Designing a Medical Device Marketplace Business Model Using the Lean Startup Method

Emma Oshaviani Annisya¹ and Taufiq Rochman²

¹,²Departemen of Industrial Engineering, Sebelas Maret University, Surakarta, Indonesia

E-mail: emmaoshaa@gmail.com

Abstract. Marketplace is a model of business where sellers and buyers do their selling and purchasing transactions online. Medical devices marketplace comes in application software that can be used as a place for promoting products that have a purpose to increase health quality in Indonesia. This application is called ‘MedMarket’ that stand for Medical-Market. The aim of this study is to design business processes that will be implemented and design product prototype according to market needs. So it can be solution to obtain various types of medical devices with good quality and competitive price in one application that will make it easier to look for the requested medical device. MedMarket is designed with lean startup method which consist of three stages: document the plan, identify the riskiest parts of the plan, and systematically test the plan to validate feedbacks from respondents. MedMarket has three main features which are verified sellers, products information, and the products are divided in several categories. Application’s prototype was designed with Adobe Xd software.

1. Introduction

Indonesia is not included in the 50 healthiest countries according to the Bloomberg Healthiest Country Index 2019 edition. This index consists of several variables such as health infrastructure and life expectancy. Based on Permenkes No. 86 of 2013, high demand for medical devices has not been followed by the development of the medical devices industry in Indonesia [1]. Today, 90% of medical devices in Indonesia are imported. Therefor the government has been assigned that medical devices industry as priority industry to develop [2]. The medical devices industry has great potential market in Indonesia, therefor it needs to be improved because there are still many debilities found in the medical devices management [3]. For that reason, the condition and function of medical devices have to be in good condition so they can support health services and can be functioned optimally [4].

Medical devices are articles, instruments, devices or machineries used in prevention, diagnosis or treatment, or to detect, measure, improve, or modify structure of human body for health purposes [5]. The high tax on medical devices in Indonesia caused a high medical cost and a cost to obtain medical devices [6]. To overcome this, it is necessary to increase bargaining power while maintaining good quality, and one of them is planning a marketplace for specific medical devices.

Marketplace is a virtual market where buyers and sellers meet with more computerized system using a network that can support the market, therefore it can be used efficiently in providing the latest information and services [7]. The internet advancement has an impact on economic growth where the society is currently innovating to create startups. In 2018, internet users in Indonesia reached 64.8% or
equal to 171.17 million people with a percentage of user growth in one year is 10.12% or equal to 27 million people [8]. In 2016, Indonesia had two thousand startups. It makes Indonesia to be the country that has the most startups in Southeast Asia. The majority of startups that had been developed are technology, science, and engineering based companies [9].

This phenomenon bears the potential to collaborate health sector with marketplace to be a startup. This startup is called ‘MedMarket’. MedMarket is designed as an application that is going to be used by people who are looking for medical devices, especially for doctors and residents. MedMarket is designed using the Lean Startup method by collecting data and mapping with Business Model Canvas, therefore a business model can suit with market needs. The aim of this study is to design business processes that will be implemented and design product prototype according to market needs. So it can be solution to obtain various types of medical devices with good quality and competitive price in one application that will make it easier to look for the requested medical device.

2. Methodology
The methodology used to design the marketplace ‘MedMarket’ consists of three stages based on lean startup method [10] as described in Figure 1.

![Figure 1. Stages of lean startup method](image_url)

The methodology begins with (1) document the plan. It aims to map the strategy of building a business by collecting data with questionnaires to 35 respondents. The questionnaire recapitulation is used to identify customer problems, jobs, and gains which used to create a Business Model Canvas (BMC). The functions of BMC are to analyse respondents’ need based on problems that had been found and mapped them into nine blocks, which are value proposition, customer segments, channel, customer relationship, revenue stream, key activities, key partners, key resources, and cost structure. (2) Identify the riskiest part of the plan. It aims to determine the riskiest parts of the Business Model Canvas that have been formed to be a priority for testing. Identification is based on the consideration of researchers and experts. (3) Systematically test the plan. It aims to test Business Model Canvas to determine the problem/solution fit and product/market fit.

3. Result and Discussion
The research was begin with document the plan using Business Model Canvas according to questionnaire recapitulation about customer problems, jobs, and gains from 35 respondents. The Business Model Canvas presented in Figure 2.
Figure 2. Business model canvas iteration #0

Business Model Canvas #0 consists of (a) value proposition: MedMarket is expected to reduce losses experienced by consumers such as less informative services, difficulties in finding product at store, and queues that occur in stores. MedMarket offers convenience to consumers in choosing good quality products, getting information about product availability, and choosing product at affordable prices. (b) customer segments: MedMarket is intended for people range 20 – 30 years old who use medical devices and are internet users. (c) channels: application can be downloaded at Playstore and marketing is done through vendors and word of mouth marketing. (d) customer relationship: MedMarket using self-service and personal assistant system to help users’ problems. (e) revenue streams: users are charged with administrative fee for each product purchased. (f) key partnership: collaboration with vendors, e-wallet, bank, and delivery courier to optimize operational activities. (g) key activities: activities are related to problem solving to help users when they are using the application. (h) key resources: MedMarket’s resources consist of physical assets, human, and intellectual prop. (i) cost structure: a costs description used to run this startup.

Stage two, identify the riskiest part of the plan. Based on consideration of researches and experts, the riskiest part of this startup is customer segments determination. Determination of customer segments must be precise so the product can be adjusted to costumer’s needs who are searching, recognizing, and obtaining medical devices easily. Therefor the selected customer segment has an age range of 20 – 50 years old with early adopters are students in medical cluster.

The last stage, systematically test the plan using two-step experiments which is the problem and the solution. The problem experiment has been figured by collecting data using a questionnaire to 10 people to validate product risk, market risk, and consumer risk. Then the Business Model Canvas was updated based on questionnaire recapitulation in value proposition and customer segments section presented in Figure 3.
Based on problem experiments, Information system modeling at MedMarket is done by creating a Business Process Model and Notation (BPMN) which aims to coordinate the sequence of processes and messages that flow between actors in different activities so that they can be easily understood. BPMN shows the business processes in the MedMarket application, where there are three stakeholders involved, consist of users, systems, and sellers as in Figure 4.

The prototype design of the MedMarket application was designed with three main features using Adobe Xd software. The first feature is the option of categories that divided into 6 categories, consists of dental equipment, vital equipment, assistive devices, consumables tools, learning support tools, and portable test kits. The second feature is product information that consists of product details, amount of available stock, and product ratings based on user reviews. The third feature is verified sellers that allows the MedMarket’s team to verify the new sellers on MedMarket application. It has purpose to make sure the quality of the products and to confirm the sellers in MedMarket already have a medical devices distribution permit.

Figure 3. Business model canvas iteration #1

Figure 4. MedMarket’s business process model and notation
The final step is solution experiment. This experiment was done by collecting data with questionnaires to 20 people to validate consumer risk based on priority features, product risk based on administrative fee agreed, and market risk based on early adopter validation. Solution experiments also presents the prototype of MedMarket application to find out feedback from respondent. Then the Business Model Canvas was updated based on questionnaire recapitulation in value proposition, revenue streams, and customer segments section presented in Figure 6.

![MedMarket prototype application](image)

**Figure 5.** MedMarket prototype application

**Figure 6.** Business model canvas iteration #2

| Key Partners       | Key Activities               | Value Proposition                                                                 | Customer Relationships      | Customer Segments                                                                 |
|--------------------|------------------------------|----------------------------------------------------------------------------------|----------------------------|----------------------------------------------------------------------------------|
| Medical Devices Provider | Problem Solver, Recruit vendors, Customization, Maintenance | Providing medical device transactional service that make easier for people to find and buy medical devices with the main features, consists of: 1. Verified Seller 2. Product Information 3. Categories Option The main features can save time and effort also can summarize the transactional process | Self Service, Personal Assistant | Medical devices users and internet users with an age range between 20 – 50 years old. Early adopter: Student in medical cluster |
| E-wallet | Key Resources                     | Key Resources                                                                 | Channels                                      | PlayStore |
| Bank | Physical asset, Human, Intellectual prop | Key Activities: Problem Solver, Recruit vendors, Customization, Maintenance | Medical Devices Provider | Word of mouth |
| Delivery Services | Channels | Key Resources: Physical asset, Human, Intellectual prop | Key Activities: Problem Solver, Recruit vendors, Customization, Maintenance | Key Resources: Physical asset, Human, Intellectual prop |
| Physical asset | | Value Proposition | Providing medical device transactional service that make easier for people to find and buy medical devices with the main features, consists of: 1. Verified Seller 2. Product Information 3. Categories Option The main features can save time and effort also can summarize the transactional process |
| Human | | Key Resources | Physical asset, Human, Intellectual prop |
| Intellectual prop | | Key Activities | Problem Solver, Recruit vendors, Customization, Maintenance |

| Cost Structure | Revenue Streams |
|----------------|-----------------|
| Fixed Cost | Administrative fee of Rp280 for each product purchased |
| Variable Cost | |

The updates contained in Business Model Canvas iteration #2 consist of (a) value proposition: the features contained in MedMarket have been validated and sorted according to user’s priority. (b) revenue streams: the final administrative fee is Rp280 for each product purchased. (c) customer segments: early adopter on MedMarket had been validated.
4. Conclusions
MedMarket application as medical devices marketplace is designed with lean startup method that has three step consists of document the plan, identify the riskiest part of the plan, and systematically test the plan. The prototype of MedMarket application is designed based on the result of problem experiment and MedMarket’s Business Process Model and Notation. The design of MedMarket prototype was created using Adobe Xd software. The prototype then has been tested in solution experiment. The results of solution experiment is validated main features that are needed by users, consist of verified sellers, product informations, and category options; validate the student in medical cluster as early adopter; and validate the administrative fee of Rp280 for each product purchased.

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Acknowledgment
The authors thank Kristiana Rahayu as development team of PT. Tesena Inovindo and Bambang Sulistiyawan as a director of PT. Rijen Cahaya Mulia and subject recruitment.
Appendix: Respondent’s Questioner

| Pertanyaan                                                                 | Jawaban                                                                                                                                 |
|---------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Penilaian dengan skala 1 – 10. Skala 1 : Sangat Tidak Setuju. Skala 10 : Sangat Setuju |                                                                                                                                 |
| Apakah Anda merasa kesulitan dalam mencari produk alat kesehatan secara konvensional? |                                                                                                                                 |
| Apakah jarak tempuh mempengaruhi Anda dalam mencari produk alat kesehatan? |                                                                                                                                 |
| Apakah antrian di toko mempengaruhi minat Anda untuk membeli produk? |                                                                                                                                 |
| Apakah informasi ketersediaan produk dapat meningkatkan minat? |                                                                                                                                 |
| Apakah waktu antri pembelian produk mempengaruhi minat? |                                                                                                                                 |
| Apakah penawaran promo mempengaruhi dalam memilih produk? |                                                                                                                                 |
| Apakah yang Anda lakukan jika kesulitan mencari produk alat kesehatan? | □ Mencari produk di online shop □ Meminta rekomendasi teman □ Memesan di toko konvensional Lainnya : |
| Bagaimana pelayanan yang membuat Anda tidak senang? | □ Pelayanan tidak ramah □ Pelayanan yang lama □ Pelayanan yang kurang informatif Lainnya : |
| Bagaimana cara Anda memilih produk? | □ Mencari info di internet □ Membaca katalog info produk □ Mendapat rekomendasi dari teman Lainnya : |
| Faktor apa yang membuat Anda memilih produk tersebut? | □ Kualitas yang ditawarkan □ Harga yang terjangkau □ Pelayanan yang baik Lainnya : |