Scan&Go Conceptual Digital Business Model: QR-Code Vending Machine

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Abstract: **The objective of the paper is to propose and introduce a system, a mobile application-based platform called "Scan&Go", enables the user who have problems in paying cash while using vending machines. Furthermore, "Scan&Go" aims to accomplish part of the Sustainable Development Goal 8 i.e. Decent Work and Economic Growth. The system will provide a connecting digital platform between donor & B40 people, where donors will be able to donate directly to the B40 people. The Design Thinking methodology is adapted for this paper which is to understand the key problems, ideation of possible solution options, validation of options by customer segments, and to suggest a conceptual solution. This includes conducting literature review and benchmark, conducting interviews using the business modeling tools i.e. the nine blocks of Business Model Canvas (BMC), Value Proposition Canvas (VPC), Environment Map (EM), and Strategy Canvas. In this paper, also we presented our literature review findings, as well as proposal of Business Model for Scan&Go – in the of Business Model Canvas (BMC), Value Proposition Canvas (VPC), Environment Map, and strategy canvas. Survey with potential customers has been made to validate the initial BMC/VPC. This paper offers a validated conceptual business model of a digital platform/apps, called Scan&Go, with focus on improving the experience of vending machine consumers in making cash-less transactions anywhere anytime for the purchasing of coffee or other convenience goods.**

Keywords: **Cashless, Vending machine, Coffee, Business Model Canvas, Value Proposition Design, Environment Map.**

I.   INTRODUCTION AND BACKGROUND

QR code payment method is increasing day by day in every sector of daily billing system [1]. People find it easier to pay with virtual cash instead of real cash. Mobile has become part and parcel of our life. While going out we might forget everything, but it rarely happens that we left mobile in the house. Which is making people more stoop to cashless payment. According to Jacobs (2018) "Over the last 15 years, mobile payments in China have grown into a $16 trillion market dominated by China's two biggest tech giants – Tencent and Alibaba." We are living in the world where every minute is expensive especially during the working hour [2]. Early morning, most of the working people have a habit of drinking coffee and light breakfast [3] [4]. However, due to their rush most of the time they miss it [5]. So, we come up with the idea to place vending machines near around busy places where people can easily scan QR code with our application to buy coffee and light foods. Instant customer response would be the priority for us to assure the best service.

In the era of modern technology, people find ways to make life less complicated [2]. People prefer vending machines for its business. However, the payment method of vending machines has not been updated with the technology flow [6]. Moreover, the complicated cash payment system discourages consumers from using it [6]. For example, sometimes their money gets stuck in the machine which causes money loss. Also, sometimes machines keep rejecting the cash repeatedly which kills time of the consumers. We will bring up a new system which can save people's time and money while using vending machines by providing quality coffees and snacks. Which will ease the payment complication of the consumer. This mobile application is developing for people of all ages. The users could be the workers, students, family and tourists.

In the app users can find the payment guidelines and process, nearest vending machines, remaining coffee and food stocks, and the donation section. In case users get any problem there will be emergency customer care where they could reach the authority anytime. Based on the scenario, it seems that QR code vending machine application will be a perfect solution to the problem.

II. PROBLEM STATEMENT

In traditional vending machines, to purchase any item people need to pay with cash [6]. But this cash payment method creates so many problems for the passers-by [7]. Sometimes they reject the cash, sometime the cash got stuck in the machine, but consumer don't get their foods, also that machine doesn't accept big 5,10,50,100 notes money [7]. Moreover, for the regular coffee drinkers it's difficult to find quality coffee in various location. Besides, convenient access to fresh food and the ability to view expiry dates, access to healthier options, more interactive experience, cashless and the ability to pre-pay, variety and products more suitable to consumer's daily work and eating habits are great challenges for the traditional vending machine [8].Thus, Scan&Go are creating a platform to solve those problem by providing QR code payment vending machine with fresh foods, quality coffees, and emergency customer care. It will take the cashless world one step ahead and farewell for the traditional cash payment method.

III. LITERATURE REVIEW

A. Non-cash payment method using QR codes in an automated microcontroller- based vending machine

Contactless payment system is being used all over the world. It is the most modern and convenient way of paying. Countries in north America is getting benefits from contactless payment. Contactless smart chip technology is a kind of system where a tiny computer is placed in a contactless device that is designed to protect the information holding inside the device also the person doing transaction. Arduino based vending machine which uses codes as an encryption method for the proper authorization of the payment can be used for the contactless payment system. For this case the user can use check items from the vending machine or from the mobile app and once the user order in the vending machine the QR code will be generated which will hold all the information of the user's order. The QR code will be displayed on a tiny display of the vending machine. Once the user scans the information will be send to a web server which holds the information of user's payment system only after the user approves using their online account for payment. This web server will take the input and process the payment. After that the second QR code will be sent to the user's application and it will store the user's order and authorization from the server. Once the user gets the QR code, he can scan it using the vending machine's scanner and the full payment will be made and the product will be released without any contact of cash. Arduino mega 2560 can be used as a microcontroller board which is based on the Atmega2560 (datasheet). It includes everything required to support the microcontroller; simply connect it to a device with a USB cable or power it to get going with a AC-to-DC adapter or battery to get started. The Mega is compatible with most shields designed for the Arduino Duemilanove or Diecimila. For the power, only an usb port will be sufficient to provide the power but external power supply can also be used. External power can come from AC-to-DC adapter or battery. The ATmega2560 contains 256 KB of flash memory for the code. Arduino Uno can also be used as a microcontroller board which is based on the ATmega328. IT works almost the same as Arduino mega 2560. For the power it works exactly the same mega 2560 but it is cheaper than it. But Atmega328 contains only 32 KB of flash memory but it will be sufficient for storing the code [28]

B. Benchmarking

For any business, one of the important things that needed to be considered is researching similar business ventures exist or not. Which helps to discover lacking sides and the strong sides of the business. We also search for some other company that has similar business models with our business model

1. Alipay vending machine

Alipay vending machine comes with a system that will help to pay customer pay their bill via Alipay while purchasing something from vending machine. It has changed the transaction volume trends of vending machines. People have adapted and liked the machine as it is straightforward to use. It comes with facilities like easy payment methods, low cost hardware repairing, boost sales, business growth. But they have some lacking. They have only one media to make transaction that is Alipay. It means that if one doesn't have Alipay he can't use this system. They also do not have any emergency balance facility in case customers run out of cash. [12]

Figure 1: Alipay vending machine and its interface.

2. vBarista

It is a coffee vending machine that accepts QR code payments. User must make an account on their website to use this cashless service. While everyone is busy setting up cafes to provide quality coffees to the customer, they come with a business idea which can be started with meagre investments, also do not need any human resources to run the business. They also provide quality coffees in their vending machines which give consumers a sweet taste of coffee. However, their main lacking is they do not have a secure app, each time opening a website for purchasing a coffee can give bad user experience to the consumer. Also they are selling coffees collaborating with only one coffee chain, that does not meet the demand of mass audience causes different people to have different taste. [15]

C. Mega Trend

Based on the mega-trend study, People are now using contactless payment in Asia, Europe and North America. Trains and subway systems around the world now use contactless smart cards to pay for travel, with many big US cities. Millions of U.S. customers are now using contactless payment solutions, with tens of millions more planned as the latest contactless payment programs underpinned by the financial sector are introduced nationally. Many companies are now switching to digital-first processes to save time. Many large corporations depend on expense solutions such as TravelBank and Expensify to funnel expenses directly to their finance departments from the proverbial cash register. At the same time, credit card companies such as Brex and Divvy are creating payment systems to streamline those activities. We can see a new wave in the all of the big companies are now trying to go for a contactless cash payment method which will change the industry and lessen peoples' suffering. [28]

D. Market Demand

Contactless payment method is growing fast and many companies are now trying to adopt this system. Applying QR code in the vending machine for the payment is not anything new. Already Alibaba has used it in their system, but their system failed due to the lacking of convenience. Though there are some alternatives of QR code scanning system like NFS technology, beacon technology, geofencing but most of them are expensive and is not supported by all of the devices. QR code scanning payment is easier and supported by most of the devices. After the revolution of e-commerce, we can see customers in recent times do not like to pay by hard cash. Even some of them prefer cash on delivery but most of them like to pay without any contact. In Malaysia people are also going with the trend and websites like Shopee, Lazada all of them support contactless payment system which will be delivered by Scan&Go in vending machines. [10]

IV. 4 LENSES OF INNOVATION

Four lenses of innovation provide an understanding to the thinking patterns that lead innovators to their big ideas [22]. By emulating these thinking patterns one can gain the skills to improve all our creative abilities for idea generation and imaginative problem-solving [24]. The main objective of using the tool is to discover opportunities for innovation and growth related to business cases.

1) **Challenging Orthodoxies**: Make people understand that it is the best and easiest way to pay. Also maintaining the quality of the food and snacks is a great challenge. Next, Convincing the seller is a great issue that why they would buy this machine from us. Finally, making the coffee chain understand that how they can gain mass consumers if they use our vending machine to supply coffee.

2) **Harnessing Trends**: The trend of cashless world is a great motivation for us to go on with the venture. People preferring cashless transactions in every sector because of its convenience and safety. So, we hope people would also appreciate and accept our idea of bringing up the cashless transaction in this platform,

3) **Leveraging Resources:** From the leveraging resources perspective, Scan&Go's main targets are the people who are busy and the people under B40. It will act as a medium to solve the solution to their problem of buying coffee from vending machines using hard cash.

4) **Understanding Needs**: This will help people to make their life more convenient especially the people who are always busy with their work and do not like to carry hard cash. This will confirm and extend job opportunities for numerous people as we need developers for our app and vending machine.

E. ENVIRONMENT MAP

A map with a clear picture of the environment and identify opportunities, constraints and threats of a business is known as environment map. The reason behind using this tool is to adapt and keep growing business with the constant change of environment, in order to avoid the business irrelevancy or economical fall. [25]

Key Trends:

According to Hirschman (2019), in 2018, approximately six hundred thousand 60kg bags of coffee had been consumed in Malaysia. Coffee consumption had been on a downward trend in Malaysia since 2012, despite the increase in popularity of premium or gourmet coffee among the younger consumers. It keeps increasing since 2012. It will grow throughout the year.

Market Forces:

Most of the people cannot have their breakfast & coffee due to rush in the early morning that increases the demand of vending machines. People do not want to waste their time by standing in queue to pay bill. So, keeping in mind their problems, our service will be the reliable system for them. [26]

Macroeconomic Forces:

The vending machine industry is growing throughout the year. We can see vending machines everywhere with different types of facilities. Adding mobile platform and cashless payment is something now which can boost the economy. [29]

Industry Forces:

Keeping in mind of new entrants, our system will give the best services. There will also be helpline and feedback options so that we can fulfill all the demands of customers. We do not want to keep a single weak point to benefit the new entrants. [25]

V. STRATEGY CANVAS

Strategy canvass is a strategic tool that allows us to know the proposals offered by a certain market analyzing all the companies present, compared to the proposed value that our company will offer with its new product [27]. The purpose of using the tool is to plot how the current competitors are competing in the market and counter attacking the competitors on each key factor based on the plot. For the strategy canvass we would to like to make a system that fulfills all the need of a user. From our point of view and based on the interviews we have analyzed the need of the customer and will apply it on our business strategy. We believe our system will boost customers as we will be providing quality coffees. The revenue will also be much as we will be working the big coffee giants. The maintenance cost will also be less which will provide benefit to the seller. Overall, we will do everything to cover up all the problems of the customer and the seller.
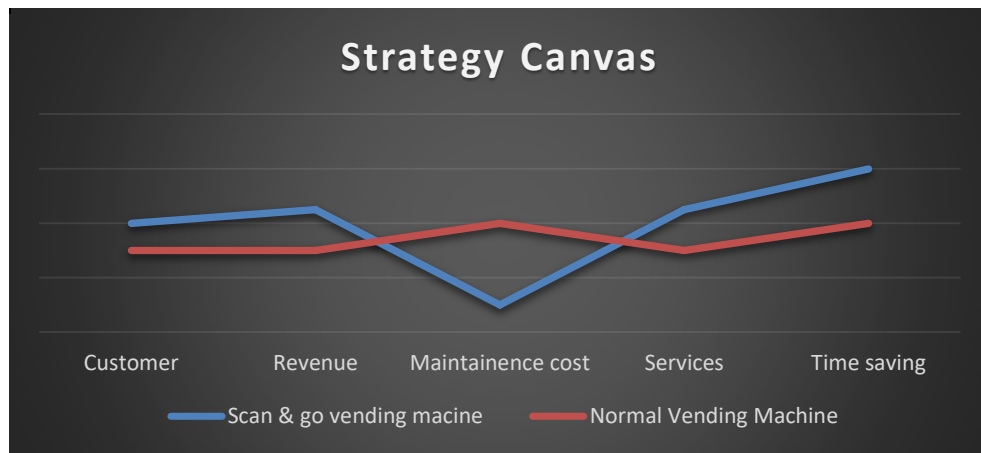
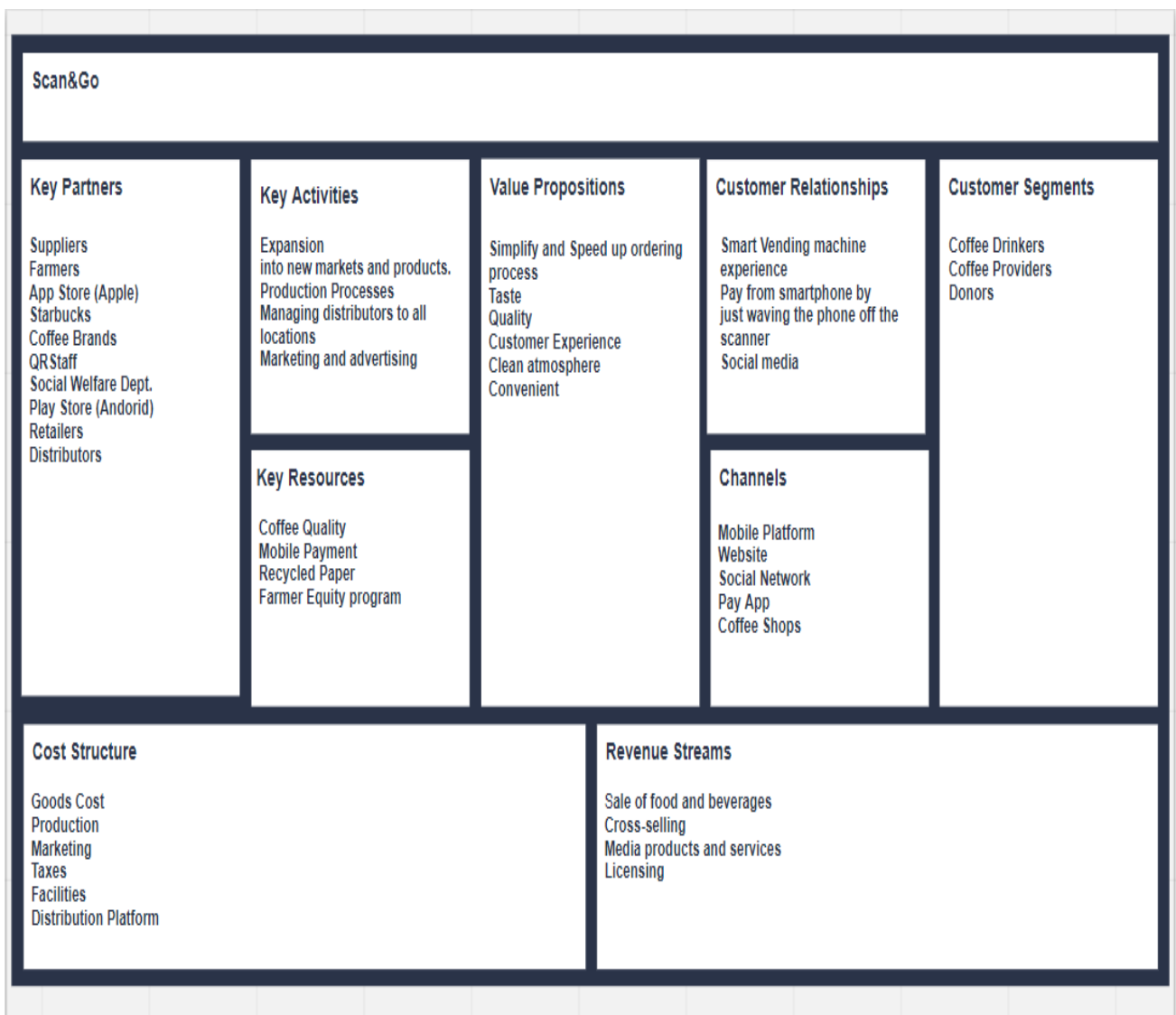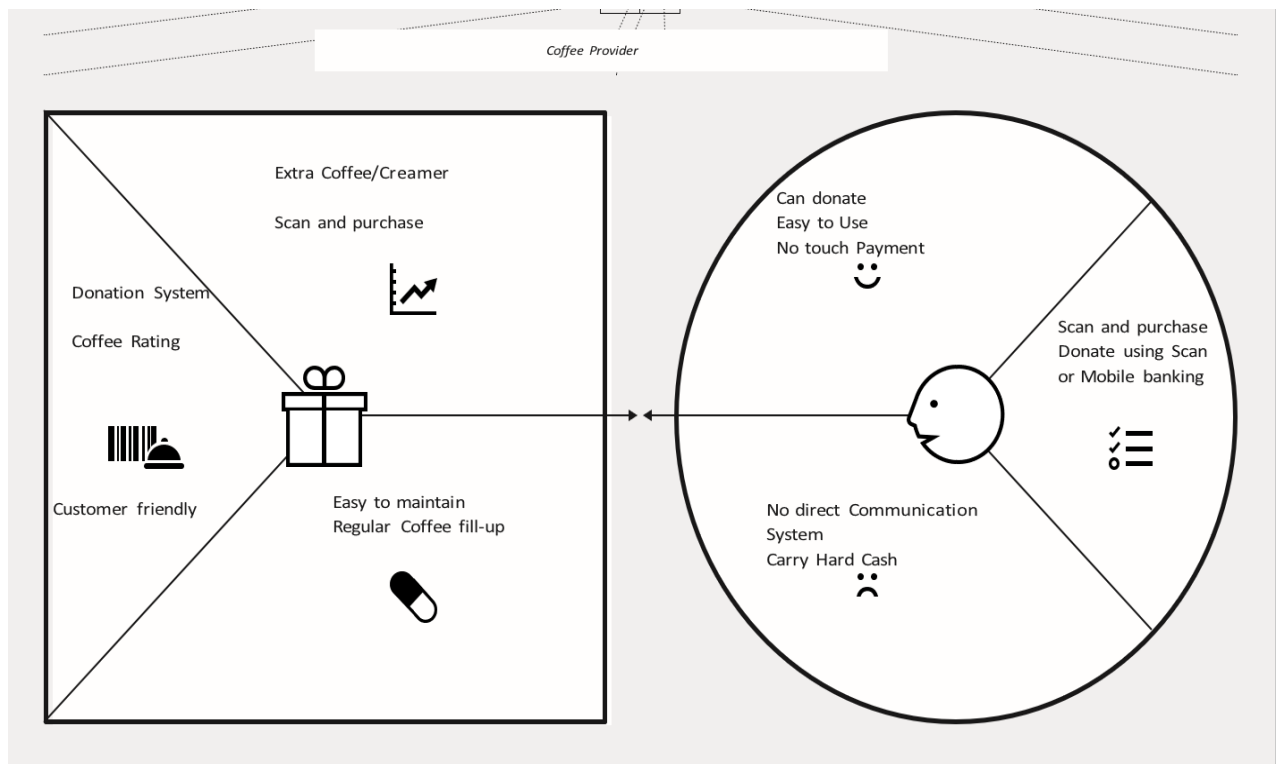**Figure 2: Strategy Canvas**

VI. INITIAL BUSINESS MODEL CANVAS
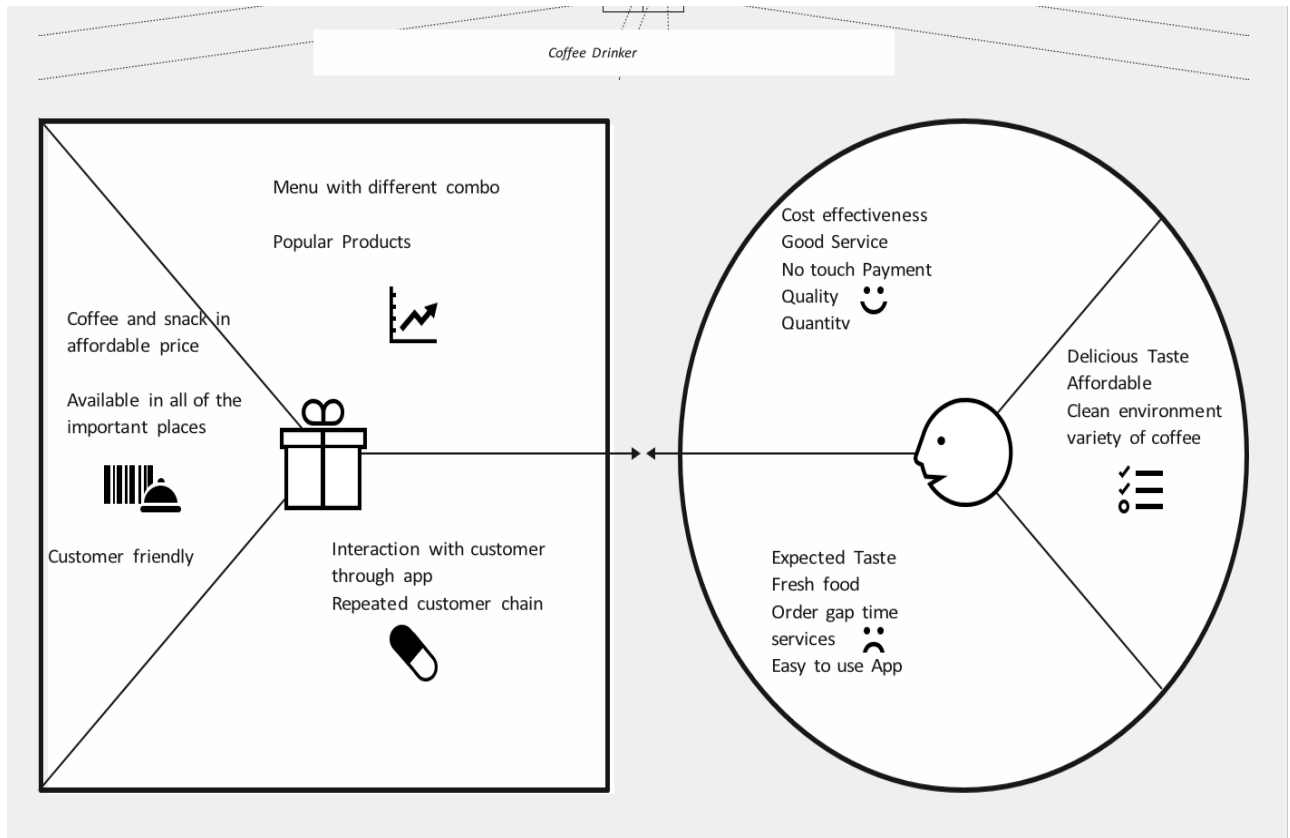

Figure 3: Initial BMC
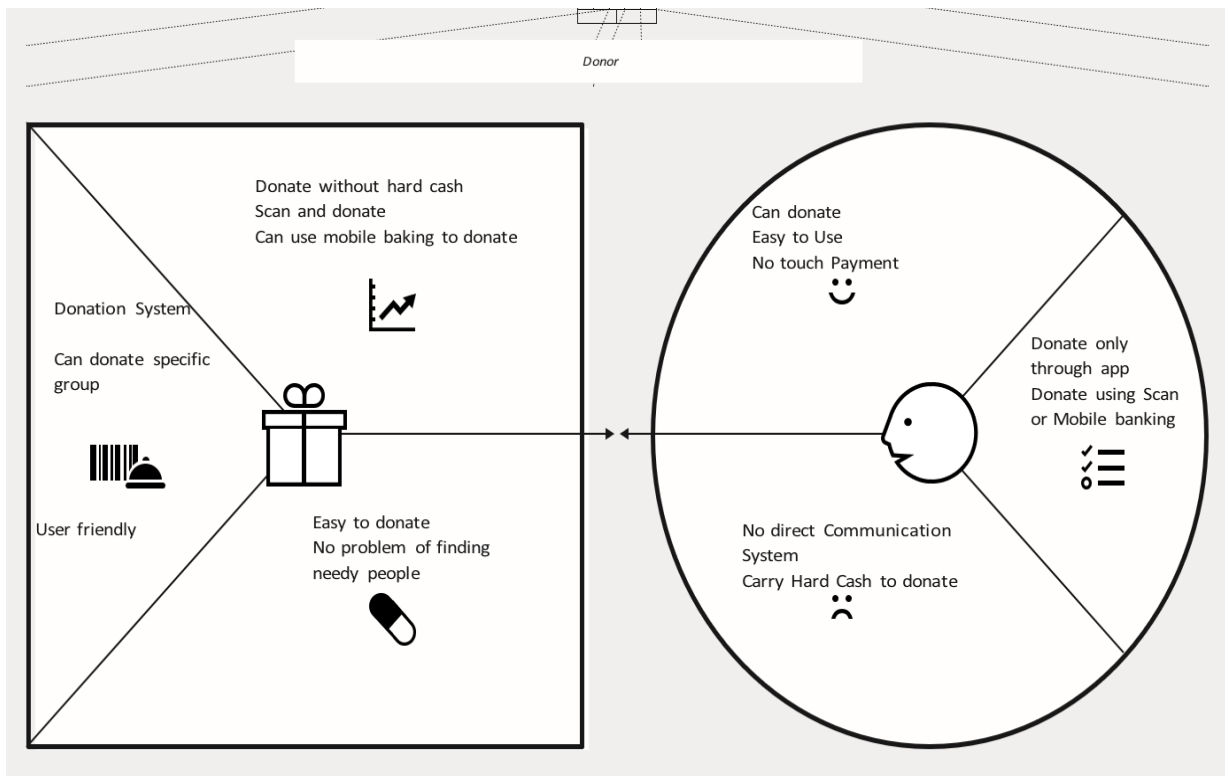
VII. INITIAL VPC

Figure 4: Initial VPC

VIII.   VALIDATION OF INITIAL BUSINESS MODEL

METHODOLOGY:

This section will explain the methodology adopted in the project, mentioning every component involved in conducting the project from the population, which is divided into students, people working under companies and administration and businessmen in our society, as well as sampling techniques used for the survey. Finally, this part provides a detailed explanation of the selected mode of analysis used and data collection methods. Google form response and a star interview method had been selected to suit the research objective and collect the required information for the project. This survey has determined the needs to gain a better insight on coffee drinkers, based on the findings the business will develop to satisfy the people in society. An interview conducted with reputed coffee shop owner in order to identify the common issues customers faced like vending machine rejecting notes, time consuming orders, carrying hard cash when using the vending machine and the opinions from the owner's point of view. The interviewee checked on the BMC, prototype sketches and suggested online banking system to help the B40 people who need money. After knowing the idea and the features, an online survey had been conducted among 50 people containing general questions about the customers' experience with vending machines in general. The online survey helped in directly getting feedback from the coffee drinker customer segments. It provided better insight on business and suggested the improvements. The findings would facilitate the project in terms of preventing any past issues customers faced with previous products or services. The customers want a quick, reliable, clean and easy system for the vending machine and transaction.
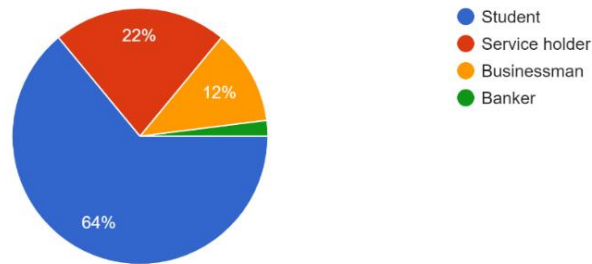
CUSTOMER VALIDATIONS

We have conducted a survey of our initial bmc and vpc among people who may gain benefits from our business, and the result of the responses that we got from our target was analysed to implement the customer's needs and wants.
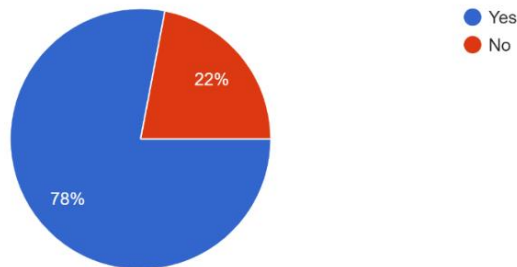
FINDINGS

The survey is filled up by a specific segment of society that can be benefited from our business such as coffee drinkers, Coffee provider. It was distributed through social media. The survey is made using a google form to ease the analysis process and to record all the responses we get as mentions below. **(The statistics from google form)**
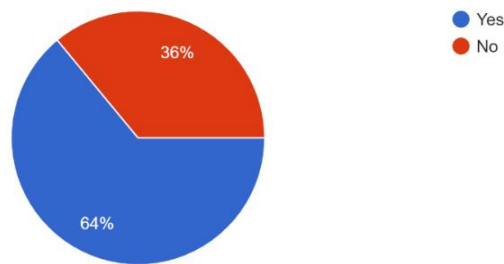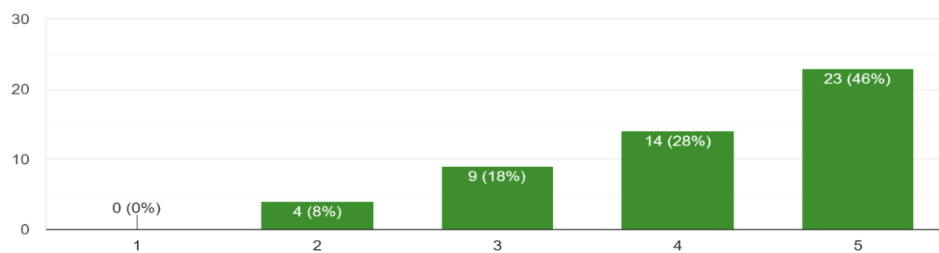
Profession
50 responses

- Student
- Service holder
- Businessman
- Banker

Are you a coffee lover?
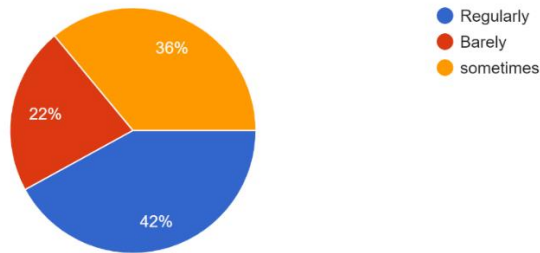50 responses

- Yes
- No

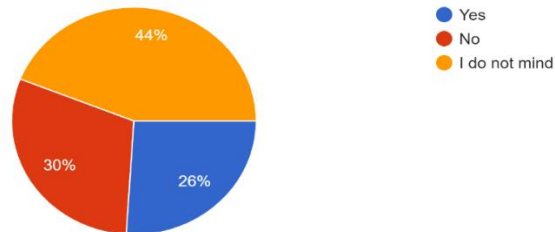Do you purchase coffee/snacks from the vending machine?
50 responses

- Yes
- No

We want to make an app that will help you to pay cash-less in the vending just by scanning QR-codes. Is it interesting to you?
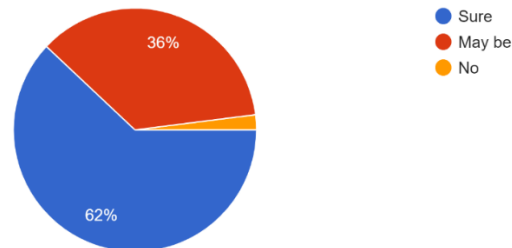50 responses
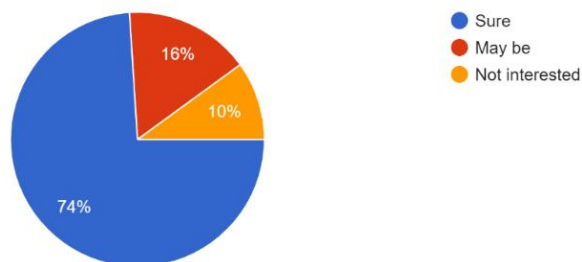
How often do you buy coffee?
50 responses

Do you like the cash payment method in the vending machine?
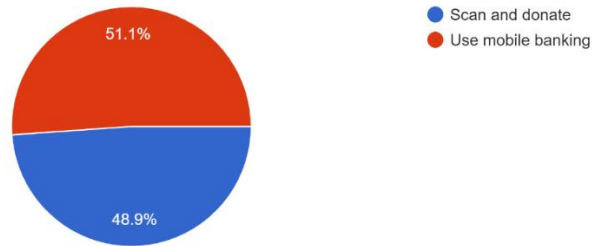50 responses

Will you use our app to pay cash-less QR code payment while purchasing coffee/snacks from the vending machine?
50 responses

Will you like to donate to help the poor people using our system?
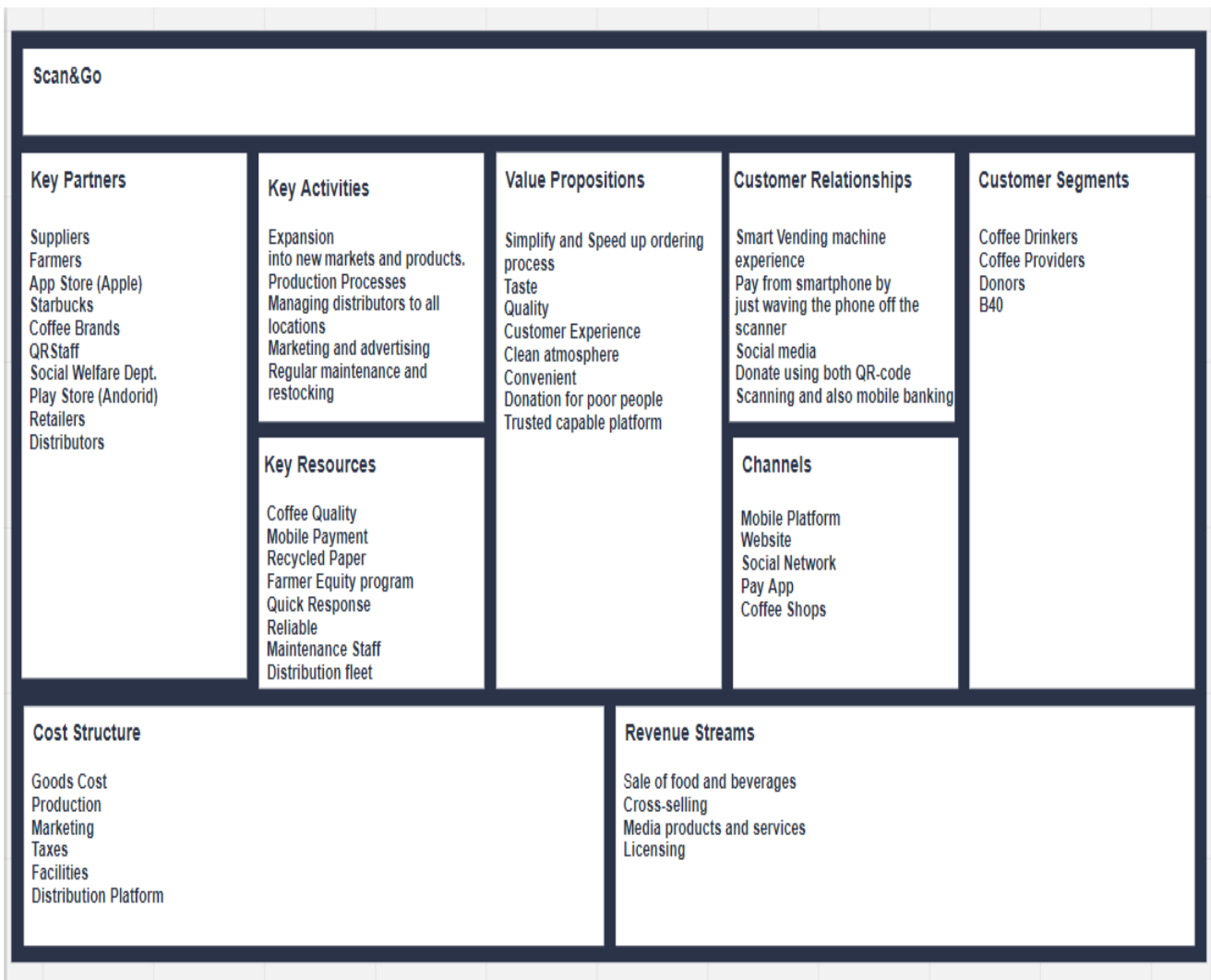50 responses

If yes, Which method will you like to follow?
45 responses

The statistics show that most of the respondents love to buy coffee from vending machines and they are very keen to use QR code scanning system to buy coffee from the vending machine. A lot of respondents also do not mind to use the current paying method and also like to use the contactless payment system. Most of the respondents like to use app to purchase coffee and they will like to donate to B40 people using the system. The number of people preferring mobile banking and scan and donate are quite similar.

IX. CONCEPTUAL SOLUTION

Enhanced BMC

A. Customer Segment

Customer segmentation is the method of separating consumers into groups based on common characteristics, so that business can efficiently and accurately sell to each group. Scan&GO lists the targeted user in Customer Segment's block which is:

1.Coffee Drinker

The people who will directly buy coffee from our vending machine.

2.Coffee Providers

They are different coffee selling companies but they can also sell their products using our vending machine.

3.Donors

Donors are the people who will donate to the B40 people using our contactless payment method.

4.B40

They are the needy people who will apply for the donation and get the donation from our system. They can also apply for a job which will help them financially.

B. Value Proposition

The value proposition describes the value in which the bundle of products and services that Scan&Go creates for the Customer segments. They are taste, quality, customer experience, clean atmosphere, donation for poor people, trusted capable platform, speedy ordering system. It will also provide additional job opportunities for the needy B40 people as the system needs workers to maintain it

C. Channels

Promote this application and vending machine system on mobile platforms, social media, websites, coffee shops and payapps. [31]

D. Customer Relationship

Customer relationships describe the type of relationship a company establishes with it is various customer segments. Scan&Go will provide fast vending machine experience and speedy and easy payment system as it will use QR code scanning system for the payment which is an easy and convenient way of transaction.

E. Key Resources

The Key Resources Building Block describes the most important assets required to make Scan&Go application work. The key resources include distribution fleet, coffee quality, mobile payment, recycled paper, farmer equity program, quick response, reliable and good maintenance staffs.

F. Key Activities

A company's key activities reflect what it will do to make the business model work. The key activities include expanding market and production process, managing distributors to all locations, advertising and regular maintenance.
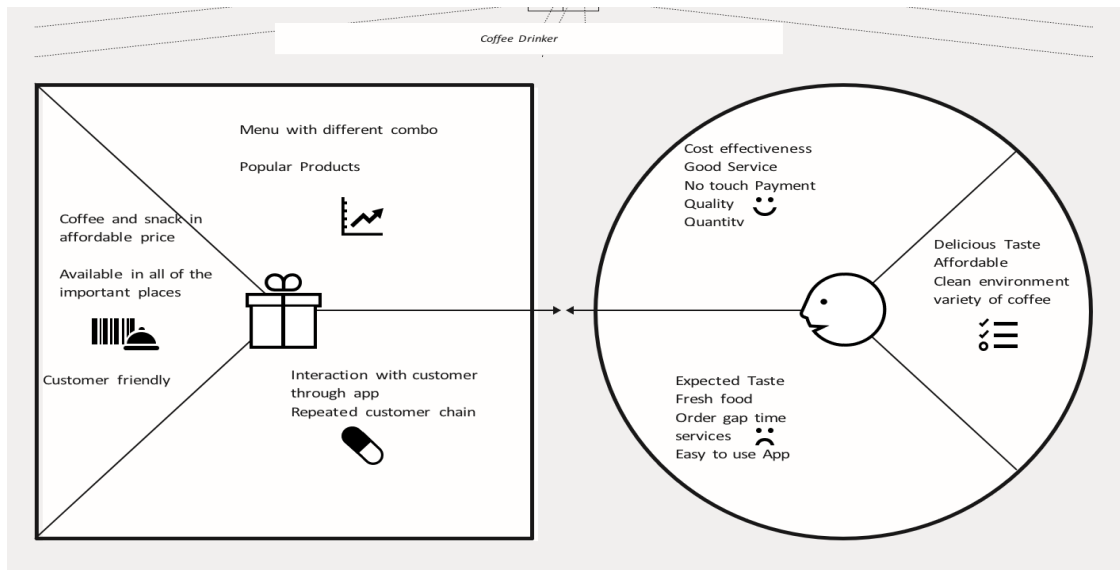
G. Key Partners

Key Partners are the connections that a company has with other companies or non-consumer entities that help the business model work. The key partners are suppliers, app systems, QR code scanning companies, retailers, distributors, farmers.
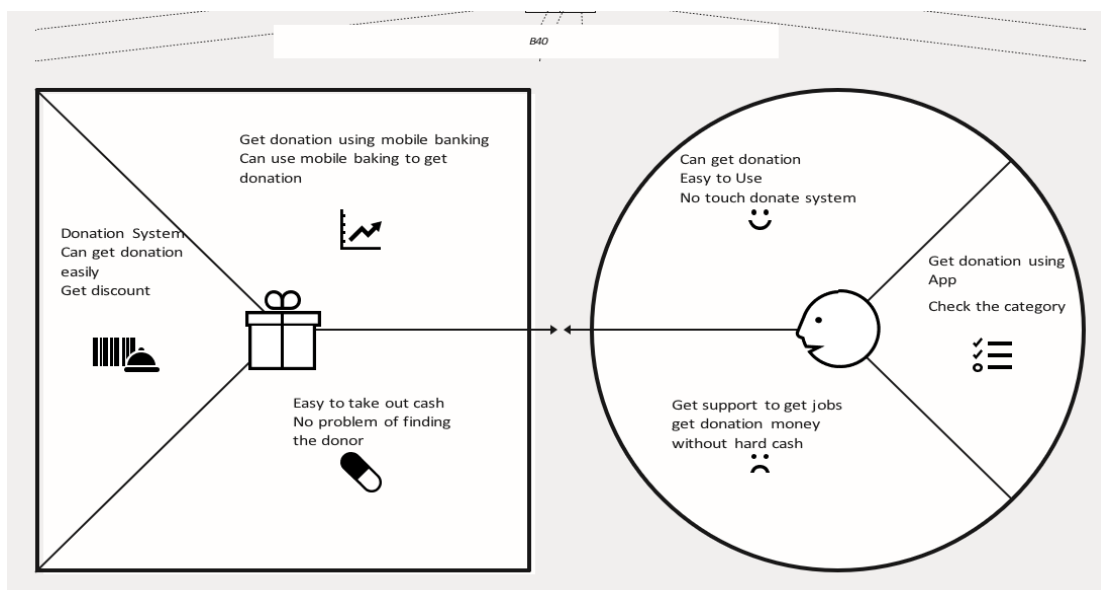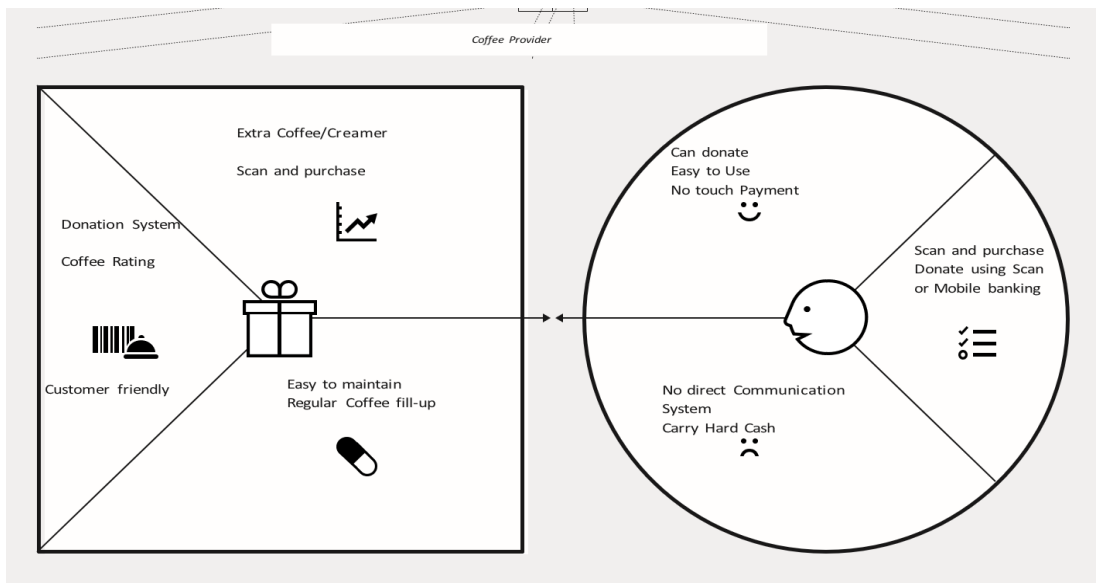
H. Cost Structure

Cost structure of the Scan&GO includes production, marketing, taxes, goods, facilities and distribution costs.
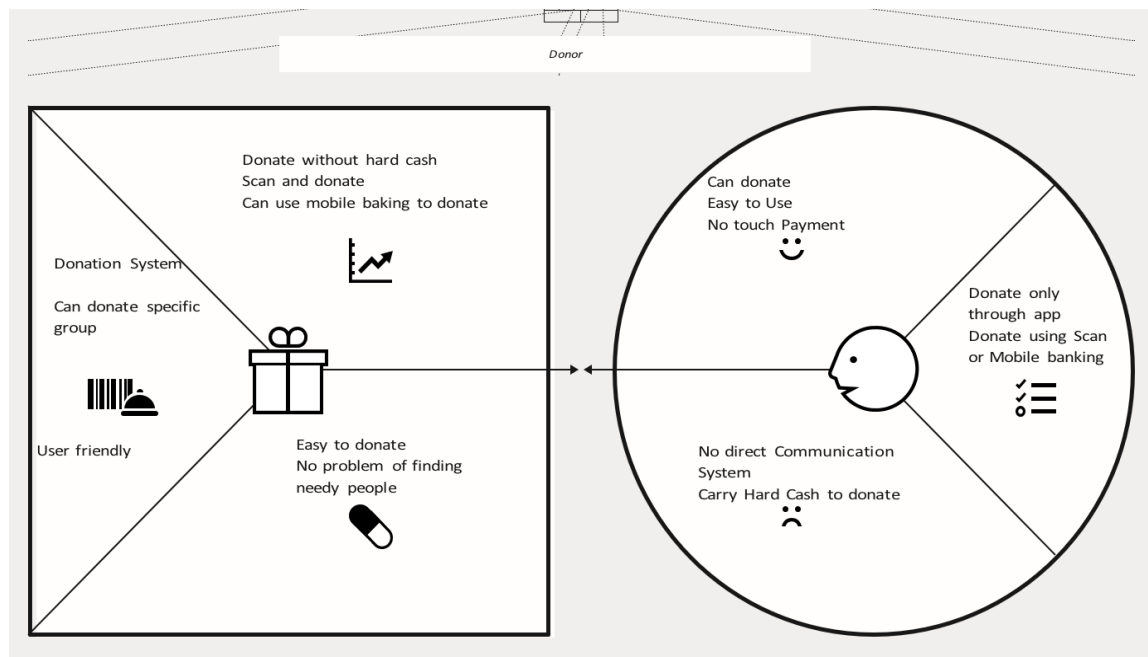
I. Revenue Stream:

Revenue Streams are the various sources from which a business earns money from the sale of goods or the provision of services. Through Scan&Go revenue will be generated by selling products, licensing, cross-selling and media products and services

Enhanced VPC

X.   CONCLUSION AND FUTURE WORKS

In conclusion, based on above modelling presentation showed the vision and perception Business Model of Scan&Go;

a conceptual digital platform. this conceptual solution could give many benefits to various customer segments like coffee drinkers, coffee providers, B40 people. Also, it could accomplish the part of SDG 8 i.e. Decent Work and Economic Growth? Scan&Go could provide a platform for the seller to sell more products through vending machine other coffee. Moreover, Scan&Go can help other online application like grab, foodpanda, to use this platform. In the future, a complete business plan for Scan&Go conceptual business model shall be developed by applying V2MOM (Vision, Values, Methods, Obstacles, and Measures) model. [30] Scan&Go also can provide both application and web-based platforms for their users. Scan&Go would take the cashless world a step ahead.

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