TAGPRENEUR

GENETICALLY MODIFIED FOOD MOBILE TAGGING SERVICES

NEEDS ANALYSIS ON 2-DIMENSIONAL QUICK RESPONSE (QR) CODE AS A MOBILE TAG IN GENETICALLY MODIFIED FOOD LABELING SERVICES

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ABSTRAK

Makanan yang telah diubahsuaikan secara genetik perlu dilabelkan, wajib di bawah Akta Bio-keselamatan 2007 untuk meyakinkan pengguna yang mengambil berat tentang apa yang mereka makan dan minum. Kekhuatiran mereka adalah berdasarkan etika, ugama dan kesihatan; serta kepastian yang gen-gen dari sebarang unsur yang terlarang tidak mencemarkan makanan yang akan mereka makan. Tagpreneur dapat memberi penyelesaian melalui "Perkhidmatan Penandaan Bimbit untuk Makanan yang Diubahsuai Secara Genetik" untuk menyebarkan maklumat tertentu seperti status gen pengubahsuaian, residu racun perosak dan logam berat, tanaman dan jarak buffer zon penimbal, pengurusan kesuburan tanah, pengurusan air yang bersih, penggunaan bijih dan bahan tanaman, penggunaan baja, pengkondisi tanah dan hama dan bahan kawalan penyakit kepada pengguna. Teknologi ini lebih baik berbanding dengan kod bar yang digunakan sekarang dari segi kos yang lebih rendah, lebih senang digunakan, kepelbagaian kegunaan, dan peningkatan mobiliti.

Permintaan terhadap aplikasi telefon bimbit daripada pengguna tempatan semakin bertambah dengan pantas. Penyelidikan ini menjelaskan satu cadangan perkhidmatan penandaan bimbit utuk membolehkan pengguna tempatan mengenalpasti status pengubah-suaian genetik yang terkandung dalam produk melalui peralatan bimbit. Spesifikasi dan aplikasi bagi kod Tindakbalas Cepat (QR) 2-Dimensi di dalam perkhidmatan penandaan juga akan dibincangkan. Penyelidik akan menganalisa permintaan daripada pengguna telefon bimbit berkamera tempatan dan saiz pasaran terhadap Perkhidmatan Penandaan Bimbit untuk Makanan yang Diubahsuai Secara Genetik dengan menggunakan tinjauan soal selidik untuk mengumpul data daripada pengguna tempatan

telefon bimbit berkamera. Sejumlah 118 dari 150 orang pengguna telah menjawab soal selidik tersebut. Soal selidik tersebut kebanyakkannya diagih kepada pengguna telefon bimbit berkamera yang berusia di antara 21 hingga 25 tahun yang menggunakan telefon bimbit berkamera dalam rutin seharian. Keputusan kajian menunjukkan bahawa 83.1% bersedia untuk menggunakan perkhidmatan penandaan bimbit untuk mendapatkan maklumat. Tahap penerimaan penggunaan kod Tindakbalas Cepat (QR) dalam perkhidmatan bimbit adalah tinggi, pada 87%. Responden juga menyatakan kemungkinan mereka akan menggunakan lebih banyak perkhidmatan penandaan bimbit dalam lima tahun akan datang.

Perkhidmatan penandaan bimbit akan meningkatkan kebolehan pengesanan kepada industri produk segar termasuk meningkatkan keselamatan produk makanan dan kecekapan rantai bekalan. Penyelidikan ini membincangkan keupayaan perkhidmatan penandaan ini dalam meningkatkan keinginan pengguna membeli di dalam proses pembelian dan juga menitik-beratkan nilai saranan perkhidmatan ini kepada pengguna. Teknologi ini akan menjadi satu penyelesaian untuk memenuhi permintaan pengguna dalam perkhidmatan pelabelan makanan dengan menggunakan aplikasi bimbit seperti yang dijelaskan dalam kajian ini.

ABSTRACT

Genetically modified food needs to be labeled, mandatory under Bio-safety Act 2007 to assure consumer who are particular about what they eat and drink. Their concerns are based on ethical, religious and health grounds; and that genes from any prohibited elements did not contaminate the food they will consume. Tagpreneur can provide a solution through its "Genetically Modified Food Mobile Tagging Services" to disseminate the necessary information such as gene modification status, pesticide residue and heavy metal, crop buffer and buffer zone distance, soil fertility management, good water management, use of seed and plant material, use of fertilizers, soil conditioners and pest and disease control materials to the consumers. This technology is better than the existing traditional bar code tagging in terms of cost (low), more convenience, high functionality and high mobility.

The demand for mobile phone applications from local camera phone users are growing rapidly. This research describes a proposed mobile tagging service for the domestic consumer to identify the genetically modified status of the product using mobile devices. The specifications and applications of the selected 2-Dimensional Quick Response (QR) code in the tagging service are also being discussed. The researcher analyze the demand of local mobile phone camera users and the market size against the Genetically Modified Food Mobile Tagging Services by using a survey questionnaire in gathering data from local mobile phone camera users. A total of 118 out of 150 users responded. The questionnaires were mainly distributed to mobile phone camera users of ages 21 to 25 years old who use mobile phone camera in their daily routine. The results of the research show that 83.1% respondents are willing to use the mobile tagging services to retrieve information.

The acceptance level of using the Quick Response (QR) code in mobile tagging services from the respondents is high, at 87%. The respondents have also indicated their likelihood to use more mobile tagging services in the next five years.

The mobile tagging services can increase traceability for the fresh produce industry that includes food safety enhancements and greater supply chain efficiency. This research discusses the capabilities of the tagging service in increasing the consumers' purchase desire in a purchasing process and also highlights the value proposition of the services. This technology will be a solution to satisfy user's demand in food labeling services by utilizing mobile applications as described in this study.

CHAPTER 1

EXECUTIVE SUMMARY

Tagprenuer is a new start-up company providing the Genetically Modified Food Mobile Tagging Services. Tagpreneur is familiar with the intricacies of genetically modified food which the consumer isn't. Hence, it is Tagpreneur's job to disseminate the necessary information to the consumer.

Health food consumers need to make sure all the food they buy in the market is free from genetic tampering. Tagpreneur's Genetically Modified Food Mobile Tagging Services is better than the existing traditional bar code tagging in terms of cost (low), more convenience, high functionalities and high mobility. The value proposition of Genetic Modified Food Mobile Tagging Services increase traceability for the fresh produces industry, enhance food safety and greater the supply chain efficiency to let the crop producer and middle retailer in managing their stock supply more efficiently.

More and more people are becoming health conscious. The target customer and the health food market trends are growing rapidly, locally and globally. The unique technology by Genetically Modified Food Mobile Tagging Services has greatly improves customers' purchase decisions. They are able to utilize the services offered ranging from shopping assistant, food traceability, print media service, anti-counterfeiting, e-coupon, and comprehensive enquiry to comparison shopping.

There are six easy steps to enquire details of a genetically modified product through Genetic Modified Food Mobile Tagging Services,

1. Point the mobile phone camera to the printed code on the product.

2. Capture the 2-Dimensional code with the mobile phone camera
3. Send the code to the message centre
4. Wait for decoding
5. Message auto replied from message center
6. Customers can link to the web site by clicking on the URL link

The replied message which consists of the detail description of the product will assist the customer in the purchasing process. The details of the description include the suitability of the planting site, transition period from conventional to organic system of production, pesticide residue and heavy metal, crop buffer and buffer zone distance, soil fertility management, good water management, use of seed and plant material, use of fertilizers, soil conditioners and pest and disease control materials, management of weeds, pests and diseases, wrapping, storage and transport of farm products, record keeping and direct sale of the product. The detailed descriptions lend better judgement to the consumer when selection and purchase are considered.

The top management team of Tagpreneur is founded by four main information technology savvy personnel with passion and full commitment to grow mobile tagging services in the local market. Tagpreneur comprises the expertise of the 2-Dimension barcode that traditional food packaging/ labeling companies find difficult to assimilate.

Where business oppurtunities are concerned, mobile tagging promises potential diversity. Tagpreneur plans to expand the market share into organic agriculture crops, Halal food for Muslims, and cosmetic products from genetically modified agriculture products. Tagpreneur is seeking an investment of RM200,000 as a start-up fund that will enable to grow in the local agriculture genetically modified food labeling market and achieve a revenue of RM30,000 for the first year, RM 66,000 for the second year and RM83,000 for the third year and a net profit of RM54,000 by the year 2012.

SECTION 2

INTRODUCTION TO THE COMPANY

This section will discuss the company background, business intent, growth strategies, target market, revenue model, and operational setup, and long term goals of Tagpreneur.

2.1 Company Background

Tagprenuer is a company set up to offer mobile tagging services on genetically modified products in the Malaysia market. Tagpreneur is developed by a team of information technology passionate personnel, the team members included, Mr. Long Yoon Foo, Mr. Chong Hon Soon, Ms. Tan Li Ling, and Mr. Soo Ker Perng. The initial development of this service was for the Business Plan Competition held by USM with the collaboration of MDEC. Tagpreneur had the honor of second runner-up in the competition and was encouraged by the general manager of MDEC to carry on the research of the mobile tagging services in Malaysia. Mr. Long Yoon Foo has contributed greatly towards the further development of this service prototype. With the consensus ideal and mindset of Mr. Soo Ker Perng, he contributed towards the development of the web site. Mr. Chong Hoon Soon has contributed towards the operations planning, and Ms. Tan Li Ling has contributed towards the development of the company's financial planning.

2.2 Business Intent

Tagpreneur intends to offer mobile services for the local consumer to retrieve information instantly from the food barcode label via mobile devices. Through this mobile service, consumer can utilize his mobile phone camera to capture the 2-Dimensional Quick Response (QR) code from the food label on the product and then send the request to the message center. The message center will interpret the short code then reply the request with a SMS

embedded with all the information about the product. The information may include the location of the planting farm, packaging company, list of fertilizer used to grow the product, packaging date, and nutrient ingredients of the product. For more information, consumers can surf through to the related websites by clicking the link embedded in the replied SMS. Consumers can opt for this service where they will receive health information or smart consumer buying tips on their daily menu sent by the servers to their mobile phones. Thus, Genetically Modified Food Mobile Tagging acts as a consultant for all genetically modified products. This consultation will specialize in genetically modified agriculture crops market and provide the information for people who are interested in the healthy agriculture products for individual consumption. The focus of the services is the needs of the consumer. It is the job of the information provider to translate those needs into low-cost solutions.

2.3 Growth Strategies

The following section will focus on the three main growth strategies for Tagpreneur. The discussions are financial strategies, technology and prototype development, and market strategies.

2.3.1 Financial Strategies

Tagpreneur's first priority in financial aid is from the investor who is interested in investing in a new start up technology based company. Tagpreneur is seeking an investment startup capital of RM 150,000 from the investor. To fund the operation cost, each highest committee member of Tagpreneur will invest RM 10,000 as operation cost. Tagpreneur will also borrow RM 100,000 from Maybank for 3 years while consistently growing in the mobile services capability and advertiser base. Tagpreneur estimates no revenue gains during the first 9 months of the service establishment. In the first 9 months, Tagpreneur intends to educate the consumers in using the 2-Dimensional Quick Response (QR) code through a series of marketing

activities. After 9 months, Tagpreneur will charge advertising fee from advertisers who advertise through the service via mobile phone according to the mobile advertising business model. Tagpreneur is expected to break-even in the third year of its business operation.

2.3.2 Technology and prototype development

Tagpreneur plans to improve its technology and prototype development according to the following strategies:

1. **Phase 1** development, Tagpreneur will be to deploy the mashup services. The types of mashup will carry out by Tagpreneur during this phase include data mashup and business mashup. Through the mashup service, Tagpreneur be able to combine similar types of media and information regarding genetically modified food from multiple sources and allow for collaborative action among businesses and services provider. Tagpreneur will also exploit the database for scalability. Then Tagpreneur will beef up its database with information focusing on the genetically modified food and product in current market place. Tagpreneur will also develop collaboration with Malaysian Retailer-Chains Association (MRCA) to establish the mutual understanding between Tagpreneur and the association. Tagpreneur's immediate customer sources will come from the association. During this time, Tagpreneur will document its system development progress and check its implementation carefully against its Key Performance Indicators.

2. **Phase 2** development will include partnership with retailer and crop producer in Malaysia. Tagpreneur will deploy its mashup services version 2.0. The Quick Response (QR) code request system and intelligent advertisement software will be fully set up and ascertained to be functioning effectively. Tagpreneur will also improve upon its service quality by using continual evolving process such as emphasize upon listening to the voice of the customer and benchmarking with Tagpreneur's customer relationship

management model. Thus, Tagpreneur will view customers' feedback and review, and learning from other mobile services during this phase.

3. **Phase 3** development will include a suite of software agents, followed by the development of full partnership with major retailer around the ASEAN country such as Tesco, Giant, Jusco, and Parkson. Tagpreneur's Quick Response (QR) code request system and intelligent advertisement agent should reach 90% of its key performance indicators.

2.3.3 Marketing Strategies

Tagpreneur's marketing strategies will be straight and simple yet achieving the biggest impact to the consumer.

1. The first strategy is developing the visibility and brand equity. To do so, Tagpreneur will advertise in selected local hypermarkets especially in the green crops section. In addition to the advertisements which will be used to drive consumer sales, Tagpreneur will launch a networking campaign among the local internet forum to drive up commercial sales and expose the correct information to consumers. Furthermore, Tagpreneur will establish customized fan sites in popular social networking sites to generate followers. It is hoped that a substantial following of interested individuals in the social networking sites can generate an effective 'buzz' effect of word of mouth to help increase the popularity of the services and website.

2. Tagpreneur's website is designed to improve information sharing among the consumers quickly and accurately. These services are free of charge for all consumers willing to register on the web site. During the launching of the marketing strategy, Tagpreneur will advertise its web site through the Search Engine Optimization (SEO) tactic to improve the volume of traffic to the web site. Tagpreneur will also work with some affiliate networks using e-banners with linkage to the Tagpreneur website.

Consumers who register on the web site will receive a confirmation email certifying the registration and usage for the mobile services.

3. Tagpreneur seeks to communicate the message with local experience farmers. This message will be communicated through a variety of methods. The first method is through advertisements. Some of the advertisements will be co-branded with the Farmer's Market. Other advertisements will be solely Tagpreneur advertisements on all sorts of interactive media such as social media, social bookmarking, blogging, digital signage, and podcasting. The ads will be placed in both local newspapers as well as the local food magazines as traditional channels of advertising.

2.4 Target Markets

The target market of Genetically Modified Food Mobile Tagging Services is the individual consumer with a stable income and a positive attitude toward health food consumption. Undergraduate students in university are the high potential target group for this service as they are technology savvy and possess high buying power. The target customers for Tagpreneur include the crop producers, middle retailers, and the advertisers who intend to market or promote their products via the services. The further discussion for customer segments will discuss in section 5.3.2.

In the initial phase of the operation, Tagpreneur will focus implementing the services on the genetic modified crops sector. In the second phase, Tagpreneur will expand the services to the organic food sector. In the advance phase, Tagpreneur will extend the services to the pharmaceutical sector, the cosmetic sector, and the Halal food sector.

2.5 Revenue Stream

Tagpreneur as the information provider will disseminate accurate, reliable, and instant information to the customers translating those needs into low-cost solutions.

Tagpreneur will portray its revenue sources as figure below.

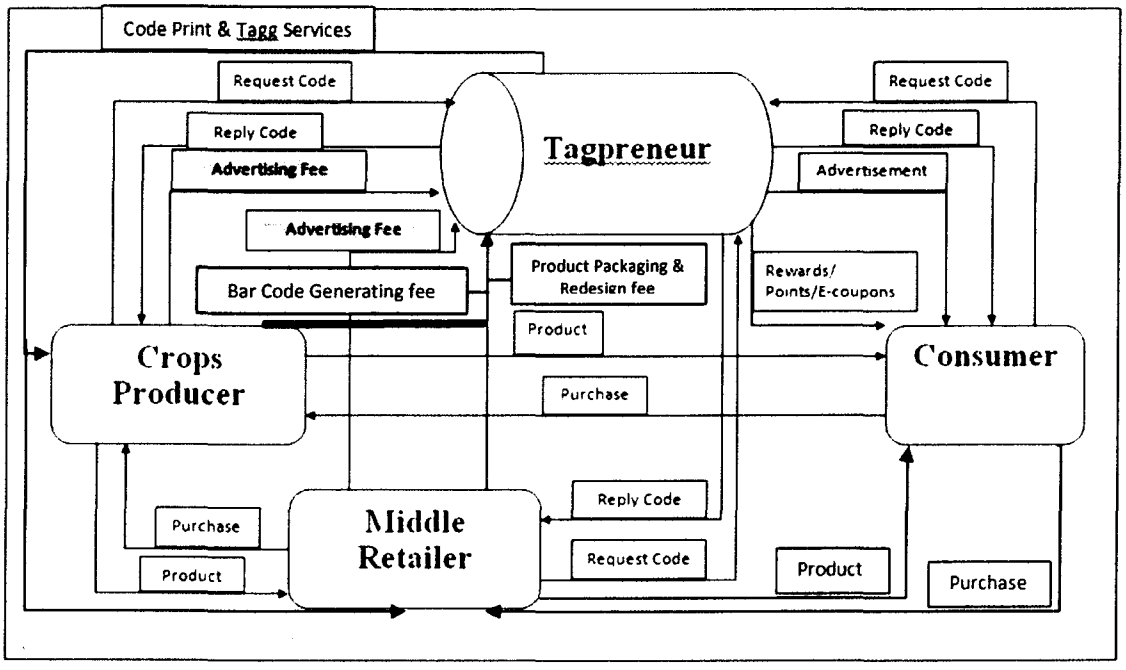

Figure 2.1: Revenue Stream

The revenue model in Figure 2.1 will further explain the elements below;

1. Crop producer is the main revenue contributor for Tagpreneur. Tagpreneur charges advertising fees, bar code generating fee, and product packaging and redesign fee on crop producers who intend to tag and promote their products to the target consumers through Tagpreneur. The advertising fee is count per customized advertisement sent to the targeted consumer basis. Each customized advertisement send to the targeted consumer will charge in RM0.50 on the advertiser. Tagpreneur will define the tag for those crop producer and middle retailer who want to adopt the mobile services. The bar code generating fee will charge on the immediate customer of the mobile services based on the complexity of the tag. The capacity of the code is direct proposition with the charges. The scale of measure for the complexity of the code is measure in bytes. 1 byte is cost

RM225.00 for the customer. The product packaging and redesign is an optional service for the customer. Tagperneur offering this service to help those customers to redesign their product to give a better packaging or presentation with the tag on their product. The product packaging and redesign fee will vary with the design favored by the customer. The basic charge of this service is RM2000.00 and the ideal of design and art work will count respectively.

2. The middle retailer is the second main revenue source for Tagpreneur. To avoid conflict, more customized advertising content such as multimedia content embedded in customized advertisement, e-voucher, e-discount and redeem point will be provided for this customer segment to differentiate them from crops producer. The charges fee is same as stated above.

3. The consumers are the target customers for both the crop producers and the middle retailer. This mobile service is free for all consumers. Tagpreneur is able to create the Pull strategy on consumers to purchase the product through customized advertisements, free e-coupons, and point of rewards in repeated purchase action. For those consumers who are interested to purchase the product after review the customized advertisement, Tagpreneur will gain 15% profit in the total amount of transaction from the successful purchase action from the advertiser.

The revenue stream can be better present in the bar graph form as below;

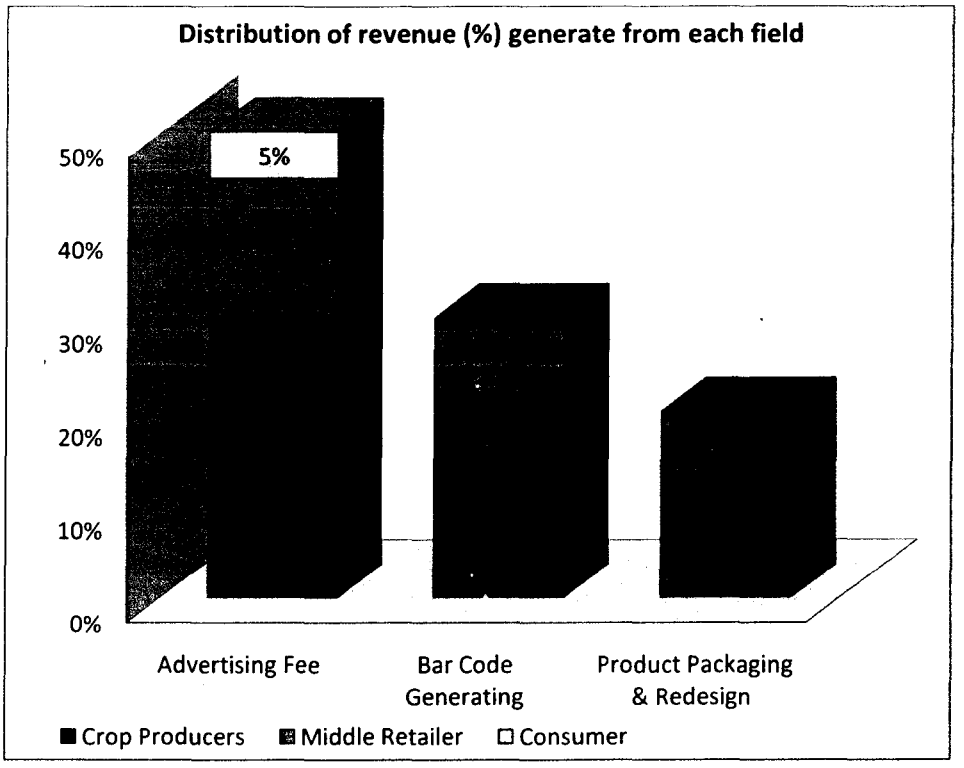

Figure 2.2: Distribution of revenue stream for Tagpreneur

For the total revenue stream, advertisement fees take 50% of the main income for Tagpreneur. Bar code generating services take 30% and product packaging and redesign take 20% of the income for Tagpreneur respectively. For the distribution of revenue from advertising fee, the crop producers take 64% as the main advertiser group. 36% fall into the middle retailers as the second party of advertisers. Crop producers take 53% in the distribution of revenue from bar code generating whereas the middle retailer takes 47%. For product packaging and redesign, crop producers take 60% in the distribution of revenue and the middle retailer takes 40% respectively.

2.6 Operational Setup

The following section describes how Tagpreneur will operate:

1. Tagpreneur will approach local farmers to collect useful information regarding local agricultural and imported products. Tagpreneur will seek assistance from the Ministry of Health, Malaysia, Department of Islamic Development Malaysia, Ministry of Agriculture Malaysia, and Ministry of Domestic Trade, Co-operative and Consumerism Malaysia to verify the collected information. During this phase, Tagpreneur will construct a database for genetic modified products in the local market. The database will well be supervised and maintained by experts of the field to make sure that the data in the database is always updated and not replicated.

2. Tagpreneur will convert all the information into a sequence product list in the database. A series of 2-Dimensional Quick Response (QR) code will be generated based on the category of the product. It functions uniquely for each product. Thus, a huge capacity of date storage is required during this phase. Tagpreneur will put the issues such as database security, data mining application and methods as priority task to secure the Tagpreneur's back-end system and the consumer personal information as well.

3. Tagpreneur will collaborate with local large distributors such as Tesco, Carrefour, Jusco, and Giant to adopt the services in their online portal as the first marketing penetration strategy for mobile tagging services in Malaysia. The efforts of market positioning and brand equity will continue to grow not only in Malaysia but in all ASEAN countries.

2.7 Long Term Goals of Company

The long term goals for Tagpreneur are as follows:

1. Maintain positive, steady growth each year.
2. Experience an increase in new customers who will become long-term customers.
3. Generate brand equity at the local agriculture market as well as within the commercial agriculture market within Malaysia and ASEAN.

SECTION 3

EMPLOYMENT OF KNOWLEDGE WORKERS

This section will discuss the management team, the organizational chart of Tagpreneur and its human resources.

3.1 Management Team

Tagpreneur is form by the following personnel who greatly passionate towards information technology. Together, this team has evolved this business plan for mobile tagging services.

1. Mr. Long Yoon Foo: Chief Executive Officer

   He currently is studying Master of Science in Information Technology majoring in Technopreneurship in Universiti Sains Malaysia. He is a person who passionate in information technology and agriculture. With such enthusiasm entrepreneur mindset, he comes out with the mobile tagging services where can perfectly implement in the modern technology and agriculture sector.

2. Mr. Soo Ker Perng: Chief Technology Officer

   He is a senior programmer expert in web develop programming in web technology. He is an expert in web design and also oversees part of the development of the prototype. The programming languages he expert in are Visual C# 2005/2008, PHP 5, MySQL, and ASP.net.

3. Mr. Chong Hoon Soon: Chief Operation Officer

   He is well train personnel in handling I.T project. He has valuable experience working in Intellicomp computer center. His experience as senior executive personnel in hardware maintenance department helps to position him at the forefront of the technological development.

4. Ms. Tan Li Ling: Chief Financial Officer

   She is a certified actuary graduated from Universiti Malaya. She experience as an actuary in insurance company and expert in economics, accounting and administration.

3.2 Organization Chart

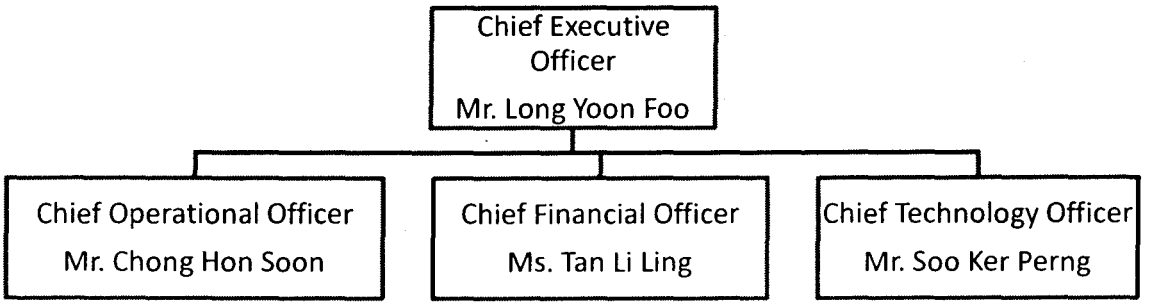

Figure 3.1: Organization Chart

3.3 Human Resource Plan

Tagpreneur is a new start up team will work with the three management team members working in various capacities as shown in the organization chart. Tagpreneur plans to hire 3 full time web developers to establish the web site and hire 1 full time system analyst to review the system flow and part of the prototype. In Year 1, Tagpreneur requires a full member of 8 staff members to develop its technology and fulfill its marketing needs. In Year 2 and Year 3, Tagpreneur will have increase in its human resources.

Table 3.1: Tagpreneur's Human Resources

Position Role	Year 1	Year 2	Year 3
Chief Executive Officer	1	1	1
Chief Operational Officer	1	1	1
Chief Financial Officer	1	1	1
Chief Technology Officer	1	1	1
Web Developer	3	4	4
System Analyst	1	1	2
Customer Service Representative	4	6	8
Total	**12**	**15**	**18**

During the first three years of Tagpreneur's operation, its chief executive officer will also oversee the technology plan. Main concern of Tagpreneur in the first year of the operation is to perfectly setup the mobile tagging technology and adopt the services in the modern agriculture sector. Its chief technology officer will also precede the web development for the services to keep abreast the mobile marketing in the services. The chief operation officer will oversee the product packaging and redesign operation. The chief financial executive will verify and manage the cost and revenue for the services. In this way, the role of the management team of Tagpreneur will be more define during the start-up three years period.

SECTION 4

PRODUCT AND SERVICE DEVELOPMENT

This section will describe an overview of the services that Tagpreneur will offer to the customer. This section will further explain the prototype, system flow, and the proposed labeling on genetically modified product.

4.1 Service/Technology Overview

According to the web definition, mobile tagging means the process of scanning, decoding and reading out the contents of a 2-Dimension barcode by using the camera of a mobile device. Various types of information can be saved in the code. However, the URL is mostly ciphered in the codes. With just a click on the mobile phone camera a handy browser links the consumer to the Tagpreneur's website. That is why 2-Dimensional barcodes take on the function of hyperlinks in the use of the mobile internet. Due to their user friendliness, they have become the key technology for mobile surfing. Typing of long URL's on the keyboard is very annoying and inefficient for the consumer. According to Mittwoch (2007), tagging a 2-Dimensional barcode, requires an installation of a reader and a free software program on the mobile phone. By using this technology, the consumer can take out his/her standard mobile phone camera, capture the short code from the food label on the product and then send the request to the message center. The message center will interpret the short code and then reply the request with a text message containing all the information about the product. The information may include the location of the planting farm, packaging company, list of fertilizers used to grow the product, packaging date

and nutrient ingredients of the product (all rules and regulation listed under Bio-safety Act 2007 Malaysia). The test message service is free of charge. Interested consumers wanting to discover more about the service can click on the lick embedded in the text message. They are able to receive relevant information on health or smart purchase tips on their mobile phones.

4.2 Service/Technology Development

Tagpreneur has adopted three main technologies to develop the services in order to provide reliable and effective solutions for consumers to retrieve information regarding the genetically modified food. The technologies are the 2-Dimensional Quick Response (QR) code, the Semantic Web 2.0, and the intelligent mobile software agent.

Gerry (2008) described the use of 2-Dimensional bar code in product tagging with camera phone scanning and ad fulfillment as an exciting new mobile marketing option. Tagpreneur has huge ambitions to adopt this technology in the service. The existence of the Semantic Web 2.0 has boosted the services in sharing and retrieving information anywhere and anytime through mobile devices. Shalini (2008) believed that future marketers could completely customize their mobile marketing messages to individual customer preferences. Through this technology, the company can respond to individual customers by customizing its products, services, and messages on a one-to-one basis.

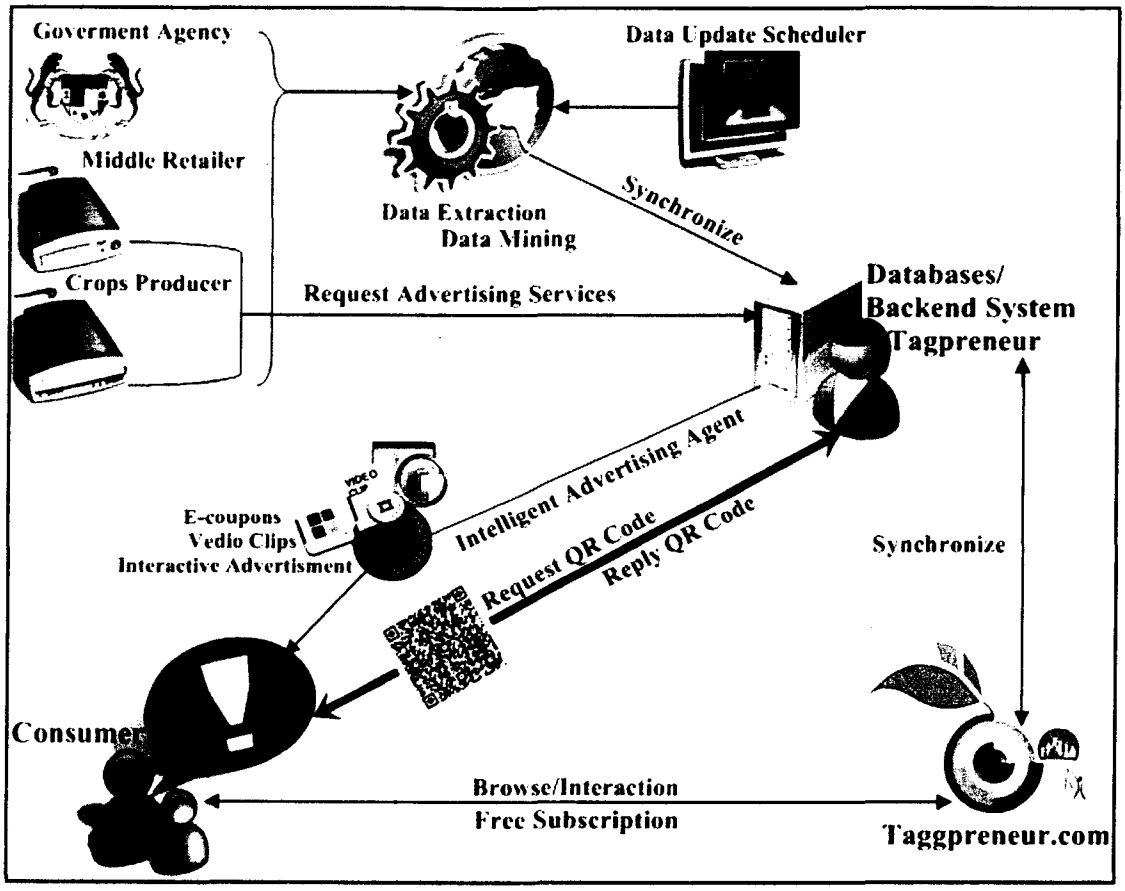

Figure 4.1: Service/Technology Overview

Figure 4.1 above clearly illustrates the service overview of the Genetically Modified Food Mobile Tagging Services. Tagpreneur acts as an informediary between the consumer, the crop producer and the middle retailer. Tagpreneur will define the mobile tag for those crop producer and middle retailer who agree to let Tagpreneur to tag their product. The information in the mobile tag is customized according to the customer preferences. Tagpreneur is offering a free 2-Dimensional Quick Response (QR) code reply to consumers requesting information about the genetically modified product tagged with a 2-Dimensional Quick Response (QR) code. Tagpreneur will decode the 2-Dimensional Quick Response (QR) code in to text form via the SMS and reply to the consumer complete with a link to the Tagpreneur's web site in the replied text message. Consumers can access the link and browse

web site via their personal mobile device. Tagpreneur.com provides the necessary feedback and its comment function enables consumers to interact with other consumers virtually. These comments are capitulated back to Tagpreneur's backend system to generate a customized profile of each customer who opts for the services. Through the data extraction and data mining technique, customized marketing messages will be delivered to the targeted customer. As an additional service, Tagpreneur rewards the loyal customers with e-coupons, e-vouchers, and redeemed points to keep the loyal customer and attract new customer to adopt the service. Crop producers and middle retailers can advertise through Tagpreneur to the targeted consumer. The customer can use the e-coupons, e-vouchers, and redeemed points to get discount rate from the crop producer and middle retailer who advertise through Tagpreneur.

4.2.1 Preliminary Prototype

Genetically Modified Food Mobile Tagging services will operate in an environment with information that is constantly being updated. Keeping information updated will be of vital importance to the profitability of this service. By setting this as the main objective, Genetically Modified Food Mobile Tagging services will maintain working, as well as functional, knowledge of all the latest information available to the consumer. The consumer will receive the most current information of all types of genetically modified crops or products available in the market.

In short, mobile tagging is a new technology where stored information in a 2-Dimension barcode and providing data on mobile devices can be read and inputted using a

standard mobile phone camera. Reading the 2-Dimension barcode necessitates the installation of a specific software, an application on the mobile device. Currently, there are eleven types of 2-Dimensional barcode which can be used as mobile tagging services. The list of the 2-Dimension barcodes are listed as below; Quick Response (QR), DataMatrix, Cool-Data-Matrix, Aztec, UpCode, Thrillcode, Quickmark, Shotcode, mCode, Beetagg, and Microsoft Tag. Further discussions in section 4.3.2.3 will justify the adoption of the 2-Dimensional Quick Response (QR) code in this service.

4.2.2 State-of-the-art services in the market:

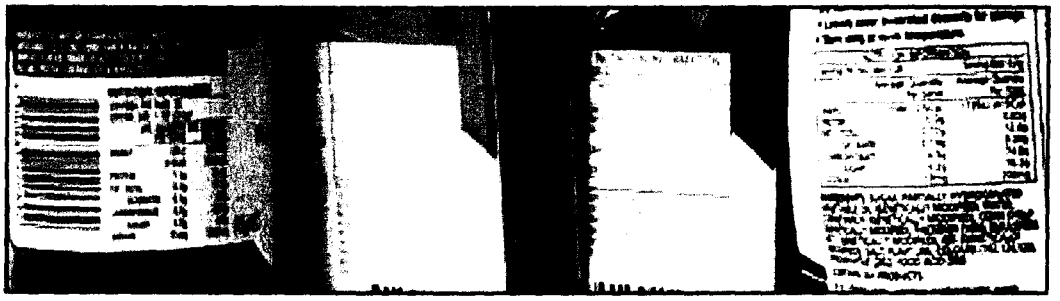

Figure 4.2: Commercial food labeling

This is the current commercial food or product label in the general market where the product's nutrient information is. However, it does not state any information regarding any genetically modified ingredients.

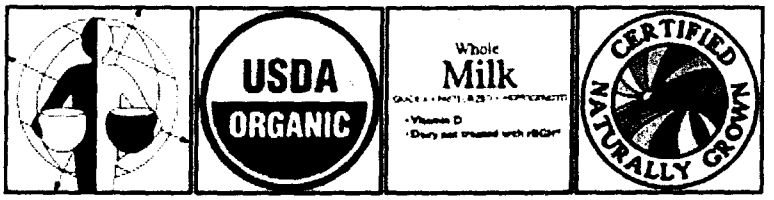

Figure 4.3: Label of Non-genetic modified organization

These are the official labels recognized by the Non-genetically modified authority organization. Food or product label armed with these logos are certified as non-genetically modified.

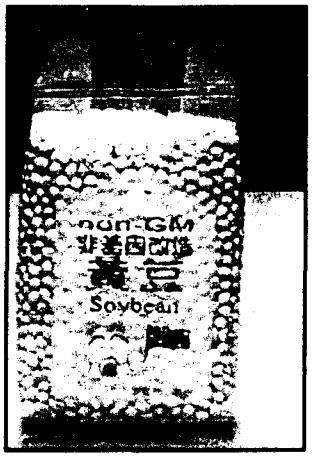

Figure 4.4: Packaging of a non-genetically modified product

The packing for Non-genetically modified products in the market provides inadequate information about the product thus appearing inconsequential to the consumer.

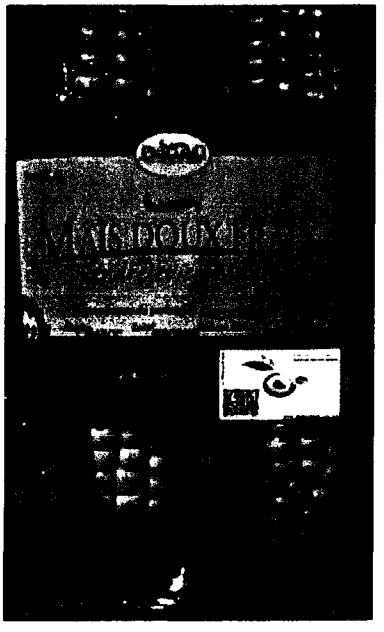

Figure 4.5: Proposed labeling on a genetically modified product by Tagpreneur

Tagpreneur has proposed this service as a low cost solution for this problem. A genetically modified product label with 2-Dimensional Quick Response (QR) code is incorporated where relevant product information is disseminated to the consumer.

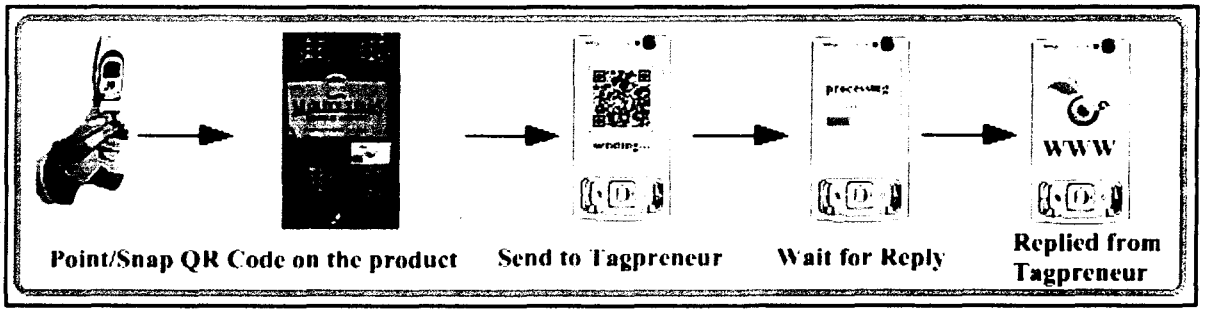

Figure 4.6: Sequence of steps of Genetically Modified Food Mobile Tagging Services

Consumers can obtain more information about the product by following the illustrations above. The detailed sequences of steps are stated below;

1. Point the mobile phone camera to the product.
2. Take a picture of the 2-Dimensional QR code with the camera hand phone
3. Send the code to the message centre
4. Wait for a while for the decoding
5. Replied product information in text message from message center
6. Customers can link to Tagpreneur's website for further browsing activity

4.2.3 Replied Message Layout

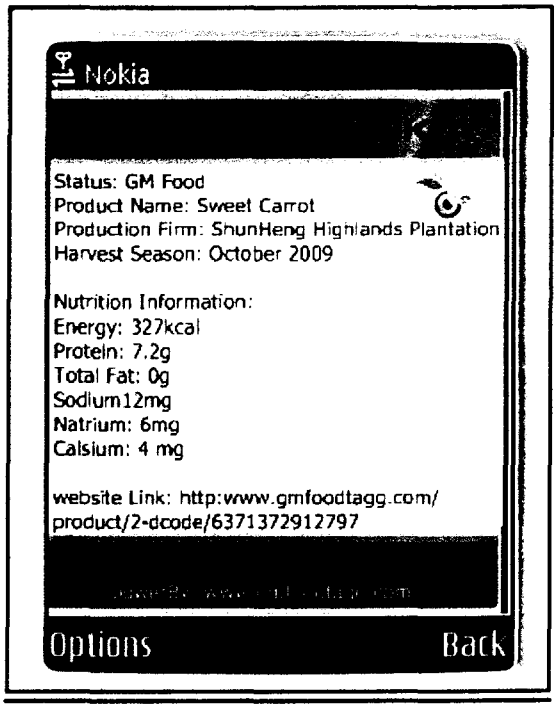

Figure 4.7: Proposed SMS layout of Genetically Modified Food Mobile Tagging Services

The replied message comes with a list of information about the product. The replied message consist of the details description of the product will lead a positive perception on consumer in the purchasing process. The details of the description include the suitability of planting site, transition period from conventional to organic system of production, pesticide residue and heavy metal, crop buffer and buffer zone distance, soil fertility management, good water management, use of seed and plant material, use of fertilizers, soil conditioners and pest and disease control materials, management of weeds, pests and diseases, wrapping, storage and transport of farm products, record keeping, direct sale of product. The details description lead better convince on consumer to make procurement. Consumers can browse through the Tagpreneur's website via the direct link at the bottom of the replied message for further information.

4.2.4 Customized advertising content

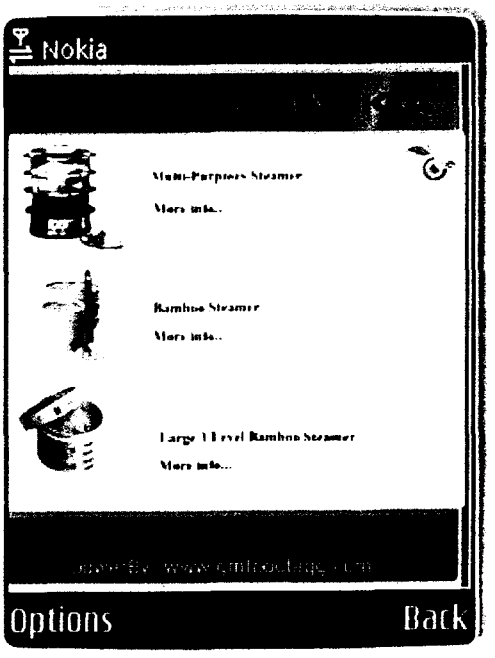

Figure 4.8: Proposed customized advertising content (1)

Figure 4.9: Proposed customized advertising content (2)

Figure 4.10: Proposed customized advertising content (3)

Figure 4.11: Propose customized advertising content in detail

Through the data mining technique, the intelligent advertisement software in Tagpreneur's back-end system has the ability to provide content and services tailored to an individual's preference and behavior. This highly personalized service is available to each