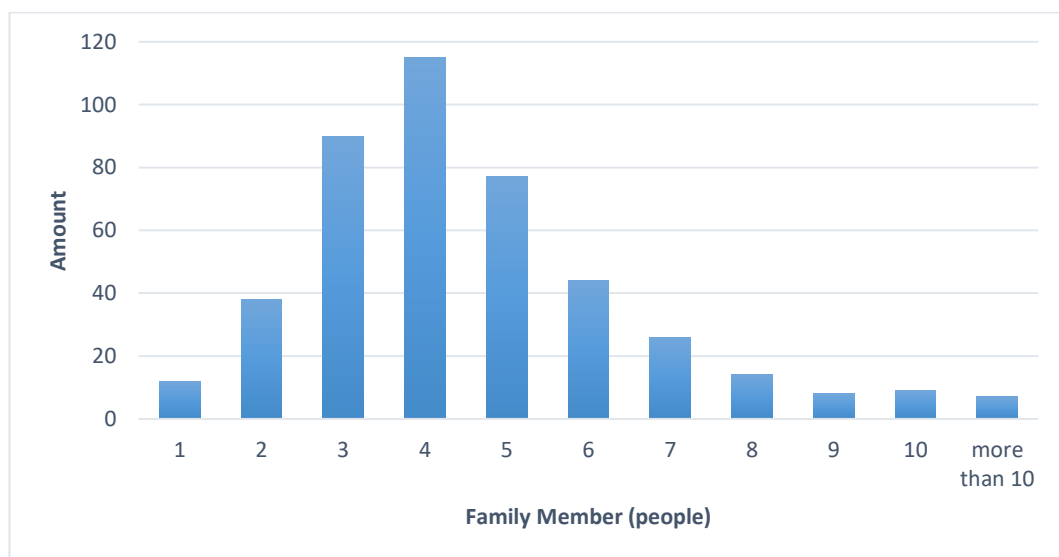


Figure 4.6 Amount of Family Member of Surveyed Respondents

The surveyed household were mostly consist of 3-4 family member. There are 90 respondents that has 3 family member and 115 respondents that has 4 people in one household. The average family member is 4.56 which is equal to 5 member in each family. This result is confirming the assumption made in this research to have 5 family member in each household. There is approximately 40% from the total surveyed household that has more than 5 family member.

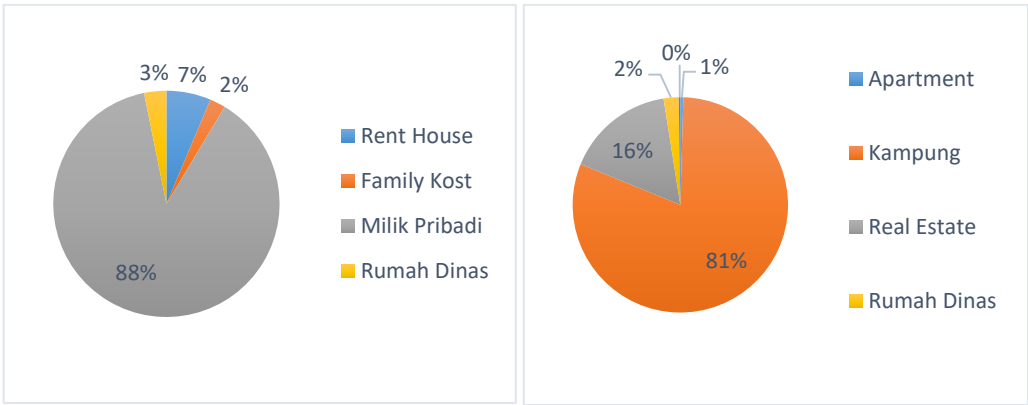


Figure 4.7 House Ownership of Surveyed Respondents

About 88% of the respondents own their house. There are only small amount of respondents who life in rent house, family kost nor *rumah dinas*. The surveyed respondents mostly life in kampung neighborhood. There are 356 respondents that lifes in kampung neighborhood. There are about 16% of the surveyed household that lifes in real estate neighborhood.



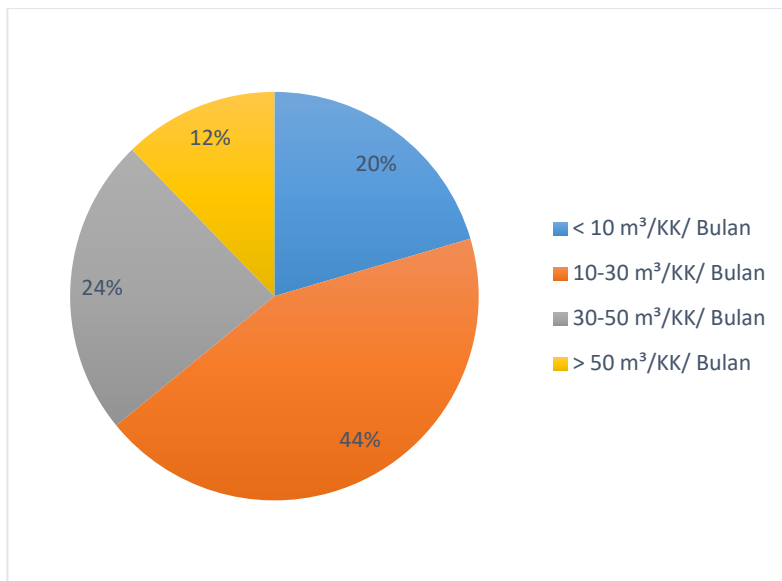


Figure 4.8 Monthly Clean Water Consumption

The clean water consumption explained in Figure 4.9. The pie chart shows that most of the surveyed respondents uses 10-30 m<sup>3</sup> a month. There are 44% household that consume 10-30 m<sup>3</sup>/month, 24% household that consume 30-50 m<sup>3</sup>/month, 20% households that consume less than 10 m<sup>3</sup>/month and 12% household that consume more than 50 m<sup>3</sup>/month.

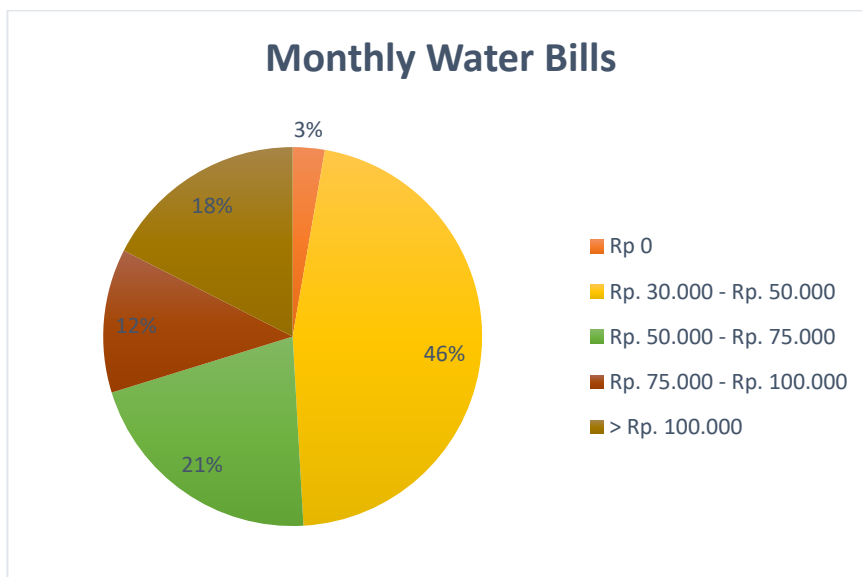


Figure 4.9 Monthly Water Bill

Figure 4.10 shows the monthly water bills of the total surveyed households. It could be concluded that the common payment amount is in range Rp 30.000 – Rp 50.000. Meanwhile, there are also people who do not use PDAM as their main water source for clean water. The people who do not use PDAM is shown by the household that pays Rp 0, which is only 3% of the total surveyed household.

Many surveyed people do not understand the reason to have immediate act conserve clean water. In other hand, some of people already started to conserve water with purpose to reduce their water bill. This research emphasizes the level of awareness of the people to conserve clean water with the purpose to delay water crisis that might happen in the nearly future. The pie chart shown in Figure 4.10 shows that there are more than 50% of the people that already know the issue of water crisis that might happen in Surabaya 2018. To be exact, there are 64% of the people who already familiar and understand the issue. The other 36%, the people who are not familiar with the issue, were being informed by the surveyor when the survey occur.

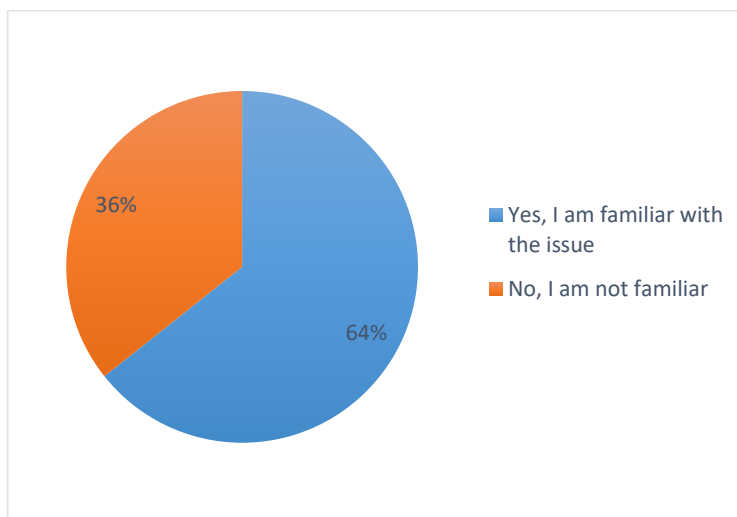


Figure 4.10 Awareness to Water Crisis

The awareness of Surabaya people to water crisis could be increased by socialization through social media or seminar given by the government. The other way to face water crisis in Surabaya is by installation of water saving product. In this research, the tem of water saving product is eco-sanitary product (ESP).

Logically, the people who do not understand about ESP (benefit, cost, water saving or water consumption), do not install ESP in their home.

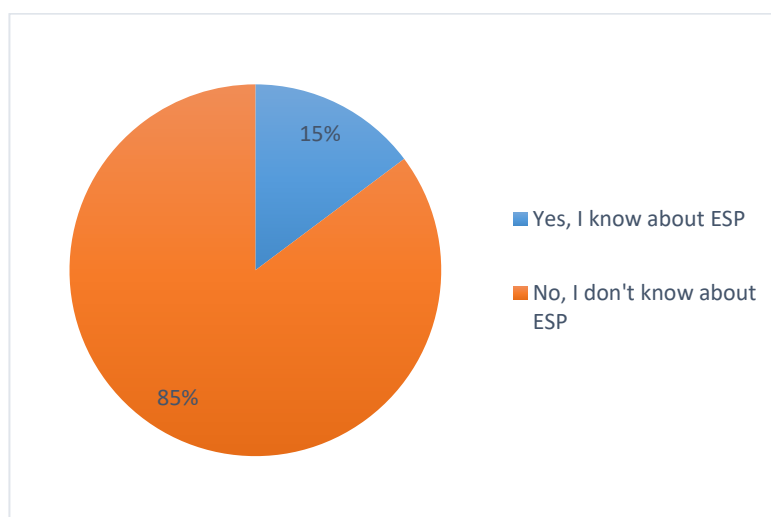


Figure 4.11 Eco-Sanitary Product Knowledge

Figure 4.12 shows the amount of household that understand the ESP and also the benefits and/or consequences of ESP installation. There are only 15% of the surveyed household that already understand about ESP.

The Willingness to Change (WTC) exist in the questionnaire section D1 question number 2. This subchapter is to explain how many of the household that already know the issue of water crisis and understand the ESP knowledge has willingness to change their current sanitary product into eco-sanitary product.

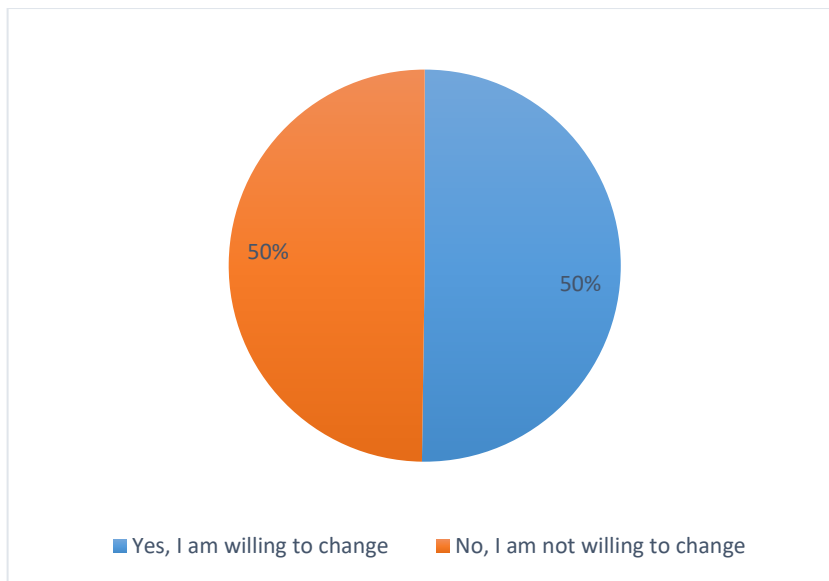


Figure 4.12 Willingness to Change

From Figure 4.13, there are 50% of the surveyed household who has willingness to change to use ESP. Meanwhile, the rest 50% of the surveyed household do not have willingness to change to ESP.

#### 4.2.2 ESP Usage Household Survey Result

In this research, the scope of sanitary product were focused on five product which are faucet, urinal, toilet, shower and toilet spray. The main consideration for the sanitary product determination is the information about water consumption and the water saving feature on each product. The eco standards for each sanitary product are described in the Table 4.6.

Table 4.8 Eco Standards in Sanitary Products for Water Saving Purpose

| No | Sanitary Products | Standard Used  | Specification |
|----|-------------------|--|---------------|
| 1  | Faucets           | Indonesia - Peraturan Menteri Green Building Standards | 8 L/minute    |
| 2  | Urinals           | Indonesia - Peraturan Menteri Green Building Standards | 4 L/flush     |
| 3  | Toilets           | Indonesia - Peraturan Menteri Green Building Standards | 6 L/flush     |
| 4  | Showers           | Indonesia - Peraturan Menteri Green Building Standards | 9 L/minute    |
| 5  | Toilet Sprays     | USA - EPAct  | 6 L/minute    |

The standards used are mostly from Peraturan Menteri about Standar Gedung Hijau (Green Building Standards). Since toilet spray eco standards do not stated in Peraturan Menteri, the eco standard was determined from USA with EPA standard. This standards will be used as the determination of the current sanitary product used in households. When the installed sanitary product water consumption below the eco standards, the sanitary product owned by the household is considered as eco product.

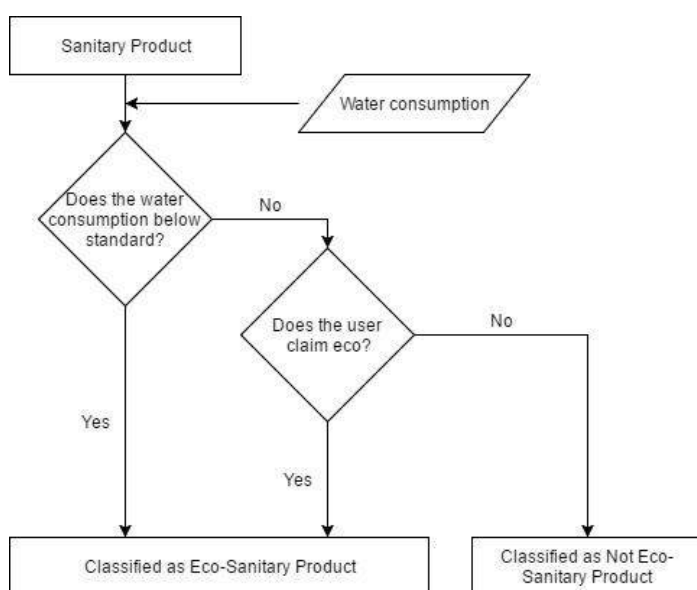


Figure 4.13 Eco-Sanitary Classification Procedure

Since the questionnaire also record the eco feature claimed by the sanitary user, this information is also useful to classify the current sanitary product to eco product or not eco. The eco-sanitary classification procedure is explained in flowchart in Figure 4.14.

The current eco-sanitary product usage is captured from the household questionnaire. In the survey, the surveyor asked the respondents about the sanitary product that were installed in their home. The surveyor asked in detail about the specification of the sanitary product that the respondents use and the water consumption of each sanitary product. This data is the main information to be processed in this subchapter. The procedure to determine “eco” of each sanitary usage in household already explained previously. The determination of “eco” is not

only based on the water consumption but also on the user claim. The user claim also become the determinator of “eco”.

Table 4.9 Amount of Eco-Sanitary User in Household

|                          | <i>Faucet</i> | <i>Urinal</i> | <i>Toilet</i> | <i>Shower</i> | <i>Toilet Spray</i> |
|--------------------------|---------------|---------------|---------------|---------------|---------------------|
| <b>Eco User</b>          | 46            | 0             | 22            | 10            | 0                   |
| <b>Total Sample Size</b> | 440           | 440           | 440           | 440           | 440                 |
| <b>Eco User (%)</b>      | 10.5%         | 0.0%          | 5.0%          | 2.3%          | 0.0%                |

From Table 4.7, there are no household that install eco-urinal and eco-toilet spray. Meanwhile, there are 10.5% of the total household that installed eco-faucet, 5% installed eco-toilet and 2.3% already installed eco-shower. It means that there are 10.5% from the total surveyed household that install faucet with flowrate below 8 liter/minute, there are 5% of the total respondents that install toilet with water consumption less than 6 liter/flush.

In Figure 4.15, the current market of eco-sanitary product explained through pie chart. The main objective of the current market is to give overview about the existing usage of eco-sanitary products. In Table 4.8, it is shown that there are only one household that install all eco product in their home.

Table 4.10 Current Market of Eco-Sanitary Product in Household

|                |                           | <i>Amount</i> |
|----------------|---------------------------|---------------|
| <b>Eco</b>     | <i>All Sanitary</i>       | 1             |
|                | <i>Partial with WTC +</i> | 35            |
|                | <i>Partial with WTC -</i> | 24            |
| <b>Not Eco</b> | <i>with WTC +</i>         | 185           |
|                | <i>with WTC -</i>         | 195           |
| <b>TOTAL</b>   |                           | 440           |

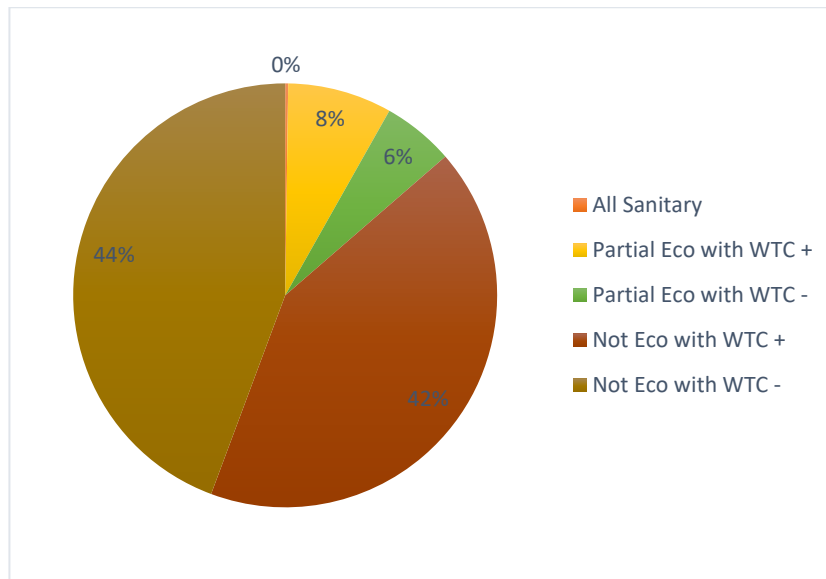


Figure 4.14 Current Market of Eco-Sanitary Product

From the pie charts in Figure 4.15, there is only one household that install 100% eco as their sanitary product. In fact, household that only install partial “eco” is much smaller (in amount %) rather than people that do not install eco as their sanitary product. This shows that people who do not use eco-sanitary is larger than the people who already uses eco-sanitary. The pie chart shows the eco-sanitary usage and how the willingness to change. The main problem from this figure is the people who has no willingness to change, which are 6% of partially eco-sanitary user and 44% of non eco-sanitary user.

### 4.3 Understanding Influencing Factors with ESP Usage

Researches cases with purpose knowing the relation between one variable with another variable using categorical data could not use the approach of linear regression. ESP usage is determined from many factors. In this subchapter, the method used is using Logistic Binary Regression (LBR). LBR method is capable to calculate the value of relation between ESP usage and the supporting factors using categorical data. This means that there are factors that can driven the people to use ESP.

The influencing factors analysis objective is to obtain information about what aspects that affect the use of eco-sanitary product. This analysis require several tests and using the *SPSS Software*.

#### *4.3.1 Flowchart of the Influencing Factor with ESP Usage Analysis*

In order to analyse the influencing factors, the first step is to determine the influencing factors that will be further analyzed. After that, the independency test was done to test between X factors and X-Y Factors. In the independency test, there are X factors that will be eliminated. The elimination process of the X factors are showing that the eliminated X factor do not dependent to Y or there are X factors that are dependent to other X factor. The X factor that are dependent to other X factor should be eliminated because the result will be redundant. The influencing factor analysis. The tests steps are explained through flowchart below in Figure 4.16 and 4.17.

The Logistic Regression is in binary form. The Y factor is determined as the ESP usage, which is coded 2 for the household that uses ESP and 1 for household that do not install ESP. There are 14 factors to be further analyzed in this subchapter. The factors are described in Table 4.9.



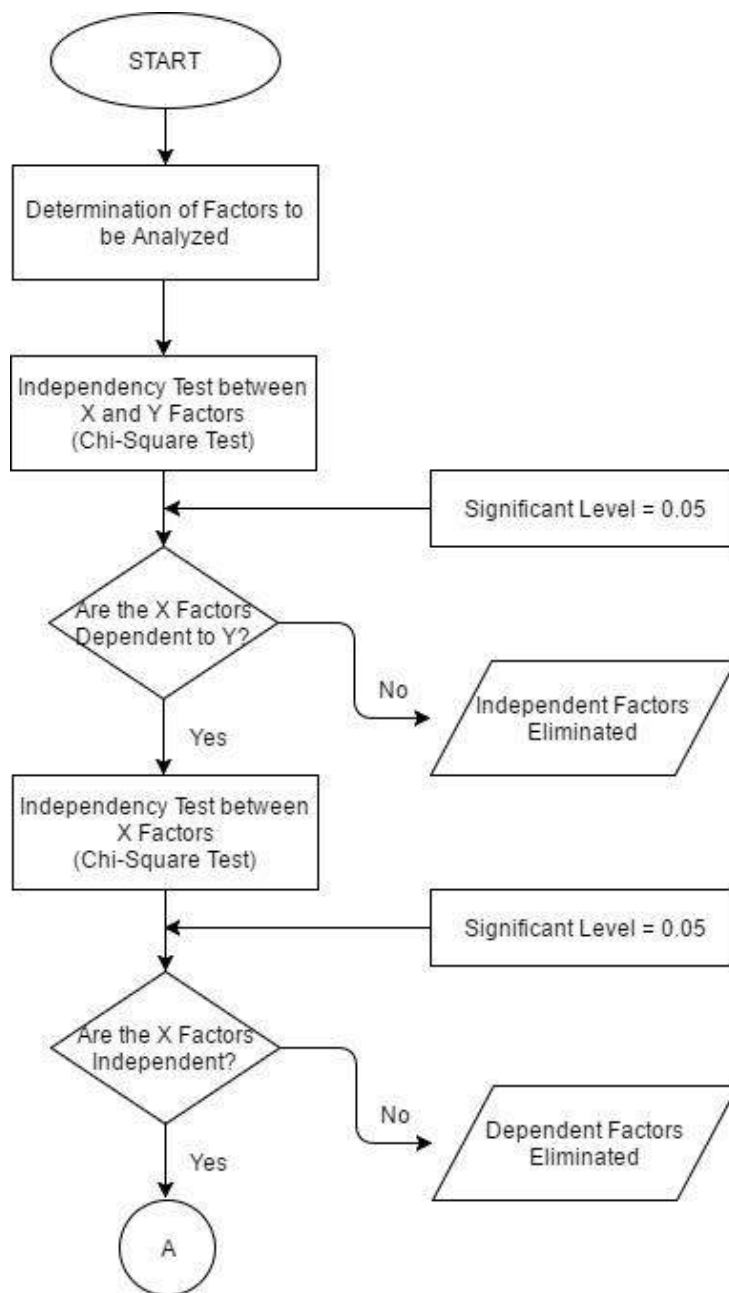


Figure 4.15 Flowchart of Influencing Factor with ESP Usage

Independency test was done in order to know the relation between two variables (Agresti, 1990). The independency test was between X-Y factors and also between X factors. Logistic binary regression is statistical analysis method that describes the response variable which has two category or more with one or more

response variable scaled categorical or continue (Agresti, 1990). The flowchart was developed based on Agresti (1990).

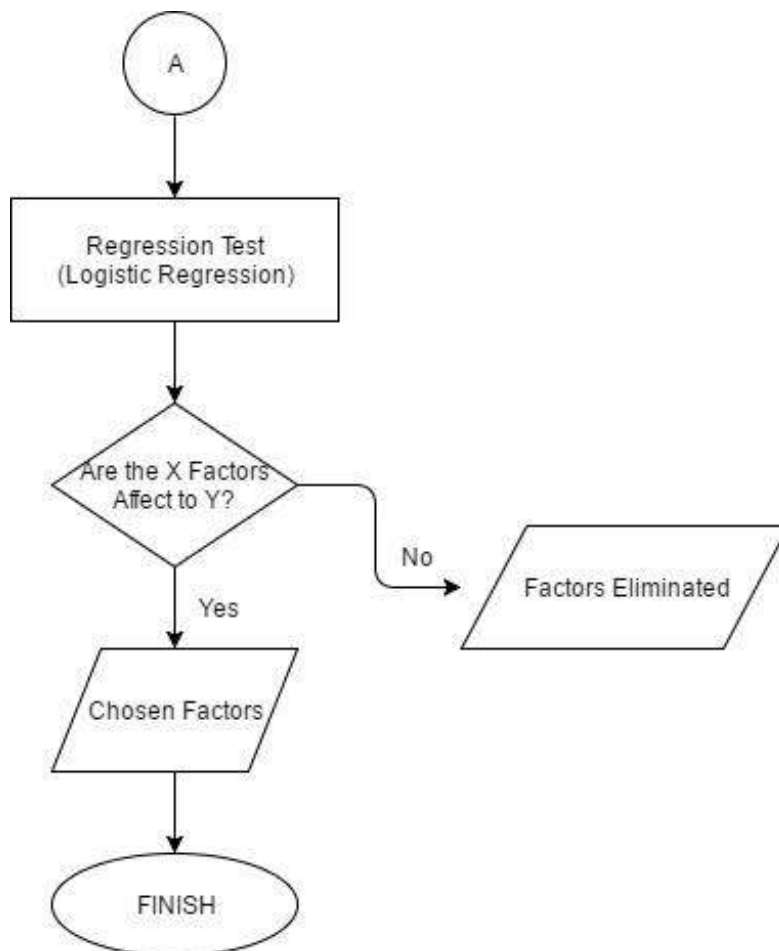


Figure 4.16 Flowchart of Influencing Factor with ESP Usage

Table 4.7 provides the suspected factors that affect the ESP usage. The chosen factors are from questions Section A, Section B, Section C, and Section D1. There are 14 factors in Table 4.8. The factors are coded from X1 until X14.

Table 4.11 List of Factors

| <i>Question</i> | <i>Factor</i> | <i>Explanation</i>   |
|-----------------|---------------|--|
| A-1             | X1            | Gender<br>“Jenis Kelamin”  |
| A-3             | X2            | Religion<br>“Apakah agama Anda?”   |
| A-4             | X3            | Education<br>“Apakah pendidikan terakhir Anda?”  |
| A-5             | X4            | Occupation<br>“Apakah pekerjaan Anda?”   |
| A-6             | X5            | Income Level<br>“Berapakah pendapatan keluarga Anda per bulan?”                          |
| A-7             | X6            | Spending<br>“Berapakah pengeluaran keluarga Anda per bulan?”                             |
| A-8             | X7            | Infant<br>“Apakah Anda memiliki anak usia balita?”                                       |
| A-9             | X8            | Family Member<br>“Berapakah jumlah orang yang tinggal dengan Anda dalam satu rumah?”     |
| A-10            | X9            | House Type<br>“Apakah jenis rumah yang keluarga Anda tinggali?”                          |
| A-11            | X10           | Neighborhood<br>“Apakah lingkungan rumah keluarga Anda?”                                 |
| B-5             | X11           | Water Usage<br>“Berapa jumlah pemakaian air PDAM per bulan?”                             |
| B-6             | X12           | Water Bill<br>“Berapa pengeluaran air rata-rata yang Anda bayar setiap bulannya?”        |
| C-4             | X13           | Awareness to Water Crisis<br>“Apakah Anda tahu mengenai problematika krisis air bersih?” |
| D-1             | X14           | ESP Knowledge<br>“Apakah selama ini Anda telah mnegetahui peralatan eco saniter?”        |

The following step is to determine the factors that will be put in the model. The choosen factors to be tested are only the factors that representing the household, not individual data. The individual data that were not included in the influencing

factor analysis are gender, religion, educational level, and occupation. The factors to be tested in this LBR test are X5 (question A-6), X6 (question A-7), X7 (question A-8), X8 (question A-9), X11 (question B-5), X12 (question B-6), X13 (question C-4), and X14 (question D-1).

Table 4.12 Factors Tested in Independency Test

| <i>Factor</i> | <i>Explanation</i>           | <i>Value Labels (Data Code)</i> |  | <i>Measure</i> |
|---------------|------------------------------|---------------------------------|--|----------------|
| X5            | Income Level                 | 1                               | Low Income<br>≤ Rp 1.000.000<br>Rp 1.000.001 – Rp 3.000.000                                      | Nominal        |
|               |                              | 2                               | Medium Income<br>Rp 3.000.001 – Rp 5.000.000<br>Rp 5.000.001 – Rp 10.000.000                     |                |
|               |                              | 3                               | High Income<br>Rp 10.000.001 – Rp 15.000.000<br>Rp 15.000.001 – Rp 25.000.000<br>> Rp 25.000.000 |                |
| X6            | Spending                     | 1                               | Low Spending<br>< Rp 1.000.000 and<br>Rp 1.000.001 – Rp 3.000.000                                | Nominal        |
|               |                              | 2                               | Medium Spending<br>Rp 3.000.001 – Rp 5.000.000 and<br>> Rp 5.000.000                             |                |
| X7            | Infant                       | 1                               | Yes, I have infant   | Nominal        |
|               |                              | 2                               | No, I don't have infant  |                |
| X8            | Family Member                |                                 | Open Number  | Ratio          |
| X11           | Water Usage                  | 1                               | < 30 m <sup>3</sup> /KK/Bulan  | Nominal        |
|               |                              | 2                               | > 30 m <sup>3</sup> /KK/Bulan  |                |
| X12           | Water Bill                   | 1                               | < Rp 50.000  | Nominal        |
|               |                              | 2                               | Rp 50.001 – Rp 100.000   |                |
|               |                              | 3                               | > Rp 100.000   |                |
| X13           | Awareness to Water Crisis    | 1                               | No, I don't know about the issue   | Nominal        |
|               |                              | 2                               | Yes, I know about the issue  |                |
| X14           | Knowledge about eco-sanitary | 1                               | No, I am not familiar  | Nominal        |
|               |                              | 2                               | Yes, I am familiar   |                |

Table 4.10 shows the chosen factors that will be used in the model. The income (X5) and spending (X6) categories refers to *Upah Minimum Regional* (UMR). The lowest category of X5 and X6 are based on the amount of UMR in Surabaya. The people with household income less than Rp 3.000.000 is categorized as low income. Meanwhile, the household income in range Rp 3.000.001 – Rp 10.000.000 is categorized as medium income. Respondents with household income more than Rp 10.000.000 is categorized as high income level. The input data to be processed in SPSS should be in scales (code). The scaling description for each factor included in Table 4.10.

#### 4.3.2 *Influencing Factor with ESP Usage Calculation and Interpretation*

Since the calculation of influencing factor with ESP usage is using Logistic Binary Regression (LBR) test, there are two predecessor procedures to be followed. The first procedure is to do the Independency Test between X factor and Y using Pearson Chi-Square. The purpose of the test is to eliminate the X factors that is independent to Y (ESP usage). The test was done using *SPSS Software* with Crosstabs and appearing the Chi-Square p-value. The significant level was determined 0.05.

**Ho: [Variable 1] is independent of [Variable 2]**

*Ho: The the usage of sanitary product Y is independent of factor X.*

**Ha: [Variable 1] is not independent of [Variable 2]**

*Ha: The the usage of sanitary product Y is not independent of factor X.*

With significant level = 5% = 0.05

The result of the test is that factor X5, X6, X13 and X14 are dependent of ESP usage (Y factor). The factors eliminated are factor X7, X8, X11, and X12 because the factors were not dependent to factor Y. This means, that the usage of ESP in household do not depends on factor X7, X8, X11, and X12. The p-value from Pearson Chi-Square of factor X7, X8, X11 and X12 is higher than the determined significant level (0.05). Table 4.11 shows the recapitulation of Pearson Chi-Square p-value of each factor tested.

Table 4.13 Independency Test for X-Y Factors

| Factor | Pearson Chi-Square p-value | Conclusion |
|--------|----------------------------|------------|
| X5     | 0.027                      | Reject Ho  |
| X6     | 0.007                      | Reject Ho  |
| X7     | 0.312                      | Accept Ho  |
| X8     | 0.573                      | Accept Ho  |
| X11    | 0.127                      | Accept Ho  |
| X12    | 0.558                      | Accept Ho  |
| X13    | 0.000                      | Reject Ho  |
| X14    | 0.003                      | Reject Ho  |

The second procedure is to do the Independency Test between X factors using Pearson Chi-Square. The independency test is done to determine which X factor is independent to one another. The test was done using SPSS Software with Crosstabs and appearing the Chi-Square p-value. The significant level is determined 0.05. The result of this test is the input of Logistic Binary Regression Test.

**Ho: [Variable 1] is independent of [Variable 2]**

*Ho: The factor Xa is independent of the factor Xb.*

**Ha: [Variable 1] is not independent of [Variable 2]**

*Ha: The factor Xa is not independent of the factor Xb.*

With significant level = 5% = 0.05

The factor that were tested in Pearson Chi-Square are the factors that were dependent to Y. So there are only four factors that were tested which are X5, X6, X13 and X14.

Table 4.14 Pearson Chi-Square p-value (Independency Test) Between X Factor

|     | X5    | X6    | X13   | X14   |
|-----|-------|-------|-------|-------|
| X5  |       | 0.000 | 0.021 | 0.000 |
| X6  | 0.000 |       | 0.014 | 0.001 |
| X13 | 0.021 | 0.014 |       | 0.004 |
| X14 | 0.000 | 0.001 | 0.004 |       |

From Table 4.12, the Pearson Chi-Square p-value is all below 0.05. So, all X factors are rejecting  $H_0$ , which means all factors are not independent to each other. The conclusion from this test is that X5, X6, X13 and X14 are somehow has influence to each other but those factors cannot put in the same model.

Logistic Binary Regression (LBR) Test purpose is to calculate the influence of X factor to the Y factor and how is the relation between X-Y factors. The factors that were tested in LBR Test are X5, X6, X13 and X14. Since the X factors are dependent to each other, the X factors are inserted separately in the model which called LBR Univariate Test.

a. LBR Univariate Test for Household Income Level (X5)

Hypothesis:

**$H_0$ : [Variable 1] do not influence significantly to [Variable 2]**

*$H_0$ : Household income level do not influence significantly to ESP usage.*

**$H_a$ : [Variable 1] do influence significantly to [Variable 2]**

*$H_a$ : Household income level influence significantly to ESP usage.*

With significant level = 5% = 0.05

Table 4.15 LBR Univariate Test Result for Income Level (X5)

| Variables in the Equation |        |      |        |    |      |        |
|---------------------------|--------|------|--------|----|------|--------|
|                           | B      | S.E. | Wald   | df | Sig. | Exp(B) |
| Step 1 <sup>a</sup> X5    |        |      | 6.942  | 2  | .031 |        |
| X5(1)                     | -.983  | .380 | 6.693  | 1  | .010 | .374   |
| X5(2)                     | -.499  | .371 | 1.811  | 1  | .178 | .607   |
| Constant                  | -1.168 | .306 | 14.557 | 1  | .000 | .311   |

a. Variable(s) entered on step 1: X5.

From Table 4.13, household income level (X5) has the overall p-value 0.031 which mean that Ho is not accepted. Category 1 in X5 is the low income and it has p-value below 0.05 with meaning that Ho is rejected. The low income level influence significantly to the ESP usage. Meanwhile, the category 2 in X5 has p-value above 0.05 with meaning that medium income do not influence the ESP usage compare to high income level. The reference category in this test is determined as “Last”.

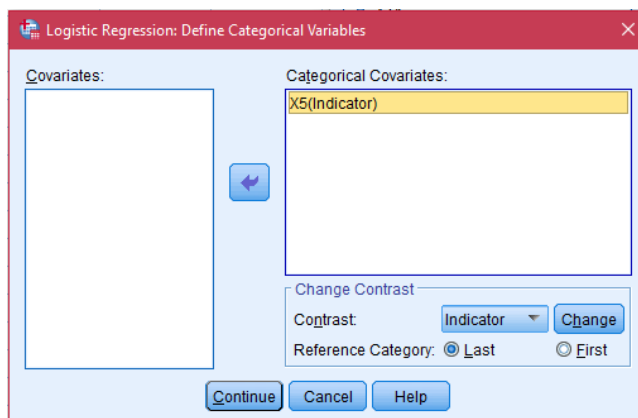


Figure 4.17 Reference Category in LBR Univariate Test for Income Level

According to Logistic Binary the comparison for the test is always the last category. The last category is made as reference for comparison between one factor to other factor. In this factor, the last category is X5(3), high income level household. The logistic binary regression function and the probability result is described below.



$$\hat{g}(x) = -1.168 + (-0.983) X5_{(1)}$$

$$\pi(x) = \frac{e^{(-1.168 - 0.983 (X51) - 0.499 (X52))}}{1 + e^{(-1.168 - 0.983 (X51) - 0.499 (X52))}}$$

$$\pi(1) = \frac{e^{(-1.168 - 0.983(1) - 0.499(0))}}{1 + e^{(-1.168 - 0.983(1) - 0.499(0))}} = 0.104$$

$$\pi(3) = \frac{e^{(-1.168 - 0.983(0) - 0.499(0))}}{1 + e^{(-1.168 - 0.983(0) - 0.499(0))}} = 0.238$$

The interpretation of  $\pi(1)$  is that the probability of using ESP because of low income level household is 0.104 and the probability of not using ESP because of low income level household is 0.896 ( $1 - 0.104 = 0.896$ ).

Meanwhile,  $\pi(3)$  is that the probability of using ESP because of high income level household is 0.238 and the probability of not using ESP because of high income level household is 0.762 ( $1 - 0.238 = 0.762$ ).

Table 4.16 Recapitulation of LBR Test on Household Income Level (X5)

|               |               | Income Level (X5) |             |
|---------------|---------------|-------------------|-------------|
|               |               | Low Income        | High Income |
| ESP Usage (Y) | Not Using ESP | 0.896             | 0.762       |
|               | Using ESP     | 0.104             | 0.238       |

b. LBR Univariate Test for Spending (X6)

Hypothesis:

**Ho: [Variable 1] do not influence significantly to [Variable 2]**

*Ho: Household spending do not influence significantly to ESP usage.*

**Ha: [Variable 1] do influence significantly to [Variable 2]**

*Ha: Household spending influence significantly to ESP usage.*

With significant level = 5% = 0.05

Table 4.17 LBR Univariate Test Result for Household Spending (X6)

| Variables in the Equation |          |        |      |        |    |        |
|---------------------------|----------|--------|------|--------|----|--------|
|                           |          | B      | S.E. | Wald   | df | Sig.   |
| Step 1 <sup>a</sup>       | X6(1)    | -.727  | .275 | 6.991  | 1  | .008   |
|                           | Constant | -1.400 | .189 | 55.073 | 1  | .000   |
|                           |          |        |      |        |    | Exp(B) |
|                           |          |        |      |        |    | .483   |
|                           |          |        |      |        |    | .246   |

a. Variable(s) entered on step 1: X6.

From Table 4.13, category 1 in X6 is the low spending and it has p-value below 0.05 with meaning that  $H_0$  is rejected. The low spending influence significantly to the ESP usage. The reference category in this test is determined as “Last”.

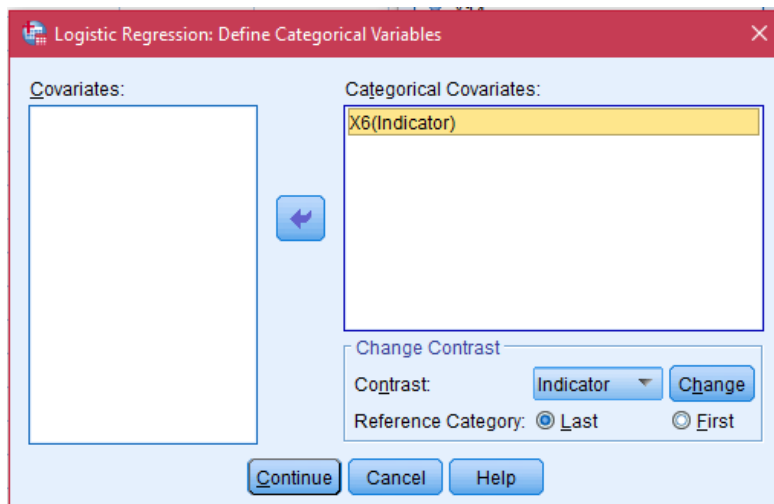


Figure 4.18 Reference Category in LBR Univariate Test for Household Spending

Since the reference category is set into “Last”, the comparison is always the last category. In this factor, the last category is X6(2), medium spending household. The logistic binary regression function and the probability result is described below.

$$\hat{g}(x) = -1.400 + (-0.727) X6_{(1)}$$

$$\pi(x) = \frac{e^{(-1.400 - 0.727 (X61))}}{1 + e^{(-1.400 - 0.727 (X61))}}$$

$$\pi(1) = \frac{e^{(-1.400 - 0.727(1))}}{1 + e^{(-1.400 - 0.727(1))}} = 0.107$$

$$\pi(2) = \frac{e^{(-1.400 - 0.727(0))}}{1 + e^{(-1.400 - 0.727(0))}} = 0.198$$

The interpretation of  $\pi(1)$  is that the probability of using ESP because of low spending household is 0.107 and the probability of not using ESP because of low spending household is 0.893 ( $1 - 0.107 = 0.893$ ).

Meanwhile,  $\pi(2)$  is that the probability of using ESP because of medium spending household is 0.198 and the probability of not using ESP because of medium spending household is 0.802 ( $1 - 0.198 = 0.802$ ).

Table 4.18 Recapitulation of LBR Test on Household Spending (X6)

|               |               | Spending (X6) |                 |
|---------------|---------------|---------------|-----------------|
|               |               | Low Spending  | Medium Spending |
| ESP Usage (Y) | Not Using ESP | 0.893         | 0.802           |
|               | Using ESP     | 0.107         | 0.198           |

c. LBR Univariate Test for Awareness to Water Crisis (X13)

Hypothesis:

**Ho: [Variable 1] do not influence significantly to [Variable 2]**

*Ho: Household awareness level do not influence significantly to ESP usage.*

**Ha: [Variable 1] do influence significantly to [Variable 2]**

*Ha: Household awareness level influence significantly to ESP usage.*

With significant level = 5% = 0.05

Table 4.19 LBR Univariate Test Result for Awareness to Water Crisis (X13)

**Variables in the Equation**

|                     |          | B      | S.E. | Wald   | df | Sig. | Exp(B) |
|---------------------|----------|--------|------|--------|----|------|--------|
| Step 1 <sup>a</sup> | X13(1)   | -1.220 | .361 | 11.449 | 1  | .001 | .295   |
|                     | Constant | -1.468 | .152 | 92.799 | 1  | .000 | .230   |

a. Variable(s) entered on step 1: X13.

From Table 4.15, category 1 in X13 is the low aware to water crisis and it has p-value below 0.05 with meaning that  $H_0$  is rejected. The low awareness influence significantly to the ESP usage. The reference category in this test is determined as “Last”.

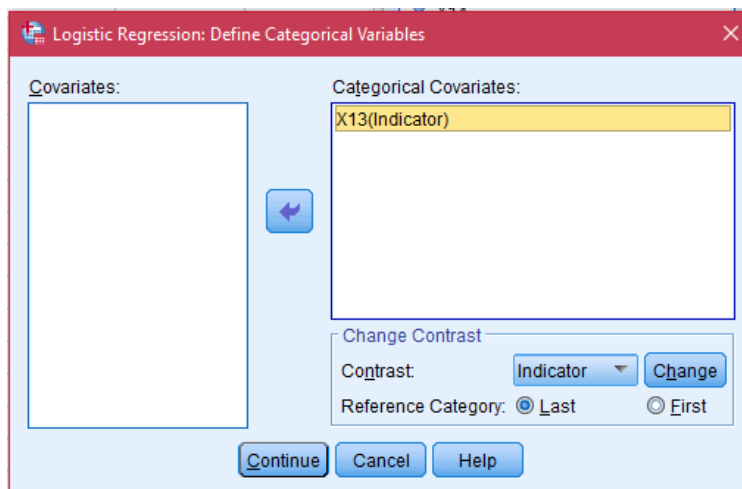


Figure 4.19 Reference Category in LBR Univariate Test for Awareness to Water Crisis

Since the reference category is set into “Last”, the comparison is always the last category. In this factor, the last category is X13(2), high awareness to water crisis. The logistic binary regression function and the probability result is described below.

$$\hat{g}(x) = -1.468 + (-1.220) X13_{(1)}$$

$$\pi(x) = \frac{e^{(-1.468 - 1.220 (X131))}}{1 + e^{(-1.468 - 1.220 (X131))}}$$

$$\pi(1) = \frac{e^{(-1.468 - 1.220 (1))}}{1 + e^{(-1.468 - 1.220 (1))}} = 0.064$$

$$\pi(2) = \frac{e^{(-1.468 - 1.220(0))}}{1 + e^{(-1.468 - 1.220(0))}} = 0.188$$

The interpretation of  $\pi(1)$  is that the probability of using ESP because of low awareness is 0.064 and the probability of not using ESP because of low awareness is 0.936 ( $1 - 0.064 = 0.936$ ).

Meanwhile,  $\pi(2)$  is that the probability of using ESP because of high awareness is 0.188 and the probability of not using ESP because of high awareness is 0.812 ( $1 - 0.188 = 0.812$ ).

Table 4.20 Recapitulation of LBR Test on Awareness to Water Crisis (X13)

|               |               | Awareness to Water Crisis (X13) |       |
|---------------|---------------|---------------------------------|-------|
|               |               | Not Aware                       | Aware |
| ESP Usage (Y) | Not Using ESP | 0.936                           | 0.812 |
|               | Using ESP     | 0.064                           | 0.188 |

d. LBR Univariate Test for ESP Knowledge (X14)

Hypothesis:

**Ho: [Variable 1] do not influence significantly to [Variable 2]**

*Ho: Household knowledge to ESP do not influence significantly to ESP usage.*

**Ha: [Variable 1] do influence significantly to [Variable 2]**

*Ha: Household knowledge to ESP influence significantly to ESP usage.*

With significant level = 5% = 0.05

Table 4.21 LBR Univariate Test Result for ESP Knowledge (X14)

**Variables in the Equation**

|                     |          | B      | S.E. | Wald   | df | Sig. | Exp(B) |
|---------------------|----------|--------|------|--------|----|------|--------|
| Step 1 <sup>a</sup> | X14(1)   | -.929  | .323 | 8.271  | 1  | .004 | .395   |
|                     | Constant | -1.038 | .282 | 13.526 | 1  | .000 | .354   |

a. Variable(s) entered on step 1: X14.

From Table 4.17, category 1 in X14 is the low knowledge to ESP and it has p-value below 0.05 with meaning that  $H_0$  is rejected. The lack of ESP knowledge influence significantly to the ESP usage. The reference category in this test is determined as “Last”.

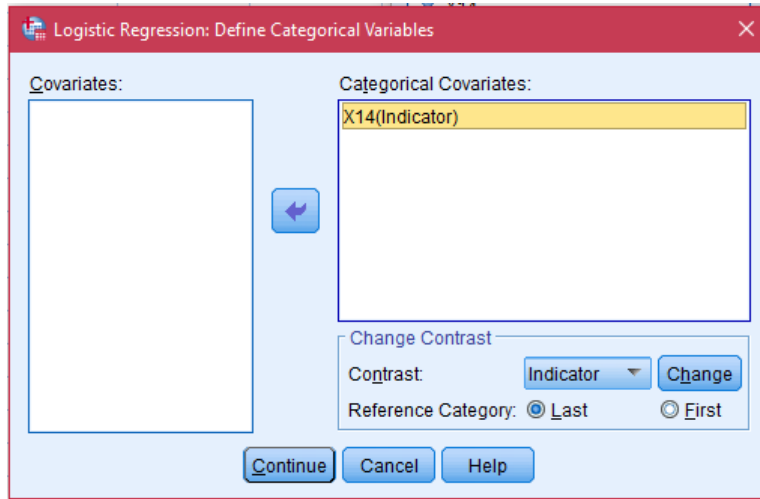


Figure 4.20 Reference Category in LBR Univariate Test for ESP Knowledge

Since the reference category is set into “Last”, the comparison is always the last category. In this factor, the last category is X14(2), comprehend ESP knowledge. The logistic binary regression function and the probability result is described below.

$$\hat{g}(x) = -1.038 + (-0.929) X14_{(1)}$$

$$\pi(x) = \frac{e^{(-1.038 - 0.929 (X14_1))}}{1 + e^{(-1.038 - 0.929 (X14_1))}}$$

$$\pi(1) = \frac{e^{(-1.038 - 0.929 (1))}}{1 + e^{(-1.038 - 0.929 (1))}} = 0.123$$

$$\pi(2) = \frac{e^{(-1.038 - 0.929 (0))}}{1 + e^{(-1.038 - 0.929 (0))}} = 0.262$$

The interpretation of  $\pi(1)$  is that the probability of using ESP because of lack of ESP knowledge is 0.123 and the probability of not using ESP because of lack of ESP knowledge is 0.877 ( $1 - 0.123 = 0.877$ ).

Meanwhile,  $\pi(2)$  is that the probability of using ESP because of comprehensive ESP knowledge is 0.262 and the probability of not using ESP because of comprehensive ESP knowledge is 0.738 ( $1 - 0.262 = 0.738$ ).

Table 4.22 Recapitulation of LBR Test on ESP Knowledge (X14)

|               |               | ESP Knowledge (X14) |            |
|---------------|---------------|---------------------|------------|
|               |               | Lack                | Comprehend |
| ESP Usage (Y) | Not Using ESP | 0.877               | 0.738      |
|               | Using ESP     | 0.123               | 0.262      |

From the logistic binary regression calculation, there are four factors that affect the ESP usage in household. The factors are household income level, household spending, awareness to water crisis and ESP knowledge.

#### 4.4 Willingness to Change Analysis

From the previous analysis, there are still many household that do not install ESP. Meanwhile, the main focus on this research is to know the demand condition of ESP by knowing what factors that can drive the household to possibly change their decision from using ordinary sanitary product to ESP product. Table 4.19 shows the drivers of willingness to change.

Table 4.23 Drivers for Willingness to Change

| <b>Driver</b> | <b>Drivers Explanation</b>   |
|---------------|--|
| Z1            | Neighborhood influence of using eco-sanitary product                             |
| Z2            | Eco-sanitary equipment is easy to find   |
| Z3            | Eco-sanitary product price is affordable to the community                        |
| Z4            | The installation of eco-sanitary product has significant impact on water savings |
| Z5            | Government might give subsidy  |
| Z6            | Increased water tariff by PDAM   |
| Z7            | Easiness to obtain information about the importance of ESP                       |
| Z8            | Free installation cost of ESP given by sanitary manufacturer                     |

There are eight options for willingness to change in the questionnaire. The eight options are the main driver which is presented as Z factors (Z1 until Z8). Referring to Question D1 number 2 until 5, the question stated in the questionnaire are:

**(Question D1-2)**

*“Apakah Anda bersedia untuk mengganti peralatan saniter di rumah dengan eco-saniter? (Ya/Tidak)”*

**(Question D1-3)**

*“Jika Ya, apakah alasan Anda bersedia mengganti peralatan saniter di rumah dengan eco-saniter? Berikan ranking prioritas dari 1-3”*

**(Question D1-4)**

*“Jika Tidak, keadaan apakah yang membuat Anda mengubah keputusan Anda di No. 2 dan bersedia menggunakan eco-saniter? Berikan ranking prioritas dari 1-3”*

The result of willingness to change is then recapitulated in bar chart represented in Figure 4.21. From the figure, the most chosen reason in Rank 1 is the significant impact on water saving by ESP installation which is represented as Z4. The least chosen reason is Z1, which is the neighborhood influence. Figure 4.21 shows the comparison between ranks for each reason react to Willingness to Change (WTC).



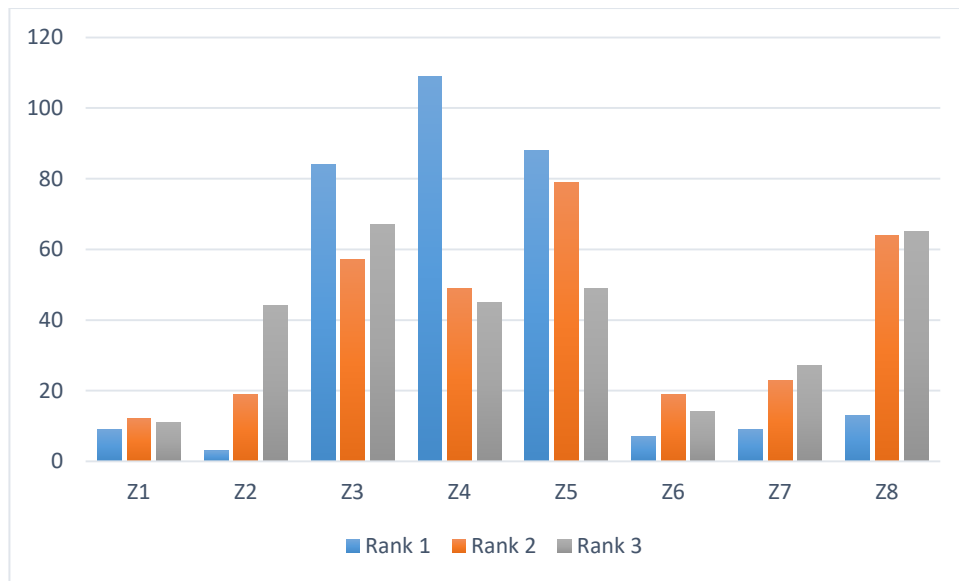


Figure 4.21 Recapitulation for Willingness to Change Drivers

Table 4.22 shows the scoring procedure for each driver. There are 9 respondents that choose Z1 as the first priority for the reason to change, 12 respondent put Z1 as the second priority and 11 respondents as the third priority. The weight calculation for Z1 scoring is:

$$\begin{aligned}
 \text{Z1 score} &= (9 * \text{weight}) + (12 * \text{weight}) + (11 * \text{weight}) \\
 &= (9 * 3) + (12 * 2) + (11 * 1) \\
 &= 62
 \end{aligned}$$

Table 4.24 Scoring Calculation for Willingness to Change Drivers

| Driver    | Rank 1<br>(Weight = 3) | Rank 2<br>(Weight = 2) | Rank 3<br>(Weight = 1) | Score |
|-----------|------------------------|------------------------|------------------------|-------|
| <b>Z1</b> | 9                      | 12                     | 11                     | 62    |
| <b>Z2</b> | 3                      | 19                     | 44                     | 91    |
| <b>Z3</b> | 84                     | 57                     | 67                     | 433   |
| <b>Z4</b> | 109                    | 49                     | 45                     | 470   |
| <b>Z5</b> | 88                     | 79                     | 49                     | 471   |
| <b>Z6</b> | 7                      | 19                     | 14                     | 73    |
| <b>Z7</b> | 9                      | 23                     | 27                     | 100   |
| <b>Z8</b> | 13                     | 64                     | 65                     | 232   |

The score for each driver is then normalized from 0 to 1 by dividing each driver score to the total score from all drivers. So, the normalized score of Z1 is:

$$\begin{aligned}\text{Z1 normalized score} &= (62 / 1932) * 1 \\ &= 0.032\end{aligned}$$

From the normalized score calculation, the highest score is on Z5, Z4, and Z3. The meaning is that Z5, Z4, and Z3 are the most important drivers for willingness to change.

Table 4.25 Normalized Score Calculation for Willingness to Change Drivers

| Factor    | Normalized Score |
|-----------|------------------|
| <b>Z1</b> | 0.032            |
| <b>Z2</b> | 0.047            |
| <b>Z3</b> | 0.224            |
| <b>Z4</b> | 0.243            |
| <b>Z5</b> | 0.244            |
| <b>Z6</b> | 0.037            |
| <b>Z7</b> | 0.052            |
| <b>Z8</b> | 0.120            |

From question D1-2, there are 50% people who are willing to change and the other 50% have no willingness to change. The people who has no willingness to change will continue to question D1-4. From 50% (219 household) who has no willingness to change, there are household (101 respondents) who still do not want to change to use ESP in any condition. There is open question available in the questionnaire D1-4 for the respondents who do not have willingness to change in any condition. The result to the open questions are various:

Satisfied with the existing product

“Lebih enak sekarang”, “Menggunakan yang biasa sudah cukup dan awet”

High price reasons

“Takut harganya mahal”, “Secara ekonomi belum mampu”

Family-based decision

“Nuruti adek, karena pembelian alat dari adek”

Uncertain for eco-products benefit

“Karena belum mengetahui secara jelas manfaat eco produk”

Too slow waterflow

“Justru kurang bersih untuk siram WC, lebih baik menyiram manual saja karena lebih bersih”

No instruction from government

“Belum adanya sosialisasi”

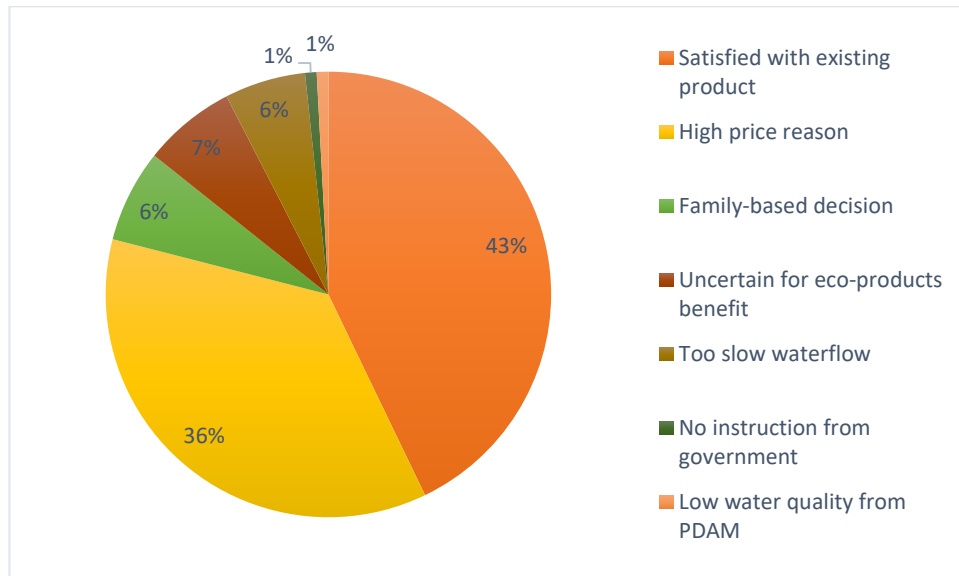


Figure 4.22 Reasons for Not Willing to Change

From Figure 4.22, the current condition satisfaction and high price of ESP become the main reason for the respondent to not change in any condition.

#### 4.5 Market Potential Demand Analysis

In order to know the future market potential, it is very important to understand market situation for ESP product. The analysis uses crosstabulation between ESP knowledge and ESP usage. The illustration of the market potential analysis is provided in Figure 4.23.

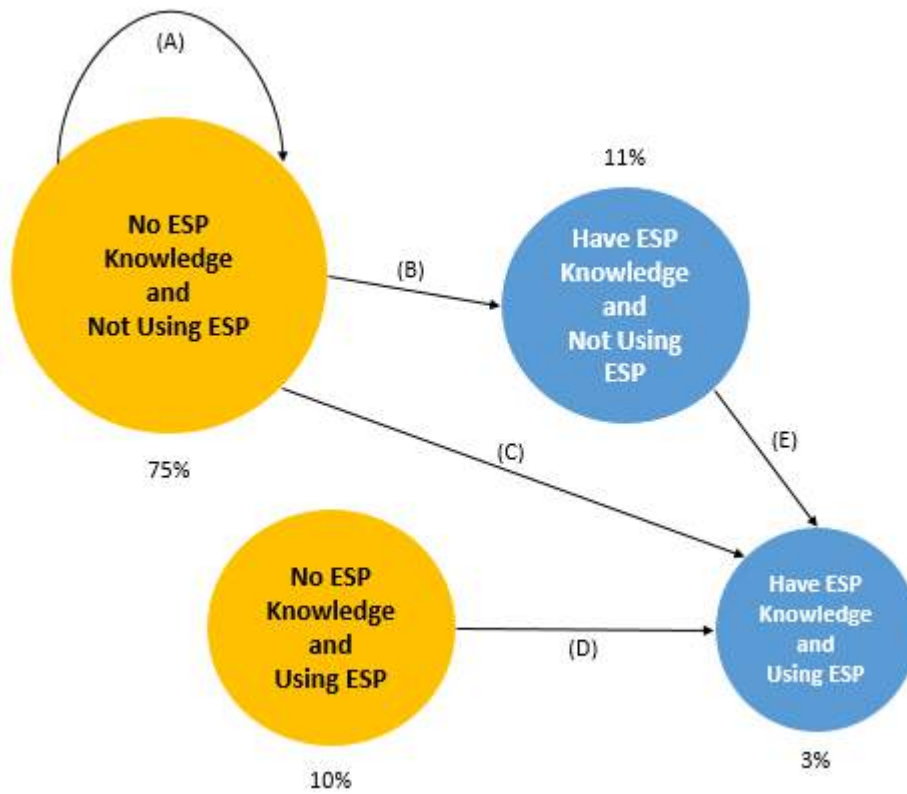


Figure 4.23 Market Potential Analysis Illustration

Figure 4.22 is the simplified mapping of ESP usage based on the household level of ESP knowledge. This can be concluded that the most of the household (329 household = 74.8%) has lack of ESP knowledge and that causes the low usage of ESP. There are 11% of the total surveyed household that have ESP knowledge but they do not install the ESP in their home. There are only small amount of household that uses ESP in their home with ESP knowledge (3%) and without ESP knowledge (10%). There are possibilities for the people to change using their sanitary product which called people transition. There are five possible transition exist in this research and illustrated in Figure 4.22.

a. People Transition (A)

This transition is the worst condition that should be the main concern in order to increase ESP usage. This transition consist of people who are not willing to change from their current state of sanitary product to ESP.

This condition is triggered by the satisfaction of the current product usage. The analysis was done in the earlier subchapter 4.4 “Reasons for Not Willing to Change”. There was 23% household that were in this transition.

b. People Transition (B)

This transition allow the user to have better understanding about ESP knowledge while they do not use ESP in their home. The better understanding could be done by increasing product advertisement with environmentally friendly information that contain in the product.

c. People Transition (C)

This transition is the people changing behavior from not using ESP and not knowing much about ESP to the stage where the ESP is installed in their house and the people has knowledge about ESP. In the stage of no ESP usage in house and lack of ESP knowledge, there are 33.8% from the total household who has willingness to change to use ESP instead of ordinary sanitary.

d. People Transition (D)

The people in this stage are the people who are using ESP but have no sufficient knowledge about sanitary product. In order to make the people have better understanding about ESP, the information about ESP should be spread wider to the household as the ESP user.

e. People Transition (E)

At this condition, there are people who has ESP knowledge but they do not use ESP in their home. To make people change from using sanitary usage to eco, the main trigger is that the installation of ESP has significant impact on water savings.

#### **4.6 Willingness to Pay**

There is pricing strategy for eco-sanitary product. Most of the eco-sanitary product has higher selling price but in long term the usage of ESP can significantly decrease water usage. In this subchapter, the willingness to pay from respondents is analyzed. There are two scenarios of willingness to pay being asked in the

questionnaire, which are for direct sanitary product, and indirect sanitary product. There are five subscenarios in each scenario. The subscenario is asking the fairness of the increased sanitary product price for eco product. The five subscenarios are: increased eco sanitary product price by 5%, 10%, 15%, 20%, and 25%. Each respondent should answer in scales from 0 to 10 about the fairness of the increased eco-sanitary product price, which 0 represents unfairness and 10 is fairness. The scales from the respondents were then represented into scores.

The scores from the respondents were further calculated to find the mode of the respondents' fairness score. The mode recapitulation is then represented in Table 4.22.

Table 4.26 Willingness to Pay Calculation

|          |     | Low Income | Medium Income | High Income |
|----------|-----|------------|---------------|-------------|
| Direct   | 5%  | 8          | 9             | 9           |
|          | 10% | 0          | 8             | 9           |
|          | 15% | 0          | 8             | 6           |
|          | 20% | 0          | 0             | 0           |
|          | 25% | 0          | 0             | 0           |
| Indirect | 5%  | 8          | 9             | 9           |
|          | 10% | 0          | 8             | 7           |
|          | 15% | 0          | 0             | 7           |
|          | 20% | 0          | 0             | 7           |
|          | 25% | 0          | 0             | 0           |

From Table 4.22, there is comparison between three income levels to the willingness to pay. The low income has less WTP than the medium income. It is shown from the modus score of the increased price by 10% is zero. This means that low income has no willingness to pay when the ESP price in the market is 10% more expensive than the ordinary sanitary ware. Medium income has lower WTP compared to high income. This is shown from the modus score of the increased price 20% of direct sanitary product is zero with meaning that with 15% increasing price of direct sanitary product the medium income household still affords to buy ESP.

## **CHAPTER 5**

### **SUPPLY SIDE ANALYSIS**

The supply side analysis captures the information of the current condition of ESP sales in the retailer shops and the salesman understanding about the ESP that were available in their store. By analyzing the supply side, this research purpose is to get an outlook of the ESP availability in the shops and how well it is known by the customer nor the salesman. The high level of knowledge or the ability of salesman able to pursue the customer to buy ESP.

From the supply side, the willingness to change and factors that influence the ESP usage become the static forecasting for the future condition. The forecasted condition of demand side should be combined with the supply side with meaning how well does the supply can comply the demand condition in the current state and future state.

#### **5.1 Supplier and Retailer Survey**

Since this research is included as exploratory research, there is no sufficient primary data provided in journals or other official reports. The data collection method for this research should be done using surveys to get the qualified data. In order to conduct qualified survey, the the questionnaire should be designed before doing the survey. In this subchapter, there will be further explanation about the questionnaire design and the survey design.

##### *5.1.1 Questionnaire Design*

The questionnaire for supply side is divided into two. The first section is the independent survey. The independent survey is done by the surveyor independently (without interaction with salesman) to record the ESP amount available in the market and the specifications of each ESP surveyed. The list of questions in questionnaire for independent survey are:

Faucet

*Merek:*

*Tipe:*

*Jenis Keran: Putar / Tekan / Sensor*

*Keadaan Aerator: Ada / Tidak Ada*

*Konsumsi Air: \_\_\_\_ liter/menit*

*Harga:*

Urinal

*Merek:*

*Tipe:*

*Jenis flush: Ada flush / Tidak ada flush*

*Konsumsi Air: \_\_\_\_ liter/flush*

*Harga:*

Toilet

*Merek:*

*Tipe:*

*Jenis flush: Ada flush (single flush / double flush) / Tidak ada flush*

*Konsumsi Air: \_\_\_\_ liter/flush*

*Harga:*

Shower

*Merek:*

*Tipe:*

*Konsumsi Air: \_\_\_\_ liter/menit*

*Harga:*

Jetwasher

*Merek:*

*Tipe:*

*Konsumsi Air: \_\_\_\_ liter/menit*

*Harga:*



The second part of questionnaire is doing interview with the salesman regarding to know the specification in more detail and how was the consumer prepective to the ESP available in the retailer store.

### 5.1.2 Survey Design

The survey design was done before the survey. The survey design includes determining number of sample size and the time needed to conduct the survey. The determination of the sample size is done to determine how many of the respondents should be put in the survey. The sample size is calculated using formula of sample size with proportion. The formula explanation is provided in subchapter 2.5. The survey population is the retailer stores in Surabaya. The sample size is calculated in order to determine the number of respondents should be listed in the survey. The total population of retailer in Surabaya is approximately 200 stores.

The calculation for the number of retailer is done for all district in Surabaya. The formula for sample size calculation is given below.

$$n_0 = \frac{Z^2 p (1 - p)}{e^2}$$

Which:

Confidential Level = 80% (which means Z value is 1.28)

e = 20%

p = 0.5

$$n_0 = \frac{Z^2 p (1-p)}{e^2} = \frac{1.28^2 * 0.5 (1-0.5)}{0.2^2} = 10.24$$

$$n = \frac{n_0 N}{n_0 + (N+1)} = \frac{10.24 * 200}{10.24 + (200)} = 9.78$$

From the calculation, the total number of retailer to be surveyed is 10 stores. List of stores to be surveyed are described Table 5.1.

Table 5.1 List of Retailer Surveyed in Supply Side Analysis

| No  | Retailer Name                       |
|-----|-------------------------------------|
| 1.  | ACE Hardware EastCoast Mall         |
| 2.  | AJBS Ngagel                         |
| 3.  | Mitra10 Kedungdoro                  |
| 4.  | UD Union Baliwerti                  |
| 5.  | CV Indah Jaya Kerttamik Baliwerti   |
| 6.  | Europe Enchanting Baliwerti         |
| 7.  | Toko Bintang Timur Medokan Semampir |
| 8.  | Toko Bangunan Al-Inayah             |
| 9.  | UD Santoso                          |
| 10. | Pondok Keramik Wiyung               |

The store selection is based on the location of the stores. In this research, there are three types of stores based on the location which is also being asked to the household respondents in demand side analysis. The types of stores is described in Section D1 no 6. There are three store category, which are:

- Rural area retailer stores
- Clustered retailer stores (Baliwerti)
- High class retailer stores (available in mall)

The determination of retailer stores to be surveyed is based on the retailer store category. So, there are 4 surveyed retailer in rural area, 3 retailer surveyed in clustered area, and 3 retailer surveyed in high class area.

## 5.2 Survey Result

The supply survey focuses on sanitary retailer shop and TOTO as the distribution center in Surabaya district. The survey limitation is only for five sanitary products which are faucet, urinal, toilet, shower, and toilet spray.

### 5.2.1 Retailer Survey Result

In the retailer survey, the main focus of the survey is to know the availability of ESP in the market (retailer). After the survey, the sanitary product is then classified into eco or not eco based on the water consumption or the claim from the packaging/salesman. The eco determination for each sanitary product procedure is described in Figure 5.1.

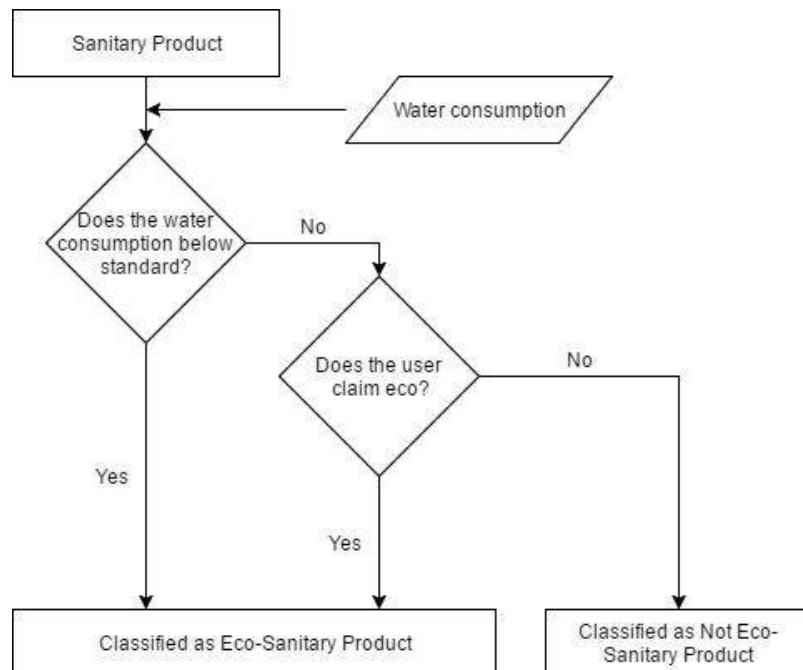


Figure 5.1 Eco Classification for Sanitary Product

There is certain condition for faucet. When the faucet is featured with aerator, the faucet is classified as eco because faucets with aerator has less than 8 liter/minute waterflow. Figure 5.2 shows the picture of aerator in faucet.



Figure 5.2 Aerator on Faucet and Double Flush on Toilet

The result to the retailer survey is described in Table 5.2. Surprisingly, there are in total 83% of faucet product that is categorized as ESP. This mean that the supply side has the ability to drive the use of ESP. Meanwhile, 57% of urinal, 57% of toilets, 29% of shower, and 10% of toilet spray is categorized as ESP.

Table 5.2 Retailer Survey Result

| ESP          | Eco | Not Eco | Eco (%) | Not Eco (%) |
|--------------|-----|---------|---------|-------------|
| Faucet       | 88  | 17      | 83.8%   | 16.1%       |
| Urinal       | 4   | 3       | 57.1%   | 42.9%       |
| Toilet       | 39  | 29      | 57.4%   | 42.6%       |
| Shower       | 27  | 65      | 29.4%   | 70.7%       |
| Toilet Spray | 5   | 44      | 10.2%   | 89.8%       |

The recapitulation given in Table 5.2 shows that eco-faucet is the easiest market access by the customer since the eco-faucet has the highest percentage. Eco-shower and eco-toilet spray has lower percentage which means that the customer may have difficulties to find showers and toilet spray with eco (water saving) specification.

In this retailer survey, the brand of product available in the market is also recapitulated. Table 5.3 shows the existing faucet brand availability in the market. Onda and Toto brand has the highest availability in the market in terms of faucet products because Onda and Toto faucets are available in high-class stores, clustered stores and also rural stores.

Table 5.3 Existing Faucet Brand Availability in the Market

| No | Brand             | High-Class Stores | Clustered Stores | Rural Stores |
|----|-------------------|-------------------|------------------|--------------|
| 1  | Onda              | available         | available        | available    |
| 2  | TOTO              | available         | available        | available    |
| 3  | Wasser            | available         | available        | N/A          |
| 4  | AER               | available         | N/A              | N/A          |
| 5  | Paloma            | available         | N/A              | N/A          |
| 6  | Kris              | available         | N/A              | N/A          |
| 7  | Sanei             | available         | N/A              | N/A          |
| 8  | Tidy              | available         | N/A              | N/A          |
| 9  | Zehn              | available         | N/A              | N/A          |
| 10 | American Standard | available         | N/A              | N/A          |
| 11 | GB                | available         | N/A              | N/A          |
| 12 | Nobili            | available         | N/A              | N/A          |
| 13 | Enchanting        | N/A               | available        | N/A          |
| 14 | Ina               | N/A               | available        | N/A          |
| 15 | Adrielle          | N/A               | available        | N/A          |
| 16 | Ernesto           | N/A               | N/A              | available    |
| 17 | Geovani           | N/A               | N/A              | available    |
| 18 | Stainless Steel   | N/A               | N/A              | available    |
| 19 | Amico             | N/A               | N/A              | available    |
| 20 | DCOTA             | N/A               | N/A              | available    |
| 21 | Mago              | N/A               | N/A              | available    |
| 22 | Soligen           | N/A               | N/A              | available    |

AER, Paloma, Kris, Sanei, Tidy, Zehn, American Standard, Germany Brilliant (GB) and Nobili faucets are easiest to find in high-class stores such as AJBS, Mitra10, and ACE Hardware. Enchanting, Ina, and Adrielle could be easy to find at clustered retail stores. In rural retail stores, the faucet brands that is available in the market are Ernesto, Geovani, Stainless Steel, Amico, DCOTA, Mago, and Soligen.

Table 5.4 Existing Urinal Brand Availability in the Market

| No | Brand             | High-Class Stores | Clustered Stores | Rural Stores |
|----|-------------------|-------------------|------------------|--------------|
| 1  | TOTO              | available         | available        | N/A          |
| 2  | Kris              | available         | N/A              | N/A          |
| 3  | Lexus             | available         | N/A              | N/A          |
| 4  | American Standard | N/A               | available        | N/A          |

Urinal is very rare to be installed in households. Table 5.4 describes that TOTO urinals are the most common brand available in the market. This is shown by the availability of TOTO urinals in high-class retail stores and clustered retail stores. Surprisingly, in there is no urinal available in rural retail store.

Table 5.5 Existing Toilet Brand Availability in the Market

| No | Brand             | High-Class Stores | Clustered Stores | Rural Stores |
|----|-------------------|-------------------|------------------|--------------|
| 1  | TOTO              | Available         | available        | available    |
| 2  | American Standard | Available         | available        | N/A          |
| 3  | Renovo            | Available         | available        | N/A          |
| 4  | INA               | N/A               | available        | available    |
| 5  | Oulu              | available         | N/A              | N/A          |
| 6  | Zehn              | available         | N/A              | N/A          |
| 7  | HCG               | available         | N/A              | N/A          |
| 8  | Kris              | available         | N/A              | N/A          |
| 9  | Tidy              | available         | N/A              | N/A          |
| 10 | Lexus             | available         | N/A              | N/A          |
| 11 | Grohe             | N/A               | available        | N/A          |
| 12 | Orchard           | N/A               | available        | N/A          |
| 13 | Enchanthing       | N/A               | available        | N/A          |
| 14 | Duty              | N/A               | N/A              | available    |

Toilet is installed in every household. From Table 5.5, the most easiest to find brand is TOTO toilets. TOTO is available in high-class retail stores, clustered retail stores and rural retail stores. Meanwhile, INA is available in clustered retail stores and rural retail stores.

Table 5.6 Existing Shower Brand Availability in the Market

| No | Brand             | High-Class Stores | Clustered Stores | Rural Stores |
|----|-------------------|-------------------|------------------|--------------|
| 1  | Onda              | Available         | available        | available    |
| 2  | TOTO              | Available         | available        | available    |
| 3  | Wasser            | Available         | available        | N/A          |
| 4  | American Standard | Available         | available        | N/A          |
| 5  | GB                | Available         | available        | N/A          |
| 6  | AER               | Available         | N/A              | available    |
| 7  | Grohe             | Available         | N/A              | N/A          |
| 8  | Tatay             | Available         | N/A              | N/A          |
| 9  | EcoSense          | Available         | N/A              | N/A          |
| 10 | Sanei             | Available         | N/A              | N/A          |
| 11 | Zehn              | Available         | N/A              | N/A          |
| 12 | Kris              | Available         | N/A              | N/A          |
| 13 | Hansgrohe         | Available         | N/A              | N/A          |
| 14 | Paloma            | available         | N/A              | N/A          |
| 15 | Enchanthing       | N/A               | available        | N/A          |
| 16 | Koles             | N/A               | available        | N/A          |
| 17 | Padova            | N/A               | available        | N/A          |
| 18 | Rivero            | N/A               | available        | N/A          |
| 19 | Stuchi            | N/A               | available        | N/A          |
| 20 | Tanaya            | N/A               | available        | N/A          |
| 21 | Mago              | N/A               | N/A              | available    |
| 22 | Alimar            | N/A               | N/A              | available    |
| 23 | Diva              | N/A               | N/A              | available    |
| 24 | Flusso            | N/A               | N/A              | available    |
| 25 | Water Tech        | N/A               | N/A              | available    |
| 26 | Yuta              | N/A               | N/A              | available    |

From Table 5.6, Onda and TOTO shower has the highest availability in the market since it is available in high-class retail stores, clustered retail stores and rural retail stores. There are also certain brands available only in high-class retail stores such as AER, Grohe, Tatay, EcoSence, Sanei, Zehn, Kris, Hansgrohe, and Paloma. Enchanting, Koles, Padova, Rivero, Stuchi, and Tanaya are familiar in clustered retail stores. In the other hand, Mago, Alimar, Diva, Flusso, WaterTech, and Yuta are available in rural retail stores.

Table 5.7 Existing Toilet Spray Brand Availability in the Market

| No | Brand             | High-Class Stores | Clustered Stores | Rural Stores |
|----|-------------------|-------------------|------------------|--------------|
| 1  | Wasser            | available         | available        | available    |
| 2  | American Standard | available         | available        | N/A          |
| 3  | Sanei             | available         | available        | N/A          |
| 4  | TOTO              | available         | available        | N/A          |
| 5  | AER               | available         | N/A              | available    |
| 6  | Kris              | available         | N/A              | N/A          |
| 7  | Onda              | available         | N/A              | N/A          |
| 8  | Paloma            | available         | N/A              | N/A          |
| 9  | Tidy              | available         | N/A              | N/A          |
| 10 | Zehn              | available         | N/A              | N/A          |
| 11 | Enchanting        | N/A               | available        | N/A          |
| 12 | Grohe             | N/A               | available        | N/A          |
| 13 | Stuchi            | N/A               | available        | N/A          |
| 14 | Figo              | N/A               | N/A              | available    |
| 15 | Soligen           | N/A               | N/A              | available    |
| 16 | Yuta              | N/A               | N/A              | available    |

The toilet spray with brand Wasser is available in the high-class retail store, clustered retail store, and rural retail store. This means that Wasser brand is the most popular brand for toilet spray.

### 5.2.2 Interview Survey Result

It was planned to have interview with sanitary manufacturer that located near Surabaya or Gresik. In fact, there are no sanitary manufacturer available near Surabaya nor Gresik. Then, interview with sanitary product distributor is planned. The main target is to be able to have interview with INA and TOTO since both of the brands are very familiar. Surprisingly, INA distributor is not available in Surabaya. So, the interview was only done to TOTO distributor.

The interview as also done with TOTO distributor. TOTO is one of the most popular brand in sanitary product. TOTO sanitary product almost found

everywhere. TOTO is originally from Japan. In Indonesia, TOTO factory (PT Surya TOTO Indonesia) is located in Jalan MH. Thamrin KM 7, District Serpong Utara, Tangerang, Banten. In 2018, PT Surya TOTO Indonesia will go public.

TOTO produces many kinds of sanitary products and improve their product design to be addaptive to Indonesian culture. TOTO sales growth reached 6.9% from 2016 to 2017 (Bisnis.com, 2017). This shows that TOTO has a dynamic sanitary market in Indonesia. In order to reach sanitary market in Surabaya, TOTO has distribution center in Surabaya. The distributor location is in Jalan Gubernur Suryo, Surabaya. The interview was conducted with the Human Resource Supervisor and the Sales Supervisor.



Figure 5.3 Interview with TOTO Distributor

The questionnaire are divided into two sections which are about purchasing process, sanitation market and market access. The interview limit only for Surabaya district. For purchasing system, TOTO Surabaya Distributor only purchase from one supplier directly PT Surya TOTO Indonesia located in Serpong, Tangerang.

Discussing about sanitation market, toilet is the most sought-after product. Shower, faucet and toilet spray is not much sought-after compare to toilets. Since the toilet is the most sought after item, toilets has the highest possibility to have stockout. The least sought product is urinal because it is mostly bought by commercial building contractor in large amount and not by individual buyer. Since



sales information is very confidential to be exposed, the illustration of sales volume is given in Figure 5.4.

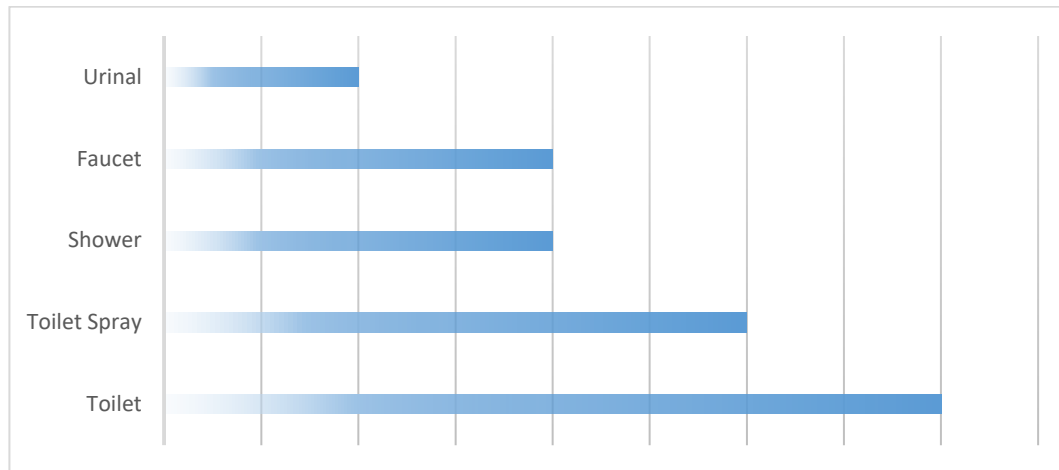


Figure 5.4 TOTO Sanitary Sales Volume

There are four types of customer in TOTO distributor which are retailer stores, contractors, interior designers, and some are individual customers. The retailer store, contractor and interior designer mostly buy in large amount. Meanwhile, the individual customer only buy single products. Based on the interview result, the frequency of individual customers is less than the project-based customers. Since the data from TOTO customer is not allowed to be published in interviews, the illustration of TOTO customer is described in Figure 5.5.

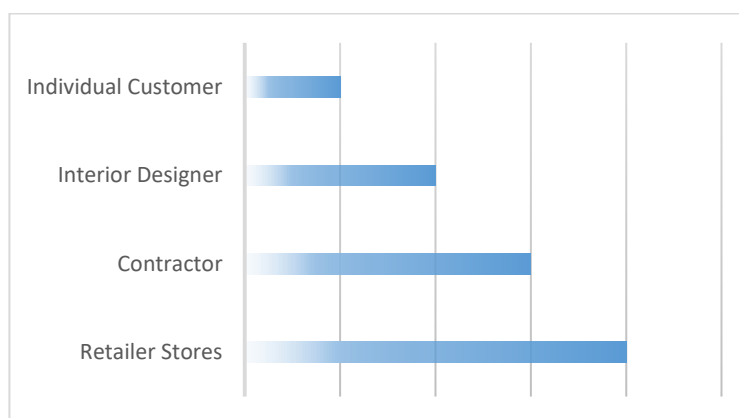


Figure 5.5 TOTO Main Customer

Figure 5.5 shows that most of the customer is dominated by the retailer stores. TOTO Distributor sells their product to retailer stores with MoU using target system. When the retailer could not reach the sales target as expected by TOTO, TOTO Distributor will cut the amount of supply to the retailer for certain condition. The second biggest customer of TOTO Distributor is the contractor. Contractor owns big project for building developments in Surabaya. There two main contractors act as the customer for sanitary product in TOTO which are PT Waringin Megah and PT Tatamulia Nusantara Indah.



Figure 5.6 Contractor as Main Customer of TOTO Sanitary Products

The market access of TOTO is well known by Surabaya customer and most of the customer of TOTO are loyal to the brand because of its quality and the continuous improvement done by TOTO. TOTO, [www.toto.co.id](http://www.toto.co.id), also has a well maintained official website that informs the specification and price from each type of their products.

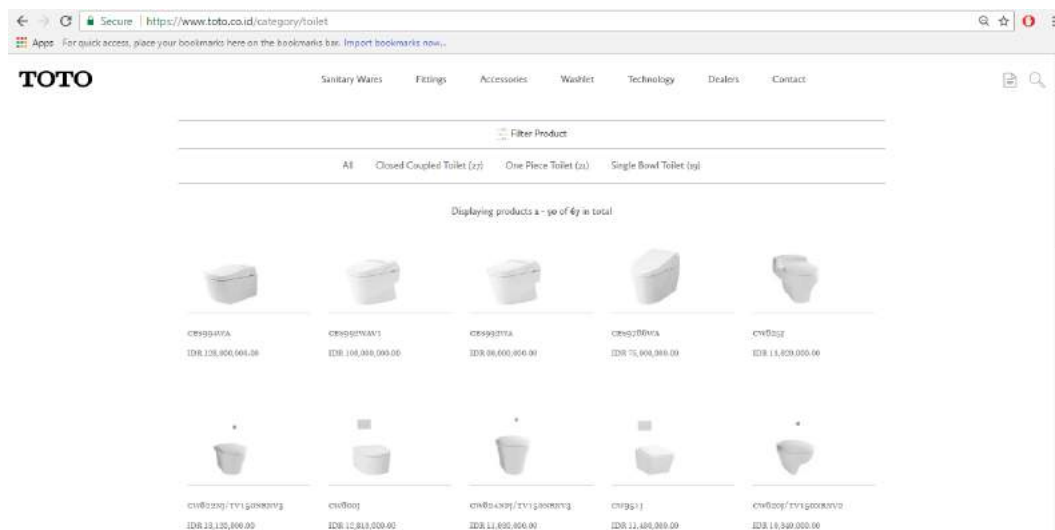


Figure 5.7 TOTO Official Website Interface

The well-maintained website helps the customer to decide which product to buy before going to the store. From the interview, Sales Supervisor confirmed that 60% of the customer already know what type of product they want to buy because of the information given in the official website. The other 40% asks TOTO some suggestion regarding to the specification of the product that meets their expectation.

The sales behavior for TOTO sanitary products in Surabaya is seasonal. In fasting month (Ramadhan) and school holiday, the sales of TOTO sanitary products remain decreasing compare to active/normal working days.

Discussing about ESP that were produced by TOTO, there is no price difference between ESP and ordinary sanitary product. For TOTO sanitary product, the price difference is based on the model (physical appearance) of the product. In other hand, all TOTO salesman already understand the eco feature in every TOTO sanitary product because all TOTO eco product was given sticker about the water consumption (especially toilets). In the official website, there is also detailed information about the water consumption of each product such as shown in Figure

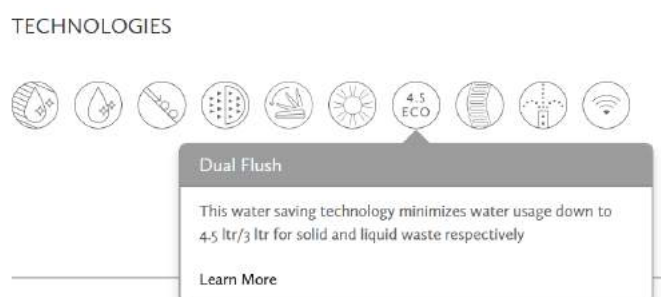


Figure 5.8 Eco Technologies in TOTO Official Website

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## **CHAPTER 6**

### **CONCLUSION AND SUGGESTION**

This chapter contains conclusion from the research regarding the objectives of the research. The suggestion for the research will be also included in this chapter.

#### **6.1 Conclusion**

The conclusion to this research are:

1. The usage eco-sanitary product in Surabaya is low. From the surveyed household, there are only 14.3% household which is categorized as eco-household because the household installed at least one eco-product. From the survey result, there are 64% from the total surveyed household that already being familiar with water crisis issue but there are still 85% of the surveyed household that do not understand clearly about eco-sanitary product.
2. From the logistic binary regression calculation, there are four factors that affect the ESP usage in household. The factors are household income level, household spending, awareness to water crisis and ESP knowledge. In addition, only medium income level that do not influence the ESP usage.
3. From eight drivers of willingness to change, there are three drivers that become the main reason for the people to change from using ordinary sanitary product to eco sanitary product. The three drivers are:
  - Eco-sanitary product price is affordable to the community (Z3).
  - The installation of eco-sanitary product has significant impact on water savings (Z4).
  - Subsidy that might given by the government (Z5).
4. The supply side consist of sanitary retailer stores and distribution center (TOTO). From the survey, the market of faucets is ready to provide eco product to the customer because the high availability of eco-faucets in the market. Toilets and urinals with eco feature are also available in the market but only 57% of them are featured with water saving technology. Shower

and toilet spray has the least availability of eco featured product in the market. From the survey held to supply side, the salesman has lack of knowledge about eco-sanitary product and reported that the eco features on water saving is not the main concern for the customer to buy sanitary product.

5. Based on the survey on demand and supply side, the driver to change using ESP could be from demand and supply side. In order to increase the use of eco-sanitary products, the socialization on ESP should be done in paralel with the socialization on how to conserve water as a preventive action to water crisis.

## **6.2 Suggestions**

The suggestion for this research are:

1. To expand the scope of demand side in the further work to commercial and public facilities in order have comprehensive demand of eco-sanitary product.
2. To elaborate more on manufacturing side as part of the supply side.
3. To obtain and use the historical data of sanitary product market from the manufacturer and the ESP user.
4. To elaborate more on the people transition in to know market potential demand on ESP.

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## APPENDIX I

### Questionnaire Design

Surveyor:  
No. Kuisioner:

#### KUISIONER SURVEY PENGUNAAN AIR BERSIH WARGA KOTA SURABAYA

##### A. DEMOGRAFI DAN INFORMASI PENGGUNA

Kecamatan:

Kelurahan:

RT/RW:

1. Jenis kelamin: (L/P)
  2. Berapakah usia Anda? \_\_\_\_\_ tahun
  3. Apakah agama Anda?  
(Islam/Kristen/Katholik/Budha/Hindu)
  4. Apakah pendidikan terakhir Anda?  
(SD/SMP/SMA/Diploma/Sarjana)
  5. Apakah pekerjaan anda?
    - a. PNS/Kary Swasta/ABRI/Polisi
    - b. Wiraswasta
    - c. Mahasiswa
    - d. Profesional
    - e. Dan lain-lain (.....)
  6. Berapakah pendapatan keluarga Anda per bulan?
    - a. ≤ Rp. 1.000.000
    - b. Rp. 1.000.000 – Rp. 3.000.000
    - c. Rp. 3.000.000 – Rp. 5.000.000
    - d. Rp. 5.000.000 – Rp. 10.000.000
    - e. Rp. 10.000.000 – Rp. 15.000.000
    - f. Rp. 15.000.000 – Rp. 25.000.000
    - g. > Rp. 25.000.000
  7. Berapakah pengeluaran keluarga Anda per bulan?
    - a. ≤ Rp. 1.000.000
    - b. Rp. 1.000.000 – Rp. 3.000.000
    - c. Rp. 3.000.000 – Rp. 5.000.000
    - d. ≥ Rp. 5.000.000
  8. Apakah Anda memiliki anak usia balita? (Ya/Tidak),  
\_\_\_\_\_ orang
  9. Berapakah jumlah orang yang tinggal dengan Anda  
dalam satu rumah?
    - a. 1 orang (tinggal sendiri)
    - b. \_\_\_\_\_ orang
  10. Apakah jenis rumah yang keluarga Anda tinggal?
    - a. Milik pribadi
    - b. Rumah dinas
    - c. Kontrak
    - d. Koo keluarga
  11. Apakah lingkungan rumah keluarga Anda?
    - a. Apartemen
    - b. Rumah susun
    - c. Kampung
    - d. Perumahan
    - e. Rumah dinas
- ##### B. PENGUNAAN AIR MINUM DAN PENYEDIAAN AIR BERSIH
1. Apakah jenis air minum yang keluarga Anda konsumsi  
setiap hari?
    - ☐ Air PDAM yang direbus
    - ☐ Air sumur yang direbus
    - ☐ Air mineral bermerek \_\_\_\_\_
    - ☐ Air isi ulang
    - ☐ Air suling (contoh: Pure It)
  2. Alasan pemilihan jenis air minum  
\_\_\_\_\_
  3. Apabila PDAM meningkatkan kualitas air bersih yang  
dilah, apakah Anda bersedia untuk mengonsumsi air  
tersebut?
    - a. Bersedia
    - b. Tidak Bersedia
  4. Apa jenis sumber air bersih yang keluarga Anda  
gunakan untuk keperluan sehari-hari?
    - ☐ PAM
    - ☐ Sumur gali/pompa (milik pribadi)
    - ☐ Sumur komunal
    - ☐ Sumur bor
    - ☐ Air sungai
    - ☐ Air sumber (tangki/gledakan)
  5. Berapa jumlah pemakaian air PDAM perbulan?
    - a. < 10 m<sup>3</sup>/KK/ Bulan
    - b. 10-30 m<sup>3</sup>/KK/ Bulan
    - c. 30-50 m<sup>3</sup>/KK/ Bulan
    - d. > 50 m<sup>3</sup>/KK/ Bulan
  6. Berapa pengeluaran air rata-rata yang Anda bayar  
setiap bulannya?
    - a. Rp. 30.000- Rp. 50.000
    - b. Rp. 50.000- Rp. 75.000
    - c. Rp. 75.000- Rp. 100.000
    - d. > Rp. 100.000
  7. Apakah di rumah Anda terdapat tandon air?  
(Ada/Tidak)
  8. Jika Ada, apakah jenis tandon air di rumah Anda?  
(Tandon Atas/Tandon Bawah/Keduanya)  
Alasan: \_\_\_\_\_
  9. Berapakah kapasitas tandon di rumah Anda?  
\_\_\_\_\_ m<sup>3</sup>
  10. Apakah Anda menggunakan pompa air dalam  
membantu pengaliran air PDAM atau pengaliran air ke  
Tandon di rumah Anda? (Ya/Tidak)
  11. Jika Ya, apakah jenis pompa air yang Anda gunakan?  
(Otomatis Mati/Manual)  
Daya: \_\_\_\_\_ Watt / Merek: \_\_\_\_\_
  12. Berapa lama Anda menggunakan pompa air per hari?  
\_\_\_\_\_ menit/hari
  13. Air PDAM hanya mengalir di waktu  
(sepanjang hari/pagi hari/siang hari/malam hari)
  14. Seberapa sering air PDAM mati di rumah Anda?  
\_\_\_\_\_ kali/bulan
  15. Berapakah daya listrik yang terpasang di rumah Anda?  
\_\_\_\_\_ VA
  16. Berapa pengeluaran listrik rata-rata yang Anda bayar  
setiap bulannya?
    - a. < Rp. 250.000
    - b. Rp. 250.000- Rp. 500.000
    - c. Rp. 500.000- Rp. 750.000
    - d. > Rp. 750.000, \_\_\_\_\_
  17. Bagaimana tekanan air dalam pipa PDAM menurut  
Anda? ( Tidak Tinggi/ Kurang Tinggi/ Cukup Tinggi /  
Tinggi / Sangat Tinggi)
  18. Kapan tekanan air di rumah Anda berada di bawah  
tekanan rata-rata? \_\_\_\_\_

19. Apakah di rumah Anda terdapat meteran air? (Ya/Tidak)
20. Bagaimana keadaan meteran air di rumah Anda? (Tidak Baik / Kurang Baik / Cukup Baik / Baik / Sangat Baik)
21. Apakah di rumah Anda menggunakan water stopper? (Ya/Tidak)
22. Jika Ya, dimanakah Anda memasang water stopper?  
☐ Tandon (Atas/Bawah/Kedua-duanya)  
☐ Bak kamar mandi

#### C. PENYEDIAAN PERALATAN SANITER

1. Berapakah rata-rata keluarga Anda menggunakan air?  
☐ Minum ( liter/hari)  
☐ Mandi ( kali/hari)  
☐ Mencuci baju ( kali/minggu)  
☐ Mencuci piring ( kali/hari)  
☐ Menyiram tanaman dengan luas taman ..... m<sup>2</sup> ( kali/hari)  
 Mencuci mobil/sepeda motor dengan jumlah mobil ..... dan sepeda motor ..... ( kali/bulan)  
 Alat cuci: Ember/Selang  
☐ Lain-lain ( )
2. Apakah jenis kamar mandi di rumah Anda?  
☐ Bak/gayung ( unit)  
☐ Shower ( unit)  
☐ Kamar mandi umum

#### 3. Identifikasi jumlah peralatan saniter di rumah Anda

| Jenis Peralatan                                 | Spesifikasi Peralatan  | Eco Feature | Jumlah |
|---|--|-------------|--------|
| Kran (termasuk di kamar mandi, dapur dan taman) | (Otomatik/Tidak)<br>Merek:<br>Q:<br>Flowrate: l/menit  |             |        |
| Urinoir / Wilet                                 | Merek:<br>(Rush/No Rush)   |             |        |
| WC  | (Jangkak/Duduk)<br>(Rush/No Rush)<br>(Single Flush/Double Flush)<br>Single Flush: l/flush<br>Double Flush: dan l/flush<br>Merek: |             |        |
| Shower  | Merek:<br>Flowrate: l/menit  |             |        |
| Wastafel  | Merek:   |             |        |
| Jet washer                                      | Merek:<br>Flowrate: l/menit  |             |        |
| Kartrub   | Merek:   |             |        |
| Water stopper                                   | Merek:   |             |        |
| Peralatan Air                                   | Sumber energi:<br>(Gas/Electric/Solar Cell)  |             |        |

4. Apakah Anda tahu mengenai problematika krisis air bersih? (Ya/Tidak)
- Jika Ya, menurut Anda apa penyebab problematika krisis air bersih?  
☐ Perubahan iklim  
☐ Pencemaran air  
☐ Penggunaan air berlebihan  
☐ Ketidakeimbangan jumlah penduduk

5. Apakah upaya yang dapat Anda lakukan untuk mencegah terjadinya krisis air bersih?  
☐ Mengubah perilaku menjadi hemat air  
 Contoh: \_\_\_\_\_  
☐ Mengganti peralatan saniter dengan peralatan eco saniter yang lebih hemat air
6. Menurut Anda, apakah strategi yang sebaiknya dilakukan pemerintah dalam mengurangi pemakaian dan mengatasi permasalahan air bersih?

#### 7. Apakah jenis septic tank yang Anda gunakan?

- a. Septic tank milik pribadi  
 b. Septic tank komunal  
 c. Tidak punya
8. Septic tank Anda menampung? buangan toilet/buangan cuci baju-piring/kedua-duanya

#### D. KESEDIAAN RESPONDEN

##### D.1 KESEDIAAN UNTUK BERUBAH

1. Apakah selama ini Anda telah mengetahui mengenai peralatan Eco Saniter? (Ya/Tidak)
2. Apakah Anda bersedia untuk mengganti peralatan saniter di rumah dengan Eco Saniter?  
 a. Ya (Lanjut No.3)  
 b. Tidak (Lanjut No.4)
3. Apakah alasan Anda bersedia mengganti peralatan saniter di rumah dengan Eco Saniter? (1 paling penting hingga ...)

|   |
|---|
| Banyak orang menggunakan Eco Saniter  |
| Peralatan Eco Saniter mudah didapatkan  |
| Harga peralatan Eco Saniter terjangkau oleh masyarakat  |
| Pemasangan Eco Saniter memberikan dampak yang signifikan terhadap penghematan air atau energi |
| Pembelian Eco Saniter mungkin mendapatkan subsidi dari Pemerintah                             |
| Peningkatan tarif air bersih oleh PDAM  |
| Informasi mengenai pentingnya eco saniter mudah didapatkan                                    |
| Bebas biaya instalasi pemasangan eco saniter dari perusahaan yang bersangkutan                |

4. Keadaan apakah yang membuat Anda mengubah keputusan Anda di No.2 dan bersedia menggunakan eco-saniter? (1 paling penting hingga ...)

|   |
|---|
| Banyak orang menggunakan Eco Saniter  |
| Peralatan Eco Saniter mudah didapatkan  |
| Harga peralatan Eco Saniter terjangkau oleh masyarakat  |
| Pemasangan Eco Saniter memberikan dampak yang signifikan terhadap penghematan air atau energi |
| Pembelian Eco Saniter mungkin mendapatkan subsidi dari Pemerintah                             |
| Peningkatan tarif air bersih oleh PDAM  |
| Informasi mengenai pentingnya eco saniter mudah didapatkan                                    |
| Bebas biaya instalasi pemasangan eco saniter dari perusahaan yang bersangkutan                |

Alasan tetap tidak bersedia: \_\_\_\_\_

5. Khusus untuk responden memilih pernyataan banyak orang menggunakan Eco Saniter pada No.4, berapa persentase tetangga di lingkungan Anda yang dapat mempengaruhi keputusan Anda dalam penggunaan eco saniter?
- 1 - 25%
  - 26 - 50%
  - 51 - 75%
  - 76 - 100%
6. Menurut Anda, peralatan Eco Saniter mudah didapatkan jika,
- Dijual di toko bangunan sekitar tempat tinggal
  - Dijual di kawasan toko bangunan (seperti Baliwerti)
  - Dijual di depo/ toko bangunan di mall (seperti Mitra 10, AJBS, dll)
7. Menurut Anda, sosialisasi penggunaan eco-saniter yang paling efektif melalui? (1 paling penting hingga ...)
- |                                    |
|------------------------------------|
| Penyediaan demo plant (demo alat)  |
| Penyediaan leaflet dan buku manual |
| Melalui iklan yang menarik         |
8. Apakah di rumah Anda terdapat tangki penyimpanan air hujan (rainwater tank)?
- Ya, Pemanfaatannya \_\_\_\_\_
  - Tidak (Lanjut No. 9)
9. Apakah Anda bersedia untuk memasang rainwater tank di rumah sebagai salah satu upaya komunal untuk menjaga level air bersih di Kota Surabaya?
- Ya (Lanjut No.10)
  - Tidak (Lanjut No.11)
10. Apakah alasan Anda memasang rain water tank di rumah sebagai salah satu upaya komunal untuk menjaga level air bersih di Kota Surabaya? (1 paling penting hingga ...)
- |  |
|--|
| Terdapat informasi dan prosedur yang jelas dari pemasangan rain water tank                       |
| Pemasangan rain water tank mendapatkan subsidi dari pemerintah atau perusahaan yang bersangkutan |
| Rain water tank memberikan dampak yang signifikan terhadap penghematan air                       |
| Peningkatan tarif air bersih oleh PDAM   |
11. Alasan apakah yang membuat Anda mengubah keputusan Anda di No.9 dan bersedia memasang rain water tank? (1 paling penting hingga ...)
- |  |
|--|
| Terdapat informasi dan prosedur yang jelas dari pemasangan rain water tank                       |
| Pemasangan rain water tank mendapatkan subsidi dari pemerintah atau perusahaan yang bersangkutan |
| Rain water tank memberikan dampak yang signifikan terhadap penghematan air                       |
| Peningkatan tarif air bersih oleh PDAM   |
- Alasan tetap tidak bersedia:
12. Menurut Anda, sosialisasi penggunaan rain water tank yang paling efektif melalui? (1 paling penting hingga ...)
- |                                    |
|------------------------------------|
| Penyediaan demo plant (demo alat)  |
| Penyediaan leaflet dan buku manual |
| Melalui iklan yang menarik         |
13. Menurut Anda, berapa persen subsidi dari Pemerintah yang dapat mempengaruhi keputusan Anda dalam penggunaan eco saniter atau pemasangan rain water tank?
- 1 - 10%
  - 11 - 20%
  - 21 - 30%
  - > 30%

14. Apakah Anda setuju dengan adanya pembatasan penggunaan air bersih di rumah guna menjaga level air bersih di Kota Surabaya? (Ya/Tidak)
15. Menurut Anda, berapa persen peningkatan tarif air bersih dari tarif saat ini yang dapat mempengaruhi keputusan Anda dalam penggunaan eco saniter atau pemasangan rain water tank?
- 1 - 5%
  - 6 - 10%
  - 11 - 20%
  - > 20%
16. Apakah Anda setuju dengan adanya kenaikan tarif air bersih? (Ya/Tidak)
17. Apakah Anda bersedia untuk menghadiri sosialisasi atau pelatihan mengenai pemasangan rainwater tank di rumah? (Ya/Tidak)

#### D.2 KESEDIAAN UNTUK MEMBAYAR

1. Dengan presentase peningkatan harga berapa persen Anda bersedia membeli eco saniter untuk penggunaan air langsung (kran, shower, jet washer)?

| Harga | Sangat Tidak Layak |   |   | Kurang Layak |   |   | Layak |   |   | Sangat Layak |
|-------|--------------------|---|---|--------------|---|---|-------|---|---|--------------|
| 5%    | 0                  | 1 | 2 | 3            | 4 | 5 | 6     | 7 | 8 | 9 10         |
| 10%   | 0                  | 1 | 2 | 3            | 4 | 5 | 6     | 7 | 8 | 9 10         |
| 15%   | 0                  | 1 | 2 | 3            | 4 | 5 | 6     | 7 | 8 | 9 10         |
| 20%   | 0                  | 1 | 2 | 3            | 4 | 5 | 6     | 7 | 8 | 9 10         |
| 25%   | 0                  | 1 | 2 | 3            | 4 | 5 | 6     | 7 | 8 | 9 10         |

2. Dengan presentase peningkatan harga berapa persen Anda bersedia membeli eco saniter untuk penggunaan alat penyimpan air (bathtub, sink, bak, wastafel, tandon)?

| Harga | Sangat Tidak Layak |   |   |   | Kurang Layak |   |   |   | Layak |   |    |  | Sangat Layak |  |
|-------|--------------------|---|---|---|--------------|---|---|---|-------|---|----|--|--------------|--|
| 5%    | 0                  | 1 | 2 | 3 | 4            | 5 | 6 | 7 | 8     | 9 | 10 |  |              |  |
| 10%   | 0                  | 1 | 2 | 3 | 4            | 5 | 6 | 7 | 8     | 9 | 10 |  |              |  |
| 15%   | 0                  | 1 | 2 | 3 | 4            | 5 | 6 | 7 | 8     | 9 | 10 |  |              |  |
| 20%   | 0                  | 1 | 2 | 3 | 4            | 5 | 6 | 7 | 8     | 9 | 10 |  |              |  |
| 25%   | 0                  | 1 | 2 | 3 | 4            | 5 | 6 | 7 | 8     | 9 | 10 |  |              |  |

3. Dengan presentase peningkatan harga berapa persen Anda bersedia membeli eco saniter untuk penggunaan pendukung air buangan (toilet, urinoir)?

| Harga | Sangat Tidak Layak |   |   | Kurang Layak |   |   | Layak |   |   | Sangat Layak |
|-------|--------------------|---|---|--------------|---|---|-------|---|---|--------------|
| 5%    | 0                  | 1 | 2 | 3            | 4 | 5 | 6     | 7 | 8 | 9 10         |
| 10%   | 0                  | 1 | 2 | 3            | 4 | 5 | 6     | 7 | 8 | 9 10         |
| 15%   | 0                  | 1 | 2 | 3            | 4 | 5 | 6     | 7 | 8 | 9 10         |
| 20%   | 0                  | 1 | 2 | 3            | 4 | 5 | 6     | 7 | 8 | 9 10         |
| 25%   | 0                  | 1 | 2 | 3            | 4 | 5 | 6     | 7 | 8 | 9 10         |

4. Dengan presentase peningkatan harga berapa persen Anda bersedia membeli eco saniter untuk penggunaan energi (water heater, pompa)?

| Harga | Sangat Tidak Layak |   |   |   | Kurang Layak |   |   |   | Layak |   |    |  | Sangat Layak |  |
|-------|--------------------|---|---|---|--------------|---|---|---|-------|---|----|--|--------------|--|
| 5%    | 0                  | 1 | 2 | 3 | 4            | 5 | 6 | 7 | 8     | 9 | 10 |  |              |  |
| 10%   | 0                  | 1 | 2 | 3 | 4            | 5 | 6 | 7 | 8     | 9 | 10 |  |              |  |
| 15%   | 0                  | 1 | 2 | 3 | 4            | 5 | 6 | 7 | 8     | 9 | 10 |  |              |  |
| 20%   | 0                  | 1 | 2 | 3 | 4            | 5 | 6 | 7 | 8     | 9 | 10 |  |              |  |
| 25%   | 0                  | 1 | 2 | 3 | 4            | 5 | 6 | 7 | 8     | 9 | 10 |  |              |  |

Terima kasih atas kesediaannya mengisi kuisioner ini ©  
Tanda tangan responden

Nama Responden:  
No. HP:

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## APPENDIX II

### Survey Design

| No | Kecamatan      | Kelurahan            | Sample Size    |                |
|----|----------------|----------------------|----------------|----------------|
|    |                |                      | Each Kecamatan | Each Kelurahan |
| 1  | TEGALSARI      | DR. SUTOMO           | 14             | 3              |
|    |                | KEDUNG DORO          |                | 3              |
|    |                | KEPUTRAN             |                | 3              |
|    |                | TEGALSARI            |                | 3              |
|    |                | WONOREJO             |                | 2              |
| 2  | GENTENG        | EMBONG KALIASIN      | 9              | 2              |
|    |                | GENTENG              |                | 2              |
|    |                | KAPASARI             |                | 2              |
|    |                | KETABANG             |                | 2              |
|    |                | PENELEH              |                | 1              |
| 3  | BUBUTAN        | JEPARA               | 14             | 3              |
|    |                | GUNDIH               |                | 3              |
|    |                | TEMBOK DUKUH         |                | 3              |
|    |                | ALON ALON CONTONG    |                | 3              |
|    |                | BUBUTAN              |                | 2              |
| 4  | SIMOKERTO      | KAPASAN              | 14             | 3              |
|    |                | SIDODADI             |                | 3              |
|    |                | SIMOKERTO            |                | 3              |
|    |                | SIMOLAWANG           |                | 3              |
|    |                | TAMBAKREJO           |                | 2              |
| 5  | PABEAN CANTIAN | BONGKARAN            | 12             | 3              |
|    |                | KREMBANGAN UTARA     |                | 3              |
|    |                | NYAMPLUNGAN          |                | 2              |
|    |                | PERAK TIMUR          |                | 2              |
|    |                | PERAK UTARA          |                | 2              |
| 6  | SEMAMPIR       | AMPEL                | 25             | 5              |
|    |                | PEGIRIAN             |                | 5              |
|    |                | SIDOTOPO             |                | 5              |
|    |                | UJUNG                |                | 5              |
|    |                | WONOKUSUMO           |                | 5              |
| 7  | KREMBANGAN     | DUPAK                | 16             | 4              |
|    |                | KEMAYORAN            |                | 3              |
|    |                | KREMBANGAN SELATAN   |                | 3              |
|    |                | MOROKREMBANGAN       |                | 3              |
|    |                | PERAK BARAT          |                | 3              |
| 8  | KENJERAN       | BULAK BANTENG        | 21             | 6              |
|    |                | SIDOTOPO WETAN       |                | 5              |
|    |                | TAMBAK WEDI          |                | 5              |
|    |                | TANAH KALI KEDINDING |                | 5              |
| 9  | BULAK          | BULAK                | 6              | 2              |
|    |                | KEDUNG COWEK         |                | 2              |
|    |                | KENJERAN             |                | 1              |
|    |                | SUKOLILO BARU        |                | 1              |
| 10 | TAMBAK SARI    | DUKUH SETRO          | 30             | 4              |
|    |                | GADING               |                | 4              |
|    |                | KAPASMADYA BARU      |                | 4              |
|    |                | PACAR KELING         |                | 4              |
|    |                | PACAR KEMBANG        |                | 4              |
|    |                | PLOSO                |                | 4              |
|    |                | RANGKAH              |                | 3              |
|    |                | TAMBAKSARI           |                | 3              |
| 11 | GUBENG         | AIRLANGGA            | 19             | 4              |
|    |                | BARATAJAYA           |                | 3              |
|    |                | GUBENG               |                | 3              |



| No | Kecamatan       | Kelurahan            | Sample Size    |                |
|----|-----------------|----------------------|----------------|----------------|
|    |                 |                      | Each Kecamatan | Each Kelurahan |
|    |                 | KERTAJAYA            |                | 3              |
|    |                 | MOJO                 |                | 3              |
|    |                 | PUCANG SEWU          |                | 3              |
| 12 | RUNKUT          | KALIRUNGKUT          | 15             | 3              |
|    |                 | KEDUNG BARUK         |                | 3              |
|    |                 | MEDOKAN AYU          |                | 3              |
|    |                 | PENJARINGAN SARI     |                | 2              |
|    |                 | RUNKUT KIDUL         |                | 2              |
|    |                 | WONOREJO             |                | 2              |
|    |                 |                      |                |                |
| 13 | TENGILIS MEJOYO | KENDANGSARI          | 8              | 2              |
|    |                 | KUTISARI             |                | 2              |
|    |                 | PANJANG JIWO         |                | 2              |
|    |                 | TENGILIS MEJOYO      |                | 2              |
| 14 | GUNUNG ANYAR    | GUNUNG ANYAR         | 8              | 2              |
|    |                 | GUNUNG ANYAR TAMBAK  |                | 2              |
|    |                 | RUNKUT MENANGGAL     |                | 2              |
|    |                 | RUNKUT TENGAH        |                | 2              |
| 15 | SUKOLILO        | GEBANG PUTIH         | 15             | 3              |
|    |                 | KEPUTIH              |                | 2              |
|    |                 | KLAMPIS NGASEM       |                | 2              |
|    |                 | MEDOKAN SEMAMPIR     |                | 2              |
|    |                 | MENUR PUMPUNGAN      |                | 2              |
|    |                 | NGINDEN JANGKUNGAN   |                | 2              |
|    |                 | SEMOLOWARU           |                | 2              |
| 16 | MULYOREJO       | DUKUH SUTOREJO       | 12             | 2              |
|    |                 | KALIJUDAN            |                | 2              |
|    |                 | KALISARI             |                | 2              |
|    |                 | KEJAWAN PUTIH TAMBAK |                | 2              |
|    |                 | MANYAR SABRANGAN     |                | 2              |
|    |                 | MULYOREJO            |                | 2              |
| 17 | SAWAHAN         | BANYU URIP           | 28             | 5              |
|    |                 | KUPANG KRAJAN        |                | 5              |
|    |                 | PAKIS                |                | 5              |
|    |                 | PETEMON              |                | 5              |
|    |                 | PUTAT JAYA           |                | 4              |
|    |                 | SAWAHAN              |                | 4              |
|    |                 |                      |                |                |
| 18 | WONOKROMO       | DARMO                | 22             | 4              |
|    |                 | JAGIR                |                | 4              |
|    |                 | NGAGEL               |                | 4              |
|    |                 | NGAGELREJO           |                | 4              |
|    |                 | SAWUNGGALING         |                | 3              |
|    |                 | WONOKROMO            |                | 3              |
|    |                 |                      |                |                |
| 19 | KARANG PILANG   | KARANGPILANG         | 10             | 3              |
|    |                 | KEBRAON              |                | 3              |
|    |                 | KEDURUS              |                | 2              |
|    |                 | WARUGUNUNG           |                | 2              |
| 20 | DUKUH PAKIS     | DUKUH KUPANG         | 8              | 2              |
|    |                 | DUKUH KUPANG         |                | 2              |
|    |                 | GUNUNG SARI          |                | 2              |
|    |                 | PRADAHKALIKENDAL     |                | 2              |
| 21 | WIYUNG          | BABATAN              | 9              | 3              |
|    |                 | BALAS KLUMPRIK       |                | 2              |
|    |                 | JAJARTUNGGAL         |                | 2              |
|    |                 | WIYUNG               |                | 2              |
| 22 | WONOCOLO        | BENDUL MERISI        | 11             | 3              |
|    |                 | JEMUR WONOSARI       |                | 2              |
|    |                 | MARGOREJO            |                | 2              |

| No | Kecamatan     | Kelurahan       | Sample Size    |                |
|----|---------------|-----------------|----------------|----------------|
|    |               |                 | Each Kecamatan | Each Kelurahan |
| 23 | GAYUNGAN      | SIDOSERMO       | 7              | 2              |
|    |               | SIWALANKERTO    |                | 2              |
|    |               | DUKUH MENANGGAL |                | 2              |
|    |               | GAYUNGAN        |                | 2              |
|    |               | KETINTANG       |                | 2              |
|    |               | MENANGGAL       |                | 1              |
| 24 | JAMBANGAN     | JAMBANGAN       | 7              | 2              |
|    |               | KARAH           |                | 2              |
|    |               | KEBONSARI       |                | 2              |
|    |               | PAGESANGAN      |                | 1              |
| 25 | TANDES        | BALONGSARI      | 13             | 3              |
|    |               | BANJAR SUGIHAN  |                | 2              |
|    |               | KARANGPOH       |                | 2              |
|    |               | MANUKAN KULON   |                | 2              |
|    |               | MANUKAN WETAN   |                | 2              |
|    |               | TANDES          |                | 2              |
| 26 | SUKOMANUNGGAL | PUTAT GEDE      | 14             | 3              |
|    |               | SIMOMULYO       |                | 3              |
|    |               | SIMOMULYO BARU  |                | 2              |
|    |               | SONO KWIJENAN   |                | 2              |
|    |               | SUKO MANUNGGAL  |                | 2              |
|    |               | TANJUNGSARI     |                | 2              |
| 27 | ASEMROWO      | ASEMROWO        | 6              | 2              |
|    |               | GENTING         |                | 1              |
|    |               | GREGES          |                | 1              |
|    |               | KALIANAK        |                | 1              |
|    |               | TAMBAK          |                | 1              |
| 28 | BENOWO        | TAMBAKOSO       | 8              | 2              |
|    |               | ROMOKALISARI    |                | 2              |
|    |               | KLAKAH REJO     |                | 2              |
|    |               | SEMEMI          |                | 1              |
|    |               | KANDANGAN       |                | 1              |
| 29 | PAKAL         | BABAT JERAWAT   | 7              | 2              |
|    |               | BENOWO          |                | 2              |
|    |               | PAKAL           |                | 2              |
|    |               | SUMBER REJO     |                | 1              |
| 30 | LAKAR SANTRI  | BANGKINGAN      | 8              | 2              |
|    |               | JERUK           |                | 2              |
|    |               | LAKARSANTRI     |                | 1              |
|    |               | LIDAH KULON     |                | 1              |
|    |               | LIDAH WETAN     |                | 1              |
|    |               | SUMUR WELUT     |                | 1              |
| 31 | SAMBI KEREK   | BRINGIN         | 9              | 3              |
|    |               | LONTAR          |                | 2              |
|    |               | MADE            |                | 2              |
|    |               | SAMBIKEREK      |                | 2              |
|    | TOTAL         |                 | 405            | 405            |

## APPENDIX III

### *Household Survey Result for Section A*

| No Kuesioner | A-1       | A-2 | A-3      | A-4     | A-5                         | A-6                             | A-7                           | A-8   | A-9 |
|--------------|-----------|-----|----------|---------|-----------------------------|---------------------------------|-------------------------------|-------|-----|
| 1            | Perempuan | 47  | Islam    | SMA     | Ibu Rumah Tangga            | Rp. 3.000.000 – Rp. 5.000.000   | Rp. 3.000.000 – Rp. 5.000.000 | Tidak | 4   |
| 2            | Perempuan | 63  | Islam    | SD      | Wiraswasta                  | ≤ Rp. 1.000.000                 | Rp. 1.000.000 – Rp. 3.000.000 | Tidak | 3   |
| 3            | Perempuan | 39  | Islam    | Sarjana | PNS/Kary Swasta/ABRI/Polisi | Rp 5.000.000 - Rp. 10.000.000   | Rp. 1.000.000 – Rp. 3.000.000 | Tidak | 4   |
| 4            | Perempuan | 30  | Islam    | Sarjana | Wiraswasta                  | Rp 5.000.000 - Rp. 10.000.000   | Rp. 3.000.000 – Rp. 5.000.000 | Tidak | 3   |
| 5            | Perempuan | 42  | Islam    | SMA     | Wiraswasta                  | Rp. 1.000.000 – Rp. 3.000.000   | Rp. 1.000.000 – Rp. 3.000.000 | Tidak | 5   |
| 6            | Perempuan | 38  | Islam    | SD      | Wiraswasta                  | Rp. 1.000.000 – Rp. 3.000.000   | Rp. 1.000.000 – Rp. 3.000.000 | Tidak | 4   |
| 7            | Laki-laki | 74  | Islam    | SD      | Wiraswasta                  | ≤ Rp. 1.000.000                 | Rp. 1.000.000 – Rp. 3.000.000 | Tidak | 7   |
| 8            | Perempuan | 38  | Islam    | SMP     | Ibu Rumah Tangga            | Rp. 3.000.000 – Rp. 5.000.000   | Rp. 3.000.000 – Rp. 5.000.000 | Tidak | 4   |
| .            | .         | .   | .        | .       | .                           | .                               | .                             | .     | .   |
| .            | .         | .   | .        | .       | .                           | .                               | .                             | .     | .   |
| .            | .         | .   | .        | .       | .                           | .                               | .                             | .     | .   |
| 428          | Laki-laki | 19  | Islam    | SMA     | Mahasiswa                   | > Rp. 25.000.000                | > Rp. 5.000.000               | Tidak | 5   |
| 429          | Laki-laki | 65  | Islam    | SMP     | Wiraswasta                  | ≤ Rp. 1.000.000                 | ≤ Rp. 1.000.000               | Tidak | 2   |
| 430          | Perempuan | 40  | Kristen  | SMA     | PNS/Kary Swasta/ABRI/Polisi | Rp. 10.000.000 - Rp. 15.000.000 | > Rp. 5.000.000               | Tidak | 3   |
| 431          | Laki-laki | 20  | Katholik | SMA     | Mahasiswa                   | Rp. 15.000.000 - Rp. 25.000.000 | Rp. 3.000.000 – Rp. 5.000.000 | Tidak | 2   |
| 432          | Laki-laki | 45  | Islam    | SMA     | Wiraswasta                  | Rp 5.000.000 - Rp. 10.000.000   | > Rp. 5.000.000               | Ya    | 6   |
| 433          | Laki-laki | 73  | Kristen  | SMA     | PENSIUNAN AL                | Rp. 1.000.000 – Rp. 3.000.000   | Rp. 1.000.000 – Rp. 3.000.000 | Tidak | 2   |
| 434          | Perempuan | 61  | Islam    | SD      | pensiunan sampoerna         | Rp. 1.000.000 – Rp. 3.000.000   | Rp. 1.000.000 – Rp. 3.000.000 | Ya    | 6   |
| 435          | Laki-laki | 41  | Islam    | SMA     | Wiraswasta                  | Rp. 1.000.000 – Rp. 3.000.000   | Rp. 1.000.000 – Rp. 3.000.000 | Tidak | 4   |
| 436          | Laki-laki | 56  | Islam    | SMP     | Wiraswasta                  | Rp. 1.000.000 – Rp. 3.000.000   | Rp. 1.000.000 – Rp. 3.000.000 | Tidak | 3   |
| 437          | Perempuan | 54  | Islam    | SMA     | ibu rumah tangga            | Rp. 1.000.000 – Rp. 3.000.000   | Rp. 1.000.000 – Rp. 3.000.000 | Tidak | 4   |
| 438          | Laki-laki | 39  | Islam    | SMA     | Wiraswasta                  | Rp. 1.000.000 – Rp. 3.000.000   | Rp. 1.000.000 – Rp. 3.000.000 | Ya    | 5   |
| 439          | Laki-laki | 18  | Islam    | SMA     | Mahasiswa                   | Rp. 15.000.000 - Rp. 25.000.000 | > Rp. 5.000.000               | Tidak | 3   |
| 440          | Perempuan | 19  | Islam    | SMA     | Mahasiswa                   | Rp. 15.000.000 - Rp. 25.000.000 | Rp. 1.000.000 – Rp. 3.000.000 | Tidak | 5   |

*Household Survey Result for Section B, Section C, and Section D1*

| No Kuesioner | B-5                | B-6                     | C-4   | D1-1  | D1-2  |
|--------------|--------------------|-------------------------|-------|-------|-------|
| 1            | < 10 m³/KK/ Bulan  | Rp. 30.000- Rp. 50.000  | Ya    | Tidak | Ya    |
| 2            | 30-50 m³/KK/ Bulan | Rp. 50.000- Rp. 75.000  | Ya    | Tidak | Ya    |
| 3            | < 10 m³/KK/ Bulan  |                         | Ya    | Ya    | Ya    |
| 4            | 10-30 m³/KK/ Bulan | Rp. 30.000- Rp. 50.000  | Tidak | Ya    | Tidak |
| 5            | 10-30 m³/KK/ Bulan | Rp. 50.000- Rp. 75.000  | Ya    | Tidak | Ya    |
| 6            | 30-50 m³/KK/ Bulan | Rp. 50.000- Rp. 75.000  | Tidak | Tidak | Tidak |
| 7            | > 50 m³/KK/ Bulan  | Rp. 75.000- Rp. 100.000 | Tidak | Tidak | Tidak |
| 8            | 30-50 m³/KK/ Bulan | Rp. 50.000- Rp. 75.000  | Ya    | Ya    | Ya    |
| .            | .                  | .                       | .     | .     | .     |
| .            | .                  | .                       | .     | .     | .     |
| .            | .                  | .                       | .     | .     | .     |
| 428          | 30-50 m³/KK/ Bulan | Rp. 75.000- Rp. 100.000 | Ya    | Tidak | Ya    |
| 429          | > 50 m³/KK/ Bulan  | > Rp. 100.000           | Tidak | Tidak | Tidak |
| 430          | 10-30 m³/KK/ Bulan | Rp. 30.000- Rp. 50.000  | Tidak | Tidak | Ya    |
| 431          | > 50 m³/KK/ Bulan  | > Rp. 100.000           | Tidak | Tidak | Tidak |
| 432          | 10-30 m³/KK/ Bulan | Rp. 50.000- Rp. 75.000  | Ya    | Tidak | Tidak |
| 433          | > 50 m³/KK/ Bulan  | > Rp. 100.000           | Ya    | Tidak | Tidak |
| 434          | 10-30 m³/KK/ Bulan | Rp. 50.000- Rp. 75.000  | Tidak | Tidak | Ya    |
| 435          | 10-30 m³/KK/ Bulan | Rp. 50.000- Rp. 75.000  | Tidak | Tidak | Tidak |
| 436          | < 10 m³/KK/ Bulan  |                         | Ya    | Tidak | Tidak |
| 437          | 10-30 m³/KK/ Bulan | Rp. 30.000- Rp. 50.000  | Tidak | Tidak | Tidak |
| 438          | > 50 m³/KK/ Bulan  | > Rp. 100.000           | Ya    | Tidak | Ya    |
| 439          | 10-30 m³/KK/ Bulan | Rp. 75.000- Rp. 100.000 | Ya    | Tidak | Tidak |
| 440          | > 50 m³/KK/ Bulan  | > Rp. 100.000           | Ya    | Tidak | Ya    |

**Section C - ESP Current Usage (Faucet and Urinal)**

| No  | FAUCET    |           |          |                |                   |        |            |                 | URINAL    |      |       |             |                |        |            |                 |
|-----|-----------|-----------|----------|----------------|-------------------|--------|------------|-----------------|-----------|------|-------|-------------|----------------|--------|------------|-----------------|
|     | Ownership | Type      | Flowrate | Eco Feature    | Brand             | Amount | Conclusion | Conclusion Code | Ownership | Type | Brand | Eco Feature | Flush Capacity | Amount | Conclusion | Conclusion Code |
| 1   | Yes       | Valve     | Unknown  | Unknown        | Jaya              | 1      | Not Eco    | 1               | No        | None | None  | None        | None           | 0      | Not Eco    | 1               |
| 2   | Yes       | Valve     | Unknown  | Unknown        | Toto              | 3      | Not Eco    | 1               | No        | None | None  | None        | None           | 0      | Not Eco    | 1               |
| 3   | Yes       | Valve     | Unknown  | Unknown        | American Standard | 9      | Not Eco    | 1               | No        | None | None  | None        | None           | 0      | Not Eco    | 1               |
| 4   | Yes       | Valve     | Unknown  | No Eco Feature | Toto              | 3      | Not Eco    | 1               | No        | None | None  | None        | None           | 0      | Not Eco    | 1               |
| 5   | Yes       | Automatic | 1        | No Eco Feature | Unknown           | 3      | Eco        | 2               | No        | None | None  | None        | None           | 0      | Not Eco    | 1               |
| 6   | Yes       | Valve     | 2.5      | No Eco Feature | Auocos            | 2      | Eco        | 2               | No        | None | None  | None        | None           | 0      | Not Eco    | 1               |
| 7   | Yes       | Valve     | 17       | Unknown        | Toto              | 2      | Not Eco    | 1               | No        | None | None  | None        | None           | 0      | Not Eco    | 1               |
| 8   | Yes       | Valve     | 2.5      | Unknown        | Amico             | 5      | Eco        | 2               | No        | None | None  | None        | None           | 0      | Not Eco    | 1               |
| .   | .         | .         | .        | .              | .                 | .      | .          | .               | .         | .    | .     | .           | .              | .      | .          | .               |
| .   | .         | .         | .        | .              | .                 | .      | .          | .               | .         | .    | .     | .           | .              | .      | .          | .               |
| .   | .         | .         | .        | .              | .                 | .      | .          | .               | .         | .    | .     | .           | .              | .      | .          | .               |
| 428 | Yes       | Valve     | Unknown  | Save Water     | Toto              | 3      | Not Eco    | 1               | No        | None | None  | None        | None           | 0      | Not Eco    | 1               |
| 429 | Yes       | Valve     | Unknown  | Unknown        | Unknown           | 3      | Not Eco    | 1               | No        | None | None  | None        | None           | 0      | Not Eco    | 1               |
| 430 | Yes       | Valve     | Unknown  | No Eco Feature | Toto              | 4      | Not Eco    | 1               | No        | None | None  | None        | None           | 0      | Not Eco    | 1               |
| 431 | Yes       | Valve     | Unknown  | No Eco Feature | Krisbow           | 1      | Not Eco    | 1               | No        | None | None  | None        | None           | 0      | Not Eco    | 1               |
| 432 | Yes       | Valve     | Unknown  | Unknown        | Unknown           | 6      | Not Eco    | 1               | No        | None | None  | None        | None           | 0      | Not Eco    | 1               |
| 433 | Yes       | Valve     | Unknown  | Unknown        | Soligen           | 3      | Not Eco    | 1               | No        | None | None  | None        | None           | 0      | Not Eco    | 1               |
| 434 | Yes       | Valve     | Unknown  | Unknown        | Unknown           | 3      | Not Eco    | 1               | No        | None | None  | None        | None           | 0      | Not Eco    | 1               |
| 435 | Yes       | Valve     | Unknown  | Unknown        | Unknown           | 3      | Not Eco    | 1               | No        | None | None  | None        | None           | 0      | Not Eco    | 1               |
| 436 | Yes       | Valve     | Unknown  | Unknown        | Unknown           | 4      | Not Eco    | 1               | No        | None | None  | None        | None           | 0      | Not Eco    | 1               |
| 437 | Yes       | Valve     | Unknown  | Unknown        | Unknown           | 3      | Not Eco    | 1               | No        | None | None  | None        | None           | 0      | Not Eco    | 1               |
| 438 | Yes       | Valve     | Unknown  | Unknown        | Unknown           | 1      | Not Eco    | 1               | No        | None | None  | None        | None           | 0      | Not Eco    | 1               |
| 439 | Yes       | Valve     | 3        | No Eco Feature | Unknown           | 5      | Eco        | 2               | No        | None | None  | None        | None           | 0      | Not Eco    | 1               |
| 440 | Yes       | Valve     | Unknown  | Unknown        | Unknown           | 5      | Not Eco    | 1               | No        | None | None  | None        | None           | 0      | Not Eco    | 1               |

## Section C – ESP Current Usage (Toilet and Shower)

| No  | TOILET    |             |              |                |                |                   |        |            |                 | SHOWER    |          |                |       |        |            |                 |
|-----|-----------|-------------|--------------|----------------|----------------|-------------------|--------|------------|-----------------|-----------|----------|----------------|-------|--------|------------|-----------------|
|     | Ownership | Type        | Flush Type   | Flush Capacity | Eco Feature    | Brand             | Amount | Conclusion | Conclusion Code | Ownership | Flowrate | Eco Feature    | Brand | Amount | Conclusion | Conclusion Code |
| 1   | Yes       | Traditional | No Flush     | Unknown        | Unknown        | Toto              | 1      | Not Eco    | 1               | No        | None     | None           | None  | 0      | Not Eco    | 1               |
| 2   | Yes       | Modern      | No Flush     | Unknown        | Unknown        | Toto              | 1      | Not Eco    | 1               | No        | None     | None           | None  | 0      | Not Eco    | 1               |
| 3   | Yes       | Both        | Double Flush | Unknown        | Unknown        | Ina               | 3      | Not Eco    | 1               | Yes       | Unknown  | Unknown        | Ina   | 2      | Not Eco    | 1               |
| 4   | Yes       | Traditional | No Flush     | Unknown        | No Eco Feature | Toto              | 2      | Not Eco    | 1               | No        | None     | None           | None  | 0      | Not Eco    | 1               |
| 5   | Yes       | Traditional | No Flush     | Unknown        | No Eco Feature | Unknown           | 1      | Not Eco    | 1               | No        | None     | None           | None  | 0      | Not Eco    | 1               |
| 6   | Yes       | Traditional | No Flush     | Unknown        | Unknown        | Ina               | 1      | Not Eco    | 1               | No        | None     | None           | None  | 0      | Not Eco    | 1               |
| 7   | Yes       | Modern      | Single Flush | 12             | Unknown        | Viano             | 1      | Not Eco    | 1               | No        | None     | None           | None  | 0      | Not Eco    | 1               |
| 428 | Yes       | Modern      | Single Flush | Unknown        | Unknown        | American Standard | 2      | Not Eco    | 1               | Yes       | Unknown  | No Eco Feature | Toto  | 2      | Not Eco    | 1               |
| 429 | Yes       | Traditional | No Flush     | Unknown        | Unknown        | Ina               | 1      | Not Eco    | 1               | No        | None     | None           | None  | 0      | Not Eco    | 1               |
| 430 | Yes       | Modern      | No Flush     | Unknown        | No Eco Feature | Toto              | 1      | Not Eco    | 1               | No        | None     | None           | None  | 0      | Not Eco    | 1               |
| 431 | Yes       | Modern      | Single Flush | 4.5            | Save water     | Unknown           | 1      | Eco        | 2               | Yes       | Unknown  | No Eco Feature | Toto  | 1      | Not Eco    | 1               |
| 432 | Yes       | Traditional | No Flush     | Unknown        | No Eco Feature | Unknown           | 2      | Not Eco    | 1               | No        | None     | None           | None  | 0      | Not Eco    | 1               |
| 433 | Yes       | Traditional | No Flush     | Unknown        | Unknown        | Unknown           | 1      | Not Eco    | 1               | No        | None     | None           | None  | 0      | Not Eco    | 1               |
| 434 | Yes       | Traditional | No Flush     | Unknown        | Unknown        | Unknown           | 2      | Not Eco    | 1               | No        | None     | None           | None  | 0      | Not Eco    | 1               |
| 435 | Yes       | Both        | No Flush     | Unknown        | Unknown        | Ina               | 2      | Not Eco    | 1               | No        | None     | None           | None  | 0      | Not Eco    | 1               |
| 436 | Yes       | Both        | No Flush     | Unknown        | Unknown        | Ina               | 2      | Not Eco    | 1               | No        | None     | None           | None  | 0      | Not Eco    | 1               |
| 437 | Yes       | Traditional | No Flush     | Unknown        | Unknown        | Unknown           | 2      | Not Eco    | 1               | No        | None     | None           | None  | 0      | Not Eco    | 1               |
| 438 | Yes       | Traditional | No Flush     | Unknown        | Unknown        | Ina               | 1      | Not Eco    | 1               | No        | None     | None           | None  | 0      | Not Eco    | 1               |
| 439 | Yes       | Traditional | No Flush     | Unknown        | No Eco Feature | Unknown           | 1      | Not Eco    | 1               | No        | None     | None           | None  | 0      | Not Eco    | 1               |
| 440 | Yes       | Modern      | No Flush     | Unknown        | Unknown        | Unknown           | 2      | Not Eco    | 1               | No        | None     | None           | None  | 0      | Not Eco    | 1               |

**Section C – ESP Current Usage (Toilet Spray)**

| No  | Ownership | Flowrate | Eco Feature    | Brand | Amount | Conclusion | Conclusion Code |
|-----|-----------|----------|----------------|-------|--------|------------|-----------------|
| 1   | No        | None     | None           | None  | 0      | Not Eco    | 1               |
| 2   | No        | None     | None           | None  | 0      | Not Eco    | 1               |
| 3   | Yes       | Unknown  | Unknown        | Ina   | 1      | Not Eco    | 1               |
| 4   | No        | None     | None           | None  | 0      | Not Eco    | 1               |
| 5   | No        | None     | None           | None  | 0      | Not Eco    | 1               |
| 6   | No        | None     | None           | None  | 0      | Not Eco    | 1               |
| 7   | No        | None     | None           | None  | 0      | Not Eco    | 1               |
| 8   | No        | None     | None           | None  | 0      | Not Eco    | 1               |
| .   | .         | .        | .              | .     | .      | .          | .               |
| .   | .         | .        | .              | .     | .      | .          | .               |
| .   | .         | .        | .              | .     | .      | .          | .               |
| 428 | Yes       | Unknown  | No Eco Feature | Toto  | 2      | Not Eco    | 1               |
| 429 | No        | None     | None           | None  | 0      | Not Eco    | 1               |
| 430 | No        | None     | None           | None  | 0      | Not Eco    | 1               |
| 431 | Yes       | Unknown  | No Eco Feature | Toto  | 1      | Not Eco    | 1               |
| 432 | No        | None     | None           | None  | 0      | Not Eco    | 1               |
| 433 | No        | None     | None           | None  | 0      | Not Eco    | 1               |
| 434 | No        | None     | None           | None  | 0      | Not Eco    | 1               |
| 435 | No        | None     | None           | None  | 0      | Not Eco    | 1               |
| 436 | No        | None     | None           | None  | 0      | Not Eco    | 1               |
| 437 | No        | None     | None           | None  | 0      | Not Eco    | 1               |
| 438 | No        | None     | None           | None  | 0      | Not Eco    | 1               |
| 439 | No        | None     | None           | None  | 0      | Not Eco    | 1               |
| 440 | No        | None     | None           | None  | 0      | Not Eco    | 1               |

## APPENDIX IV

### *Drivers for Willingness to Change*

| No  | Willingness to Change | Z1 | Z2 | Z3 | Z4 | Z5 | Z6 | Z7 | Z8 | Alasan tetap tidak bersedia mengganti alat eco-saniter?                   |
|-----|-----------------------|----|----|----|----|----|----|----|----|---|
| 1   | Ya                    | 0  | 0  | 0  | 1  | 1  | 0  | 0  | 1  |   |
| 2   | Ya                    | 1  | 0  | 1  | 0  | 0  | 0  | 0  | 1  |   |
| 3   | Ya                    | 0  | 0  | 1  | 0  | 0  | 0  | 1  | 1  |   |
| 4   | Tidak                 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | Masih membaca referensi   |
| 5   | Ya                    | 0  | 0  | 1  | 0  | 1  | 0  | 0  | 1  |   |
| 6   | Tidak                 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | Tidak terbiasa dengan desain produk eco saniter. Lebih memilih yang biasa |
| 7   | Tidak                 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | Takut harganya mahal  |
| .   | .                     | .  | .  | .  | .  | .  | .  | .  | .  | .   |
| .   | .                     | .  | .  | .  | .  | .  | .  | .  | .  | .   |
| .   | .                     | .  | .  | .  | .  | .  | .  | .  | .  | .   |
| 428 | Ya                    | 0  | 0  | 0  | 0  | 1  | 1  | 1  | 0  |   |
| 429 | Tidak                 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  |   |
| 430 | Ya                    | 0  | 0  | 0  | 1  | 1  | 0  | 0  | 1  |   |
| 431 | Tidak                 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | Sebab sewa apartemen  |
| 432 | Tidak                 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  |   |
| 433 | Tidak                 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  |   |
| 434 | Ya                    | 0  | 0  | 0  | 1  | 1  | 1  | 0  | 0  |   |
| 435 | Tidak                 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  |   |
| 436 | Tidak                 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  |   |
| 437 | Tidak                 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  |   |
| 438 | Ya                    | 0  | 0  | 1  | 0  | 1  | 0  | 0  | 1  |   |
| 439 | Tidak                 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  |   |
| 440 | Ya                    | 0  | 1  | 0  | 1  | 0  | 1  | 0  | 0  |   |



## APPENDIX V

### *Retailer Survey Result*

#### FAUCET

| Retailer | Brand  | Type                     | Price        | Eco Feature | Water Consumption | Faucet Type  | Eco Conclusion |
|----------|--------|--------------------------|--------------|-------------|-------------------|--------------|----------------|
| AJBS     | AER    | Basin Tap WS1C           | Rp 485,000   | Aerator     | 6liter            | Single Lever | Eco            |
| AJBS     | AER    | Basin Tap Press WF-02    | Rp 340,000   | Aerator     | 6liter            | Press Button | Eco            |
| AJBS     | AER    | Sink Tap VOV 3C          | Rp 195,000   | Aerator     | 6liter            | Single Lever | Eco            |
| AJBS     | AER    | Basin Tap Mixer SAM W2   | Rp 425,000   | Aerator     | 6liter            | Single Lever | Eco            |
| AJBS     | AER    | Wall Tap SOV 09BXF       | Rp 138,000   | Aerator     | 6liter            | Single Lever | Eco            |
| AJBS     | Wasser | Basin Tap Mixer EMB-B30  | Rp 670,000   | Aerator     | 6liter            | Single Lever | Eco            |
| AJBS     | Wasser | Basin Tap Mixer MBA-S230 | Rp 652,000   | Aerator     | 6liter            | Single Lever | Eco            |
| AJBS     | Wasser | Basin Tap Mixer MBA-S030 | Rp 605,000   | Aerator     | 6liter            | Single Lever | Eco            |
| AJBS     | Wasser | Basin Tap Mixer MMB-A030 | Rp 986,000   | Aerator     | 6liter            | Single Lever | Eco            |
| AJBS     | Wasser | Basin Tap TBM-A032       | Rp 665,000   | Aerator     | 6liter            | Single Lever | Eco            |
| AJBS     | Wasser | Basin Tap Mixer CBA-S430 | Rp 735,000   | Aerator     | 6liter            | Single Lever | Eco            |
| AJBS     | GB     | Kitchen Faucet GBV-C01   | Rp 1,659,000 | Aerator     | 6liter            | Single Lever | Eco            |
| AJBS     | GB     | Basin Tap Mixer GBV-1021 | Rp 862,000   | Aerator     | 6liter            | Single Lever | Eco            |
| AJBS     | GB     | Basin Mixer GBV-7005     | Rp 1,400,000 | Aerator     | 6liter            | Single Lever | Eco            |
| Mitra10  | Paloma | XR 1233                  | Rp 5,150,000 | Aerator     | 6liter            | Single Lever | Eco            |
| Mitra10  | Paloma | XR 1231                  | Rp 4,150,000 | Aerator     | 6liter            | Single Lever | Eco            |
| Mitra10  | Paloma | MXR 1451                 | Rp 3,950,000 | Aerator     | 6liter            | Single Lever | Eco            |
| Mitra10  | Paloma | MXR 1533                 | Rp 4,250,000 | Aerator     | 6liter            | Single Lever | Eco            |
| Mitra10  | Paloma | MXR 1551                 | Rp 3,550,000 | Aerator     | 6liter            | Single Lever | Eco            |
| Mitra10  | Paloma | MXR 1633                 | Rp 2,850,000 | Aerator     | 6liter            | Single Lever | Eco            |
| Mitra10  | Paloma | MXR 1631                 | Rp 2,250,000 | Aerator     | 6liter            | Single Lever | Eco            |

| Retailer | Brand  | Type                 | Price        | Eco Feature | Water Consumption | Faucet Type  | Eco Conclusion |
|----------|--------|----------------------|--------------|-------------|-------------------|--------------|----------------|
| Mitra10  | Paloma | MXR 1651             | Rp 2,350,000 | Aerator     | 6liter            | Single Lever | Eco            |
| Mitra10  | Paloma | MXR 1851             | Rp 2,250,000 | Aerator     | 6liter            | Single Lever | Eco            |
| Mitra10  | Paloma | Tap 1661             | Rp 900,000   | Aerator     | 6liter            | Single Lever | Eco            |
| Mitra10  | Paloma | Tap 1681             | Rp 900,000   | Aerator     | 6liter            | Single Lever | Eco            |
| Mitra10  | Paloma | MXR 1833             | Rp 2,750,000 | Aerator     | 6liter            | Single Lever | Eco            |
| Mitra10  | Paloma | AP 1861              | Rp 675,000   | Aerator     | 6liter            | Single Lever | Eco            |
| Mitra10  | Paloma | MXR 2331             | Rp 1,550,000 | Aerator     | 6liter            | Single Lever | Eco            |
| Mitra10  | Paloma | MXR 1831             | Rp 1,950,000 | Aerator     | 6liter            | Single Lever | Eco            |
| Mitra10  | Paloma | MXR 1856             | Rp 6,950,000 | Aerator     | 6liter            | Single Lever | Eco            |
| Mitra10  | Tidy   | KX-04 Lavatory Mixer | Rp 629,800   | Aerator     | 6liter            | Single Lever | Eco            |
| Mitra10  | Tidy   | KX-10 5505           | Rp 146,000   | Aerator     | 6liter            | Single Lever | Eco            |
| Mitra10  | Tidy   | KX-01 4098           | Rp 206,000   | Aerator     | 6liter            | Single Lever | Eco            |
| Mitra10  | Tidy   | KX-01 9103           | Rp 243,000   | Aerator     | 6liter            | Single Lever | Eco            |
| Mitra10  | Zehn   | Gerberra             | Rp 547,000   | Aerator     | 6liter            | Single Lever | Eco            |
| Mitra10  | Zehn   | Endine               | Rp 736,000   | Aerator     | 6liter            | Single Lever | Eco            |
| Mitra10  | Zehn   | Iris                 | Rp 729,000   | Aerator     | 6liter            | Single Lever | Eco            |
| Mitra10  | Zehn   | Filbert              | Rp 961,800   | Aerator     | 6liter            | Single Lever | Eco            |
| Mitra10  | Onda   | A 804 MH             | Rp 79,500    | Aerator     | 6liter            | Single Lever | Eco            |
| Mitra10  | Onda   | A 801 T              | Rp 40,000    | No Aerator  | Unknown           | Single Lever | Not Eco        |
| Mitra10  | Onda   | S 801 Y              | Rp 111,500   | Aerator     | 6liter            | Single Lever | Eco            |
| Mitra10  | Onda   | A 803 JB             | Rp 129,500   | Aerator     | 6liter            | Single Lever | Eco            |
| Mitra10  | Onda   | CLS 03               | Rp 40,000    | No Aerator  | Unknown           | Single Lever | Not Eco        |
| Mitra10  | Onda   | CLS 01               | Rp 80,000    | No Aerator  | Unknown           | Single Lever | Not Eco        |
| Mitra10  | Onda   | Bibcock BC           | Rp 60,000    | No Aerator  | Unknown           | Single Lever | Not Eco        |
| Mitra10  | Onda   | A 820 K              | Rp 105,000   | No Aerator  | Unknown           | Single Lever | Not Eco        |

| Retailer     | Brand             | Type            | Price        | Eco Feature | Water Consumption | Faucet Type  | Eco Conclusion |
|--------------|-------------------|-----------------|--------------|-------------|-------------------|--------------|----------------|
| Mitra10      | American Standard | TP 2121         | Rp 405,100   | Aerator     | 6liter            | Single Lever | Eco            |
| Mitra10      | American Standard | Neo Mixer       | Rp 660,000   | Aerator     | 6liter            | Single Lever | Eco            |
| Mitra10      | AER               | SAM W2          | Rp 500,000   | Aerator     | 6liter            | Single Lever | Eco            |
| Mitra10      | AER               | SAS WX1         | Rp 525,000   | Aerator     | 6liter            | Single Lever | Eco            |
| Mitra10      | AER               | SAG W2          | Rp 425,000   | Aerator     | 6liter            | Single Lever | Eco            |
| Mitra10      | AER               | SAM W4 C        | Rp 425,000   | Aerator     | 6liter            | Single Lever | Eco            |
| Mitra10      | American Standard | Colony Pro      | Rp 1,800,000 | Aerator     | 6liter            | Single Lever | Eco            |
| ACE Hardware | Kris              | CHR 8198 D73    | Rp 1,500,000 | Aerator     | 6liter            | Single Lever | Eco            |
| ACE Hardware | Nobili            | N206007         | Rp 453,000   | No Aerator  | Unknown           | Single Lever | Not Eco        |
| ACE Hardware | Nobili            | NZ061173ZCR     | Rp 1,058,000 | Aerator     | 6liter            | Single Lever | Eco            |
| ACE Hardware | Kris              | CHR 15305 KS    | Rp 528,000   | Aerator     | 6liter            | Single Lever | Eco            |
| ACE Hardware | Kris              | CHR 3305-073    | Rp 848,000   | Aerator     | 6liter            | Single Lever | Eco            |
| ACE Hardware | Kris              | CHR 19501 HL    | Rp 1,158,000 | Aerator     | 6liter            | Single Lever | Eco            |
| ACE Hardware | Kris              | CHR 3611020 C   | Rp 902,000   | Aerator     | 6liter            | Single Lever | Eco            |
| ACE Hardware | Kris              | T 9018          | Rp 999,000   | Aerator     | 6liter            | Single Lever | Eco            |
| ACE Hardware | Kris              | CHR 19501 D73   | Rp 658,000   | Aerator     | 6liter            | Single Lever | Eco            |
| ACE Hardware | Kris              | CHR 19001 KSHES | Rp 788,000   | Aerator     | 6liter            | Single Lever | Eco            |
| ACE Hardware | Kris              | CHR 19001 K565  | Rp 579,000   | Aerator     | 6liter            | Single Lever | Eco            |
| ACE Hardware | Kris              | CHR 15401 KS-E1 | Rp 463,000   | Aerator     | 6liter            | Single Lever | Eco            |
| ACE Hardware | Kris              | CF 60           | Rp 518,000   | Aerator     | 6liter            | Push Valve   | Eco            |
| ACE Hardware | Kris              | 1118 T          | Rp 518,000   | Aerator     | 6liter            | Push Valve   | Eco            |
| ACE Hardware | Sanei             | PA 586 JC       | Rp 698,000   | No Aerator  | Unknown           | Single Lever | Not Eco        |
| ACE Hardware | Sanei             | PY 503 R        | Rp 568,000   | No Aerator  | Unknown           | Single Lever | Not Eco        |

| Retailer                           | Brand      | Type            | Price      | Eco Feature | Water Consumption | Faucet Type  | Eco Conclusion |
|------------------------------------|------------|-----------------|------------|-------------|-------------------|--------------|----------------|
| ACE Hardware                       | Sanei      | PY 510 R        | Rp 518,000 | Aerator     | 6liter            | Single Lever | Eco            |
| ACE Hardware                       | Sanei      | EIA 28          | Rp 638,000 | No Aerator  | Unknown           | Single Lever | Not Eco        |
| Bintang Timur (Medokan Semampir)   | Onda       | A 820 K         | Rp 60,000  | No Aerator  | Unknown           | Single Lever | Not Eco        |
| CV Indah Jaya Keramik Baliwerti    | Toto       | T 23BO 13N      | Rp 472,000 | Aerator     | 6liter            | Single Lever | Eco            |
| CV Indah Jaya Keramik Baliwerti    | Toto       | TX 129 L        | Rp 390,000 | Aerator     | 6liter            | Single Lever | Eco            |
| CV Indah Jaya Keramik Baliwerti    | Wasser     | TL 050          | Rp 260,000 | Aerator     | 6liter            | Single Lever | Eco            |
| CV Indah Jaya Keramik Baliwerti    | Wasser     | TL 060          | Rp 230,000 | Aerator     | 6liter            | Single Lever | Eco            |
| CV Indah Jaya Keramik Baliwerti    | Ernesto    | GF 4117         | Rp 66,500  | Aerator     | 6liter            | Push Valve   | Eco            |
| CV Indah Jaya Keramik Baliwerti    | Ernesto    | GF 2403         | Rp 402,500 | Aerator     | 6liter            | Single Lever | Eco            |
| CV Indah Jaya Keramik Baliwerti    | Adrielle   | AD 6422         | Rp 475,000 | Aerator     | 6liter            | Single Lever | Eco            |
| CV Indah Jaya Keramik Baliwerti    | Adrielle   | AD 6423         | Rp 375,000 | Aerator     | 6liter            | Single Lever | Eco            |
| CV Indah Jaya Keramik Baliwerti    | Adrielle   | 13 017          | Rp 980,000 | Aerator     | 6liter            | Single Lever | Eco            |
| Europe Enchanting Baliwerti        | Enchanting | E 167           | Rp 260,000 | Aerator     | 6liter            | Single Lever | Eco            |
| Europe Enchanting Baliwerti        | Onda       | A 803 JB        | Rp 120,000 | Aerator     | 6liter            | Single Lever | Eco            |
| Europe Enchanting Baliwerti        | Ina        | Classic Series  | Rp 176,000 | Aerator     | 6liter            | Single Lever | Eco            |
| Europe Enchanting Baliwerti        | Toto       | TX 109 LRS      | Rp 700,000 | Aerator     | 6liter            | Single Lever | Eco            |
| Pondok Keramik Wiyung              | Mago       | D 116           | Rp 121,000 | No Aerator  | Unknown           | Single Lever | Not Eco        |
| Pondok Keramik Wiyung              | Mago       | D 143           | Rp 143,000 | No Aerator  | Unknown           | Single Lever | Not Eco        |
| Pondok Keramik Wiyung              | Mago       | D 163           | Rp 173,000 | No Aerator  | Unknown           | Single Lever | Not Eco        |
| Pondok Keramik Wiyung              | Mago       | D 253           | Rp 295,000 | Aerator     | 6liter            | Single Lever | Eco            |
| Pondok Keramik Wiyung              | Mago       | D 259           | Rp 247,000 | Aerator     | 6liter            | Single Lever | Eco            |
| Toko Bangunan Al-Inayah 2 (Benowo) | DCOTA      | DT 01           | Rp 20,000  | No Aerator  | Unknown           | Single Lever | Not Eco        |
| Toko Bangunan Al-Inayah 2 (Benowo) | Onda       | A 801 T         | Rp 30,000  | No Aerator  | Unknown           | Single Lever | Not Eco        |
| Toko Bangunan Al-Inayah 2 (Benowo) | Soligen    | Taman 1/2       | Rp 20,000  | No Aerator  | Unknown           | Single Lever | Not Eco        |
| UD Santoso (Morokrembangan)        | Amico      | PVC Dinding 3/4 | Rp 15,000  | No Aerator  | Unknown           | Single Lever | Not Eco        |

| Retailer           | Brand           | Type         | Price        | Eco Feature | Water Consumption | Faucet Type  | Eco Conclusion |
|--------------------|-----------------|--------------|--------------|-------------|-------------------|--------------|----------------|
| UD.Union Baliwerti | Geovani         | 200B         | Rp 135,000   | Aerator     | 6liter            | Single Lever | Eco            |
| UD.Union Baliwerti | Geovani         | 300B         | Rp 150,000   | Aerator     | 6liter            | Single Lever | Eco            |
| UD.Union Baliwerti | Stainless Steel | SS 202       | Rp 100,000   | Aerator     | 6liter            | Single Lever | Eco            |
| UD.Union Baliwerti | Stainless Steel | SS 301       | Rp 115,000   | Aerator     | 6liter            | Single Lever | Eco            |
| UD.Union Baliwerti | TOTO            | TX 115 NP    | Rp 760,000   | Aerator     | 6liter            | Single Lever | Eco            |
| UD.Union Baliwerti | TOTO            | TX 109 LP    | Rp 532,000   | Aerator     | 6liter            | Single Lever | Eco            |
| UD.Union Baliwerti | TOTO            | TX 115 LL    | Rp 2,640,000 | Aerator     | 6liter            | Single Lever | Eco            |
| UD.Union Baliwerti | TOTO            | TX 116 LEJBR | Rp 2,490,000 | Aerator     | 6liter            | Single Lever | Eco            |
| UD.Union Baliwerti | TOTO            | TX 115 LEJBR | Rp 1,920,000 | Aerator     | 6liter            | Single Lever | Eco            |
| UD.Union Baliwerti | TOTO            | TX 109 L     | Rp 753,000   | Aerator     | 6liter            | Single Lever | Eco            |
| UD.Union Baliwerti | TOTO            | TX 126 LE    | Rp 1,540,000 | Aerator     | 6liter            | Push Valve   | Eco            |

## URINAL

| Retailer                        | Brand             | Type                | Price        | Water Consumption | Flush Capacity | Eco Conclusion |
|---------------------------------|-------------------|---------------------|--------------|-------------------|----------------|----------------|
| ACE Hardware                    | Kris              | P-Trap E 903        | Rp 1,059,000 | Unknown           | Flush          | Not Eco        |
| ACE Hardware                    | Kris              | P-Trap SF4111       | Rp 909,000   | Unknown           | Flush          | Not Eco        |
| Mitra 10                        | Lexus             | L 102               | Rp 1,175,000 | Unknown           | Flush          | Not Eco        |
| Mitra 10                        | Toto              | U 57 M              | Rp 2,138,500 | 4liter            | Flush          | Eco            |
| AJBS                            | Toto              | U 57                | Rp 2,292,000 | 4liter            | Flush          | Eco            |
| Europe Enchanting Baliwerti     | American Standard | Siphon Jet Top Spud | Rp 3,320,000 | 4liter            | Flush          | Eco            |
| CV Indah Jaya Keramik Baliwerti | Toto              | UW 58 J             | Rp 3,000,000 | 4liter            | Flush          | Eco            |

TOILET

| Retailer | Brand             | Type                   | Price        | Toilet Type | Flush Type   | Water Consumption | Eco Conclusion |
|----------|-------------------|------------------------|--------------|-------------|--------------|-------------------|----------------|
| AJBS     | TOTO              | CE6                    | Rp 556,000   | Traditional | No Flush     | 0                 | Not Eco        |
| AJBS     | TOTO              | CW 660NJ               | Rp 2,025,000 | Modern      | Double Flush | 3 ltr / 4.5 ltr   | Eco            |
| AJBS     | TOTO              | CW 914J                | Rp 6,250,000 | Modern      | Double Flush | Unknown           | Not Eco        |
| AJBS     | TOTO              | CW421J                 | Rp 2,421,000 | Modern      | Double Flush | 3 ltr / 4.5 ltr   | Eco            |
| AJBS     | Oulu              | Mono A895              | Rp 2,465,000 | Modern      | Double Flush | Unknown           | Not Eco        |
| Mitra10  | American Standard | Slim SMART B1A         | Rp 1,885,000 | Modern      | Double Flush | 3 ltr / 4.5 ltr   | Eco            |
| Mitra10  | Tidy              | 008-S Washdown         | Rp 999,900   | Modern      | Double Flush | Unknown           | Not Eco        |
| Mitra10  | American Standard | Winplus DF OCST        | Rp 1,240,800 | Modern      | Double Flush | 3 ltr / 6 ltr     | Eco            |
| Mitra10  | TOTO              | CW 421J                | Rp 2,530,000 | Modern      | Double Flush | 3 ltr / 4.5 ltr   | Eco            |
| Mitra10  | TOTO              | CW 660NJ               | Rp 2,530,000 | Modern      | Double Flush | 3 ltr / 4.5 ltr   | Eco            |
| Mitra10  | American Standard | Flexio                 | Rp 3,990,000 | Modern      | Double Flush | 3 ltr / 4.2 ltr   | Eco            |
| Mitra10  | HCG               | Renoir CS180DF         | Rp 1,390,000 | Modern      | Double Flush | 3 ltr / 4.8 ltr   | Eco            |
| Mitra10  | American Standard | Winplus DF CCST        | Rp 1,126,000 | Modern      | Double Flush | 3 ltr / 6 ltr     | Eco            |
| Mitra10  | American Standard | Slim SMART Winplus     | Rp 1,399,000 | Modern      | Double Flush | 3 ltr / 6 ltr     | Eco            |
| Mitra10  | American Standard | Close Coupled B1A CCST | Rp 1,764,000 | Modern      | Double Flush | 3 ltr / 4.5 ltr   | Eco            |
| Mitra10  | Tidy              | 055 Two Piece          | Rp 699,000   | Modern      | Double Flush | Unknown           | Not Eco        |
| Mitra10  | Oulu              | A895                   | Rp 2,165,000 | Modern      | Double Flush | Unknown           | Not Eco        |
| Mitra10  | Oulu              | A878                   | Rp 2,165,000 | Modern      | Double Flush | Unknown           | Not Eco        |
| Mitra10  | Zehn              | 080-S                  | Rp 1,743,800 | Modern      | Double Flush | Unknown           | Not Eco        |
| Mitra10  | Zehn              | 1819 Siphonic          | Rp 1,300,000 | Modern      | Double Flush | Unknown           | Not Eco        |
| Mitra10  | TOTO              | C436 Superior          | Rp 5,420,000 | Modern      | Double Flush | 3 ltr / 4.5 ltr   | Eco            |
| Mitra10  | TOTO              | CW637J                 | Rp 2,900,000 | Modern      | Double Flush | 3 ltr / 4.5 ltr   | Eco            |
| Mitra10  | TOTO              | CW630JW                | Rp 4,107,000 | Modern      | Double Flush | 3 ltr / 4.5 ltr   | Eco            |
| Mitra10  | American Standard | Slim SMART OD1         | Rp 1,735,000 | Modern      | Double Flush | 3 ltr / 6 ltr     | Eco            |

| Retailer           | Brand             | Type               | Price         | Toilet Type | Flush Type   | Water Consumption | Eco Conclusion |
|--------------------|-------------------|--------------------|---------------|-------------|--------------|-------------------|----------------|
| Mitra10            | American Standard | Razor SMART Activa | Rp 4,147,000  | Modern      | Double Flush | 4 ltr / 6 ltr     | Eco            |
| Mitra10            | Tidy              | 021S               | Rp 1,246,800  | Modern      | Double Flush | Unknown           | Not Eco        |
| Mitra10            | Zehn              | 017A-S Albert      | Rp 888,800    | Modern      | Double Flush | Unknown           | Not Eco        |
| Mitra10            | Zehn              | 021S-Z1 Geneva     | Rp 1,612,800  | Modern      | Double Flush | Unknown           | Not Eco        |
| Mitra10            | Oulu              | A625               | Rp 1,188,000  | Modern      | Double Flush | Unknown           | Not Eco        |
| Mitra10            | Lexus             | L2020              | Rp 2,227,000  | Modern      | Double Flush | Unknown           | Not Eco        |
| Mitra10            | Lexus             | L1182              | Rp 1,472,000  | Modern      | Double Flush | Unknown           | Not Eco        |
| Mitra10            | Renovo            | KH-839             | Rp 1,015,000  | Modern      | Double Flush | Unknown           | Not Eco        |
| Mitra10            | HCG               | Monet S Ivory      | Rp 1,446,700  | Modern      | Double Flush | Unknown           | Not Eco        |
| Mitra10            | HCG               | Latis Dual Flush   | Rp 2,836,000  | Modern      | Double Flush | Unknown           | Not Eco        |
| Mitra10            | American Standard | New Granada        | Rp 1,472,000  | Modern      | Double Flush | 3 ltr / 4.5 ltr   | Eco            |
| ACE Hardware       | Kris              | A 5004             | Rp 1,279,000  | Modern      | Double Flush | 2 / 4 ltr         | Eco            |
| ACE Hardware       | Kris              | A 2132             | Rp 1,159,000  | Modern      | Double Flush | 2 / 4 ltr         | Eco            |
| ACE Hardware       | Kris              | AC 815             | Rp 1,379,000  | Modern      | Double Flush | 1 / 3 ltr         | Eco            |
| UD Union Baliwerti | TOTO              | C 436              | Rp 5,500,000  | Modern      | Single Flush | 6 ltr             | Eco            |
| UD Union Baliwerti | TOTO              | SW 635 JP2         | Rp 12,500,000 | Modern      | Double Flush | 3 ltr / 4.5 ltr   | Eco            |
| UD Union Baliwerti | TOTO              | SW 633 J           | Rp 1,500,000  | Modern      | Single Flush | 6 ltr             | Eco            |
| UD Union Baliwerti | TOTO              | SW 823 J           | Rp 6,000,000  | Modern      | Single Flush | 6 ltr             | Eco            |
| UD Union Baliwerti | TOTO              | CW 631             | Rp 3,500,000  | Modern      | Double Flush | 3 ltr / 4.5 ltr   | Eco            |
| UD Union Baliwerti | TOTO              | CW 660             | Rp 1,920,000  | Modern      | Double Flush | 3 ltr / 4.5 ltr   | Eco            |
| UD Union Baliwerti | TOTO              | CW 421             | Rp 1,920,000  | Modern      | Double Flush | 3 ltr / 4.5 ltr   | Eco            |
| UD Union Baliwerti | American Standard | New Granada        | Rp 1,500,000  | Modern      | Double Flush | 3 ltr / 4.5 ltr   | Eco            |
| UD Union Baliwerti | Renovo            | KH 816             | Rp 875,000    | Modern      | Double Flush | Unknown           | Not Eco        |

| Retailer                         | Brand             | Type           | Price        | Toilet Type | Flush Type   | Water Consumption | Eco Conclusion |
|----------------------------------|-------------------|----------------|--------------|-------------|--------------|-------------------|----------------|
| Europe Enchanting Baliwerti      | TOTO              | C7             | Rp 330,000   | Traditional | No Flush     | 0                 | Not Eco        |
| Europe Enchanting Baliwerti      | TOTO              | SW 637 JP      | Rp 2,200,000 | Modern      | Double Flush | 3 ltr / 4.5 ltr   | Eco            |
| Europe Enchanting Baliwerti      | TOTO              | CW 421         | Rp 1,950,000 | Modern      | Double Flush | 3 ltr / 4.5 ltr   | Eco            |
| Europe Enchanting Baliwerti      | TOTO              | SW 660 J       | Rp 2,500,000 | Modern      | Double Flush | 3 ltr / 4.5 ltr   | Eco            |
| Europe Enchanting Baliwerti      | TOTO              | SW 631 JP      | Rp 3,300,000 | Modern      | Double Flush | 3 ltr / 4.5 ltr   | Eco            |
| Europe Enchanting Baliwerti      | TOTO              | SW 784 JP      | Rp 2,700,000 | Modern      | Single Flush | 6 ltr             | Eco            |
| Europe Enchanting Baliwerti      | TOTO              | CW 914 J       | Rp 5,700,000 | Modern      | Single Flush | 6 ltr             | Eco            |
| Europe Enchanting Baliwerti      | TOTO              | SW 880 JP      | Rp 4,900,000 | Modern      | Double Flush | 3 ltr / 4.5 ltr   | Eco            |
| Europe Enchanting Baliwerti      | American Standard | Winplus DF     | Rp 990,000   | Modern      | Double Flush | 3 ltr / 6 ltr     | Eco            |
| Europe Enchanting Baliwerti      | Enchanthing       | E 1304         | Rp 798,000   | Modern      | Double Flush | Unknown           | Not Eco        |
| Europe Enchanting Baliwerti      | Grohe             | A 3104         | Rp 1,930,000 | Modern      | Double Flush | 3 ltr / 6 ltr     | Eco            |
| Europe Enchanting Baliwerti      | INA               | 8201           | Rp 660,000   | Modern      | Single Flush | Unknown           | Not Eco        |
| CV Indah Jaya Keramik Baliwerti  | TOTO              | CW 421         | Rp 1,898,000 | Modern      | Double Flush | 3 ltr / 4.5 ltr   | Eco            |
| CV Indah Jaya Keramik Baliwerti  | TOTO              | CW 660         | Rp 1,898,000 | Modern      | Double Flush | 3 ltr / 4.5 ltr   | Eco            |
| CV Indah Jaya Keramik Baliwerti  | Orchard           | Closet Jongkok | Rp 75,000    | Traditional | No Flush     | 0                 | Not Eco        |
| Toko Bangunan Al-Inayah 3        | Duty              | Closet Duduk   | Rp 455,000   | Traditional | No Flush     | 0                 | Not Eco        |
| Toko Bangunan Al-Inayah 4        | INA               | Closet Jongkok | Rp 135,000   | Traditional | No Flush     | 0                 | Not Eco        |
| Bintang Timur (Medokan Semampir) | INA               | Closet Jongkok | Rp 145,000   | Traditional | No Flush     | 0                 | Not Eco        |
| Bintang Timur (Medokan Semampir) | INA               | 8201           | Rp 420,000   | Traditional | No Flush     | 0                 | Not Eco        |
| UD Santoso                       | INA               | Closet Jongkok | Rp 135,000   | Traditional | No Flush     | 0                 | Not Eco        |
| Pondok keramik Wiyung            | INA               | Closet Jongkok | Rp 150,000   | Traditional | No Flush     | 0                 | Not Eco        |



## SHOWER

| Retailer | Brand             | Type      | Price        | Water Consumption    | Eco Conclusion |
|----------|-------------------|-----------|--------------|----------------------|----------------|
| AJBS     | GB                | GBV 1899G | Rp 4,435,000 | Unknown              | Not Eco        |
| AJBS     | GB                | GBV 1899H | Rp 4,166,000 | Unknown              | Not Eco        |
| AJBS     | AER               | MS 2      | Rp 1,675,000 | Unknown              | Not Eco        |
| Mitra10  | Onda              | SW 12     | Rp 182,000   | Unknown              | Not Eco        |
| Mitra10  | Onda              | SW 18     | Rp 192,500   | Unknown              | Not Eco        |
| Mitra10  | Onda              | SW 08     | Rp 125,300   | Unknown              | Not Eco        |
| Mitra10  | Onda              | SW 13 C   | Rp 189,200   | Unknown              | Not Eco        |
| Mitra10  | Onda              | SW 13 W   | Rp 189,200   | Unknown              | Not Eco        |
| Mitra10  | Onda              | SW-P      | Rp 137,700   | Unknown              | Not Eco        |
| Mitra10  | Onda              | SW-Y      | Rp 137,700   | Unknown              | Not Eco        |
| Mitra10  | Onda              | SO 244 PC | Rp 98,000    | Unknown              | Not Eco        |
| Mitra10  | Onda              | 232 PW    | Rp 95,000    | Unknown              | Not Eco        |
| Mitra10  | Onda              | SO 255 PW | Rp 83,000    | Unknown              | Not Eco        |
| Mitra10  | Onda              | SW 05     | Rp 84,500    | Unknown              | Not Eco        |
| Mitra10  | Onda              | SW 01     | Rp 67,500    | Unknown              | Not Eco        |
| Mitra10  | Onda              | SW 02     | Rp 77,500    | Unknown              | Not Eco        |
| Mitra10  | AER               | GSH 1C    | Rp 138,800   | Unknown              | Not Eco        |
| Mitra10  | AER               | HS1-1C    | Rp 210,000   | Unknown              | Not Eco        |
| Mitra10  | AER               | FSH-3CW   | Rp 210,000   | Unknown              | Not Eco        |
| Mitra10  | AER               | WS-12 FR  | Rp 130,000   | Unknown              | Not Eco        |
| Mitra10  | American Standard | A 7605 C  | Rp 370,000   | 6 L/menit (1.58 gpm) | Eco            |

| Retailer | Brand             | Type            | Price        | Water Consumption    | Eco Conclusion |
|----------|-------------------|-----------------|--------------|----------------------|----------------|
| Mitra10  | American Standard | SH Lava Faucet  | Rp 1,000,000 | 6 L/menit (1.58 gpm) | Eco            |
| Mitra10  | American Standard | Mono Hole Agate | Rp 850,000   | 6 L/menit (1.58 gpm) | Eco            |
| Mitra10  | Wasser            | SHS 537         | Rp 250,000   | Unknown              | Not Eco        |
| Mitra10  | Wasser            | SHS 533         | Rp 120,000   | Unknown              | Not Eco        |
| Mitra10  | Wasser            | SHS 733         | Rp 480,000   | Unknown              | Not Eco        |
| Mitra10  | Paloma            | E 2104          | Rp 550,000   | hemat air 30%        | Eco            |
| Mitra10  | Toto              | THX 17 B        | Rp 250,000   | 5 L/menit (1.32 gpm) | Eco            |
| Mitra10  | Toto              | THX 48          | Rp 280,000   | 5 L/menit (1.32 gpm) | Eco            |
| Mitra10  | Zehn              | PSS 5380 CP     | Rp 158,800   | Claim hemat air      | Eco            |
| Mitra10  | Zehn              | PHS 1220 BRP    | Rp 100,800   | Unknown              | Not Eco        |
| Mitra10  | Zehn              | PAS 1802 CP     | Rp 257,000   | Unknown              | Not Eco        |
| Mitra10  | Zehn              | PSS 5381 CP     | Rp 158,000   | Unknown              | Not Eco        |
| Mitra10  | Zehn              | PSS 2191 CP     | Rp 172,000   | Unknown              | Not Eco        |
| Mitra10  | Zehn              | PAS 2181 CP     | Rp 152,000   | Unknown              | Not Eco        |
| Mitra10  | Zehn              | 5231 CP         | Rp 158,000   | Unknown              | Not Eco        |
| Mitra10  | Zehn              | 1220 CP         | Rp 122,000   | Unknown              | Not Eco        |
| Mitra10  | Zehn              | 5380 CP         | Rp 127,000   | Unknown              | Not Eco        |
| Mitra10  | EcoSense          | ES 0105 K       | Rp 338,000   | 7.6 Lpm              | Eco            |
| Mitra10  | EcoSense          | ES 0102 K       | Rp 338,000   | 7.6 Lpm              | Eco            |
| Mitra10  | Sanei             | PS 393 C        | Rp 313,500   | Unknown              | Not Eco        |

| Retailer     | Brand | Type             | Price        | Water Consumption | Eco Conclusion |
|--------------|-------|------------------|--------------|-------------------|----------------|
| Mitra10      | Sanei | PS 355 C         | Rp 150,000   | Unknown           | Not Eco        |
| ACE Hardware | Sanei | PSN 357 - 80X    | Rp 103,000   | On/Off Button     | Eco            |
| ACE Hardware | Sanei | PSN 350 80X      | Rp 95,900    | On/Off Button     | Eco            |
| ACE Hardware | Sanei | PSN 353 80X      | Rp 95,900    | On/Off Button     | Eco            |
| ACE Hardware | Sanei | PS 361 C         | Rp 313,000   | Unknown           | Not Eco        |
| ACE Hardware | Sanei | PSN 353C         | Rp 157,000   | On/Off Button     | Eco            |
| ACE Hardware | Sanei | PSN 350C         | Rp 226,000   | Unknown           | Not Eco        |
| ACE Hardware | Sanei | PSN 351C         | Rp 143,000   | Unknown           | Not Eco        |
| ACE Hardware | Sanei | PS 11            | Rp 398,000   | Unknown           | Not Eco        |
| ACE Hardware | Sanei | PSN 355C         | Rp 153,000   | Unknown           | Not Eco        |
| ACE Hardware | Grohe | Vitalio Trend    | Rp 891,000   | Water Save (-50%) | Eco            |
| ACE Hardware | Grohe | Vitalio Joy      | Rp 987,000   | Water Save (-35%) | Eco            |
| ACE Hardware | Grohe | Vitalio Joy Wall | Rp 1,245,300 | Water Save (-35%) | Eco            |
| ACE Hardware | Kris  | IFAR 941C HH     | Rp 238,000   | Unknown           | Not Eco        |
| ACE Hardware | Kris  | AR 90            | Rp 443,000   | Unknown           | Not Eco        |
| ACE Hardware | Tatay | Mirror           | Rp 778,000   | Water Save (-50%) | Eco            |
| ACE Hardware | Kris  | SRS A56          | Rp 299,000   | Unknown           | Not Eco        |
| ACE Hardware | Kris  | AR 950           | Rp 508,000   | Unknown           | Not Eco        |
| ACE Hardware | Kris  | AR 236           | Rp 199,000   | Unknown           | Not Eco        |
| ACE Hardware | Kris  | AR 234           | Rp 179,000   | Unknown           | Not Eco        |
| ACE Hardware | Kris  | KWS 235          | Rp 179,000   | Unknown           | Not Eco        |
| ACE Hardware | Kris  | AR 977C HH       | Rp 179,000   | Unknown           | Not Eco        |

| Retailer                         | Brand             | Type               | Price        | Water Consumption       | Eco Conclusion |
|----------------------------------|-------------------|--------------------|--------------|-------------------------|----------------|
| ACE Hardware                     | Hansgrohe         | Versomono          | Rp 409,000   | Inlet 100% - Outlet 60% | Eco            |
| ACE Hardware                     | Tatay             | Kristal CHRM 31219 | Rp 399,000   | Water Save (-50%)       | Eco            |
| ACE Hardware                     | Tatay             | UFO                | Rp 419,000   | Unknown                 | Not Eco        |
| UD.Union Baliwerti               | TOTO              | THX 48 ZP          | Rp 225,000   | 5 L/menit (1.32 gpm)    | Eco            |
| UD.Union Baliwerti               | TOTO              | THX 17 T           | Rp 175,000   | 5 L/menit (1.32 gpm)    | Eco            |
| UD.Union Baliwerti               | Koles             | 2033               | Rp 150,000   | Unknown                 | Not Eco        |
| UD.Union Baliwerti               | Padova            | 1138               | Rp 100,000   | Unknown                 | Not Eco        |
| UD.Union Baliwerti               | Rivero            | 141                | Rp 175,000   | Unknown                 | Not Eco        |
| UD.Union Baliwerti               | Tanaya            | TZ 6020            | Rp 75,000    | Unknown                 | Not Eco        |
| UD.Union Baliwerti               | Stuchi            | SSH 203            | Rp 150,000   | Unknown                 | Not Eco        |
| CV Indah Jaya Keramik Baliwerti  | TOTO              | TX 454 SOBR        | Rp 4,000,000 | 5 L/menit (1.32 gpm)    | Eco            |
| CV Indah Jaya Keramik Baliwerti  | Wasser            | SHS 633            | Rp 500,000   | Unknown                 | Not Eco        |
| CV Indah Jaya Keramik Baliwerti  | Wasser            | SHS 733            | Rp 500,000   | Unknown                 | Not Eco        |
| Europe Enchanting Baliwerti      | American Standard | La Vita            | Rp 1,000,000 | Unknown                 | Not Eco        |
| Europe Enchanting Baliwerti      | Enchanthing       | E3                 | Rp 900,000   | 7 L/menit (1.8 gpm)     | Eco            |
| Europe Enchanting Baliwerti      | GB                | GBV 1399           | Rp 775,000   | 8 L/menit (2.1 gpm)     | Eco            |
| Europe Enchanting Baliwerti      | Onda              | SO 230             | Rp 600,000   | Unknown                 | Not Eco        |
| Europe Enchanting Baliwerti      | Toto              | TX 491 SCZ         | Rp 2,000,000 | 5 L/menit (1.32 gpm)    | Eco            |
| Bintang Timur (Medokan Semampir) | AER               | CSH 3C             | Rp 170,000   | Unknown                 | Not Eco        |
| Bintang Timur (Medokan Semampir) | Onda              | SW 05              | Rp 70,000    | Unknown                 | Not Eco        |

| Retailer                         | Brand      | Type        | Price        | Water Consumption    | Eco Conclusion |
|----------------------------------|------------|-------------|--------------|----------------------|----------------|
| Bintang Timur (Medokan Semampir) | Onda       | SW 01       | Rp 135,000   | Unknown              | Not Eco        |
| Pondok Keramik Wiyung            | Mago       | S 160       | Rp 2,200,000 | 6 L/menit (1.58 gpm) | Eco            |
| Pondok Keramik Wiyung            | Mago       | S 110       | Rp 1,200,000 | 4 L/menit (1.05 gpm) | Eco            |
| Toko Bangunan Al-Inayah 2        | Onda       | SW 02       | Rp 150,000   | Unknown              | Not Eco        |
| Toko Bangunan Al-Inayah 2        | Water Tech | Hand Shower | Rp 70,000    | Unknown              | Not Eco        |
| Toko Bangunan Al-Inayah 2        | Yuta       | Hand Shower | Rp 70,000    | Unknown              | Not Eco        |
| UD Santoso                       | Alimar     | 2808 3      | Rp 100,000   | Unknown              | Not Eco        |
| UD Santoso                       | Diva       | Hand Shower | Rp 90,000    | Unknown              | Not Eco        |
| UD Santoso                       | Flusso     | Hand Shower | Rp 80,000    | Unknown              | Not Eco        |

## TOILET SPRAY

| Retailer | Brand  | Type         | Price      | Water Consumption | Eco Conclusion |
|----------|--------|--------------|------------|-------------------|----------------|
| Mitra10  | Sanei  | PSN 75 C     | Rp 204,000 | Unknown           | Not Eco        |
| Mitra10  | Sanei  | PSN 77 C     | Rp 132,000 | Unknown           | Not Eco        |
| Mitra10  | Sanei  | PSN 75 White | Rp 300,000 | Unknown           | Not Eco        |
| Mitra10  | Paloma | 9105         | Rp 550,000 | Unknown           | Not Eco        |
| Mitra10  | Wasser | WE 99 JS     | Rp 138,800 | Unknown           | Not Eco        |
| Mitra10  | TOTO   | THX 20 NB    | Rp 209,200 | 3.6liter/minute   | Eco            |
| Mitra10  | TOTO   | THX 403 SB   | Rp 380,800 | 3.6liter/minute   | Eco            |
| Mitra10  | AER    | SC 07 W      | Rp 118,900 | Unknown           | Not Eco        |
| Mitra10  | AER    | SC 07 C      | Rp 196,900 | Unknown           | Not Eco        |
| Mitra10  | AER    | SC 06 W      | Rp 145,000 | Unknown           | Not Eco        |

| Retailer     | Brand             | Type           | Price      | Water Consumption | Eco Conclusion |
|--------------|-------------------|----------------|------------|-------------------|----------------|
| Mitra10      | AER               | SC 05 W        | Rp 140,000 | Unknown           | Not Eco        |
| Mitra10      | Onda              | S 75 Exclusive | Rp 91,500  | Unknown           | Not Eco        |
| Mitra10      | Onda              | TS 02 White    | Rp 101,500 | Unknown           | Not Eco        |
| Mitra10      | Onda              | S 75 CCS       | Rp 102,500 | Unknown           | Not Eco        |
| Mitra10      | Onda              | S 88 CCS       | Rp 100,000 | Unknown           | Not Eco        |
| Mitra10      | Onda              | S 75 NCS       | Rp 102,000 | Unknown           | Not Eco        |
| Mitra10      | Tidy              | TCB 439        | Rp 62,500  | Unknown           | Not Eco        |
| Mitra10      | Tidy              | PU 001         | Rp 94,500  | Unknown           | Not Eco        |
| Mitra10      | Tidy              | FL 010         | Rp 109,000 | Unknown           | Not Eco        |
| Mitra10      | Tidy              | PM 495         | Rp 106,000 | Unknown           | Not Eco        |
| Mitra10      | Tidy              | FL 479         | Rp 92,600  | Unknown           | Not Eco        |
| Mitra10      | American Standard | TP 404         | Rp 128,000 | Unknown           | Not Eco        |
| Mitra10      | American Standard | F 074 H002     | Rp 305,000 | Unknown           | Not Eco        |
| Mitra10      | Zehn              | PCB 010        | Rp 120,000 | Unknown           | Not Eco        |
| ACE Hardware | Kris              | PTSS 0211 5    | Rp 179,000 | Unknown           | Not Eco        |
| ACE Hardware | Kris              | ETSS 0211 2    | Rp 105,000 | Unknown           | Not Eco        |
| ACE Hardware | Kris              | TSS A132 01    | Rp 94,900  | Unknown           | Not Eco        |
| ACE Hardware | Kris              | PTSH 0211 5    | Rp 62,900  | Unknown           | Not Eco        |
| ACE Hardware | Kris              | HS A132 9      | Rp 58,900  | Unknown           | Not Eco        |
| ACE Hardware | Sanei             | PS 75 C        | Rp 338,000 | Unknown           | Not Eco        |
| ACE Hardware | Sanei             | PSN 75 C       | Rp 145,000 | Unknown           | Not Eco        |
| ACE Hardware | Sanei             | PSN 77C        | Rp 143,000 | Unknown           | Not Eco        |
| ACE Hardware | Sanei             | PSN 75 80X     | Rp 167,000 | Unknown           | Not Eco        |

| Retailer                         | Brand             | Type     | Price |         | Water Consumption | Eco Conclusion |
|----------------------------------|-------------------|----------|-------|---------|-------------------|----------------|
| UD.Union Baliwerti               | Grohe             | GL 99JS  | Rp    | 65,000  | Unknown           | Not Eco        |
| UD.Union Baliwerti               | TOTO              | THX-20   | Rp    | 190,000 | 3.6liter/minute   | Eco            |
| UD.Union Baliwerti               | Stuchi            | SSW 301  | Rp    | 150,000 | Unknown           | Not Eco        |
| UD.Union Baliwerti               | Sanei             | SN 75    | Rp    | 175,000 | Unknown           | Not Eco        |
| CV Indah Jaya Keramik Baliwerti  | TOTO              | THX 20   | Rp    | 210,000 | 3.6liter/minute   | Eco            |
| CV Indah Jaya Keramik Baliwerti  | Wasser            | WE 90 JS | Rp    | 75,000  | Unknown           | Not Eco        |
| Europe Enchanting Baliwerti      | American Standard | TP 530   | Rp    | 250,000 | Unknown           | Not Eco        |
| Europe Enchanting Baliwerti      | Enchanthing       | E1       | Rp    | 225,000 | Unknown           | Not Eco        |
| Europe Enchanting Baliwerti      | TOTO              | THX 20   | Rp    | 360,000 | 3.6liter/minute   | Eco            |
| Bintang Timur (Medokan Semampir) | AER               | SC 06 W  | Rp    | 100,000 | Unknown           | Not Eco        |
| Bintang Timur (Medokan Semampir) | AER               | SC 07    | Rp    | 125,000 | Unknown           | Not Eco        |
| Bintang Timur (Medokan Semampir) | Onda              | S88 CCS  | Rp    | 88,500  | Unknown           | Not Eco        |
| Bintang Timur (Medokan Semampir) | Soligen           | White    | Rp    | 52,000  | Unknown           | Not Eco        |
| Bintang Timur (Medokan Semampir) | Wasser            | WE 99 JS | Rp    | 102,000 | Unknown           | Not Eco        |
| Toko Bangunan Al-Inayah 2        | Yuta              | Chrome   | Rp    | 70,000  | Unknown           | Not Eco        |
| UD Santoso                       | Figo              | White    | Rp    | 60,000  | Unknown           | Not Eco        |

## APPENDIX VI

### *Forming Factors SPSS Tests*

#### Pearson Chi-Square Test for Independency between Y \* X5

**Chi-Square Tests**

|                              | Value              | df | Asymptotic Significance (2-sided) |
|------------------------------|--------------------|----|-----------------------------------|
| Pearson Chi-Square           | 7.203 <sup>a</sup> | 2  | .027                              |
| Likelihood Ratio             | 6.837              | 2  | .033                              |
| Linear-by-Linear Association | 7.084              | 1  | .008                              |
| N of Valid Cases             | 440                |    |                                   |

#### Pearson Chi-Square Test for Independency between Y \* X6

**Chi-Square Tests**

|                                    | Value              | df | Asymptotic Significance (2-sided) | Exact Sig. (2-sided) | Exact Sig. (1-sided) |
|------------------------------------|--------------------|----|-----------------------------------|----------------------|----------------------|
| Pearson Chi-Square                 | 7.185 <sup>a</sup> | 1  | .007                              | .008                 | .006                 |
| Continuity Correction <sup>b</sup> | 6.460              | 1  | .011                              |                      |                      |
| Likelihood Ratio                   | 7.042              | 1  | .008                              |                      |                      |
| Fisher's Exact Test                |                    |    |                                   |                      |                      |
| Linear-by-Linear Association       | 7.168              | 1  | .007                              |                      |                      |
| N of Valid Cases                   | 440                |    |                                   |                      |                      |

#### Pearson Chi-Square Test for Independency between Y \* X7

**Chi-Square Tests**

|                                    | Value              | df | Asymptotic Significance (2-sided) | Exact Sig. (2-sided) | Exact Sig. (1-sided) |
|------------------------------------|--------------------|----|-----------------------------------|----------------------|----------------------|
| Pearson Chi-Square                 | 1.023 <sup>a</sup> | 1  | .312                              | .344                 | .199                 |
| Continuity Correction <sup>b</sup> | .726               | 1  | .394                              |                      |                      |
| Likelihood Ratio                   | 1.069              | 1  | .301                              |                      |                      |
| Fisher's Exact Test                |                    |    |                                   |                      |                      |
| Linear-by-Linear Association       | 1.020              | 1  | .312                              |                      |                      |
| N of Valid Cases                   | 440                |    |                                   |                      |                      |



Pearson Chi-Square Test for Independency between Y \* X8

**Chi-Square Tests**

|                              | Value               | df | Asymptotic Significance (2-sided) |
|------------------------------|---------------------|----|-----------------------------------|
| Pearson Chi-Square           | 11.450 <sup>a</sup> | 13 | .573                              |
| Likelihood Ratio             | 12.477              | 13 | .489                              |
| Linear-by-Linear Association | .847                | 1  | .357                              |
| N of Valid Cases             | 440                 |    |                                   |

Pearson Chi-Square Test for Independency between Y \* X11

**Chi-Square Tests**

|                                       | Value              | df | Asymptotic Significance<br>(2-sided) | Exact Sig. (2-<br>sided) | Exact Sig. (1-<br>sided) |
|---------------------------------------|--------------------|----|--------------------------------------|--------------------------|--------------------------|
| Pearson Chi-Square                    | 2.328 <sup>a</sup> | 1  | .127                                 |                          |                          |
| Continuity<br>Correction <sup>b</sup> | 1.915              | 1  | .166                                 |                          |                          |
| Likelihood Ratio                      | 2.273              | 1  | .132                                 |                          |                          |
| Fisher's Exact Test                   |                    |    |                                      | .156                     | .084                     |
| Linear-by-Linear<br>Association       | 2.322              | 1  | .128                                 |                          |                          |
| N of Valid Cases                      | 440                |    |                                      |                          |                          |

Pearson Chi-Square Test for Independency between Y \* X12

**Chi-Square Tests**

|                              | Value              | df | Asymptotic Significance (2-sided) |
|------------------------------|--------------------|----|-----------------------------------|
| Pearson Chi-Square           | 1.166 <sup>a</sup> | 2  | .558                              |
| Likelihood Ratio             | 1.168              | 2  | .558                              |
| Linear-by-Linear Association | .785               | 1  | .376                              |
| N of Valid Cases             | 440                |    |                                   |

Pearson Chi-Square Test for Independency between Y \* X13

**Chi-Square Tests**

|                                       | Value               | df | Asymptotic<br>Significance (2-sided) | Exact Sig. (2-<br>sided) | Exact Sig. (1-<br>sided) |
|---------------------------------------|---------------------|----|--------------------------------------|--------------------------|--------------------------|
| Pearson Chi-Square                    | 12.572 <sup>a</sup> | 1  | .000                                 | .000                     | .000                     |
| Continuity<br>Correction <sup>b</sup> | 11.584              | 1  | .001                                 |                          |                          |
| Likelihood Ratio                      | 14.036              | 1  | .000                                 |                          |                          |
| Fisher's Exact<br>Test                |                     |    |                                      |                          |                          |
| Linear-by-Linear<br>Association       | 12.543              | 1  | .000                                 |                          |                          |
| N of Valid Cases                      | 440                 |    |                                      |                          |                          |

Pearson Chi-Square Test for Independency between Y \* X14

**Chi-Square Tests**

|                                       | Value              | df | Asymptotic Significance<br>(2-sided) | Exact Sig. (2-<br>sided) | Exact Sig. (1-<br>sided) |
|---------------------------------------|--------------------|----|--------------------------------------|--------------------------|--------------------------|
| Pearson Chi-Square                    | 8.709 <sup>a</sup> | 1  | .003                                 | .006                     | .005                     |
| Continuity<br>Correction <sup>b</sup> | 7.613              | 1  | .006                                 |                          |                          |
| Likelihood Ratio                      | 7.555              | 1  | .006                                 |                          |                          |
| Fisher's Exact Test                   |                    |    |                                      |                          |                          |
| Linear-by-Linear<br>Association       | 8.689              | 1  | .003                                 |                          |                          |
| N of Valid Cases                      | 440                |    |                                      |                          |                          |

Pearson Chi-Square Test for Independency between X5 \* X6

**Chi-Square Tests**

|                              | Value                | df | Asymptotic Significance (2-sided) |
|------------------------------|----------------------|----|-----------------------------------|
| Pearson Chi-Square           | 267.682 <sup>a</sup> | 2  | .000                              |
| Likelihood Ratio             | 331.999              | 2  | .000                              |
| Linear-by-Linear Association | 244.243              | 1  | .000                              |
| N of Valid Cases             | 440                  |    |                                   |

Pearson Chi-Square Test for Independency between X5 \* X13

**Chi-Square Tests**

|                              | Value              | df | Asymptotic Significance (2-sided) |
|------------------------------|--------------------|----|-----------------------------------|
| Pearson Chi-Square           | 7.689 <sup>a</sup> | 2  | .021                              |
| Likelihood Ratio             | 7.728              | 2  | .021                              |
| Linear-by-Linear Association | 7.038              | 1  | .008                              |
| N of Valid Cases             | 440                |    |                                   |

Pearson Chi-Square Test for Independency between X5 \* X14

**Chi-Square Tests**

|                              | Value               | df | Asymptotic Significance (2-sided) |
|------------------------------|---------------------|----|-----------------------------------|
| Pearson Chi-Square           | 21.156 <sup>a</sup> | 2  | .000                              |
| Likelihood Ratio             | 19.201              | 2  | .000                              |
| Linear-by-Linear Association | 20.044              | 1  | .000                              |
| N of Valid Cases             | 440                 |    |                                   |

Pearson Chi-Square Test for Independency between X6 \* X13

**Chi-Square Tests**

|                                    | Value              | df | Asymptotic Significance (2-sided) | Exact Sig. (2-sided) | Exact Sig. (1-sided) |
|------------------------------------|--------------------|----|-----------------------------------|----------------------|----------------------|
| Pearson Chi-Square                 | 6.087 <sup>a</sup> | 1  | .014                              | .015                 | .009                 |
| Continuity Correction <sup>b</sup> | 5.596              | 1  | .018                              |                      |                      |
| Likelihood Ratio                   | 6.167              | 1  | .013                              |                      |                      |
| Fisher's Exact Test                |                    |    |                                   |                      |                      |
| Linear-by-Linear Association       | 6.073              | 1  | .014                              |                      |                      |
| N of Valid Cases                   | 440                |    |                                   |                      |                      |

Pearson Chi-Square Test for Independency between X6 \* X14

**Chi-Square Tests**

|                                    | Value               | df | Asymptotic Significance<br>(2-sided) | Exact Sig. (2-<br>sided) | Exact Sig.<br>(1-sided) |
|------------------------------------|---------------------|----|--------------------------------------|--------------------------|-------------------------|
| Pearson Chi-Square                 | 10.546 <sup>a</sup> | 1  | .001                                 | .002                     | .001                    |
| Continuity Correction <sup>b</sup> | 9.675               | 1  | .002                                 |                          |                         |
| Likelihood Ratio                   | 10.331              | 1  | .001                                 |                          |                         |
| Fisher's Exact Test                |                     |    |                                      |                          |                         |
| Linear-by-Linear<br>Association    | 10.522              | 1  | .001                                 |                          |                         |
| N of Valid Cases                   | 440                 |    |                                      |                          |                         |

Pearson Chi-Square Test for Independency between X13 \* X14

**Chi-Square Tests**

|                                       | Value              | df | Asymptotic Significance<br>(2-sided) | Exact Sig. (2-<br>sided) | Exact Sig. (1-<br>sided) |
|---------------------------------------|--------------------|----|--------------------------------------|--------------------------|--------------------------|
| Pearson Chi-Square                    | 8.172 <sup>a</sup> | 1  | .004                                 | .005                     | .003                     |
| Continuity<br>Correction <sup>b</sup> | 7.390              | 1  | .007                                 |                          |                          |
| Likelihood Ratio                      | 8.834              | 1  | .003                                 |                          |                          |
| Fisher's Exact Test                   |                    |    |                                      |                          |                          |
| Linear-by-Linear<br>Association       | 8.154              | 1  | .004                                 |                          |                          |
| N of Valid Cases                      | 440                |    |                                      |                          |                          |