

A STUDY ON THE CONSUMER PERSPECTIVE ON FACTORS INFLUENCE THE FRESHNESS OF COLD STORAGE GOODS TO THEIR INTENTION TO PURCHASED FROM GROCERY STORES

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ABSTRACT

This study examines the factors that affect the freshness of cold chain products that influence consumer intention to purchase the goods at the grocery store. These factors are temperature control, packaging, transportation handling and equipment, product shelves, rack design, and the distance from the grocery store to the consumer's storage place. The study adopted a quantitative method, in which the distribution of questionnaires is used as an instrument to gather feedback from the respondents. A total of 114 respondents were approached and participated in the survey within Johor, Malaysia. The focus of this study is to understand the customer perspective on the management of cold storage handling and temperature settings in the supermarket to maintain the freshness of the products until arriving at their storage. Due to the product sensitiveness with temperature control and handling, the goods require special care to maintain the fresh look and quality. Especially, meat, fruit, and vegetable products certified with high-quality seals must ensure a high level of consumer acceptance, despite the inevitable fluctuations caused by growing conditions and post-harvest reactions. The findings revealed that the fresh looks and quality, and safety play a decisive role in these products, which influence the consumer's intention to purchase. It shows that most of the respondents agree that temperature control, packaging, equipment handling, and distance, are among the best predictors for keeping the freshness of goods that will influence consumers' purchase intention for cold storage goods. However, in terms of the supply chain, knowledge of the process tends to be focused on people in the industry and not general consumers which affect their buying decision. Although some limitations such as Covid-19 occur, it does not affect the outcome of overall research. Future research could explore another variable that could influence the customer intention to purchase cold storage goods.

Keywords: *Cold Chain Handling; Customer Purchased Intention; Chilled Goods; Sensitive Temperature; Perishable Goods.*

1.0 INTRODUCTION

The distribution of food products is rapidly shifting from traditional markets toward supermarkets and convenience stores with the introduction of cold chain logistics services. These products are easier to procure as major distributors are offer shipping via insulated trucks to maintain the freshness and quality of the product till the end of the consumer. The quality of local cold- chain services varies widely. Food products have been damaged from a lack of refrigeration, as well as from loading and unloading at room temperature. It is estimated that 90% of food waste is created during the transportation process before the products reach the consumer's storage, which is the interest of this study.

1.1 RESEARCH BACKGROUND

The cold chain logistics market is segmented by service (storage, transportation and value-added services), temperature type (chilled and frozen), application (fruits and vegetables, dairy products, fish, meat, and seafood, processed food, pharmaceuticals (include biopharma), bakery and confectionery, and geography. The cold chain service is also called a temperature-controlled logistics management process for a product that requires refrigerated temperatures or special care to keep the products fresh from the supplier until reach to the consumer's delegate (*Shashi, 2021*). Cold chain logistics management is different from the regular logistics process as it required material handling and equipment with specific temperature control. Usually, cold chain (CC) in logistics is used to store products such as meat, milk, ice cream, tablets, medicine, and medical instruments. Cold chain services carry a risk of product expiry due to the nature of the product itself which is prone to the change in temperature. Huge supermarkets such as GIANT, ECONSAVE, AEON, and many more have established a proper procedure to manage the freshness of the products in ideal condition all the time. While Mini supermarket also providing the same facility to ensure the freshness of the product before its purchase by the customer. In this study, the focus is to understand the customer perspective on the management of temperature settings in the supermarket to maintain the freshness of the products until arrive at their storage.

1.2 PROBLEM STATEMENT

Cold chain logistics is the transportation of temperature-controlled products from one location to another such as food and beverages, pharmaceuticals, and temperature-sensitive chemicals. This transportation includes not only delivery of goods to end customers, but also raw material procurement, production and storage at specific temperatures. A rise or fall in temperature during the logistics phase can mean a catastrophe for food cold chain product. Cold supply chain focuses on maintaining the required temperature of the goods throughout the entire transportation and also pays attention to the right packaging, timings, routes, and other factors to ensure the transportation of frozen items in their pristine condition. Companies that dealing with cold chain products, have to face many challenges to ensure safe and damage-free transportation of the goods in order to keep the quality of goods and to reach customer satisfaction. Cold chain logistics management will increase transshipment points due to perishability, a wide variety of products supplied, multiple raw material suppliers, short shelf life, strict traceability and regulatory requirements, and longer supply chain distances. In that respect, it carries greater risk and larger network. This increases the likelihood of food waste and ultimately increases costs. According to The Star News reported by Fatimah Zainal in

(2021), Malaysia's daily food waste will continue to grow in 2021, especially during the festival, and people need to be aware of its negative impact on the environment and surrounding areas. Thus, a suitable approach must be taken by a company to keep its cold storage products from any void or damages due to the lack of temperature settings and design of the storage box itself in order to maintain the quality of the cold chain products (CCP). Moreover, products such as fruits and vegetables are easily damaged due to changes in temperature and improper handling during transportation (*Rakesh D.Raut, 2019*). Improper transportation facilities also affect the ideal condition of the products. This will give an impact on the consumers themselves if the goods are already void or damage before they reached to consumer's storage place.

1.3 RESEARCH OBJECTIVES

In the study, the researcher had developed three Research Objectives (*RO*) as follows:

- i.* To investigate customer's insight on the influence factor that determines the freshness of the purchase of the product from the cold storage at the supermarket. (*RO1*)
- ii.* To investigate the relationship between the Grocery cold chain management and customer storage distance to maintain the freshness of the products purchased from the supermarket. (*RO2*)
- iii.* To put forward a recommendation of framework model for the cold chain products handling at Grocery. (*RO3*)

To achieve the objectives of the research, a quantitative approach will be adopted to collect all required information. Data collection is based on survey form by the consumers that purchased cold storage products from GIANT and ECONSAVE supermarket located in Johor, Malaysia. For example, ECONSAVE Pasir Gudang, GIANT Plentong, AEON Tebrau and AEON Bukit Indah. The estimated respondent is 130 respondents. The research analysis will be carried out in the supermarket located in Johor, Malaysia. The purpose is to help improve the quality of cold storage products in Malaysia and to reach customer satisfaction.

2.0 LITERATURE REVIEW

This chapter provide an overview from previous literature reviews of case studies in the following areas. In this chapter, the researcher analyses the collected information to identify information and knowledge gaps, prove theoretical limitations and perspectives, summarize the research area, and perform further analysis on the research area.

2.1 COLD SUPPLY CHAIN MANAGEMENT

First of all, to handle cold storage products is different from regular supply chain as it is required more care due to the nature of the product itself that is very sensitive on how to properly handle and manage the products to always be in good condition until arrive to consumer's storage place. That is because supply chain management for specialty product impacts logistics services for many groups of products in the monitored temperature range.

Each group has different parameters and temperature control in storing and transporting in order to keep the good from any damages or void (*Anna Brzozowska, 2016*). For example, perishable commodities that are specially temperature controlled, such as meat, fresh fruits and vegetables, confectionery, beverages, vaccines, and fresh flowers are all have one thing in common. Meanwhile, in supermarket, fresh fruits and vegetables (FFV) should be stored at low temperatures and high relative humidity to reduce respiration, metabolism and transpiration rates to prolong shelf life. They are usually stored above 13°C, but some can be safely stored down to 5°C if refrigerated immediately after harvest. (*Storage of fresh fruit and vegetables, 2016*). Besides, cold chain transportation is a variation of the standard supply chain, which transport products from the point of origin to the final consumer. It involves the movement of products that are cooled at 2° and 8°C or 36° to 46°F or at even lower temperatures ranging down to -70°C or -85°F (*klingecorp, 2020*). The transport that used in cold chain logistics is different from regular transport used in supply chain process because it has temperature-controlled that used in keeping the quality of the goods while transporting. The whole process, from the manufacturer to the supplier or supermarket to the end consumer, must be done efficiently. The refrigerated food supply chain consists of many components including storage, monitoring, packaging and transportation.

2.2 ISSUE AND CHALLENGES

Intervention to the cold chain may create problems such as spoilage, changes in the appearance, taste, or smell of a product, growth of harmful bacteria, or lost potency. From manufacturing, packaging, storing, transporting is important factor to maintain the freshness of all FCCP. Supply chain risk and resilience are becoming increasingly important due to the high levels of uncertainty and vulnerability associated with fresh food. It is due to the climate change and lack of operations and functions in supply chain process (*Kune- Muh Tsai, 2018*). Due to the nature of the product itself that is very sensitive to temperature, using technology will ease the supply chain activities especially in cold chain management.

2.2.1 Temperature Controlled

Fresh foods such as fruits, vegetables, dairy products, meat and fish products need to be refrigerated or frozen throughout the supply chain. If those products are not taken care well alongside the supply chain process, it will decrease the quality and also exposed to microorganism and bacteria that will cause damages to the goods. According to an article by *Aiello, G. (2012)* on the simulation analysis of cold chain performance based on time-temperature data stated that an approached has been made by a simulation to evaluate the performance of a cold chain in terms of expected product quality at the retail store, and to estimate the expected fraction of perished products because the configuration and operational characteristics of the supply chain have a significant impact to ensure proper temperature conditions for storage units along the supply chain.

2.2.2 Food Waste

One of the main reasons for the disposal of perishable goods such as fruits and vegetables, meat products and other CCP is due to improper handling, storage and lack of information about actual quality conditions. Because of that, proper management in cold chain must be run effectively knowing that the goods are sensitive with temperature control. From the manufacturer, storing and transportation all are very crucial in ensuring the goods are properly

handled. The utilize of intelligent packaging solutions such as time- temperature indicators are being discussed more and more frequently as it will help to kept the goods in great condition (*Sonja Rossaint, 2015*).

2.2.3 Quality and Safety

Many people are very busy with daily work that sometimes do not have time to eat good food and regularly eat instant food in which unhealthy for the body. For example, a study conducted in Dhaka, Bangladesh by *Muhammad Rehan MASOOM (2015)* reported that a collective data from urban consumers who regularly purchased cold storage products tend to buy a good quality product that look fresh and safety for their health when purchasing at retails or supermarket. Nowadays, people are very choosy and picky when it comes to food.

2.3 PROPER HANDLING EQUIPMENT

Cold chain product is very sensitive with temperature that it needs a specific handling system and management in order to delivered the goods safely. However, to deliver the goods safely by using real-time data is very effective in maintaining the freshness of the goods. But if any incident or breakdown happened it will slightly affect to the CCP especially in storing and while in distribution. Facilities and equipment use to manage the CCP plays important roles in storing and keeping the goods safely. For example, freezer, refrigerated container and monitoring system use to check the condition of the goods while transporting. Transportation and storage design at supermarket are important to maintain the freshness of the goods from the manufacturer to the warehouse and supermarket until it reaches consumer's storage place.

2.3.1 Storage Design

The arrangement of cold storage products must be specified due to temperature sensitivity as it need to be monitored regularly on the conditions. To add, poor cabinet stocking and stacking arrangements and inadequate servicing can cause significant problems with maintaining low temperatures and the interference with cabinet design can disrupt the flow of cool air through the cabinet and cause a rise in temperature. Food waste happened when the goods are not getting pick by the consumers and has been out in display shelves for a long time until it decayed or damages. Not to mentioned that temperature controlled in display shelves also can extend the shelf-life of the CPP and to maintain its fresh looks while in display.

2.4 CONSUMER PERSPECTIVE

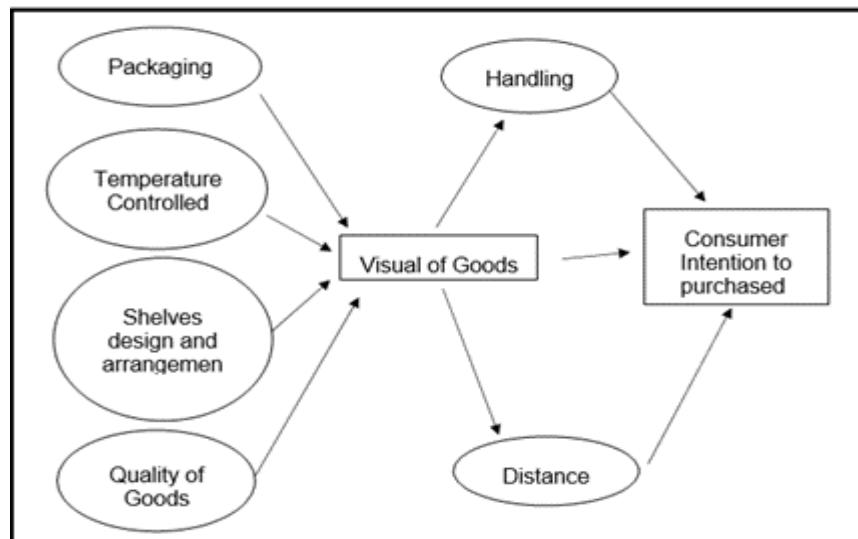
Consumer or called as customer are important factor that contribute in gaining a profit from a certain business. In short, by understanding the consumer's buying decision from many aspects will help in changing the way a marketer promotes the goods based on consumer's perspective. In this study, the researcher wants to investigate the factors that influence the buyer's intention to purchase cold storage products in order to determine the effectiveness temperature setting in maintaining the freshness of the goods.

2.4.1 Distance

Starting from the consumer's purchased of the goods from supermarket to the way home also could affect the durability and condition of the goods. This is because the goods are exposed to surrounding without any measurement of temperature controlled. If the goods are exposed for a long time along the way home, it will somehow reduce the freshness and the quality of the goods. At this point, packaging can also play important roles in keeping the freshness of the goods.

2.5 CONCEPTUAL FRAMEWORK

In this study, the researcher builds a conceptual framework on cold chain handling in order to observe how and what factors that impact to the freshness of the goods during the transportation to consumer's storage place.



3.0 RESEARCH METHODOLOGY

Generally, this chapter will emphasize every aspect involved in answering consumer's insight and preference on maintaining the freshness of cold chain products in supermarket in Malaysia. Moreover, the purpose of this analysis is to improve cold chain handling in supply chain management. It will discuss the research design and the construction of quantitative research (questionnaire survey) as well as selection of scales for measurement, sampling, sample size, pre-test and pilot tests, recruitment of participants, data collection techniques, and data analysis techniques. Measurement of validity and reliability is discussed. Finally, in order to obtain a result for this study, the researcher used quantitative method for the purpose of collecting the primary data through online form or questionnaire section.

3.1 RESEARCH INSTRUMENT

3.1.1 Primary Data

Primary data means that the data used is made for the first time by the researcher through the efforts made. This data is also known as primary or raw data. Through this implementation, the required data can be collected through various means such as personal interviews, surveys conducted or even by telephone, observations, surveys and so on.

3.1.2 Secondary Data

Secondary data is the use and acquisition of useful information through studies done that are collected and recorded by other researchers. The use of secondary data is a form of data that is easily collected from a variety of reliable sources such as websites, journals, articles, censuses, books, internal records of organizations, reports and more. This data also offers some advantages to researchers as it is very time-consuming and cost-effective and easy to find.

3.2 INSTRUMENT DEVELOPMENT

3.2.1 Questionnaire

In the questionnaire layout, there will be three sections that will be included in the questionnaire in order to assist in obtaining accurate information as well as being able to answer the objectives of the study as mentioned in chapter 1. The questionnaire has three different sections with section A, section B and section C:

Section A: This section mainly focuses on demographic information such as age, gender, income, educational background and marital status.

Section B: This section will contain the focus of research in which will answer the objectives of the research.

Section C: This section contains some questions that will focus on suggestions that can be given for improvement purposes.

3.2.2 Sampling Size

According to Kesion Malaysia mentioned that world population review (2021) mentioned that Johor Bahru's 2021 population is now estimated at 1,044,548. And the population number is said to be increased year by year. Based on the study that are being conducted, the focused target of population for this research is for people who had experienced on buying a cold storage goods from supermarket such as GIANT and ECONSAVE that located in Johor. Estimated that more than 100,000 consumers have experience buying a cold storage goods at grocery store in Johor. Therefore, the total number of respondents for the survey obtained and referenced by the researcher through Krejcie and Morgan's (1970) table is needed to help complete this study in which for a population that is equal to or greater than 1,000,000, the required sample size is 384.

3.2.3 Pilot Testing

Pilot testing are small-scale pilot research that try to determine if key components of a larger research often a randomized controlled trial (RCT) would be viable. They might be used for

example, to try to anticipate a suitable sample size for the full-scale research and to improve on different parts of the study design. Pilot studies are an important part of the research process. The goal of a pilot study is to determine the viability of a method that will be employed in a larger size investigation. Using a clinical trial as an example, this section describes the responsibilities and limits of pilot studies. A pilot study can be used to investigate the viability of the innovative intervention's recruiting, randomization, retention, assessment processes, new methodologies, and implementation.

3.2.4 Smart PLS (Partial Least Square)

The reason for this approach to this data collection is that the original data probably has high validity and reliable criteria compared to the secondary data modified from previous studies. In addition, it has the advantage of using collection strategies that are essential for distinguishing the topic of interest, better understanding of information, effective data output, more accurate and meaningful data acquisition. In this study, researcher used data analysis to draw conclusions from the questionnaire data. Specified Goals Methodology developed questionnaires have been prepared. Formalized supervisory questions questionnaire distributions data examination. The data was then presented using a table and a bar chart. The reason for using SmartPLS3 software was that the chart that contained all the data from the questionnaire was simple to understand, and the results were more accurate. Descriptive statistics will then be used to describe or comprehend the respondent's demographic profile. The same method will be used to investigate variable dimension, as indicated using mean and median.

3.3 DATA ANALYSIS

3.3.1 Normality Test

The purpose of a normality test is to determine if a sample size has been described from a normally distributed population and to determine how probable it is for a random variable in the data set to be normally distributed. According to Garson (2012), the usual skewness and kurtosis permissible range for distributed data should be between -2 and +2.

4.0 RESULT AND DISCUSSION

The researcher will be using Descriptive analysis and Partial Least Squares Structural Equation Modelling (PLS-SEM) that includes the assessment of Measurement and Structural Model to interpret the results. The structural model ascertains the significance of hypothesized relationships. Different hypotheses were proposed to evaluate the relationship of predictors on the outcome.

4.1 PILOT TEST

4.1.1 Reliability and Normality Test

| Construct | Cronbach's Alpha Value | Number of Item | Strength |
|--|------------------------|----------------|------------|
| Customer Acceptance | 0.7 | 5 | Acceptable |
| Handling Management | 0.754 | 4 | Acceptable |
| Distance of Supermarket from Home | 0.857 | 4 | Good |
| Visual of Goods | 0.788 | 16 | Good |
| Packaging of Goods | 0.778 | 4 | Acceptable |
| Temperature Controlled | 0.868 | 4 | Good |
| Shelve Design and Arrangement of Goods | 0.87 | 4 | Good |
| Quality of Goods | 0.855 | 4 | Good |

Table 4.1: Reliability Test

From the table 4.1 shows the Cronbach's alpha value for the pilot test for each variable. Majority of the variables are in the range of 0.8 and above which is considered as good except for Customer Acceptance with 0.721, Handling Management with 0.754, Visual of Goods with 0.788 and Packaging of Goods with 0.778. According to Cortina, J, M. (1993), more than 0.70 is acceptable internal reliability test value.

| Variable | | Item | Skewness | Kurtosis |
|-----------------------------------|------------------------|---------------|----------|----------|
| Customer Intention to Purchased | | Customer 1 | -3.672 | 11.731 |
| | | Customer 2 | -1.31 | 0.746 |
| | | Customer 3 | -2.956 | 8.717 |
| | | Customer 4 | -0.565 | -0.748 |
| | | Customer 5 | -1.344 | 1.741 |
| Handling Management | | Handling 1 | -2.724 | 8.616 |
| | | Handling 2 | -1.948 | 4.854 |
| | | Handling 3 | -1.655 | 2.83 |
| | | Handling 4 | -1.862 | 2.646 |
| Distance of Supermarket from Home | | Distance 1 | -0.911 | -0.346 |
| | | Distance 2 | -1.235 | 0.311 |
| | | Distance 3 | -0.987 | -0.303 |
| | | Distance 4 | -0.609 | -0.934 |
| Visual of Goods | Packaging of Goods | Packaging 1 | -1.664 | 1.64 |
| | | Packaging 2 | -1.183 | 0.131 |
| | | Packaging 3 | -1.338 | 1.007 |
| | | Packaging 4 | -1.713 | 2.079 |
| | Temperature Controlled | Temperature 1 | -2.116 | 3.707 |
| | | Temperature 2 | -1.767 | 1.875 |
| | | Temperature 3 | -1.876 | 2.594 |
| | | Temperature 4 | -1.871 | 2.462 |
| | Shelve Design | Shelve 1 | -1.329 | 0.741 |
| | | Shelve 2 | -0.955 | -0.454 |
| | | Shelve 3 | -1.549 | 1.37 |
| | | Shelve 4 | -1.154 | -0.058 |
| | Quality of Goods | Quality 1 | -2.116 | 3.707 |
| | | Quality 2 | -2.116 | 3.566 |
| | | Quality 3 | -1.414 | 1.208 |
| | | Quality 4 | -1.642 | 1.829 |

Table 4.2: Normality Test

For normality test, skewness and kurtosis have been tested on the 10 sets of pilot test data. Based on the result, most variables obtain below +2 and above -2 except for some of them that not achieved. Hair, J. F et al. (2017) and Bryne (2010) states that data is considered to be normal if Skewness is between -2 to +2 and Kurtosis is between -7 to +7.

4.2 DESCRIPTIVE ANALYSIS

| Element | | Response | Frequency | Percent % |
|----------------|-----------------|----------|-----------|-----------|
| Gender | Male | 114 | 30 | 26.3 |
| | Female | | 84 | 73.7 |
| Age | 18 - 22 | 114 | 56 | 49.1 |
| | 23 - 27 | | 33 | 28.9 |
| | 28 - 32 | | 9 | 7.9 |
| | 33 - 37 | | 4 | 3.5 |
| | 38 and Above | | 12 | 10.5 |
| Position | Students | 114 | 61 | 53.5 |
| | Employee | | 37 | 32.5 |
| | Unemployed | | 4 | 3.5 |
| | Self-employed | | 5 | 4.4 |
| | Others | | 7 | 6.1 |
| Income | Below RM1500 | 114 | 66 | 57.9 |
| | RM1501 - RM3900 | | 22 | 19.3 |
| | RM3901 - RM5500 | | 14 | 12.3 |
| | RM5501 - RM8700 | | 9 | 7.9 |
| | Above RM8701 | | 3 | 2.6 |
| Buying Pattern | Everyday | 114 | 4 | 3.5 |
| | Once in a Week | | 24 | 21.1 |
| | Twice a Week | | 20 | 17.5 |
| | Rarely | | 15 | 13.2 |
| | When Needed | | 51 | 44.7 |

Table 4.3: Respondent Response Rate

From the total of 130 minimum sample size needed to represent the cross-section of the population based on Krejcie and Morgan's (1970), this research managed to obtain 114 responses. This indicates that this research gains 87.69 percent of the response rate from the respondents needed.

4.3 RESEARCH OBJECTIVE 1

The purpose of objective 1 is to investigate customer's insight on the influence factor that determines the freshness of the purchase of the product from the cold storage at the supermarket. The data will be interpreted in descriptive analysis.

| Input | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree | Mean | Standard Deviation |
|---|-------------------|----------|----------|------------|----------------|-------|--------------------|
| As a buyer, you will buy groceries that visually looks good and fresh at supermarket. | 0 | 0 | 1 (0.9%) | 11 (9.6%) | 102 (89.5%) | 4.983 | 0.242 |
| Do you agree that the packaging of groceries itself could influence your intention to purchase. | 0 | 0 | 9 (7.9%) | 30 (26.3%) | 75 (65.8%) | 4.625 | 0.582 |
| Do you think the quality of product is very important in purchasing groceries. | 0 | 0 | 4 (3.5%) | 14 (12.4%) | 96 (84.2%) | 4.875 | 0.361 |
| The way of managing cold storage product reflect to the condition of goods. | 0 | 4 (3.5%) | 3 (2.7%) | 17 (4.9%) | 90 (78.9%) | 4.229 | 0.784 |
| Shelve design at supermarket could influence to the freshness and visual of goods. | 1 (0.9%) | 3 (2.6%) | 9 (7.9%) | 26 (22.8%) | 75 (65.8%) | 4.292 | 0.923 |

Table 4.4: Respondent's Answer on Objective 1

4.4 RESEARCH OBJECTIVE 2

The purpose of Objective 2 is to investigate the consumer intention to purchase framework as a lens to explore factors influence the freshness of cold storage product to the consumer intention to purchase which will be assess through the measurement model assessment.

| VARIABLE | ITEM | LOADING | VIF | AVE | CR | CA | R2 |
|-----------------------------------|---------------|---------|-------|-------|-------|-------|-------|
| Customer Acceptance | Customer 1 | 0.488 | 1.245 | 0.612 | 0.773 | 0.712 | 0.748 |
| | Customer 2 | 0.796 | 1.529 | | | | |
| | Customer 3 | 0.675 | 1.231 | | | | |
| | Customer4 | 0.658 | 1.243 | | | | |
| | Customer 5 | 0.555 | 1.296 | | | | |
| Handling Management | Handling 1 | 0.842 | 1.721 | 0.705 | 0.877 | 0.791 | |
| | Handling 2 | 0.532 | 1.184 | | | | |
| | Handling 3 | 0.876 | 2.027 | | | | |
| | Handling 4 | 0.756 | 1.547 | | | | |
| Distance of Supermarket from Home | Distance 1 | 0.862 | 2.272 | 0.703 | 0.904 | 0.857 | |
| | Distance 2 | 0.887 | 2.586 | | | | |
| | Distance 3 | 0.886 | 2.578 | | | | |
| | Distance 4 | 0.706 | 1.461 | | | | |
| Packaging of Goods | Packaging 1 | 0.789 | 1.582 | 0.602 | 0.857 | 0.778 | |
| | Packaging 2 | 0.706 | 1.486 | | | | |
| | Packaging 3 | 0.741 | 1.544 | | | | |
| | Packaging 4 | 0.86 | 1.971 | | | | |
| Temperature Controlled | Temperature 1 | 0.866 | 2.306 | 0.717 | 0.911 | 0.868 | |
| | Temperature 2 | 0.864 | 2.322 | | | | |
| | Temperature 3 | 0.823 | 2.036 | | | | |
| | Temperature 4 | 0.832 | 2.06 | | | | |
| Shelve Design | Shelve 1 | 0.819 | 2.084 | 0.721 | 0.911 | 0.87 | |
| | Shelve 2 | 0.797 | 1.921 | | | | |
| | Shelve 3 | 0.889 | 2.608 | | | | |
| | Shelve 4 | 0.886 | 2.614 | | | | |
| Quality of Goods | Quality 1 | 0.879 | 2.791 | 0.711 | 0.903 | 0.855 | |
| | Quality 2 | 0.845 | 2.231 | | | | |
| | Quality 3 | 0.745 | 1.612 | | | | |
| | Quality 4 | 0.87 | 2.445 | | | | |
| Visual of Goods | Visual 1 | 0.679 | 1.489 | 0.611 | 0.863 | 0.788 | |
| | Visual 2 | 0.598 | 1.586 | | | | |
| | Visual 3 | 0.639 | 1.571 | | | | |
| | Visual 4 | 0.768 | 1.606 | | | | |

Table 4.5: Construct Validity, Dimensionality, Reliability and Item

Further, the discriminant validity of the constructs was examined by following the Fornell and Larcker (1981) criterion. This test is used to compare the correlations between constructs and the square root of the AVE for each construct applied in this study. The results in Table 4.6 show that all the values (diagonals) were higher than the conforming row and column values. Hence, it demonstrates that there is no discriminant validity issue for this study.

| | Customer Acceptance | Distance | Handling | Packaging | Quality | Shelve | Temperature | Visual |
|-------------|---------------------|----------|----------|-----------|---------|--------|-------------|--------|
| Customer | 0.642 | | | | | | | |
| Distance | 0.559 | 0.839 | | | | | | |
| Handling | 0.609 | 0.553 | 0.84 | | | | | |
| Packaging | 0.465 | 0.683 | 0.561 | 0.776 | | | | |
| Quality | 0.504 | 0.698 | 0.678 | 0.708 | 0.836 | | | |
| Shelve | 0.521 | 0.713 | 0.608 | 0.759 | 0.793 | 0.849 | | |
| Temperature | 0.422 | 0.664 | 0.664 | 0.74 | 0.802 | 0.781 | 0.846 | |
| Visual | 0.499 | 0.639 | 0.668 | 0.78 | 0.799 | 0.737 | 0.704 | 0.862 |

Table 4.6: Fornell and Larcker (1981) Criterion

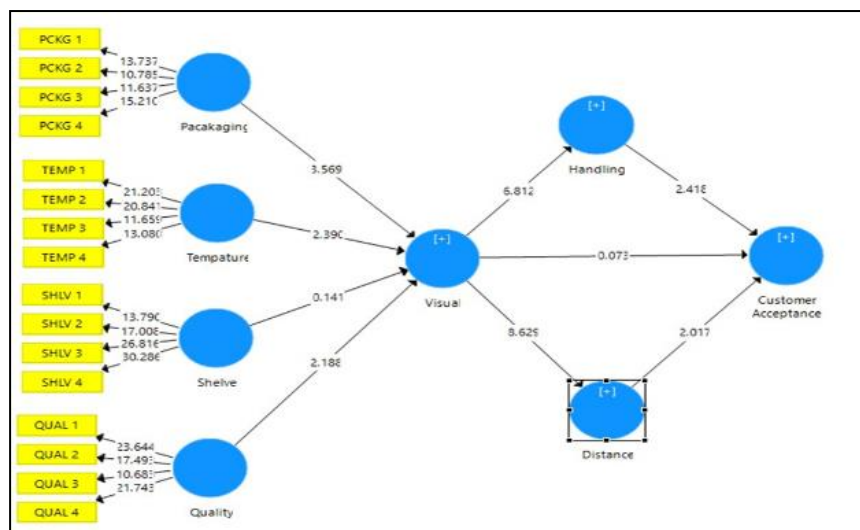
| Hypothesis | Relationship | T-Value | P-Value | Decision |
|------------|--------------|---------|---------|---------------|
| H1 | D -> C | 2.017 | 0.044 | Supported |
| H2 | H -> C | 2.418 | 0.016 | Supported |
| H3 | P -> V | 3.569 | 0 | Supported |
| H4 | Q -> V | 2.188 | 0.029 | Supported |
| H5 | S -> V | 0.141 | 0.888 | Not Supported |
| H6 | T -> V | 2.39 | 0.017 | Supported |
| H7 | V -> C | 0.073 | 0.942 | Not Supported |
| H8 | V -> D | 8.629 | 0 | Supported |
| H9 | V -> H | 6.812 | 0 | Supported |

Table 4.7: Hypothesis Verification

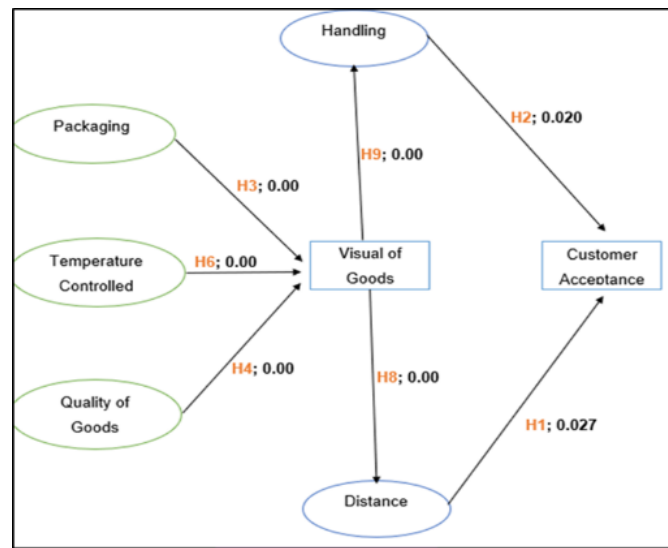
Among the constructs, the model estimation showed there was no significant relationship between shelf design to visual of goods and visual of goods to the customer acceptance (H5 and H7 were not supported). Regarding visual context, packaging, quality and temperature controlled exert a significant positive effect to the customer intention to purchased ($t > 2$, $p < 0.05$; H3, H4 and H6 supported). Regarding distance context, visual of goods support exerts a significant positive effect to the customer intention to purchased ($t > 2$, $p < 0.05$; H8 supported). Regarding handling management context, visual of goods also support exerts a significant positive to the customer intention to purchased ($t > 2$, $p < 0.05$; H9 supported). Regarding customer acceptance context, distance and handling support exerts a significant positive effect to the customer intention to purchased ($t > 2$, $p < 0.05$; H1 and H2 supported).

4.5 STRUCTURE EQUATION MODEL

This section is to develop an adoption framework that identifies the factors influence the freshness of cold storage product to their intention to purchase from grocery stores. Based on the structured equation model, below is the graphical representation of inner model after the bootstrapping procedure: -



Below is the graphical representation of the latest model after H5 and H7 being removed since there was no significant relationship between shelf design and visual of goods and visual of goods to customer acceptance (H5 and H7 were not supported).



5.0 RECOMMENDATION AND CONCLUSION

In this chapter, the researcher will explain on overview of this research and recommendation for future studies.

5.1 OVERVIEW OF THIS STUDY

The quantitative method has been used for this research where the questionnaire is issued to collect the data. The questionnaire had been clearly arranged from demographic into significant questions to ensure it related to research objectives and research questions. The total of respondents is 114 and the questionnaire had been spread to the customers who experience buying groceries from any supermarket located in Johor such as GIANT and ECONSAVE.

5.2 LIMITATION OF THIS STUDY

Since the researcher is a full-time degree student, time to conduct the research is limited as the researcher need to attend other onlineclasses, tests and perform other assignments. Plus, short period of time to review the LR to identify all the variable require for development of the framework.

5.3 RECOMMENDATION FOR FUTURE STUDIES

The limitation of this study led to the recommendation for future researchers. Besides, several recommendations need to be provided to improve and expands the findings of this research. Eventually, it can be used for other researcher and for researcher himself to improve the research for the future. First, there is a recommendation to improve the service in cold chain

industry which is to acknowledge the consumer demand and buying pattern. Not all buyers know how to choose good quality of goods. For example, if the buyer is a young man age between 18 years old to 22 years old, there is possibility that he does not have more knowledge on handling cold storage goods. So, it is a good idea to assist them in buying the goods by showing how great the product sold in the supermarket. Next, put an automatic board to show the current condition of the goods on the display shelf could also provide a reminder or instruction for the buyer on how to handle the goods with specific temperature setting properly so as they can be in a good shape for a long period especially for goods such as fruits and vegetable, fish and meat.

5.4 CONCLUSION

This research is aimed to investigate the influence of demographic factors such as gender, age and position and income towards the factors influence the freshness of a cold storage product to the consumer's intention to purchase as it has been discussed throughout this research. The review of findings shows that not all the IVs have a significant relationship with DV. Even though, some limitations as mentioned before has occur, but it does not affect the outcome of overall research. Last but not least, there are some suggestions and recommendation that have been proposed for a better future of the study.

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