

# 1. INTRODUCTION

## 1.1. Background

Many new beverage products have been developed and launched. People are faced with the variety of products and should make a decision on which product to be consumed. The several stages of product development are required before a beverage product is launched into the market. Product concepts are obtained from a variety of sources, including the marketing and research department, management department, and consumer research until it is launched on the market (Resurrección, 1998). The voice of consumers is used in the early stage of product development. Direct communication is needed to know consumer requirements. A product should be in demand by consumers to guarantee the product can survive in the market.

Consumer preference refers to consumer choice toward a food product compared with other products (Franchi, 2012; Vabo and Hansen, 2014). Consumer preference is a complex behavior that is not only influenced by consumer acceptance but is also influenced by extrinsic factors such as environment, social demographic, and culture. Consumer acceptance and demographic factors that can affect the consumer preference toward a food product can be known by consumer test.

Sensory analysis is a part of consumer test. Sensory analysis is required to determine consumer acceptance of food products in different areas. Consumer response to a product idea, product characteristics, and other aspects related to the product can be determined by sensory analysis test (Meilgaard et al., 1999). Before a food product will be launched, sensory analysis is taking a part as a control method to minimize the failure (Lawless and Heymann, 1998). Sensory test can be applied to increase consumer acceptance (Resurrección, 1998). Consumer acceptance on the product sensory characteristics refers to consumer assessment of food product quality (Lawless and Heymann, 2010). Consumer acceptance can be identified by hedonic score test.

The consumer acceptance related with consumer choice preference. The association represents an interaction between two or more variables and a causal relationship. The sensory attribute that has an association with preference is a key sensory attribute in food product development. Key sensory attribute is crucial attribute that influence consumer choice (Delgado et al., 1995; Krisjati, 2015). Consumer liking on key sensory attribute affects consumer to product repurchase. On food product which is already launched into the market, key sensory attribute is used to product improvement. Product improvement is needed to obtain consumer satisfaction. However, there is no research about the interaction between consumer acceptance with consumer preference on commercial beverage product in Indonesia. Therefore, this study aims to determine the key sensory attributes that can influence consumer choice on commercial beverage product.

## **1.2. Literature Review**

### **1.2.1. Product Development**

Food for some people is not only as a necessity, but also as a pleasure (Fuller, 2011). Therefore, many aspects should be considered in food product development. According to Bhuiyan (2011) there are several stages to develop a new product. The stages are new product strategy, bussiness analysis, development, product testing, and commercialization.

- **New Product Strategy**

New product strategy is the basic stage of product development. On this stage product concept and product criteria are developed based on market research. Market research is a good source for generating product ideas. The product concept must be appropriate with company objectives.

- **Business Analysis**

On this stage the profits, return on investment, and sales volume of new product will be calculated by marketing team. The key of this stage is new product should provide benefits to companies.

- **Development: A new product is produced based on it idea.**

- **Product testing: Conduct commercial experiment to verify the business analysis**

- Commercialization: Product launching.

Though a development process has been done, it does not guarantee that the new product will be successful in the market. According Komninos (2002) there are several reasons of new product failure. The reasons are underestimated competitors, failed in estimating the number of potential consumers, the expensive price, and failed in product distribution. From the reasons above, it can be concluded that the reason for the new product failure is due to miscommunication between consumers and companies. The voice of consumers becomes fundamental factor in the success of a product.

The importance of consumer involvement in the success of a product becomes the basis for the establishment of Quality Functional Deployment (QFD). QFD is a technique used to help the company in product development process. The objectives of QFD implementation are screening the customer wants and needs and translate the customer requirements into technical characteristics and specifications

There are four phases of Quality Function Deployment (Becker Associates Inc, 2000; Benner *et al.*, 2003).

- Phase1. Product planning  
Customer requirements, product measurements, and the technical ability to meet each customer requirements.
- Phase 2. Product design
- Phase3. Process planning
- Phase 4. Process control

This phase is created to monitor the production process and maintenance schedules.

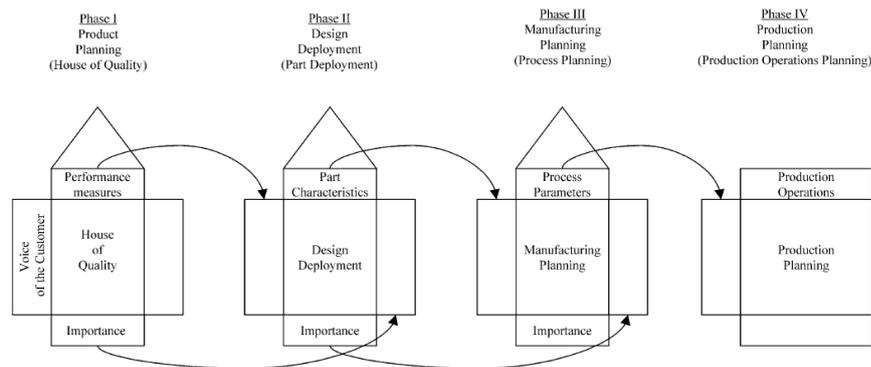


Figure 1. Four Phase of Quality Function Deployment

Source: Benner *et al.*, 2003

### 1.2.2. Sensory Analysis

Sensory analysis is important in food product development because not all of the food quality attributes can be analyzed using tools or instruments (Resurrection, 1998). Sensory test is a panelist response to test samples. Soekarto (1985) in Lailiyana (2012) said that even though a food product has a good quality but if it is not tasty, the product will not be consumed again. Winarno (1997) said that aroma and flavour can affect consumer liking on food product. Therefore sensory analysis is required to determine consumer liking and consumer preference on the food products.

Sensory analysis is divided into two major groups i.e. objective test and subjective test. Objective tests is divided into two categories, those are discriminative test and descriptive test. The subjective test is divided into two categories: affective test and consumer test. Discriminative test is used to determine the differences between the samples. Descriptive test is used to determine the sensory attributes and the difference intensity of the sensory attributes on the tested samples. Meanwhile, affective test is used to determine panelist preference and acceptance of product being tested. By affective test it can be known whether product sensory attributes can be accepted by consumers or not (Soekarto, 1985).

In order to obtain the accurate result, the subjective test requires large number of panelists. Panelists are individuals or groups who provide sensory assessment of

the characteristics or quality from tested samples. The sensory result data are subjective (Lailiana, 2012). Some requirements are needed to be a panelist, such as has a normal sensitivity, good sensing capability, focus ability, and good health condition (ASTM, 1996). There are six categories of panelist i.e. individual expert panelist, small expert panelist, trained panelist, untrained panelist, semi-trained panelist, and consumer panelist. For consumer test, panelist usually consist of 30 to 1000 peoples (Soekarto, 1985).

Steps in sensory test involve:

1. Make the sensory test design, worksheet, score sheet, and determine the sensory test date.
2. Make the test procedure, sample code, the method, the tools, material, and also arrange proper lighting.  
In the manufacture of sample code, sample coding used three numbers arranged randomLy and should not be the same. It aims to minimize the invalid panelist perception.
3. Identify the samples and sample code number.
4. Organoleptic testing process.

(ASTM, 1996)

### **1.2.3. Consumer Acceptance**

A nine-point hedonic scale is the most common method used to test the consumer acceptance of a product. Nine point hedonic scale has four positive categories, one neutral category, and four negative categories. These categories are labeled with numbers to indicate degree of liking. The advantage of nine point hedonic scale compared to other scaling methods is the limitation option (limited choice). The limited choice helps the panelists to rate the product. Nine point hedonic scale is suitable for the wide range of population with untrained panelists (Lim, 2011). This technique is easy, simple, and effective to be used as a measurement tool. In hedonic test consumers will rate sample sensory attributes. From the test results, it can be determined the sensory attributes to be considered in new product development.

#### 1.2.4. Consumer Preference

Preference test is used to determine the consumer preference on the food product. Preference test is divided into three groups: paired preference testing, non-forced preference, and preference ranking. In paired preference test, a product is confronted with other similar products, and consumers will assess which product is more preferred by consumers (Lawless and Heymann, 2010). While on the non forced preference test, consumers will choose the preferred product or not preferred at all. The aim of no preference option is to know the honest response from consumers to a food product (Krisjati, 2015). This consumer preference should be developed by the company. Food preference test is not difficult and suitable for children and adults respondents (Drewnowski & Hann, 1999).

#### 1.2.5. Commercial Food Product Categories

- **Ginger Drink**

Ginger is the rhizome of the *Zingiber officinale* plant. Ginger is widely used as herbal ingredient. Ginger contains volatile oil, pungent principles like gingerols and shogaols, lipids, proteins, starch, vitamins, and minerals. The characteristics of ginger are warm, sweet, strong aroma, and pungent flavor. Ginger has many health benefits such as improves blood circulation, lowers blood sugar, and anti nausea (George *et al.*, 2014).

In Indonesia, ginger is widely used as ingredient for herbal beverage products. Ginger based products are ginger drinks, *bandrek*, *bajigur*, ginger with coffee, and ginger with milk. There are several commercial brands of ginger drink products such as Intra Jahe Wangi, Nutrisari W'dank Sari Jahe, Herbadrink Sari Jahe, and Anget Sari Wedang Jahe. Intra Jahe Wangi product is the pioneer of instant ginger drink. Intra Jahe Wangi is produced by CV. Intrafood which has been established since 1984.

- **Aloe vera Drink**

Aloe vera (*Aloe barbadensis*) is a short stem plant that has sharp thick leaves. Aloe vera has many benefits. Aloe vera leaves consist of outer layer and aloe gel.

Aloe gel are translucent, tasteless, chewy, and slimy. Aloe gel contains of water, polysaccharides such as pectin, cellulose, hemicellulose, glucomannan, acemannan, mannose derivatives, and aloin compound (Femenia *et al.*, 1999; Scala *et al.*, 2013). Aloin has antibiotic and antiseptic properties that can be used for skin care.

In food industry, aloe vera gel is widely used for beverage products and health drink products. To produce aloe vera drink, some treatments such as heating process, dehydration, and grinding are needed. The heating process will take a long time and it cause aloe vera gel damage. Therefore, high-pressure process can be applied to minimize the damage and preserve the freshness, flavor, texture, and color of aloe vera (Scala *et al.*, 2013).

- **Mixed Fruits and Vegetables Juice**

Fruits and vegetables have a lot of vitamins, minerals, and iron that are essential for growth. However, fruits and vegetables are perishable and have short shelf life. Some processes are required to extend the shelf life. Fruits and vegetables can be processed into mixed juice. The juice is extracted from several types of vegetables and fruits that mixed with other additive ingredients. The juice will be pasteurized and packaged in aseptic packaging to extend the shelf life (Gabrovská *et al.*, 2014).

### **1.3. Objectives**

The main objectives of this research are:

1. To determine the most important sensory attributes which are preferred by consumers.
2. To determine demographic factors that influence consumer choice of beverage products being tested.
3. To determine the association between hedonic score and preference test on commercial beverage products being tested.