



اُونِيُوَرْسِيْتِي تِيكْنُولُوجِي مَارَا
UNIVERSITI
TEKNOLOGI
MARA

NEW PRODUCT DEVELOPMENT

TECHNOLOGY ENTREPRENEURSHIP (ENT600)

Prepared by:

FACULTY	FACULTY OF EDUCATION
PROGRAMME	ED260 - BACHELOR OF SCIENCE EDUCATION (HONS.) CHEMISTRY
SEMESTER	3 / 20262
STUDENTS NAME AND ID	1. ALIFAH ILYANA BINTI MOHD FAZLI (2025114901) 2. DESTYREA LYN ROSRAN (2025124261) 3. NURIN NUHA BINTI HASNAL (2025382699) 4. NURLIYANA ATIQA BINTI HAMIDI (2025394431) 5. NURSAHMIRA IZZATI BINTI MOHD RAMSA (2025143383)
PROJECT TITLE	NEW PRODUCT DEVELOPMENT REPORT: <i>'Smart Slice Lock'</i>
SUBMISSION DATE	19 th JUNE 2026

Prepared for:

DR. EHSAN FANSUREE BIN MOHD SURIN

Table of Contents

1.0 EXECUTIVE SUMMARY	3
2.0 INTRODUCTION	4
2.1 PROBLEM STATEMENT.....	4
2.2 METHODOLOGY	6
3.0 NEW PRODUCT DEVELOPMENT (NPD)	7
3.1 Definition of New Product Development	7
3.3 New Product Development Process.....	10
3.3.1 Research and Development.....	10
3.3.2 Product Design / Features	20
3.3.3 Concept Testing	25
3.3.4 Build Prototype (2D / 3D).....	27
3.3.5 Test Marketing	28
4.0 CONCLUSION	34
5.0 REFERENCES	35
6.0 APPENDICES	36

1.0 EXECUTIVE SUMMARY

The aim of the report is to give out information regarding our product and on the other hand to clarify it to the potential customer. To identify challenges which people face prior to creating a prototype of our product, we ran an online survey. The outcomes of the survey can be used to develop a prototype which can be developed to meet consumer and market demand. We noticed a number of issues as a result of our brainstorming session.

After researching online, we discovered there were a number of reasons why people feel the traditional single cake box isn't good enough for take-out and delivery. The causes are external heat melting cakes, cake slices moving and causing breaks to the decorations, packaging opening accidentally and leakage of food, and the above issues directly impact consumer satisfaction in relation to the major dessert brands. The potential customers are targeted towards high value bakeries, food delivery riders, takeout eaters and eco-conscious buyers. Secret Recipe is one among several companies to be an inspiration.

The Smart Slice Lock 2.0 container was developed to address our audience issue. This solution belongs to a group of easy type of solutions and is also user friendly. The Smart Slice Lock 2.0 is a complete protection solution, crammed with technical functions to create the best transport presentation. We've also included special features for our product that we've packed into an insulated base tray with an EPS foam layer and a thermal aluminium foil layer along the side walls to help keep the cake cold longer--and a mechanical side support system that is resizable to completely eliminate cake friction. This can lead to higher temperature maintenance and the safety of a slice. Our solution is proven to have a high potential in market based on market research and the demonstrated data. Of the 22 respondents, approximately 100% stated that the concept of the Smart Slice Lock 2.0 is very appealing and about 90.9% expressed a positive opinion on the fact that this innovation would significantly enhance their overall take-out and home delivery experience.

Hence, the marketing strategy for our product is to distribute it to high-end bakery chains, specialty dessert cafes and food delivery companies. In addition to this, we also employ advertising and social networking as marketing strategies. It is inevitable that there are resources in this business that must be used, such as food-grade rigid plastics, thermal raw materials, manufacturing assembly manpower, manufacturing location, distribution logistics, partner-baker network development.

2.0 INTRODUCTION

Smart Slice Lock is an innovative cake storage container with variety of functions and convenience for the customer who wishes to maintain cake's freshness and presentation. It is designed to store, protect, transport, and display individual cake slices while keeping them cooler and fresher for a longer period. The Smart Slice Lock will be a very helpful product invention that can help customer enjoy their cakes with secured storage.

Smart Slice Lock comes with three main features which are insulated base, thermal aluminium foil side layers, and a transparent food-grade plastic lid. It is capable of preventing cake movement and damage to preserve the cake's appearance and decoration. Other than that, the Smart Slice Lock also allows user to have a good view of the product while keeping it protected from external contaminants.

The main objective of this product is to offer an innovative product that can improve the performance of current cake's storage by creating a reusable packaging solution with anti-slip lock component and keeps cake fresher for a longer period as the main function. In addition, its reusable design promotes environmental sustainability by reducing plastic waste and encourage more eco-friendly consumption practices. Through its combination of insulation technology, durability, and practicality, the Smart Slice Lock provides a smarter, secured, and a more sustainable way to store and transport cake slices.

2.1 PROBLEM STATEMENT

From our research conducted, we discovered that most conventional cake slice containers are designed only for basic storage and do not effectively maintain the freshness of the cake for a long period. During transportation and display, cake slices are often exposed to external temperatures, causing the texture, taste, and overall quality of the cake to be less appealing.

In addition, many cake packaging products provide incompetent protection against movement during transportation or delivery. This causes cake slices to shift inside the container, and lead to damage of the decorations, toppings and overall destroyed the presentation of the cake. This issue is particularly problematic for bakeries and food delivery services, where product appearance plays a significant role in customer satisfaction.

Another issue addressed is that most cake containers are made from single-use plastic materials. These containers are often disposed after one time use, which leads to increasing in plastic waste and environmental waste. Consumers are becoming more environmentally aware and are seeking alternative way that can reduce waste without compromising functionality.

Lastly, the problem identified is the lack of packaging solutions that combine insulation, durability, and convenience in a single product. Existing containers generally focus on either protection or portability but rarely provide temperature retention features that could help preserve the freshness of the cake slices. This creates a need for a more innovative packaging design that can address multiple concerns simultaneously.

2.2 METHODOLOGY

i. Research

The research was mostly done through investigation regarding the product available during purchase of cake slices. The research was conducted by searching the existing product on the internet and reading through customers feedback to gain some review and dissatisfaction arise from consumers. Through this action, we were able to identify the weakness and thus improve our product packaging. Research on existing cake packaging technologies, insulation materials, market trends, and consumer preferences were also carried out to develop a better product that can effectively maintains cake freshness while meeting customer needs and industry demands.

ii. Survey and questionnaire

We also handed out survey and questionnaires to collect informative feedback and insights for our new product development process. It is an important step to get some ideas and consumer viewpoint for the specification and the improvement field needed. The survey and questionnaires were created using Google Form and were given out via WhatsApp, Facebook, and Instagram by sharing the link of the survey and questionnaires. Through the responses given, most of respondents has answered honestly and shared their insights regarding the current packaging product.

3.0 NEW PRODUCT DEVELOPMENT (NPD)

3.1 Definition of New Product Development

The general definition for new product development (NPD) is the overall process of which entrepreneur designs and creates new product or service that will be sold to customers. There are several different approaches to this process. Some approaches are customer centered, team based, or systematic as examples. NPD aims to drive innovations and creates valuable product that meets customer and business demands.

Before producing a new product development, we don't only consider the functions and the capability of the product, but instead we need to measure our goal and our user target to meet their needs and demands. The product should be relevant and appealing to the customer to attracts the user target besides highlighting the main function of the product. The next consideration of product requirement is the competitiveness of the product. For instance, ice-cream brand. Every ice-cream brand such as Baskin Robbins, Inside Scoop, Godiva have different types of flavours, quality and pricing for the ice-cream product. Every ice cream product can be enjoyed by consumers, but not everyone would buy the same brand of ice cream.

3.2 Classification of New Product Development

New products are classified as two categories which are completely new product, and improvements on existing products.

A completely new product refers to a product that introduces something new to the consumers and can be categorized into two types: new to the world products and new to the firm products.

New to the world products are new interventions product that has never been introduced in the market. They are first of their kind and usually resulted from thorough research, innovation, and technological advancement. An example of new to world product is covid vaccine. Through a thorough research and investigation, the vaccine was finally produced and introduced to the society for health protection.

Next, new to firm products are products that are new to the company but already been introduced to the marketplace. Although the product itself is not new to the consumers, but it is still considered as new for the company because it expands its range

of products. For example, EV car has been introduced into the marketplace for quite a while, but Proton has recently made one of their own EV car, the so-called Proton e.Mas. This allows the company to attract new customers and compete in a different market segment.

Improvements on existing products refers to modifications or enhancements made to products that are already available in the market. There are several types of improvements on existing products which are: addition to existing lines, improvements and revisions to existing products, cost reductions, and repositioning.

Firstly, additions to existing lines involve introducing new variants or subsets of product within the existing product line. These additions were usually designed to reach different needs of customer groups or market segment. For instance, a cake company may invent new flavours cake such as Dubai chocolate, matcha, pistachio and ube while keeping its original product. By expanding addition in the product line, the company can attract wider customer groups while maintaining the favourites of current customer.

Secondly, improvements and revisions to existing products means old products are being replaced with new products that contain cosmetic and functional enhancements. Cosmetic enhancements may include changes in packaging, appearance, or branding. Functional enhancements include the improvement of product performance, quality, or convenience. For example, the innovation of our product which is the Smart Slice Lock which improves the quality of the cake while preserving its freshness during display.

Thirdly, cost reductions refer to efforts made by a company to reduce production or operational costs without significantly changing the product's features or benefits. Although consumers may not receive new benefits other than a lower selling price, cost reductions can provide significant advantages to the company. Lower production costs can increase profit margins, improve efficiency, and allow the company to offer more competitive prices.

Lastly, repositioning includes finding new applications, uses, or target markets for an existing product. This strategy more likely to change consumer perception rather than technical development. Companies may market a product differently to attract a new group of consumers or to create a different perception for the product.

In conclusion, new products introduce new ideas, inventions, or product lines that create opportunities in the market, while improvements on existing products enhance, modify, or reposition current product to better meet consumer demands. Both classifications are important for business growth, helping companies remain competitive, affect customers, and adapt to changing market needs.

3.3 New Product Development Process

3.3.1 Research and Development

A) Idea Generation

This is indeed an important process in entrepreneurship. It is supposedly able to solve the problem discovered. A major problem we found from our research is that conventional cake slice boxes are unable to preserve the freshness of cakes for an extended period of time as they are transported, affecting the texture, taste and quality of the cake. Moreover, there are numerous packaging solutions that are not effective and result in cake slices moving around and damaging the decorative and presentation aspects of their cakes. Lastly, most containers are made from single-use plastic, leading to an increase in plastic waste and environmental pollution.

All of the ideas and platforms will be discussed in this part, in order to solve any problems in this problem and to make feasible products. Market research and surveys through Google Forms shared on apps such as WhatsApp and Instagram can be helpful in this process. Reading complaints of customers and reading the feedback for existing products may help to get a fresh idea that can be applied to the product and may also be profitable. The question or problem to be addressed is important. Then, solutions and ideas can be generated. Lastly, the suitable idea will be chosen.

The Smart Slice Lock 2.0 will be the answer to these issues. With this ground-breaking cake storage box, people will store, protect, transport and display individual cake slices in a safe and cooler, longer freshness environment. What's special about this product is that it offers a reusable packaging solution that addresses multiple concerns in an active way without any effort.

B) Idea Screening

Idea screening is the process to assess all ideas collected. This process comes after doing the generation idea process. Taking a negative perspective on ideas, in this section I will actually end up focusing on realistic ideas. In essence there are some questions that can help us to screen the ideas, some of them are

if the idea can achieve the objectives, assumptions, constraints, feasibility, value, risk and sanity check. There are some features that have been decided to develop the Smart Slice Lock 2.0.

1. Advanced Temperature Retention

In order to help keep cakes cold and fresh longer, we thought of using a dual thermal method of bottom thermal insulation and a side wall thermal aluminium foil. This set up helps to reduce the transfer rate of heat and reflects heat from the outside and therefore prevents unwanted temperature changes in food such as cream and frosting even in hot weather delivery situations.

2. Structural Stability & Protection

Inside the container, we wanted to add a divider and side support system that would be mechanical. The flexible cake stand is designed to securely hold the cake so it remains stable, won't move, slide or rub against the sides on the way to the event and keeps the cake looking neat and well presented.

3. Environment Stability

We used strong, durable, food-grade rigid plastic that can be reused many times to minimize environmental impact from the use of single-use plastic materials to make Smart Slice Lock 2.0. This promotes an eco-friendly way of using containers and significantly reduces plastic waste, while maintaining the utility of the containers.

4. Conveying Maximum Portability and Practicality

We didn't just want to provide basic storage, but we wanted to provide a place to attach a carrying handle at the top of the container and a built-in fork compartment. The product has highly convenient mobility features for take-out and delivery riders, and the clear tinted lid lets customers see what's inside without risking contamination from outside the container.

C) Market Survey

This market survey was conducted to get perspective directly from consumer, thus an online survey was conducted. The survey consists of 11 questions with multiple choices, checkboxes and short answer question. This questionnaire was divided into 5 sections which are Respondent Profile (2 questions), Current Experience with Takeaway Packaging (3 questions), Customer Expectations (1 question), Smart Slice Lock Concept Evaluation (4 questions) and Open-Ended Questions (1 question).

1. How often do you purchase Secret Recipe products for takeaway or delivery?

22 responses

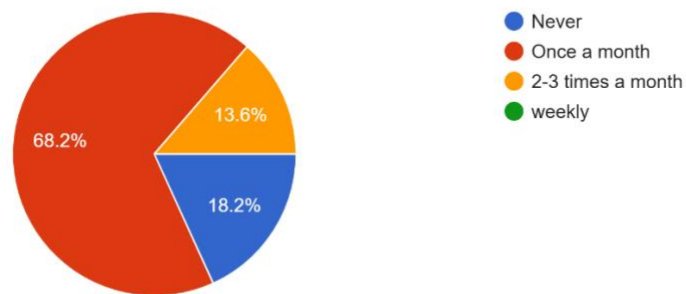


Figure 3.3.1(a): Frequency of purchasing Secret Recipe products for takeaway

The pie chart in the figure above indicates the percentage of consumers who purchase Secret Recipe products for takeout or delivery purposes each purchase. The greatest frequency was a month (68.2% of the respondents, or about 15 people). A quarter (2 respondents) of those who buy a product are never 18.2%, which is trailed closely by those who buy 2–3 times per month at 13.6% (3 respondents). This indicates that majority of the respondents are frequent purchasers of these high-end dessert products, but their purchasing frequency is inclined to monthly events rather than weekly events.

2. What products do you usually purchase for takeaway/delivery?

22 responses

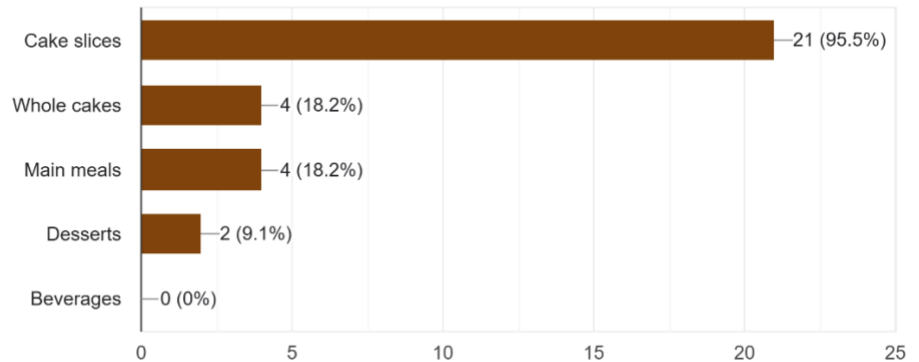


Figure 3.3.1(b): Products usually purchased through takeaway/delivery

It is seen that 22 people are responding to this survey. Around 21 respondents (95.5% of the survey) buy cake slices. Other general desserts came in at 9.1% (2 respondents) while whole cakes and main meals each made up 18.2% (4 respondents). This is a clear sign that single slices of cake are the leading product in the dessert delivery and takeaway market segment

3. Overall, how satisfied are you with Secret Recipe's current takeaway packaging?

22 responses

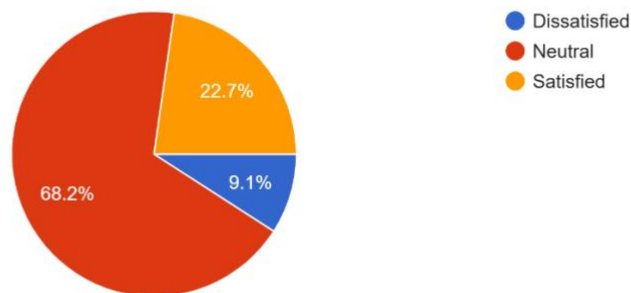


Figure 3.3.1(c): Consumer satisfaction with current takeaway packaging

Consumer satisfaction with current takeaway packaging show in the pie chart in this figure shows the general satisfaction level of consumers towards the standard takeaway packaging utilized by leading brands such as Secret Recipe. The highest segment is neutral, which contributed 68.2% of the respondents which is 15 people. The second highest range is met, with approximately 22.7% (5 respondents), and 9.1% (2 respondents) stating that

they were "dissatisfied. This neutral to negative lean seems to imply a high level of consumer indifference and therefore a distinct opportunity for a better structural packaging design.

4. Have you ever experienced any of the following problems?

22 responses

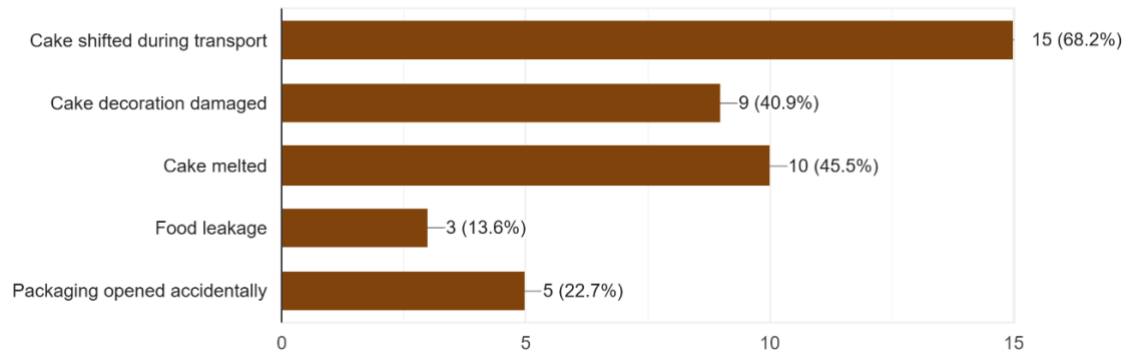


Figure 3.3.1(d): Prevalence of packaging problem encountered

This horizontal bar chart illustrates respondents' experience with packaging problems while they are traveling. Cake shifting in transit came in with the highest number of respondents (68.2%) in this poll. 40.9% (9 respondents) then reported damage from decorations or toppings, and 45.5% (10 respondents) reported damaged cakes because of ambient temperature changes. Further, 22.7% (5 respondents) and 13.6% (3 respondents) attributed the accidents of opening packages and leakage of food to the inability of traditional containers to provide physical and thermal protection, respectively.

5. Did the packaging issue affect your satisfaction with Secret Recipe?

22 responses

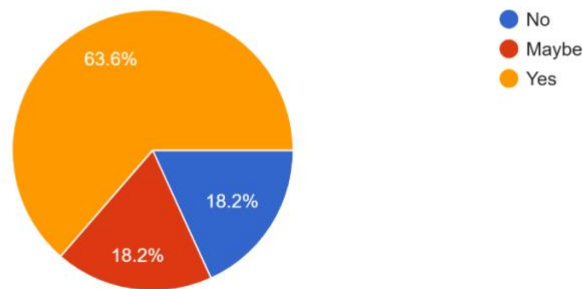


Figure 3.3.1 (e): Impact of packaging issues on brand satisfaction

The pie chart to the right illustrates the effect of packaging problems on a food brand's satisfaction with the brand. This survey based questionnaire reveals that a whopping 63.6% (14 respondents) confirmed that packaging-related problems reduced their satisfaction with the establishment. Meanwhile, 18.2% (4 respondents) said that it may impact their satisfaction, while 18.2% (4 respondents) said it had no impact on them. It's a testament to the fact that structural package damage poses a significant risk to customer retention and brand equity.

6. How important are these following features for take away packaging?

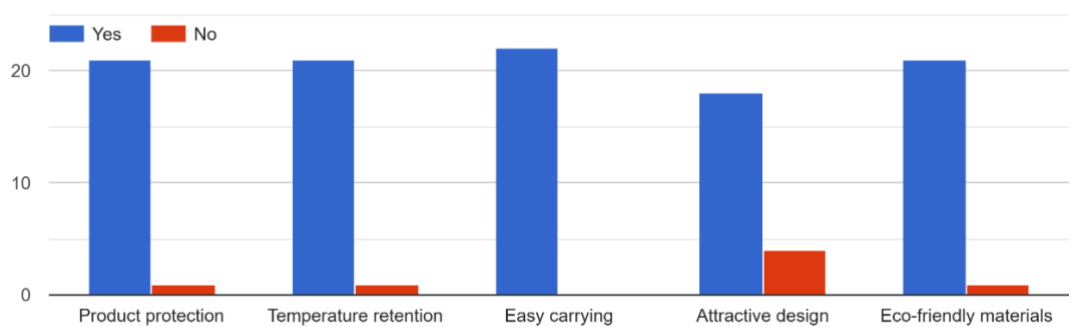


Figure 3.3.1 (f): Importance of packaging features to consumers

Importance of packaging features to consumers showed in Double bar graph, which assesses the consumer needs for alternative container functions. An overwhelming majority of the 22 respondents rated key functions as

absolutely critical. Nearly all respondents (99%) gave maximum "Yes" votes to the product protection, temperature retention, easy carrying and eco-friendly materials. Technical utility and sustainability, on the other hand, were a much greater concern for contemporary consumers than purely aesthetic attractive design, with it being given a slightly lower weighting.

7. Based on the concept shown, how appealing is the Smart Slice Lock packaging?
22 responses

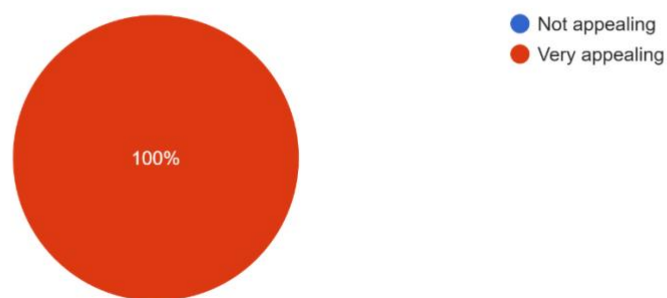


Figure 3.3.1(g): Appeal of the Smart Slice Lock concept

According to figure 4.3.1(f), our design framework initial consumer reactions showed a 100% agreement among the respondents that the concept of Smart Slice Lock packaging is very appealing. The 100% acceptance rate demonstrates that a container that combines physical locking dividers with targeted temperature control is a good answer to a consumer need.

8. Do you think it is to maintain food temperature?
18 responses

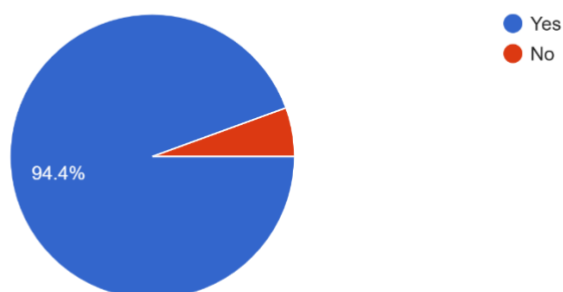


Figure3.3.1 (h): Perception of necessity for temperature maintenance

From the figure mapping thermal priorities, 94.4% of the respondents agreed that food temperature maintenance during transport is very important to

ensure the freshness of dessert. 5.6% said it was not necessary. This information proves that a passive insulation layer for cake delivery systems is perfectly developed to be followed in the mass market.

9. Do you believe Smart Slice Lock would improve your takeaway experience?
22 responses

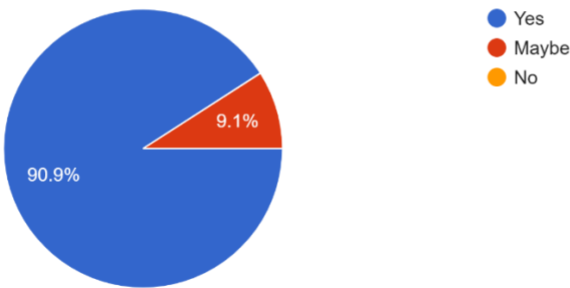


Figure 3.3.1 (i): Anticipated improvement to the takeaway experience

It is clear from the figure that most of the people who form the target population accept the operational value of our design. 90.9% (20 respondents) agreed with a firm hand that the Smart Slice Lock 2.0 would significantly enhance their take away and delivery experience, whereas 9.1% (2 respondents) were not convinced or uncertain

10. Would you be willing to pay an additional fees for enhanced protective packaging?
22 responses

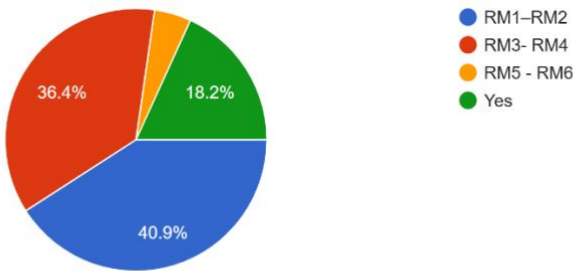


Figure 3.3.1(j): Consumer willingness to pay premium packaging fees

Consumer willingness to pay premium pricing for packagingThe pie chart indicates that premium packaging for food safety is not financially feasible and is not price elastic. Some 40.9% would pay an extra RM1 to RM2 for added protection, while 36.4% would pay an extra RM3 to RM4. Another 18.2% felt comfortable to an RM5-RM6 range and the rest generally agreed on the extra

costs. This validates a consumer's willingness to pay for validated structural security, which is very profitable.

11. Do you have any additional comments or suggestions regarding takeaway packaging?
22 responses

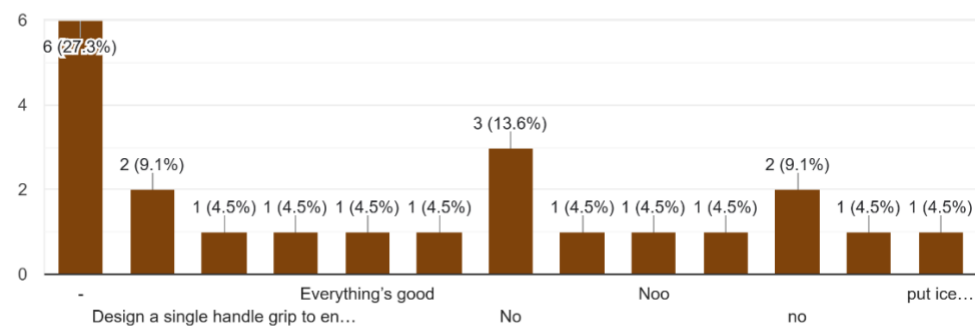


Figure 3.3.1 (k): Additional comments from consumers

Most of the responders has noting to comment regarding on the Smart Slice Lock. Some of them suggest putting a handle for easier grip and convenience to carry it anywhere and the other one suggest to put ice pack.

D) Current Market Need

A survey conducted to get the information about current needs from the consumer towards our product. It is done via a web survey and there are multiple questions asked in this survey. Based on the survey results, almost all the respondents said that the most important dessert they take away from their cakes is a single slice, but the delivery experience is greatly marred by the structural shifting and melting of the cake.

The majority of respondents (68.2%) face problems of cakes shifting in a conventional box regularly, while 45.5% regularly experience melted cream and ruined frostings. The majority of those who responded had agreed that the features included in the Smart Slice Lock 2.0 will come in handy in helping to solve the recurring issues. There are a few reasons why our product is accepted by customers when we introduce it to them, and that's why we're at this point with the Smart Slice Lock 2.0 container. So when we bring our product to our customers, there are a few reasons why they take our product, that's why we're here with the Smart Slice Lock 2.0 container. Our product can help them who have the difficult challenge to present the cake the way they want, have limited time for delivery because of the melting point, and care a lot about the environment and eco-reusability to avoid using single use items.

According to this survey, this box definitely encourages people to confidently order such fragile bakery items via delivery services or takeaway. The remainder of the target audience were very willing to pay premium surcharges for visual and thermal quality of their food with more than 95% agreeing to pay these costs. So, this survey will help us understand the market requirements and its potential to the customer. In conclusion, this survey shows the product has potential to give benefits to the consumers.

3.3.2 Product Design / Features

Product Design

Smart Slice Lock is an innovative packaging designed specifically for a single slice of cake. The packaging is shaped to fit a cake slice securely, helping to reduce movement and prevent damage during transportation. It features a tinted transparent cover that allows customers to view the cake while protecting it from direct heat exposure. In addition, the packaging is equipped with a thermal insulation system and a reusable ice pack compartment to help maintain the cake's freshness and temperature for a longer period. Other features such as the adjustable cake support, built-in fork compartment, and carrying handle provide added convenience for both customers and delivery services. Overall, Smart Slice Lock offers a practical solution for keeping cake slices fresh, secure, and visually appealing throughout the delivery process.

Product Features

1. Bottom Thermal Insulation Layer

Smart Slice Lock is equipped with a thermal insulation layer at the bottom section of the packaging. This layer acts as a barrier that slows down heat transfer from the external environment to the reusable ice pack. As a result, the cooling effect can be maintained for a longer period, helping to preserve the freshness and quality of the cake during transportation. This feature is especially useful for deliveries in hot weather conditions where cakes are more easily melts.

2. Reflective Outer Layer

The outer surface of the packaging is designed with a reflective layer that helps reduce heat absorption from the surrounding environment. By reflecting some of the external heat, the packaging can maintain a more stable internal temperature. This feature supports the cooling performance of the reusable ice pack and helps protect temperature-sensitive cake ingredients such as cream, chocolate, and frosting.

3. Reflective Inner Layer

The inner layer of Smart Slice Lock is designed to help retain the cool temperature inside the packaging. Instead of allowing the cold air to release quickly, this layer reflects and retains the cooling effect generated by the reusable ice pack. This contributes to a longer-lasting cooling performance and helps ensure that the cake remains fresh and visually appealing until it reaches the customer.

4. Tinted Transparent Cover

The packaging is equipped with a tinted transparent cover that provides both functionality and aesthetic value. The transparent design allows customers to view the cake without opening the packaging, while the tinted surface helps reduce direct exposure to sunlight and heat. This feature not only enhances the overall appearance of the product but also helps maintain the quality of the cake during transportation and display.

5. Reusable Ice Pack Button Compartment

Smart Slice Lock includes a dedicated compartment for a reusable ice pack located beneath the cake tray. The ice pack helps maintain a cool environment inside the packaging and can be reused multiple times, making it a practical and environmentally friendly solution. Customers can simply refreeze the ice pack before future use, reducing waste while improving temperature control during delivery.

6. Resizable Cake Support System

The packaging features a resizable cake support system that can hold different sizes and thicknesses of cake slices. This adjustable holder helps keep the cake stable and prevents it from shifting or collapsing during transportation. By securing the cake in position, the support system helps preserve the cake's presentation and reduces the risk of damage.

7. Built-in Fork Compartment

To improve convenience, Smart Slice Lock includes a dedicated compartment for storing a disposable or reusable fork. This allows customers to enjoy their cake immediately without needing additional utensils. The compartment keeps the fork hygienically separated from the cake while ensuring it is readily available whenever needed.

8. Attached Carrying Handle

The packaging is equipped with an attached carrying handle located at the top of the container. This feature makes the product easier to carry and transport, particularly for customers purchasing cakes as takeaway items. The handle also improves convenience for delivery riders and helps reduce the risk of accidental drops or mishandling during transportation.

Idea Generation For The Product Design



Figure 3.3.2 (a) The visual of the idea generation for the product design



Figure 3.3.2 (b) The visual of the idea generation for the product logo

Figure 3.3.2 (a) and Figure 3.3.2 (b) provides the simplified product visualizations such as name, brand, logo and basic representation used to build the front view.

Palette Colour Selection



Figure 3.3.2 (c) The colour palette of the Smart Slice Lock 2.0 packaging

Based on Figure 3.3.2 (c) the colour palette of the Smart Slice Lock 2.0 establishes it as a premium lifestyle accessory rather than just a basic plastic container. The pink tones instantly give off a sweet, bakery-inspired vibe, while the deep, dark base adds a modern, high-end touch that makes the product feel sturdy and secure. By keeping the top clear at the design puts the focus entirely on the freshness of the food inside. Overall, the colors blend the joy of treating oneself with the practical need for clean, reliable food storage, making it both highly functional and visually appealing to customers.

3.3.3 Concept Testing

A) Purpose

Concept testing in marketing is an early-stage market research method which involve the evaluation from its target audience in terms of idea, product, its viability or new features. Additionally, this research method often incorporates various testing frameworks to gather structured quantitative and qualitative data. This method is preferably done before getting into the real investing of time and money into product launch and development. Furthermore, the collection of data is functional to understand customer needs and estimate market demand. Essentially, the goal is to collect important insights which can be useful for identifying weak ideas and further product growth.

B) Sample Population

This concept testing targets a diverse group of consumers primarily from university students and bakery customers. To evaluate the purposed “ Smart Slice Lock” packaging design, a sample of respondents will be selected using voluntary response sampling approach via an online Google Form. The group is very well suited for the study due to their role as primary users and beneficiaries of the innovation. Given that each consumer segment interacts with the product lifecycle in distinct ways, students and customers can offer vital feedback on user acceptance and aesthetic appeal. Furthermore, they also offer critical insights into the structural safety and durability of the packaging during transit. By gathering data from this varied sample, the study can effectively measure the overall acceptance, practicality, and performance of the Smart Slice Lock.

C) Survey Format

To gather useful information for the product development and optimization of the Smart Slice Lock, research is conducted carefully through a survey format via structured online questionnaire to gather both quantitative and qualitative data from respondents. The survey begins by assessing the overall satisfaction of consumers toward their experience with the current packaging of cake slices. This satisfaction is measured based on the packaging's ability to maintain structural integrity, regulate temperature and preserve visual presentation during delivery. Next, the survey provides the overview of the functionality of the packaging for the consumers by introducing the core innovative features of the Smart Slice Lock, such as its specialized stabilizing mechanisms and thermal insulation properties. After understanding these operational characteristics, consumers are asked to assess the concept's practicality, perceived value, and effectiveness compared to traditional boxes. The questionnaire is organized to transition from understanding the current problems in the market to assessing the acceptance of the solution by the target audience.

D) Concept Testing Results & Evaluation

Based on the data obtained, there is a clear product-market fit for a specialized packaging innovation for Smart Slice Lock 2.0.

A massive **95.5%** of consumers primary takeaway purchase is individual cake slices, yet they heavily suffer from transit issues. Several weak points identified are cake shifting in transit (**68.2%**), melting (**45.5%**), and ruined decorations (**40.9%**).

Furthermore, **90.9%** of respondents express indifference or outright dissatisfaction with current standard market packaging (**68.2%** neutral, **22.7%** dissatisfied). This widespread neutrality indicates that consumers merely tolerate existing options due to a lack of better alternatives.

By directly resolving these prominent transit and temperature vulnerabilities with secure structural holds and insulation, the smart slice lock concept effectively capitalizes on a massive gap in a high-demand market segment.

3.3.4 Build Prototype (2D / 3D)

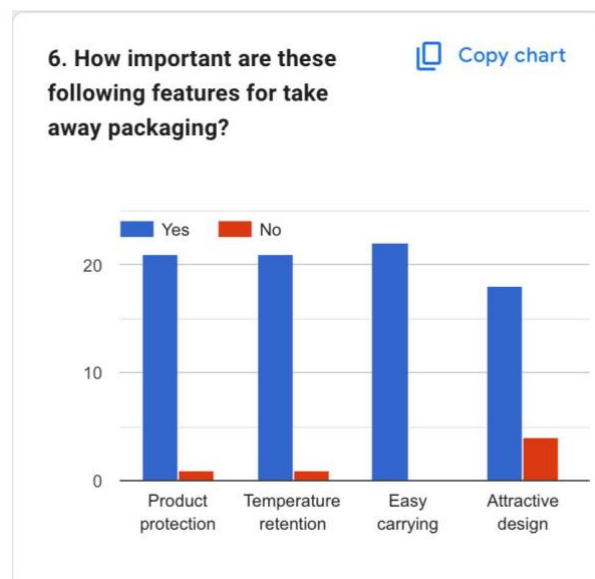
The Smart Slice Lock prototype is a single-slice cake packaging system designed to maintain the temperature, freshness, and structural integrity of a cake slice during delivery. The purpose of this prototype is to provide a practical solution that preserves cake quality, prevents damage, and improves user convenience. It was constructed using a foam bottom layer as thermal insulation to maintain the cooling effect of the ice pack, while both the inner and outer sides are lined with aluminium foil to reduce heat transfer and retain cold temperature. A resizable clear-sheet cake support was added to hold different cake sizes securely, along with a small built-in fork compartment for user convenience. In addition, a clear-sheet handle was included to improve portability. Overall, these materials work together to ensure effective temperature control, protection of the cake, and ease of use during delivery.



3.3.5 Test Marketing

A market testing survey was conducted using a Google Form questionnaire to evaluate the acceptance and potential demand for the proposed Smart Slice Lock, an innovative cake packaging solution equipped with protective and temperature-retaining features. A total of 22 respondents participated in the survey. The questionnaire focused on consumers' perceptions of the importance of packaging characteristics, the attractiveness of the product concept, its impact on takeaway experiences, and consumers' willingness to pay an additional amount for enhanced packaging benefits.

Analysis of Important Packaging Features



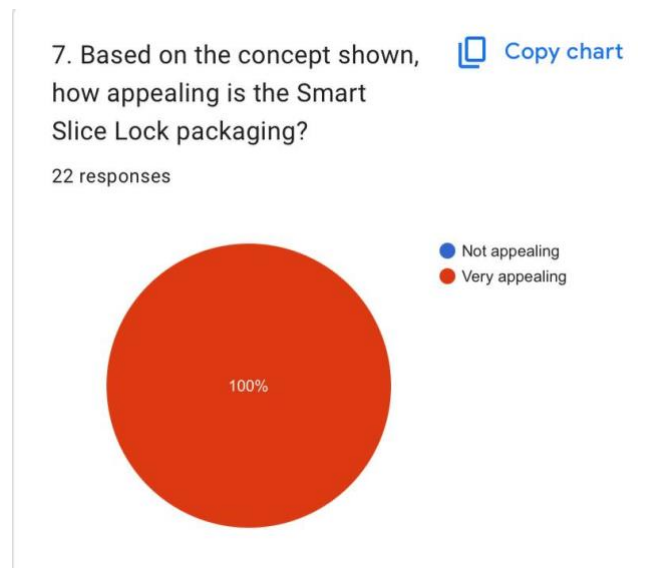
The findings indicate that respondents place considerable importance on functional aspects of packaging. A total of 21 respondents (95.5%) agreed that product protection is an essential feature, while only one respondent (4.5%) did not consider it important. This suggests that consumers are highly concerned about maintaining the quality and appearance of food products during transportation. Since cakes are delicate and easily damaged, packaging that provides adequate protection is likely to be valued by customers.

Similarly, 21 respondents (95.5%) identified temperature retention as an important feature. This finding demonstrates that consumers are aware of the influence of temperature on the freshness and quality of cakes. Maintaining a suitable temperature during delivery can help preserve the taste, texture, and overall condition of the product. Therefore, the thermal insulation incorporated into Smart Slice Lock represents a significant advantage that addresses consumers' practical needs.

Ease of carrying received the highest level of agreement, with all 22 respondents (100%) indicating that this feature is important. This result highlights consumers' preference for convenient and user-friendly packaging. Since takeaway and food delivery services have become increasingly popular, consumers expect packaging to facilitate transportation without compromising safety and comfort. The result suggests that portability is a critical factor influencing consumers' purchasing decisions.

Although attractive design received a slightly lower percentage compared to other features, 18 respondents (81.8%) still considered it important, while 4 respondents (18.2%) disagreed. This indicates that aesthetic value remains relevant to consumers; however, practical functionality appears to be given greater priority. Consumers are more likely to appreciate packaging that performs effectively rather than packaging that is visually appealing but lacks useful features. Consequently, Smart Slice Lock should prioritize product performance while maintaining an attractive appearance.

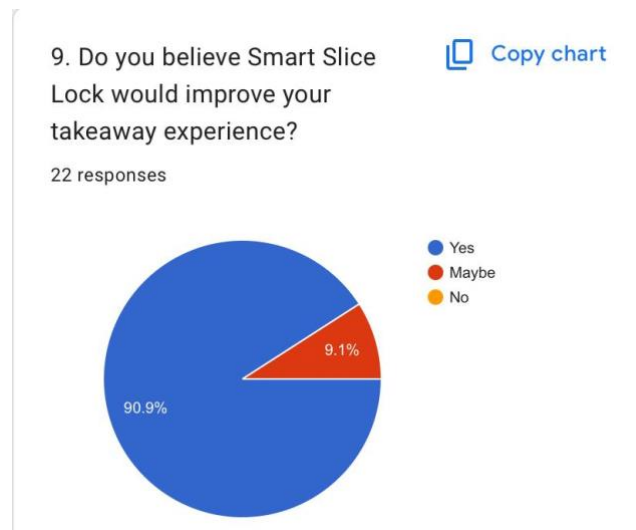
Consumer Acceptance of the Product Concept



The survey results revealed that all 22 respondents (100%) perceived the Smart Slice Lock concept as very appealing. This finding demonstrates a remarkably high level of acceptance among potential consumers. The unanimous positive response suggests that the product successfully addresses existing issues associated with conventional cake packaging, particularly those related to product protection and temperature maintenance.

The strong appeal of the concept may also indicate that consumers recognize the uniqueness and innovativeness of Smart Slice Lock. The integration of protective and thermal features differentiates the product from conventional packaging solutions currently available in the market. Such differentiation could provide a competitive advantage and contribute to greater customer interest and satisfaction.

Perceived Improvement in Takeaway Experience

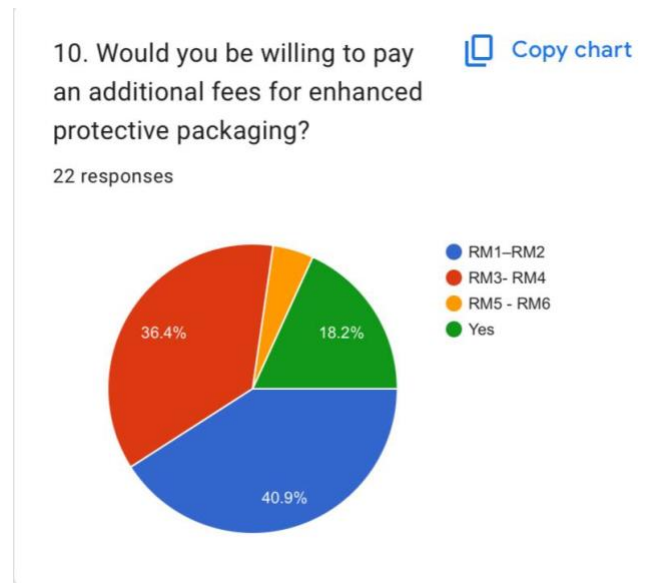


Respondents were also asked whether Smart Slice Lock would improve their takeaway experience. The findings showed that 20 respondents (90.9%) answered “Yes,” while 2 respondents (9.1%) selected “Maybe.” Notably, none of the respondents answered “No.”

These findings suggest that the majority of respondents believe that Smart Slice Lock has the potential to enhance the overall customer experience. Consumers appear to perceive the packaging as a practical solution to common issues encountered during takeaway and delivery, such as damaged cake slices, leakage, loss of freshness, and inconvenience during transportation.

The absence of negative responses further indicates that the proposed product fulfills consumer expectations and addresses real market needs. Furthermore, the small proportion of respondents who selected “Maybe” may indicate that some consumers require additional information or practical experience with the product before making a definitive judgment. Nevertheless, the overwhelmingly positive responses provide encouraging evidence regarding the product’s market potential.

Consumers' Willingness to Pay Additional Costs



The survey also explored respondents' willingness to pay an additional amount for premium packaging features. The results revealed that 9 respondents (40.9%) were willing to pay an additional RM1–RM2, while 8 respondents (36.4%) were willing to pay between RM3 and RM4. Only one respondent (4.5%) was willing to pay RM5–RM6, whereas four respondents (18.2%) expressed their willingness to pay without specifying a particular amount.

These findings demonstrate that consumers acknowledge the value provided by enhanced packaging and are generally willing to bear additional costs in exchange for improved protection and convenience. However, the distribution of responses suggests that consumers are price-sensitive and prefer moderate price increments. Therefore, setting the additional cost within the range of RM1–RM2 may be more acceptable to the majority of consumers and could encourage higher adoption rates.

The willingness of respondents to pay extra also indicates that consumers do not perceive Smart Slice Lock merely as ordinary packaging, but rather as a value-added innovation capable of improving product quality and user experience.

Overall, the market testing results indicate that Smart Slice Lock possesses strong market potential and positive consumer acceptance. The high percentages recorded for product protection, temperature retention, and ease of carrying demonstrate that the product addresses several important factors valued by consumers. In addition, the unanimous agreement regarding the attractiveness of the concept and the overwhelmingly positive responses concerning its impact on takeaway experiences further strengthen the feasibility of the product.

The survey findings also reveal that consumers are willing to pay a reasonable premium for packaging that offers superior performance and convenience. This suggests that Smart Slice Lock has the potential to generate commercial value while satisfying customer needs. Furthermore, the innovative features incorporated into the product may provide a competitive advantage in the growing food delivery and takeaway market.

Based on the responses collected from 22 participants, it can be concluded that Smart Slice Lock has received a highly favourable reception from potential consumers. The findings demonstrate that respondents value the product's protective, temperature-maintaining, and portable characteristics, while also recognizing its potential to enhance the overall takeaway experience. The willingness of consumers to pay an additional amount for these benefits further supports the commercial viability of the product.

4.0 CONCLUSION

In conclusion, the development of Smart Slice Lock 2.0 demonstrates an innovative solution to the limitations of conventional cake slice packaging. The product was developed to solve several market research problems, such as freshness of cakes in the existing container, lack of protection during transport, takeaway and environmental problems in using plastic container. By integrating features such as improved insulation, secure cake positioning, durability, portability, and reusability, Smart Slice Lock 2.0 offers a practical and user-friendly packaging solution for both consumers and bakery businesses.

Besides, the new product development process allowed the team to transform the needs of customers and opportunities in the market into a viable, valuable product concept. The proposed packaging design not only ensures the quality and appearance of cake slices but also promotes sustainable consumption with its reusability. Therefore, Smart Slice Lock 2.0 can be beneficial to increase customer satisfaction, decrease packaging waste and provide a competitive edge in the food packaging market.

The overall message from this case study is that it is important to recognise consumer problems, undertake market research and innovate in the development of products. Overall, the Smart Slice Lock 2.0 is an excellent example of how innovative and customer-oriented solutions can help businesses thrive.

5.0 REFERENCES

Arena, a PTC Business. (2026, June 10). *New Product Development (NPD) Definition* | Arena. Arena. <https://www.arenasolutions.com/resources/glossary/new-product-development/>

Claybaugh, S. (2021, October 20). 5 most common thermal insulation materials. Thermaxx Jackets. <https://www.thermaxxjackets.com/news/5-most-common-thermal-insulation-materials/>

Netherlands Enterprise Agency. (n.d.). How to make your business operations sustainable. Business.gov.nl. <https://business.gov.nl/sustainable-business/sustainable-business-operations/how-to-make-your-business-operations-sustainable/>

Schroeder, H. (2024, August 22). 8 steps of a sustainable new product development process. ESCATEC. <https://www.escatec.com/blog/8-steps-new-product-development-process>

WorldSkills International. (n.d.). Prototype modelling. WorldSkills. <https://worldskills.org/skills/id/337/>

Hernawan Sulistyanto, Sofyan Anif, Sutama Sutama, Sabar Narimo, Anam Sutopo, Muhammad Izzul Haq, & Gamal Abdul Nasir. (2022). Education Application Testing Perspective to Empower Students' Higher Order Thinking Skills Related to The Concept of Adaptive Learning Media. Indonesian Journal on Learning and Advanced Education (IJOLAE), 4(3), 257–271. <https://doi.org/10.23917/ijolae.v4i3.19432>

6.0 APPENDICES

Appendix A : Survey Questionnaire

Refer to Section 3.3.1

Appendix B : New Product Development Design (Smart Slice Lock 2.0)

Refer to section 3.3.2

Appendix C : Build In Prototype (3D)

Refer to section 3.3.4