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The Business Model Innovation of Agtech Startups

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Abstract:
Indonesian startup founders show increasing enthusiasm for agriculture and fisheries. However, globally startup success rate is only 5%. On top of that, many Agtech startups fail to create a sustainable business modeland, many of them face the business model challenges. Thus, the researcher wants to study the business model innovation adopted by Agtech startups and capabilities needed to conduct the business model innovation.
This study is conducted in qualitative research by a semi-structured interview method because the study aims to get in-depth information. The research is conducted to 6 Agtech startups, which represent six categories of Agtech startup. The founded data are analyzed with thematic analysis method, word frequency analysis and combined with a review of recent literature to give a deep insight. Addressing this problem will have a practical benefit for Agtech startup in Indonesia in conducting a business model innovation and helping to develop a better understand the business model innovation in Agtech startups.
The research shows that value creation aspect which is people, asset, and partner focus on operation and marketing area. Agtech startup put their focus on their product, people, partner, pricing strategy and their way of getting customers. The business model innovation process heavily relies on people in their organization, partner, and customer. Thus, the capabilities needed for innovating is sensing opportunity from people, partner, and customer, seizing their stakeholder and improve continuously. Future study is recommended to explore deeply about the effect of each the business model innovation on the startup's success with a quantitative study.

Keywords: *Agtech startup, the business model innovation, the business model innovation capabilities*

1. Introduction

Agricultural technology or 'Agtech' in short is technologies in the agricultural sector that help to increase productivity, improve the utilization of the used resources, and/or give positive ecological impact (Dutia, 2014). The term startup itself is used to describe a human institution designed to create a new product or service under condition of extreme uncertainty (Ries, 2011). Combining the meaning of Agtech by Dutia and startup by Ries, the researcher defined Agtech startup as an institution that creates new/innovative technologies in the agricultural sector.

Even though more startup founders show interest in the agriculture industry (Mulia, 2019), 'globally startup success rate is only 5%', according to Mr Rudiantara, the head of the Ministry of Communication and Information(Yadika, 2019). It is asserted that many Agtech startups face obstacles to grow and to offer sustainable value to their customer because of the business environment and business model challenges (Lohento & Sotannde, 2019, p. 1).

As one of the startup obstacle, a business model is a description of every activity to create value that results in consumer value-added and long-term revenue (Oliver, 2015).It is believed that all of the successful company operates by having a useful business model as its guideline (Johnson, Christensen, & Kagermann, 2008). Thus, a business model plays an essential part in a business's success. An Agtech startup success definition can come in many parameters such as revenue and profit, customer growth, sustaining after three years, offer effective product/service to customers, and achieve their planned outputs(Lohento & Sotannde, 2019).

2. Literature Review

2.1. Agtech Startup

The term startup is defined as an institution that creates a new product or service under extreme uncertainty (Ries, 2011). On the other note, Agtech is technologies in the agricultural sector that help with increasing productivity, improving the efficiency of resource use, and give positive ecological impact(Dutia, 2014). Thus, in this research, we define Agtech startup as an institution that creates new/innovative products or services in the agricultural sector. There are six major groups of Agtech startups (Oliveros). It includes On-farm input, Innovative food and beverages, Supply chain and intermediary platform, Food e-commerce and meal kits, novel farming system, and Financial and Other Services.

2.2. The Business Model

A business model is defined as an explanation of every activity that is made to create value that will result in customer value-added and long-term revenue (Oliver, 2015).The structure of this the business model framework can be seen in figure 1. It offers a systematic explanation of how a business unit creates and keep interested. It consists of three pillars; value creation, value proposition, and value capture(Chu, 2017).

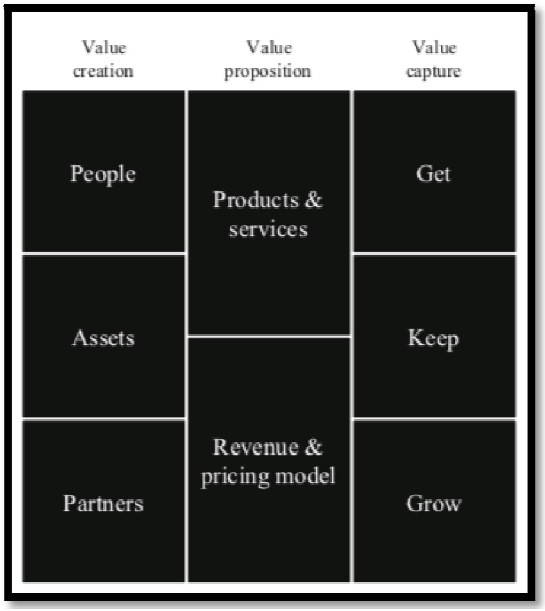

Figure 1: Chu Business Model Framework
Source: (Chu, 2017)

The first pillar is value creation that consists of people, asset, and partner needed by business unit to create value. The secondpillar is value proposition that consists of product and service that business unitgives and revenue and pricing model that business unit adopt. The lastpillar is value capture that explains how a business unitgets, keep, and grow customers.

2.3. The business model Innovation

The business model innovation (BMI) is a situation when at least two of the business model groups are innovated to deliver value in a new way (Lindgardt, Reeves, Stalk, & Deimler, 2009). Generally, BMI can be characterized by one or more of the following: a fundamental change in the customer value proposition and the value chain configuration, operating model of the organization, or in the business model of the business unit(Sahay & Sahay, 2017).

3. Methodology

Semi-structured interviews are conducted for this research in order to collect the primary data. Due to the government regulations regarding Covid-19 Pandemic, the data are collected through online platforms Google Meet. The data are collected from 6 respondents namely BIOPS, Kamala, Wegrow, Etnogotani, Bekal Lilo, and eFisherythat represent 6 categories of Agtech startup.

The aims of conducting these interviewsare to get insights about the business model innovation adopted by Agtech startup. In the interview, the researcher expects to get more insight about respondents' the business model, their innovation to the business model, and the capability to innovate the business model.To analyze the data the researcher use thematic analysis method and word frequency.

4. Analysis and Result

4.1. Thematic Analysis

Thematic analysis method is applied by the researcher to analyse the data.The researcherchooses this method since it can describe data set in detail (Braun & Clarke, 2006). The researcher aims to find out about the business model, the business model innovation, the business model innovation capabilities, and the business model innovation driver. Thematic analysis is done by applying several stages of analysis that's start with familiarizing and coding, theme development, reviewing and defining theme, and lastly write a report. (Terry, Hayfield, Clarke, & Braun, 2017)

Aspect	Sub-aspect	Explanation
People	Primary activity	Technology, operational, marketing
	Secondary activity	CEO, business development
Asset	Physical asset	Production tools
	Non-physical asset	Patent, data
Partner	Supplier	System production
	Strategic partner	Sales using a third party to introduce the technology
Product and service		Data sensor to predict the amount of water needed, pest, plant's disease that's better to raise the efficiency of plant production and lessen the work so it becomes easier.
Revenue and pricing model		Determining price according to COGS and feature, paid with profit sharing and fully paid to own.
Get		Demo plot, promotion by an influencer, promotion in an event, social media, and community.
Keep		Help when there is a problem with the technology
Grow		Recommend a certain product and recommending another one.

Table 1: The Business Model of Biops from Interview's Result by Using Thematic Analysis
Source: The Researcher's Analysis

Aspect	Sub-aspect	Explanation
People	Primary activity	Production, digital marketing, sales
	Secondary activity	CEO, business development, finance
Asset	Physical asset	Production tools, Ready cascara, production place
	Non-physical asset	Logo, PIRT (in the process)
Partner	Supplier	Production vendor, farmer, farmer's wife
	Strategic partner	Organic store, reseller store, hotels
Product and service		Tea from cascara, different raw material and taste. Contain more anti-oxidant, and use e-radiation to eliminate bacteria better.
Revenue and pricing model		3 times of COGS for pay to own individual buyer, 2 times of COGS or consignment for partners.
Get		Open booth in an event with the target market, give tester, push the social value and nutritional benefit, sell in organic stores, social media and e-commerce, give vouchers for a buyer that bring other buyers.
Keep		Discount voucher, share testimony and review
Grow		Innovate another product to sell

Table 2: The Business Model of Kamalafrom the Interview's Result by Using Thematic Analysis
Source: The Researcher's Analysis

Aspect	Sub-aspect	Explanation
People	Primary activity	COO, RnD, Marketing
	Secondary activity	CEO, Finance
Asset	Physical asset	Office, place for production, production tools, printer, paper cutter.
	Non-physical asset	Application, data
Partner	Supplier	Supplier for raw material
	Strategic partner	Store partner, Vlogger for selling, a middleman to get business to work with, communities for workshop
Product and service		A better green living platform that provides microgreens kit with application and games to know urban farming to make it easier to farm, herbs kitchen kit, workshop, service to make farm, and kawanhijau.com as a platform to share/sell farming products.
Revenue and pricing model		Determine price according to COGS, Pay fully with individual customer and consignment with partner store.
Get		Offline store, online shop, e-commerce, giveaway, add channel and collaborator, social media
Keep		Post interaction by having group chat and gathering
Grow		Give additional item such as a workshop to have with microgreens kit, releasing new product such as another kit. Microgreens kit can be used once and can be refilled with a new seed, and plant media.

Table 3: The Business Model of Wegrow from Interview's Result by Using Thematic Analysis
Source:The Researcher's Analysis

Aspect	Sub-aspect	Explanation
People	Primary activity	Production, website maker, designer
	Secondary activity	An owner that's not involved, finance
Asset	Physical asset	Packing tools, cart, production tools, warehouse
	Non-physical asset	Website, brand
Partner	Supplier	Farmer
Product and service		Vegetable kits that's easier to get, fresh and great quality. Vegetable products. Give a better price for farmers.
Revenue and pricing model		Pay to own system, determine price according to competitors such as the main market and local market.
Get		Follow Instagram and Facebook, share pamphlet, attend vegetable exhibitions, share vegetables' benefit, save potential buyers phone number, advertising
Keep		Keep in touch with customers through a broadcast message in WhatsApp
Grow		Have a vegetables processed product

Table 4: The Business Model of Etnogotani from interview's Result by Using Thematic Analysis
Source:The Researcher's Analysis

Aspect	Sub-aspect	Explanation
People	Primary activity	Courrier, one man working for branding, design, cook, and Quality control
Asset	Physical asset	Kitchenware, bowl, mixing bowl
	Non-physical asset	Branding, social media
Partner	Supplier	Work with printing agency, packaging vendor, and material vendor
	Strategic partner	Sharing profit with parents for oven, fridge, and mixer.
Product and service		Rice box, soft cookie, frozen food, with a brand that is closer to customers and great quality.
Revenue and pricing model		Customer pay fully to own the product, determine price according to the market, for cookies, it's expensive due to a premium material.
Get		Sell through the sister, giveaway cookie, quiz time, free delivery, ask to follow, repost, tag a new product in Instagram story, event, send the product to friends, give cute packaging for social media update material.
Keep		Keep with a good impression that the product is delicious and clean, give a free portion for loyal customers.
Grow		Have many variants so people can order a lot in one time especially for group work or office worker.

Table 5: The Business Model of Bekal Lilo from Interview's Result by Using Thematic Analysis
Source:The Researcher's Analysis

Aspect	Sub-aspect	Explanation
People	Primary activity	Technology, operational, sales, marketing
	Secondary activity	HR, CEO
Asset	Physical asset	Building, cold storage
	Non-physical asset	Brand, patent, and data
Partner	Supplier	Manufacturing for feeder, partnership for cold storage
	Strategic partner	Distributor to sell fish
Product and service		Auto feeder for effort efficiency so it's easier and gives better output, give funds through eFishery fund, and sell frozen product or fresh product through eFishery fresh
Revenue and pricing model		Fund is free and they are encouraged to use eFishery feeder, their fish will be taken and sold. Sold according to market price and fully paid by customers.
Get		Through demo, word of mouth, engage the third party such as feed vendor to introduce the product.
Keep		Great feeder performance, gathering, retention program
Grow		Give funding if they use eFishery feeder

Table 6: The Business Model of efishery from Interview's Result by Using Thematic Analysis
Source:The Researcher's Analysis

Startup	Innovated Aspect	Explanation
BIOPS	People	Used to have no business development area
	Product	The previous product is big, complex with a feature that is not needed by farmers, and expensive.
	Pricing model	Used to only have a fully paid option for payment.
Kamala	Asset	Used to have a booth and coffee grinder until they sell it
	Product	Used to sell castea, a ready to drink tea not a tea in a jar than can last for one month.
	Get	Used to sell in booth. Re-brand from castea to Kamala with better packaging and emotional value.
Wegrow	People	Innovate for new Rnd and Marketing department
	Partner	Gradually add a workshop partner and selling partner
	Product	Used to only have offline workshop and microgreens kit. The application used to be accessed by the buyer only.
	Get	Used to only sell via offline.
Etnogotani	Product	Used to sell vegetable salad and using empty land to utilize
	Get	Used to get customer by booth only
Bekal Lilo	People	Used to not have courier and distribute through gosend and grabfood which is an online shipping agent
	Partner	Distributor change over time since the material in Makassar is often sold out.
	Product	Used to only have bekal lilo (rice box)
	Get	Used to only get customer buy selling through sister and update Instagram constantly.
eFishery	People	People that are involved in the production process in now supervising

Table 7: The Business Model Innovation from Interview's Result by Using Thematic Analysis
Source:The Researcher's Analysis

The business model innovation effect is not the same for every startup since they do not apply the same exact the business model innovation. For BIOPS, the business model innovation impacts the business to have a more productive product, grow customer in many cities, customers with a rent payment system/sharing profit keep on using the product, have more business opportunity to utilize. For Kamala. The market is opening up to the product and has more trust in the product. At the same time, the customer is increasing. The goal to join a competition and collaboration is also achieved. For Wegrow, more people get interested in the product, and customer from a different region can have access to the product as well. Furthermore, it has more exposure to the market and the increase in sales. Etnogotani is affected by the rise of the customer as well as a rise in profit. For Bekallilo, they can increase in customer, sales, and profit. eFishery is affected in terms of getting more recognition and customer growth which means more profit coming in and the product is more effective.

In terms of the business model innovation capabilities, Agtech startup identifies anopportunity, integrate their resource and innovate continuously. BIOPS sense improvement opportunity through feedback by a customer and make a better product. BIOPS seize its stakeholder by asking for feedback and then applying the product again. BIOPS can be seen actively transforming by their business model innovation as well as the way they go through a trial and error process. Kamalasenses their opportunity bylooking at their people capability. For the seizing, Kamalamakes sure to unifies the thoughts among people in the startup and talk about it with partners. For the transforming, Kamala shows their transformation from their business model innovation as well as their effort on RnD.

Wegrow senses their opportunity through their market interest. For the seizing, they try to look/research for a partner first then let their customer know their new innovation. For transformation, along with the updated business model, Wegrow also keeps on transforming as they currently prepare for several renewals. Etnogotani shows their sensing ability through its suppliers' problem. It also seizes the opportunity by discussing it with their supplier. Lastly, it continuously transforms its organization by their updated business model and showing another transformation such as working to increase partner.Bekal lilo sense opportunity from their market feedback. The seizinghappens through discussing with people. Bekal lilo keeps on transforming, even for now through working on perfecting the packaging and keep on learning.For eFishery, it senses the innovation opportunity by the problem in the market. EFishery seizing capability can be seen through people that have a special job to integrate partner. They also keep on transforming the business model.

The business model driver for Agtech startup is not the same for every startup. Firstly, BIOPS see that Indonesia's farming sector's deficiency is that it is done without data as the basis. Second, Kamala's main innovation driver is the change of their strategy to not sell a ready to drink. Third, Wegrow's main driver for innovation is their strategy and adding business online. For the next company, Etnogotani, it sees a media deficiency for farmers to sell their product other than to middleman. Bekal lilo's main driver of the business model innovation is the change of strategy of avoidingoutsider comeinto the placeevery day. Lastly, EFisherykeeps on innovating because they have a strategy to be in charge of the end-to-end process of the farming process.

4.2. Word Frequency

In order to support the thematic analysis, the researchers use a word frequency analysis to find the dominant category of the business model. The researcher uses Query tools in Nvivo 12 which is an application made by Qualitative Research International (QSR). The researcher present TOP10 words that relate to the topic.

Word Items	English Version	Frequency Percentage
Mereka	They	0.65%
Orang	People	0.64%
Produk	Product	0.40%
Petani	Farmer	0.36%
Teknologi	Technology	0.22%
Harga	Price	0.21%
Sayur	Vegetables	0.18%
Pasar	Market	0.18%
Jualan	Selling	0.17%
Kerjasama	Partner	0.15%

Table 8: Word Frequency Analysis Result
Source:The Researcher's Analysis

Through this word frequency analysis, a pattern can be seen that all of the startups dominantly talk about their customer and people by using the word they and people. On top of that, startup frequently talks about their product by mentioning product, technology, and vegetables. They also mention farmer, and partner frequently which is a word to indicate partner. In addition, selling is among the most frequently used word which is a word that startup uses to talk about getting customers. Lastly, it talks about pricing strategy with the evidence of the word price and market.

4.3. The Business Model

For the value creation process in Agtech startup, we can see that in People aspect, the Agtech startups mostly have two types of employee capabilities which are the primary activity and secondary activity. In Agtech startup, the primary activity that is owned by startups is operational or production which means that it is the most important activity. In addition, five out of six startups have marketing/salespeople. Every startup that is being studied has both physical and non-physical asset. The physical asset that is owned by every startup is an operational tool. As for the non-physical asset, brand and data is the one that mostly owned by startups. The partner that Agtech startup owns consist of two types of partner, namely supplier and strategic partner. All of the Agtech startup own supplier and it is dominated by suppliers that relate to operational purpose whilst strategic partner is for marketing purpose.

In this research, all of the startups provide the benefit of 'better' for their product, and 4 startups add the benefit 'easier' to their product as well. Agtech startup that the researcher interview uses a markup pricing and competition-based pricing. It also uses a pay-to-own pricing strategy whilst the B2B startup adds a pay-to-use option for their customer as well.

Agtech startup mostly can get customers through 'hunting' process which is making themselves noticeable to potential buyers. They keep the customer by maintaining a great quality product and giving post-purchase communication. The dominant growing strategy is to add many variant products so customers can increase their value to startup by buying more product. It is also worth to mention that from the analysis, Agtech startup put a focus on their product, people, partner, way of getting customer, and pricing strategy.

4.4. The Business Model Innovation

In terms of the business model innovation, each startup in this research has 2 or more innovated business model aspect. All of the startup in this research innovate their product to come up with a better product. It can be explained by the word frequency analysis that shows how product is concluded among the word that appear frequently. Thus, it is believed that product is an important aspect to innovate. Other than product, the way to get customer can also see innovated frequently from offline base to getting customer through online as well. This focus on customer can be seen reflected by the word frequency analysis where words that is related to getting customer thatappear frequently. People and partner are also innovated to find another business opportunity or have a better-quality product. By word frequency analysis, partner and people can also be stated as one of the dominant the business model as it is oftenly talked about by several startup. Thus, to innovate, Agtech startup focus more on product, getting customer, people, and partner.

4.5. The Business Model Capabilities

The researcher notices that there are three patterns of the business model innovation capabilities shown in the data. All of the startup shows an ability to sense an opportunity by doing research to customer and partner or a people improvement in their startup. Then they will need to integrate their resource and stakeholder. This can be done by discussion with people in the startup, partner, and the customer. Lastly, agtech startups need to renew their organization continuously. This capability is in line with study by Teece (2007, 2012 cited in (Vodovoz & May, 2017), there are three types of capabilities needed by a business unit to conduct a business model innovation. These are sensing (identifying opportunities), Seizing (integrating resources and stakeholder), and transforming organization continuously. In addition,

the involvement of people in startup, partner, and customer is also supported by the word frequency analysis which these three categories are frequently mentioned by Agtech startups.

4.6. The Business Model Driver

The main the business model innovation driver that can be seen in Agtech startup comes from both external and internal reason. For external reason it is driven by the infrastructure deficiency in the status quo. For the internal reason in because of the strategy adopted by the Agtech startup.

5. Conclusions and Recommendations

The business model adopted by Agtech startup is different from one another. This research tries to find a business model and innovation adopted by Agtech startup. For the value creation, Agtech startup focus on term of production. Their people, asset, and partner focus on the operational activity that help to make a great product. The value of the product that they serve is 'better' and the Agtech startups determine their price by cost-based-pricing and competitor-based-pricing method. A pattern of pricing model can be seen where startup sells products to the customer by offering a pay-to-own model, where a B2B Agtech startup open to the option of a pay-to-use model as well. To get customer, startups focus more on hunting capabilities and making themself seen by potential customers through promotion. They maintain great quality product and post-purchase communication to keep customer and adding product variation to grow their customer.

The researcher recommends Agtech startup to focus on their product as it plays a huge role in other the business model aspect such as keeping and growing customer. Other than a product, Agtech startup can focus on innovating their people by having business development, a partner that can help with giving better product or serving more market, and get customers through online to reach more customer. The researcher also recommends Agtech startup to identify an opportunity through conducting research to customer and partner, as well as their people's capability. To integrate the business model, Agtech startup can discuss among themselves, discuss it with partners, then announcing it to the customer. Lastly, innovation should be done continuously to achieve business success.

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