



TAMA PASTE

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ABSTRACT

Tama Paste is an innovative product designed to provide a solution to the problem of excess food waste disposal in the environment. This product is made from finely ground leftover eggshells. Tama Paste can be molded into home decorations such as flower pots, cosmetic or stationery holders. This is due to its clay-like texture, which makes it easy to work with. Additionally, Tama Paste can be sold as a side income for all groups since the materials used to produce it are readily available and the production cost is low. Commercially, Tama Paste has the potential to become a highly sought-after product in the market due to its high level of innovation. Moreover, Tama Paste has various advantages in addressing environmental issues. One of the environmental issues is the disposal of excess food waste throughout the production spectrum, from the farm to the distributor to the consumer. This can have a negative impact on the ecosystem and contribute to the increasing global warming. Eggshells as a food waste material cannot be left to waste and can be transformed into valuable industrial innovation products. This is due to the richness of eggshells in calcium carbonate, which is classified as a solid waste material that is difficult to dispose of. In this study, we will focus on eggshells as food waste and examine their use as a product that can bring various benefits to the industry.

Keywords: food waste, eggshells, environmental problems

ABSTRAK

Tama Paste merupakan sesuatu produk yang diinovasikan untuk menjadi sesuatu penyelesaian masalah dari segi pembuangan sisa makanan yang berlebihan di alam sekitar. Produk ini diperbuat daripada hasil kutipan sisa kulit telur yang telah dihancurkan menjadi serbuk halus. Daripada Tama Paste ini, ianya boleh direkabentuk menjadi perhiasan rumah seperti pasu bunga, bekas letak alat solek atau alat tulis. Ini adalah kerana sifat tama paste yang menyerupai tanah liat yang memudahkan produk ini dapat diolah. Selain itu, Tama Paste ini juga dapat dijual untuk dijadikan sebagai pendapatan sampingan kepada semua golongan. Ini kerana bahan yang digunakan untuk menghasilkan Tama Paste mudah diperolehi dan kos pembuatannya rendah. Dari segi kommersial pula, Tama Paste ini mempunyai potensi untuk menjadi sesuatu produk yang boleh mendapat sambutan yang tinggi di dalam pasaran disebabkan oleh nilai inovasinya yang tinggi. Disamping itu, Tama Paste juga mempunyai pelbagai kelebihan untuk mengatasi isu alam sekitar. Antara isuisu alam sekitar adalah pembuangan Sisa makanan yang berlaku di sepanjang spektrum pengeluaran, dari ladang hingga pengedaran kepada peruncit kepada pengguna. Hal ini boleh membawa kesan buruk terhadap ekosistem dan membawa kepada pemanasan global yang semakin meningkat. Kulit telur sebagai sisa pembuangan makanan tidak boleh dibiarkan begitu sahaja dan sebaliknya boleh diubah menjadi produk inovasi industri yang berharga. Ini adalah disebabkan oleh khasiat kulit telur yang kaya dengan kalsium karbonat yang disifatkan sebagai bahan sisa pepejal yang sangat sukar untuk dilupuskan. Dalam kajian ini, kami akan memberi tumpuan kepada kulit telur sebagai sisa makanan, dan mengkaji penggunaannya sebagai sesuatu produk yang dapat membawa pelbagai kelebihan dalam industri.

Kata Kunci: sisa makanan, kulit telur, masalah alam sekitar

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CHAPTER 1 INTRODUCTION

1.1 INTRODUCTION

Food waste and organic waste are most of the waste generated by Malaysians (Chong et al., 2019). The sharp increase in industrial agriculture waste in our communities has resulted in serious environmental problems. Damage to natural ecosystems and the disposal of industrial waste are becoming major global issues because of the decline in landfill capacity. As a result, many countries have put into place strict environmental protection laws and developed waste management strategies to lessen environmental pollution and degradation (Ngayakamo et al., 2020). As the amount of trash produced in our society keeps increasing, waste disposal and recycling which are seen as being both economically and environmentally advantageous by using wastes for industrial development as viable alternatives to construction have attracted a lot of attention (Ngayakamo et al., 2020). One of the methods to promote the recycling rate is to introduce new ideas for reusing waste products.

Eggshells are waste that is disposed of in large quantities in Malaysia as Malaysians are one of the largest egg eaters in the world (Doh & Chin, 2014). Eggshell is nonhazardous, but it attracts worms and rats, which becomes a health problem for the public. In Malaysia, eggshells are regarded as municipal waste in household and poultry industries so most of them ended up in landfill (Kiew et al., 2016).

The number of chicken eggshell waste is increasing every day as many people consumed eggs in their daily life. They are also produced by many factories as they are a major ingredient for many types of food products such as fast food, bakery, and salad dressings. It is reported that about 25,000 tons of eggshell waste is being produced globally and this waste is being disposed of in the landfill site (Hasrin et al., 2020). Studies now contemplate the extraction and characterization of one of the most easily accessible as well as useful sources of raw material from eggshells and evaluate its beneficial applications (Zaman et al., 2018).

1.2 PROBLEM STATEMENT

The ever-increasing global population requires different resources in addition to the basic needs of food and residence for survival. Consequently, it has led to increased urbanization, higher food demand, and hence heightened food waste generation. Subsequently, the increasing urbanization and industrialization with amplified waste generation have wreaked havoc on our climate; thus, making it necessary to take certain extravagant measures to ensure the safety and sustainability of our planet (Waheed et al., 2020). Unsustainable human consumption is causing several environmental problems such as the scarcity of natural resources, the quantity of generated waste, and landfilling disposal (Vilarinho et al., 2022).

Solid waste management is one of the leading problems in Malaysia. Rapid development and population growth have prompted researchers to improve the recycling and reusing of waste materials for sustainable development (Wei et al., 2021). Eggshell is a solid waste, with the production of several tons per day. Eggshell is mostly sent to landfill with a high management cost (Faridi & Arabhosseini, 2018). According to the Environmental Protection Agency, eggshell waste is the 15th biggest pollution issue in the food industry. In 2017, 12235 million eggs were consumed and around 85 thousand tonnes of eggshell waste were yielded in Malaysia (Tiong et al., 2018).

When improperly disposed of in designated areas, they are regarded as a significant cause of environmental pollution and later pose a health risk due to the growth of fungi on eggshells (Waheed et al., 2020). Chicken eggshell is discarded in Malaysia as municipal waste and is difficult to handle and often ends up in landfill (Wei et al., 2021). However, the main obstacle to a widespread recourse to waste recycling is the lack of knowledge about its effect (Zanelli et al., 2021).

Therefore, a research study about the uses of waste material is necessary to conduct. Recycling eggshells into useful products gives good potential benefits on many levels, both for food manufacturers and the much wider construction industry. This research will focus on the utilization of eggshell powder into a paste that can be molded into household items.

1.3 RESEARCH OBJECTIVES

1. To create a paste made from eggshells to reduce food wastage.
2. To identify customers' acceptance of Tama Paste.

1.4 RESEARCH QUESTIONS

1. How to create Tama Paste from eggshells?
2. What is customer acceptance level towards Tama Paste?

1.5 SCOPE OF THE PROJECT

The scope of this study is limited to the development of eggshells into a paste as a solution for food waste issues in Malaysia. Tama Paste is created by using crushed eggshells alongside other household ingredients such as cornstarch, glue, baby oil, and lemon juice. It is formed and molded domestically. This project also aims to study the acceptance and insight of consumers towards Tama Paste as a recycled food waste product.

This study involves the participation of consumers from Malaysia, such as housewives, low-income consumers, and restaurant owners as suppliers of our resources. The study will be conducted in Seksyen 13, Shah Alam, Malaysia which has a total population of 18,187, according to Jabatan Perangkaan Malaysia, 2021.

The reason that our target demographic consists of housewives and low-income consumers is mainly that they are the most susceptible to using our products. Housewives are usually interested in household decorations and having an ecofriendly product such as Tama Paste might be an interesting investment for them. Next, for low-income consumers, Tama Paste is the perfect substitute as compared to ceramic household decorations. This is because Tama Paste is a low-cost product, making it accessible to most people.

1.6 SIGNIFICANCE OF THE RESEARCH

From preliminary observations, food wastage such as eggshells in common households and restaurants has become a major issue, negatively affecting our environment. Therefore, the development of innovative products created from these food wastes is necessary to overcome this problem.

Recycling eggshells cannot only be seen as a key driver to boost economic performance, but also represents an effective option to safely use the discarded materials, and at the same time reduces the risk of microbiological problems as well as the costs of disposal into the environment (Francis et al., 2018).

1.7 SWOT Analysis

SWOT Analysis (short for strengths, weaknesses, opportunities, threats) is a business strategy tool to assess how an organization compares to its competition. The strategy is historically credited to Albert Humphrey in the 1960s, but this attribution remains debatable. There is no universally accepted creator. Also known as the SWOT Matrix, it has achieved recognition as useful in differentiating and establishing a niche within the broader market. Beyond the business world, SWOT Analysis can also be applied to the individual level to further assess a person's situation versus their competition. There are both internal and external considerations built into the tool. "Strengths" and "weaknesses" are internally related. The former represents a facet of an organization/entity which lends it an advantage over the competition. The latter is characteristic of that same entity, which leads to a relative disadvantage against the competition. Regarding externally related, "opportunities" are realities in the greater environment that can be exploited to benefit the entity. While on the other hand, "threats" are realities in the greater environment, which might lead to problems for the entity (Teoli, et al., 2019).

<p>Strengths:</p> <ul style="list-style-type: none"> • Product is made from recycled food waste, making it sustainable and ecofriendly. • Versatile; able to be made into a multitude of products. • Low cost needed to create the product. • User friendly; consumers of all ages can access the product. 	<p>Weaknesses:</p> <ul style="list-style-type: none"> • Weak in tension; poor shock resistance. • No copyright protection. • Difficult to control during processing due to the product being fragile. • Production process is complicated, and the workload is high, making it timeconsuming.
<p>Opportunities:</p> <ul style="list-style-type: none"> • Tama Paste could be used in other aspects of the industry, such as tile creation. • Can leave a positive impact on the environment. • Could raise awareness regarding food waste recycling. • Creating an innovative product that is unique compared to others in the market. 	<p>Threats:</p> <ul style="list-style-type: none"> • Well-known competitors in the industry for higher quality household decorations, such as Kingres Marketing Sdn. Bhd. • Easy for competitors to recreate the product. • Rising cost of ingredients. • Target market of the product is too small.

Table 1: SWOT Analysis of Tama Paste

1.8 DEFINITION OF OPERATIONAL TERMS

These are the terms and their operational definitions:

Tama Paste

Tama Paste consists of two separate words. The first word is “Tama” which is an abbreviation of the word *tamago*, originating from the Japanese language, which means eggs. The second word, “Paste” is defined as a thick, soft, moist substance typically produced by mixing dry ingredients with a liquid. Hence, Tama Paste directly translates into “eggshell paste”.

Landfill site

A landfill site is an area of land that is specifically designed and engineered for the disposal of solid waste. The waste is deposited in a carefully constructed cell and covered with soil and other materials to prevent environmental contamination. Landfills are typically monitored and managed for decades after they are closed to ensure that they do not pose a threat to human health or the environment (UNEP, 2018).

Municipal waste

Municipal waste, also known as solid waste, refers to the waste generated by households, commercial establishments, and institutions within a city or town. Municipal waste typically includes items such as food waste, paper, plastics, glass, and metals, as well as hazardous waste like batteries and electronics (World Bank, 2018).

Insight

According to a report by McKinsey & Company, "Insight is a key driver of innovation and growth. It is the foundation for new products, services, and business models that can create significant value for customers and society." (McKinsey & Company, 2018).

Microbiological

Microbiological refers to the study of microorganisms, including bacteria, viruses, fungi, and other microscopic organisms. Microbiology plays an important role in various fields, such as medicine, agriculture, environmental science, and biotechnology (WHO, 2018).

1.9 SUMMARY

In conclusion, this project serves as an insight into the uses of recycling eggshells as a solution to overcome food wastage and the negative impact it poses on the environment. Furthermore, it can improve consumers' comprehension of the importance of reducing and recycling food waste towards a better and greener environment.

CHAPTER 2 LITERATURE REVIEW

2.1 INTRODUCTION

In Chapter 2, the project's concept is introduced, along with any associated theories. The chapter is summarized at the end. A literature review is a review of data gathered from journals, books, proceedings, and previous studies for a current investigation. It is a methodical procedure that calls for research as well as expertise in discovering, gathering, reading, and summarizing in-depth material since it can offer concepts and guidance on the issues being researched.

A sufficient context for the literature evaluation must be provided by identifying general topics, concerns, or areas of concentration. The overall direction of the subject, any theoretical or methodological suggestions, supporting data, and any new issues or viewpoints should be mentioned.

2.2 FOOD WASTAGE

Approximately 88 million tonnes (Mt) of food is wasted in the European Union each year and the environmental impacts of these losses throughout the food supply chain are widely recognized. The environmental impact of food production and consumption is further exacerbated when food is wasted rather than consumed (Scherhauser et al., 2018). Food waste, particularly when avoidable, incurs a loss of resources and considerable environmental impacts due to the multiple processes involved in the life cycle. Major environmental and climate changes are driven by changes in socioeconomic development. The problem of food waste, its unsustainable management, and associated environmental consequences are becoming a great concern due to the rapid socioeconomic development (Ogunmoroti et al., 2022). Approximately 1.4 billion hectares of fertile land (28% of the world's agricultural area) is used annually to produce food that is lost or wasted. In terms of greenhouse gas (GHG) emissions, global food waste is responsible for 4.4 billion tons of CO₂ eq. annually, or around 8% of the total global GHG emissions (Tonini et al., 2018).

2.3 RECYCLING FOOD WASTE

Food wastage and its accumulation are becoming a critical problem around the globe due to the continuous increase in the world population. The exponential growth in food waste is imposing serious threats to our society like environmental pollution, health risk, and scarcity of dumping land. Incineration of food waste consisting of high moisture content results in the release of dioxins which may further lead to several environmental problems (Katami et al, 2019). Therefore, appropriate methods are required for the management of food waste. Even seemingly small behaviour changes can have a big aggregate impact. One estimate suggests that an emission reduction of 123 million tons of carbon dioxide per year over 10 years (7.4% of US national emissions) can be achieved by relatively small alterations in behavior (Linder et al., 2018).

2.4 EGGSHELL RECYCLE PRODUCTS

Eggshell is a solid waste, with the production of several tons per day. Eggshell is mostly sent to landfill with a high management cost. It is economical to transform the eggshell waste to create new values from these waste materials. The eggshell waste can be used in biodiesel production as a solid base catalyst used for biodiesel pollutants minimization, reducing the production costs of biodiesel and making the process of biodiesel production fully ecological and environment-friendly, as an absorbent of heavy metals from wastewater as it is a serious environmental problem in the ecosystem, as biomaterial to replace bone tissues due to the rise in the number of patients, and as a fertilizer and calcium supplement in nutrition for humans, animals, and plants (Faridi et al., 2018). Besides that, eggshells could also be effectively incorporated into concrete production as cementitious blends (Nandhini & Karthikeyan, 2020).

2.5 CONCEPT/ THEORY

ADDIE Model

ADDIE model or the five stages of development was originally developed during the '70s for the U.S. Army at Florida State University. The original ADDIE model encompasses a five-phase process that allowed for the analysis of instructional needs and the design, development, and implementation of instructional methods (Kurt, 2017). The five phases or stages in the creation of tools are analysis, design, development, implementation, and evaluation. These five phases were established as an effective training method and meant to be followed in sequential order, and on each step, there are intended behavioural outcomes.

Analysis

The analysis stage involves identifying the learning needs of the target audience and analysing the context of the product. In this stage, researchers gather information about the consumers, their preferences, and the specific outcomes that need to be achieved. According to Liang and Li (2018), the analysis stage is critical for understanding the consumers' needs and creating objectives that are relevant to their specific context. Additionally, this stage may involve conducting a needs assessment to identify gaps in knowledge or skills (Yang, 2021).

Design

The design stage involves creating a blueprint for the product that outlines the objectives, strategies, and methods needed. In this stage, designers select the appropriate strategies and materials that are aligned with the objectives. According to Cho and Lim (2021), the design stage should also include considering the consumers' preferences to create an engaging and effective product.

Develop

The development stage involves creating the actual product based on the design blueprint. In this stage, designers develop and refine the product itself. According to Paquette, Liu, and Fontaine (2018), the development stage should also consider the use of emerging technologies to create engaging and interactive products.

Implementation

The implementation stage involves delivering the product to the consumers. This can be done in a variety of formats, including online, in-person, or a hybrid of the two. According to Park, Kim, and Kim (2018), the implementation stage should also include providing feedback and support to the consumers to enhance their engagement.

Evaluation

The evaluation stage involves assessing the effectiveness of the training program in achieving the desired learning outcomes. This includes evaluating the learners' performance, the effectiveness of the product, and its impact towards the consumers. According to Kim, Cho, and Lee (2019), the evaluation stage should also include gathering feedback from the consumers to identify areas for improvement and to ensure the continuous improvement of the product.

2.6 SUMMARY

In conclusion, the stated supporting literary documents focus on the major title of the body of literature being investigated. Any additional subheadings are added according to how well it relates to the project's criteria.

CHAPTER 3 METHODOLOGY

3.1 INTRODUCTION

In chapter 3. The project's research methodology is discussed in depth according to how it has been carried out. Research methodology simply refers to the practical "how" of any given piece of research. More specifically, it's about how we systematically designed a study to ensure valid and reliable results that address the study's aims and objectives.

3.2 RESEARCH DESIGN

This study is development research using the ADDIE model carried out in five stages including Analysis, Design, Development, Implementation, and Evaluation. The ADDIE model implements a systemic approach. The essence of the systemic approach is dividing the learning process plan into several steps and organizing the steps into logical sequences. The outputs of each step are then used as inputs for the next steps. It includes a testing and revision process so that the product developed has met the product criteria. good, empirically tested, and no more mistakes (Ardianto & Rifai, 2021; Purba et al., 2022).

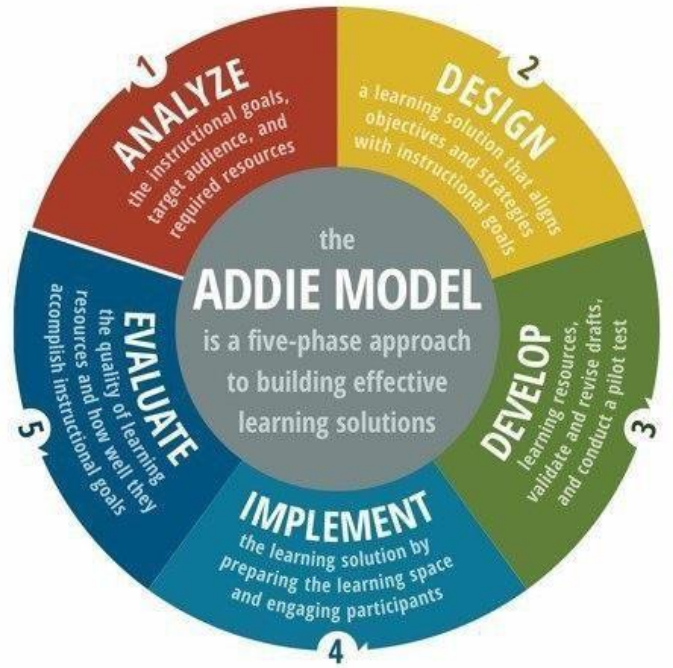


Figure 1 : The Addie Model

3.2.1 Analysis

For our study, the analysis stage would involve collecting information about our target audience, including their age, gender, and interests. It would also involve analyzing the context of the product, including any similar products available, and the materials needed to create Tama Paste. Once the information is gathered, we can develop objectives that are aligned with the target audience's needs and the specific context of Tama Paste.

When a product is released, I am one of the first to use it
30 responses

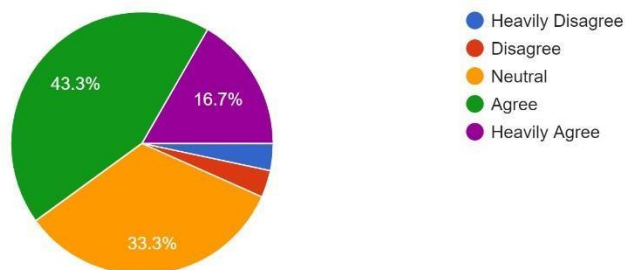


Figure 2 : Question 1 of the analysis study.

I am willing to try Tama Paste
30 responses

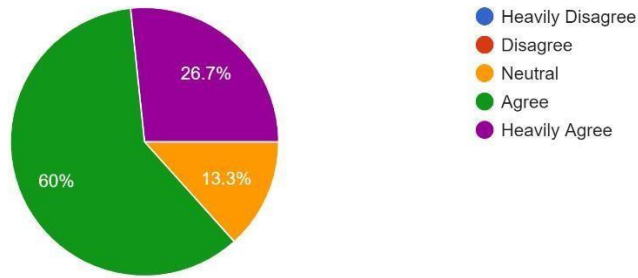


Figure 2.1: Question 2 of the analysis

I am interested to use Tama Paste to create household decorations. e.g. vase, brush holder, pen holder
30 responses

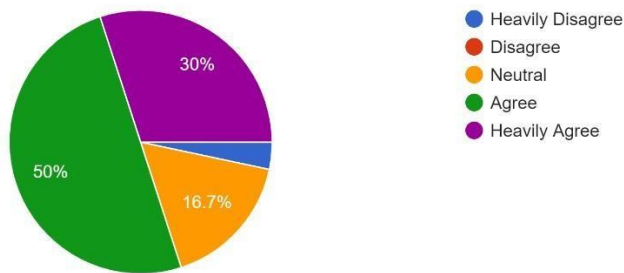


Figure 2.2: Question 3 of the analysis

Generally, I like to try out new products and services
30 responses

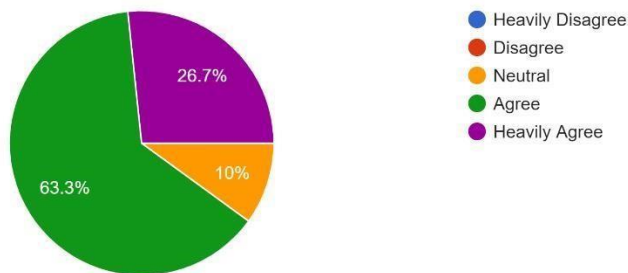


Figure 2.3. Question 4 of the analysis

Based on the data collected from the questionnaire, we have concluded to proceed with the creation of Tama Paste.

3.2.2 Design

The design stage involves creating a blueprint for the creation of Tama Paste. This includes determining the ingredients necessary and developing a step by-step process on how to create the paste. The results will be evaluated alongside group members for further improvement of design results. Ingredients: i. Crushed eggshells

ii. 1 cup corn starch

iii. $\frac{3}{4}$ cup glue

iv. Non-stick pan

v. Baby oil

vi. Lemon juice

3.2.3 Development

Once the design has been finalized, the development stage involves creating the paste according to the steps and using the ingredients needed. The paste is then tested during this stage to ensure that it is functional and user-friendly.

STEP 1



Collected eggshells are washed thoroughly.

STEP 2



Eggshells are set out to dry Completely.

STEP 3



Dried eggshells are grounded into crushed a fine powder.

STEP 4



Corn-starch, water-based glue, and fine powder half a lemon is added into the eggshells to form a paste.

STEP 5



The paste is then heated up in a pan, and moulded into any shape you like.

STEP 6



After moulding, the item is heated up in an oven until it fully dries.

3.2.4 Implementation

The implementation stage involves releasing Tama Paste to the public and making it available to the target audience. This includes setting up a booth to introduce consumers to Tama Paste and creating a hands-on experience for them.



Figure 2.4: Respondent with product



Figure 2.5: Respondent with product



Figure 2.6: Respondent with product



Figure 2.7: Production of the Tama Paste



Figure 2.8: Production of the Tama Paste

3.2.5 Evaluation

The final stage of the ADDIE model involves evaluating the effectiveness of Tama Paste and making any necessary changes based on user feedback. This includes analyzing user behavior and acceptance and conducting surveys or other types of user research.

3.3 CONCLUSION

In conclusion, this chapter covered project design research and provided information on the project's methodologies, procedures, materials, and data analysis approach.

CHAPTER 4 DATA ANALYSIS AND RESEARCH FINDINGS

4.1 INTRODUCTION

This chapter will represent the results that have been obtained to see the effectiveness of our project, TAMA PASTE. The result from our online questionnaire were analysed in more detail to draw conclusions based on our objectives which have been stated. This questionnaire will be conducted by using a group of respondents who are people of the general public.

4.2 RELIABILITY ANALYSIS OF THE QUESTIONNAIRE

According to Sekaran and Bougie (2013), the consistency of a test, survey, observation, or other measuring devices is connected to reliability testing. This is necessary to guarantee the validity of the data and the consistency of the test result throughout several attempts. The Cronbach's Alpha was used in this study to evaluate the reliability of the measurements. The reliability coefficient known as Cronbach's Alpha measures how strongly a group of items are positively associated with one another. It is crucial to remember that before the questions are submitted for reliability tests, all of the questionnaire's negatively phrased items should be reversed. The greater the internal consistency dependability, the nearer to 1 Cronbach's alpha is (Sekaran & Bougie, 2013).

4.3 DESCRIPTIVE ANALYSIS

This is the process of statistically and visibly characterizing a key aspect of the data is known as descriptive analysis. Descriptive analysis, in other words, is a type of research that outlines the variables in a scenario that the researcher is interested in (Sekaran & Bougie, 2013). Descriptive analysis may be given more precisely for each variable. Additionally, the data can be interpreted using a histogram, bar chart, or pie chart. Descriptive analysis is a sort of data analysis that helps to explain, illustrate, or summaries data points in a constructive way so that patterns can develop that satisfy all of the data's

conditions. It is one of the most crucial procedures in statistical data analysis. This analysis comprising of gender, age, education level, marital status, and monthly income.

4.3.1 Respondent Demographic Profile

We sent online surveys to people of the public and collected replies from them. These questions on the respondents' behaviour are designed to test their ability to recall the information. This project has sought personal information from respondents such as gender, age, education level, marital status, and monthly income.

Demography	Category	Frequency	Percentage
Gender	Male	10	33.3
	Female	20	66.7
Age	20 and below	2	6.7
	21-30	24	80.0
	41-50	3	10.0
	51 and above	1	3.3
Education Level	High School/SPM	6	20.0
	Undergraduate (Certificate/Diploma/Degree)	24	80.0
	Postgraduate (Masters/PhD)	-	-
Marital Status	Single	25	83.3
	Married	5	16.7
Monthly Income	Very Good	5	16.7
	Average	12	40.0
	Bad	1	3.3
	Very Bad	-	-
	Prefer not to Answer	12	40.0

Table 2: Table of Respondent Demographic

Based on the table above, it shows the profile of respondents for this project. According to the gender, there are 33.3% of male and 66.7% of female respondents from 30 people. According to the age group, 6.7% of the respondents are from the ages 20 and below, 80% are between the ages of 21 and 30, 10% are between the ages of 41 and 50,

and 3.3% are from the ages of 51 and above. According to the educational level, 20% of respondents are still in high school or have an SPM certificate, and 80% of them are undergraduates. For marital status, 83.3% of respondents are single, and the other 16.7% are married. Lastly, for monthly income, 16.7% of the respondents have a very good income, 40% have an average income, 3.3% have a bad income, and 40% of them prefer not to answer this question.

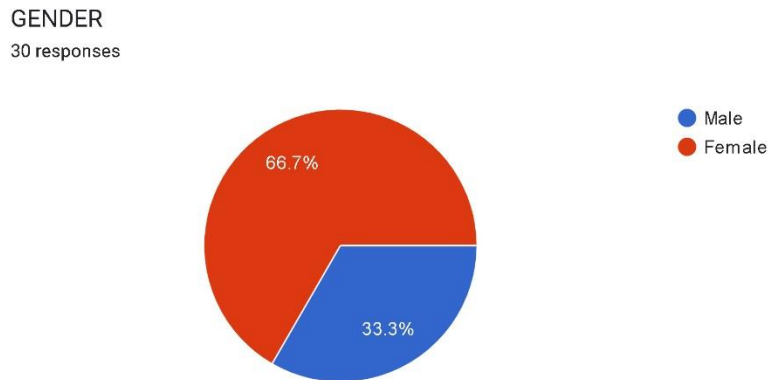


Figure 3: Outcome of questionnaire

This survey had 30 respondents, with 20 (66.7%) of them female and the remaining 10 (33.3%) being male. We can infer from the figure above that there are generally more female respondents than male respondents.

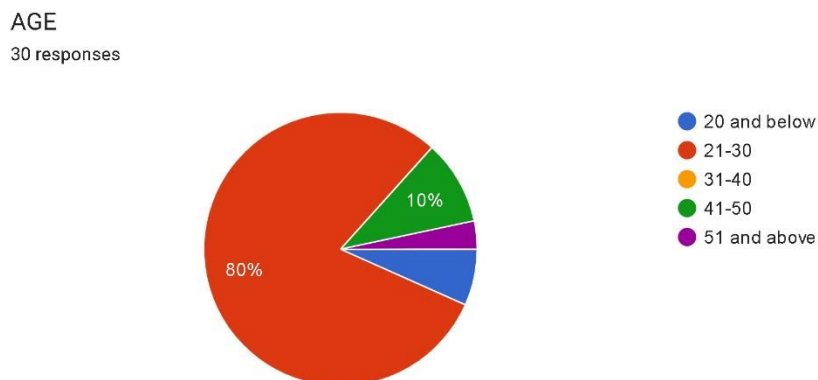


Figure 3.1: Outcome of questionnaire

The age of the respondents is depicted in the figure above. The respondents'

ages range from below 20 to above 51 and are broken down into five age groups. The first group is made up of 6.7% of people who are 20 years old and below. The second group consists of 80% of people who are between 21 and 30 years old. Next, 10% of respondents make up for those between 41 and 50 years old. Finally, 3.3% of the respondents are 51 years old and above. In conclusion, the average respondents' age is 21 to 30 years old.

EDUCATION LEVEL
30 responses

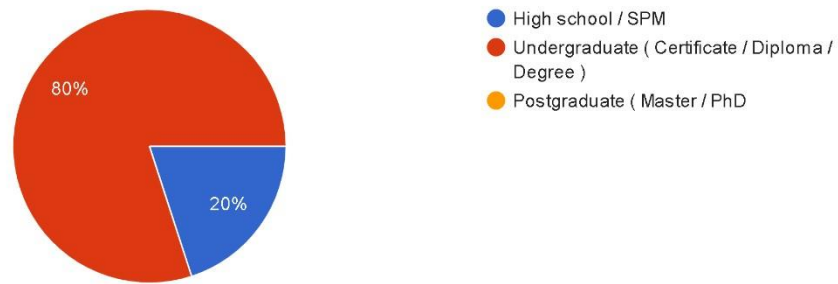


Figure 3.2: Outcome of questionnaire

The respondents' educational level is displayed in the figure above. 80% of the them are undergraduates with Diploma and Degree level certificates, and the remaining 20% have a high school or SPM level certificate. It demonstrates that most of the respondents are undergraduates.

MARITAL STATUS
30 responses

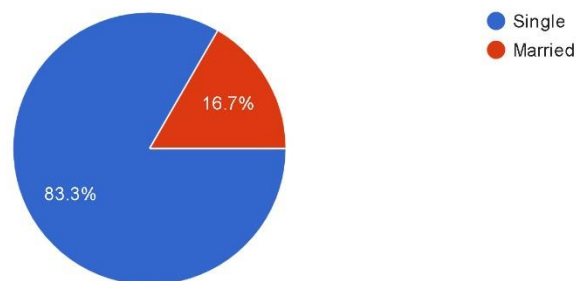


Figure 3.3: Outcome of questionnaire

There are two choices for the marital status of respondents. The figure above shows that 83.3% of them are single, and the remaining 16.7% are married.

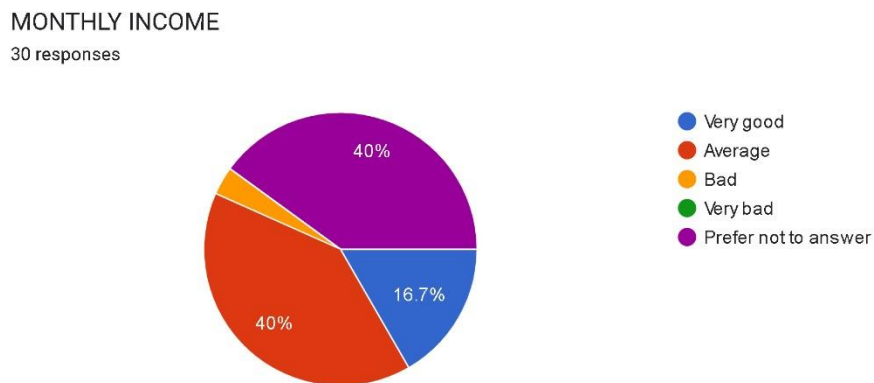


Figure 3.4: Outcome of questionnaire

Based on the figure above, 16.7% of the respondents have a very good monthly income. Next, 40% of the respondents have an average monthly income, and the same percentage of them prefer not to answer this question. Finally, only 3.3% of respondents have a bad monthly income.

4.3.2 Dependant Variable Questionnaire

In this part, we gave respondents 7 short questions for them to answer. The central tendency measurement of constructs refers to measures of centre or central location and is a summary measure that attempts to describe a whole set of data with a single value that represents the middle or centre of its distribution. In this project, we can see that the mean is measured and described by the standard deviation. Each score will be determined by the mean and the evidence from this data is listed as follows:

1. I am very concerned about the waste generated from eggshells

30 responses

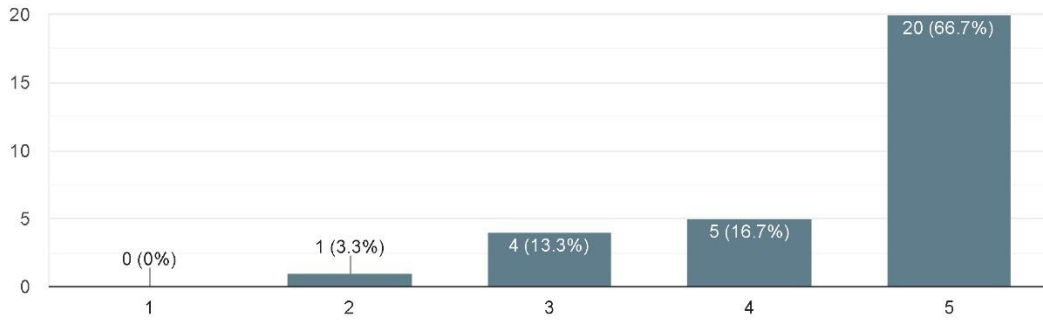


Figure 3.5: Outcome of questionnaire

The figure above shows the number of respondents who strongly disagree (1), disagree (2), neutral (3), agree (4) and strongly agree (5). Most respondents (20) strongly agreed that they are very concerned about the waste generated from eggshells. A total of 5 respondents agreed, and 4 of them neutral about this statement. Finally, 1 person disagreed with this statement. In conclusion, more than more than 50% of all respondents support the statement that they are worried about waste generated from eggshells.

2. I find it important that eggshell products are environmentally friendly and sustainable.

30 responses

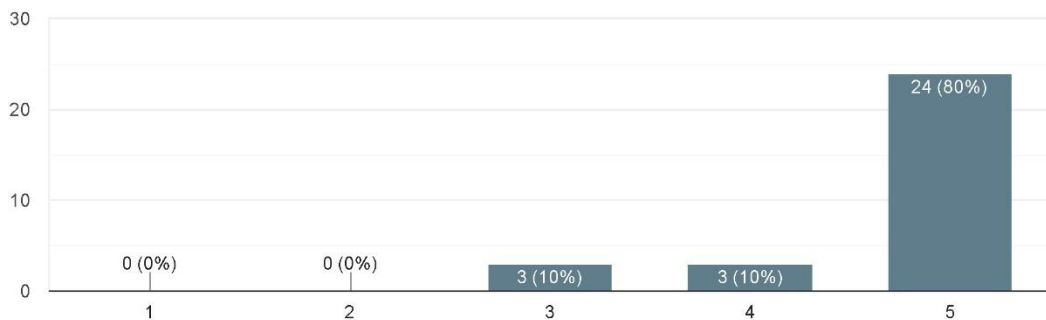


Figure 3.6: Outcome of questionnaire

Only 10% (3 people) of respondents, as shown in the figure above, were neutral with the statement that they find it important that Tama Paste is environmentally friendly and sustainable. The same percentage of those who polled said they agree in response to the assertion. However, 24 respondents, or 80%, said they strongly agreed with this statement.

3. I would like to try a product made from Tama Paste in the future.

30 responses

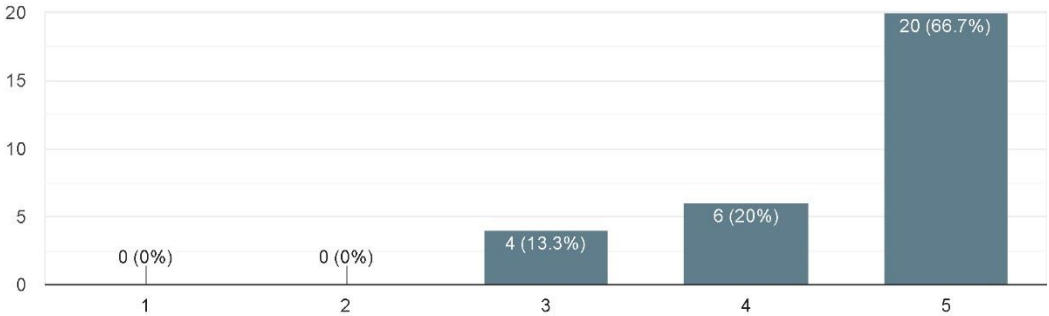


Figure 3.7: Outcome of questionnaire

Based on the analysis in the figure above, the highest responses are that most of the respondents strongly agree with the statement that they would like to try a product made from Tama Paste in the future, which is 66.7% (20 people). While 20% (6 people) of respondents agreed with the statement and 13.3% (4 people) of the respondents chose neutral. Finally, none of the respondents chose to disagree or strongly disagree for the statement.

4. I am willing to pay a premium price for products made from Tama Paste compared to traditional alternatives.

30 responses

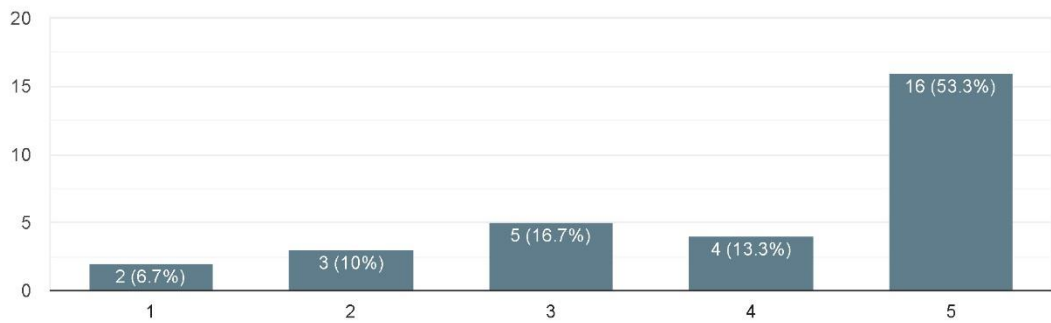


Figure 3.8: Outcome of questionnaire

According to the data, as many as 53.3% (16 individuals) strongly agreed, while 13.3% (4 individuals) agreed that they are willing to pay a premium price for products made from Tama Paste compared to traditional alternatives. Meanwhile, 5 individuals, or 16.7%, responded neutrally to the statement. Finally, 10% (3 individuals), and 6.7% (2 individuals) stated that they disagree and strongly disagree to the statement respectively.

5. I will recommend Tama Paste to my friends and family.

30 responses

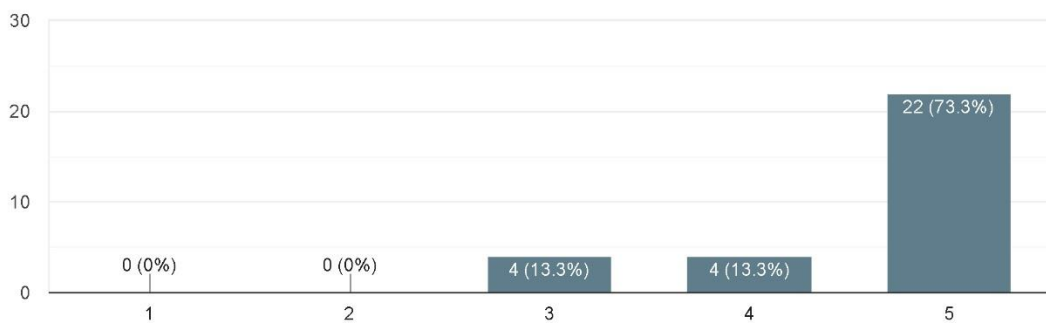


Figure 3.9: Outcome of questionnaire

In the figure above, most of the respondents, which is 73.3% (22 people) stated that they strongly agreed to the statement that they will recommend Tama Paste to their

friends and family, and 13.3% (4 people) agreed about the statement. The same percentage of respondents stated that they were neutral towards that statement.

6. Compared to conventional options, items manufactured using Tama Paste exhibit greater durability.
30 responses

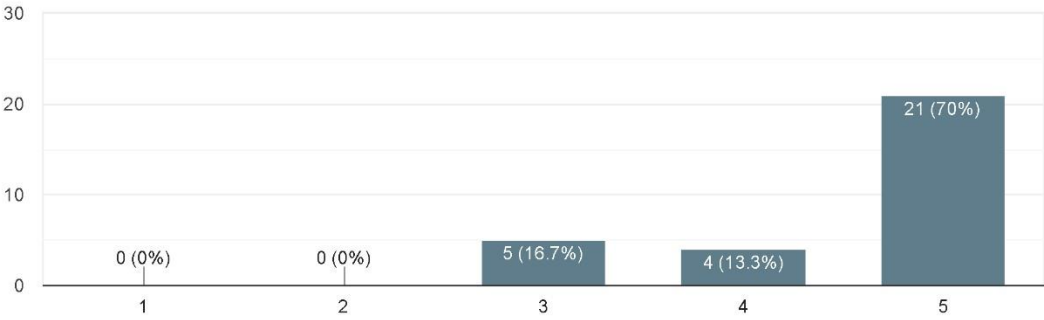


Figure 3.10: Outcome of questionnaire

According to the data above, most of the respondents, more specifically 70% or 21 individuals strongly agreed and 13.3% or 4 individuals agreed that compared to conventional options, items manufactured using Tama Paste exhibit greater durability. Meanwhile, 5 individuals, or 16.7%, responded neutrally to the statement.

7. The paste exhibits significant flexibility and can be utilised to make a broad variety of alternative items.
30 responses

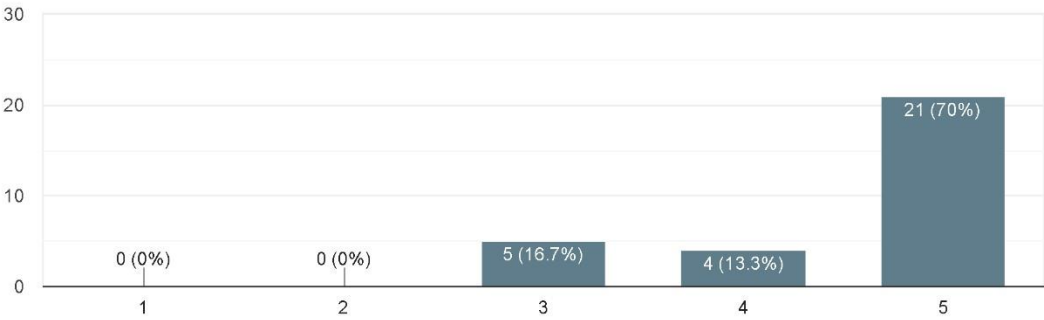


Figure 3.11: Outcome of questionnaire

Based on the analysis in the figure above, the highest response was those who strongly agreed with the statement that the paste exhibits significant flexibility and can be utilised to make a broad variety of alternative items which is 70% (21 people). While 13.3% (4 people) of the respondents also agreed with the statement and the remaining 16.7% (5 people) of the respondents chose neutral. The results of this questionnaire showed that none of the respondents disagreed or strongly disagreed with the statement.

4.4 DISCUSSION

In statistics, the mean score (also known as the arithmetic mean) is a measure of central tendency that represents the average value of a set of data. It is calculated by adding up all the values in the data set and dividing the sum by the total number of values.

CHAPTER 5 DISCUSSION AND CONCLUSION

5.1 INTRODUCTION

This project represents an in-depth investigation into Tama Paste, aiming to uncover key insights and implications. Through rigorous research and analysis, we have identified significant findings that contribute to the existing body of knowledge in the field. As we conclude this project, the following section summarizes our main outcomes, highlights their relevance, and suggests avenues for future exploration.

5.2 FINDINGS

In this chapter, the findings of the product on Tama Paste using ADDIE MODAL where the product could be used as a recycled item are presented. This study aims to reduce eggshells by producing products that help our environment to maintain sustainability from waste. Automatically this helps us to discover the effectiveness of Tama Paste in making its daily basis uses, there are also various challenges to this research product. After completing the analysis of the questionnaire conducted through SPSS, we found that the customer acceptance of Tama Paste is high. This means that we have successfully achieved the objective of our project.

5.3 LIMITATIONS

5.3.1 Number of Respondents

In assessing the limitations of a product, the number of respondents plays a crucial role in determining the reliability and generalizability of the findings. A limited number of respondents can introduce certain limitations that should be taken into consideration. For our product, our number of respondents are only 30 people. Therefore, the findings may not accurately reflect the diverse perspectives, preferences, and experiences of the larger population. This lack of representativeness can undermine the validity and reliability of the conclusions drawn from the data.

5.3.2 Time Constraints

The limitations of a product can often arise due to time constraints imposed during its development and production. When time becomes a critical factor, several areas may be affected, leading to various limitations. For our project, Tama Paste was developed throughout one semester only, which is 5 months. Therefore, a few problems with finalizing the final product were raised. For example, the packaging of the paste itself was not developed in time before the end of the semester.

5.3.3 Limited Budget

When it comes to developing Tama Paste, we had a limited budget. Therefore, certain limitations inevitably arise. We had to allocate limited funds to various aspects of the product, such as research and development, materials, and developing processes. With a limited budget, it can result in the use of lower-grade components, impacting the overall quality and performance of the product.

5.4 RECOMMENDATION

Based on the research conducted, there are a few recommendations that can be used to improve Tama Paste for future research.

In terms of the number of respondents, the future study should reach out to more people to participate as respondents in our project. With this, we would be able to gather more input and feedback on Tama Paste and receive more information regarding the customer acceptance of Tama Paste.

In terms of time constraint, a longer period of research and development would be beneficial in finalizing the end product for Tama Paste, such as the packaging and labelling. With an extended period for developing our product, we would also be able to perform more rigorous research in perfecting the paste itself.

In terms of limited budgeting, future studies should prioritize the critical features of Tama Paste. For example, identifying the most critical features that provide the core value proposition of the product. We can execute this by focusing on enhancing these features rather than investing in a wide range of functionalities. By allocating resources to improve key aspects, we can strengthen the Tama Paste's value proposition without exceeding the allocated budget.

5.5 CONCLUSION

The project was based on the objectives which are to create a paste made from eggshells to reduce food wastage and to identify customers' acceptance of Tama Paste. After the analysis of the reliability test, results have shown that all of the independent variables have a positive significant relationship and influence with customers' acceptance toward Tama Paste. The study has shown that the customers' acceptance has a strong relationship with personal factors according to Cronbach's Alpha. Therefore, the two objectives of the project have been successfully achieved.

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APPENDIX A

GANTT CHART

ACTIVITY	MONTH/WEEK													
	1				2				3				4	
	2	3	4	5	6	7	8	9	10	11	12	13	14	
Title Discovery														
Literature Study														
Consultation and Supervision														
Proposal Preparation						*								
Need Analysis/ Feasibility study														
Product Design														
Product Development														
Product Implementation												**		
Final report and preparation for final presentation														

*Pembentangan Proposal akan diadakan pada minggu ke-6

**Pembentangan Projek Akhir akan diadakan pada minggu ke-13

QUESTIONNAIRE

SECTION A (DEMOGRAPHIC PROFILE)



Instructions: This section serves the purpose to collect the data and information of the respondents. Please choose accordingly based on your personal information. All information provided by you will be kept confidential and only used for academic purposes.

GENDER *

- Male
- Female

AGE *

- 20 and below
- 21-30
- 31-40
- 41-50
- 51 and above

MONTHLY INCOME *

- Very good
- Average
- Bad
- Very bad
- Prefer not to answer

EDUCATION LEVEL *

- High school / SPM
- Undergraduate (Certificate / Diploma / Degree)
- Postgraduate (Master / PhD

SECTION B (VARIABLES IN THE STUDY)



Instructions: This section aims to collect respondents' opinions and views on the variables that affect customer acceptance towards Tama Paste. Please answer the following questions accurately based on the scale of 1-5 given.

1. I am very concerned about the waste generated from eggshells *

	1	2	3	4	5	
Totally Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Totally Agree

2. I find it important that Tama Paste is environmentally friendly and sustainable. *

	1	2	3	4	5	
Totally Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Totally Agree

3. I would like to try a product made from Tama Paste in the future. *

	1	2	3	4	5	
Totally Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Totally Agree

4. I am willing to pay a premium price for products made from Tama Paste compared to traditional alternatives. *

	1	2	3	4	5	
Totally Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Totally Agree

5. I will recommend Tama Paste to my friends and family. *

	1	2	3	4	5	
Totally Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Totally Agree

6. Compared to conventional options, items manufactured using Tama Paste exhibit greater durability. *

	1	2	3	4	5	
Totally Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Totally Agree

7. The paste exhibits significant flexibility and can be utilised to make a broad variety of alternative items. *

	1	2	3	4	5	
Totally Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Totally Agree