

# Market and Industrialization Opportunities of Rumah Unggul Sistem Panel Instan (RUSPIN) Technology Using Business Model Canvas

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## ABSTRACT

Rumah Unggul Sistem Panel Instan (RUSPIN) technology is the development of Rumah Instan Sederhana Sehat (RISHA) with several improvements. Besides resistance to earthquakes, this technology has advantages such as ease and speed of installation compared to conventional houses. As a new technological innovation that has been proven, to develop RUSPIN technology to be an industrialization model in the future, therefore a study of technology business plan is required. Research objectives eager to see the market and industrialization opportunities of RUSPIN technology. The study using Business Model Canvas (BMC) concept which strived to combine 9 business aspects such as customer segments, value proposition, channels, customer relationships, revenue streams, key resources, key activities, key partners, and cost structure into one complete concept map. As the result of this study, the market opportunity for RUSPIN technology is very large with the market segmentation is families that do not own a home and the target market for Low-Income Families (MBR). RUSPIN technology also has an opportunity to be industrialized by looking at the demand side (market opportunities), while from the supply side, efforts are needed to increase the number of certified RUSPIN applicators and developers.

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## 1. Introduction

Housing is a basic need for families and nowadays housing needs in Indonesia are still very high. This housing backlog has reached 11.4 million houses. As a solution to accelerating the fulfillment of housing needs is developing and implementing precast-based housing technology innovations. The Ministry of Public Housing and Settlement (PUPR) through Research and Development Center for Housing and Settlement (Pusperkim) already produced precast housing technology for earthquake-resistant simple houses (Febrinastri & Fadilah, 2021). The previous precast housing technology development in Indonesia is Rumah Instan Sederhana Sehat (RISHA) which has been implemented both in the disaster area and housing area (Pribadi, et. al., 2023).

Rumah Unggul Sistem Panel Instan (RUSPIN) is the development of RISHA technology with several improvements. These improvements aimed to obtain better knock-down building construction

and focused on simplifying the structure and component building design. RUSPIN technology only use two types of panels, so the installation process could be easier and faster. In 2013, RUSPIN technology has been tested for structural durability based on the reference to the Indonesian earthquake regulation and it is categorized as a fully ductile structure ([Badan Standardisasi Nasional, 2012](#)). This proves that RUSPIN technology meets the requirements as a structural component of buildings that is resistant to moderate to severe earthquakes in Indonesia.

As the latest technological innovation, RUSPIN technology certainly is in the process of advancing to industrialization in the future and as technoware also involves the other three elements, namely humanware, infoware, and orgaware. Producing RUSPIN with the innovation of precast printing equipment is a form of technological element. This is in line with what was presented by ([Gopinath & Sai, 2021](#)), in which technology is a manifestation of the four elements and the interactions between their components namely technoware, humanware, infoware, and orgaware. This is in accordance with what was expressed by ([Brown & Brown, 2019](#)) which states that when implementing a good business strategy, the company must understand the developing technology, processes, and the right market share.

Adoption of technology is one of the crucial factors in improving the product quality because technology has characteristics as a driver of environmental change (business world) rapidly, so it is able to compete in a more competitive condition ([Gopinath & Sai, 2021](#)). The experience of several developed countries is discovered that the adoption of new technology applied in an industrial system could provide a contribution of 40%-50% to economic growth, in fact the technology that had been applied by Japanese was able to contribute 66% to economic growth ([Gopinath & Sai, 2021](#)).

Considering RUSPIN as a new technological innovation has been proven that have advantages such as ease and fast in installation process compared to conventional houses and also resistance to earthquakes, therefore to develop it into an industrialization model in the future, a study of business model is required. There are several business models in entrepreneurship, but the one most often used and quite popular nowadays is Business Model Canvas (BMC). BMC aimed to illustrate, design, describe, and narrow several business aspects into a unified whole business strategy ([Osterwalder & Pigneur, 2010](#)). BMC is a tool in management strategy to translate concepts, consumers, infrastructure, and company finances into visual elements ([Setiawan et. al., 2021](#)).

BMC could be used to obtain company strategies effectively and efficiently ([Raya, et.al., 2021](#)). BMC concept is designed for managing the strategic sustainable and competitive development of the company structures in the context of the turbulent and unpredictable changes in the market environment ([Dudin et. al., 2015](#)). BMC explains the detail comprehensive of value or product offered, marketing, human resources, and finance, so the company could determine the direction of their movement and find out the business competitive advantages ([Velter, et. al., 2020](#)). By gradually evaluating each key element, it will provide convenience and practicality in analyzing and taking steps for improvement ([Furqon, Sultan, & Wijaya, 2019](#)).

BMC is suitable for small industries in Indonesia because the small industry has a crisis-resistant character and always produces consumptive goods and always needed by the community ([Umar et. al., 2018](#)). This is also in accordance with the opinion of ([Sparviero, 2019](#)) with a focus on the printing business states that the final mapping result of the BMC method creates a new alternative strategy that tends to the right side (creative side), which means that the owner must innovate and make the business more creative. Cooperation with other Small Medium Enterprise (SME) players is an important point of BMC, ([Hamwi, Lizarralde, & Legardeur, 2021](#)) also stated the same thing. In order to face the competition, a strategy is needed to face the competitor.

Ref. ([Islami, Mustafa, & Topuzovska, 2020](#)) revealed that market share could be expanded and maintained for those who have breakthroughs and innovations and the strategy is using BMC. Before using BMC, the small industry must be able to recognize their position in the marketing strategy, either as a market leader or market follower. Once they found their position in the market, they should prepare a marketing mix which is a standard strategy that is necessarily a business should have. ([Rosa,](#)

Sassanelli, & Terzi, 2019) has also conveyed regarding this marketing mix. This research contributes to see the market and industrialization opportunities of RUSPIN technology using BMC concept.

## 2. Method

The study of market and industrialization opportunities of RUSPIN technology using a qualitative descriptive analysis. Quality analysis for describing objects and processes (Strijker, Bosworth, & Bouter, 2020). Analysis used BMC to describe the segmentation and market target of RUSPIN. Collecting data method is divided into two, i.e. primary data and secondary data. Primary data is collected from field observations and in-depth interviews with technology manufacturers or applicators who located in Bali. For secondary data, the data is collected from literature studies about BMC references (both from journal and book) and RUSPIN technical documents which taken from Pusperkim and Directorate of Human Settlements, PUPR Ministry.

The BMC concept combine nine business aspects such as customer segments, value proposition, channels, customer relationships, revenue streams, key resources, key activities, key partners, and cost structure into one complete concept map which is described below including the illustration of Fig. 1.

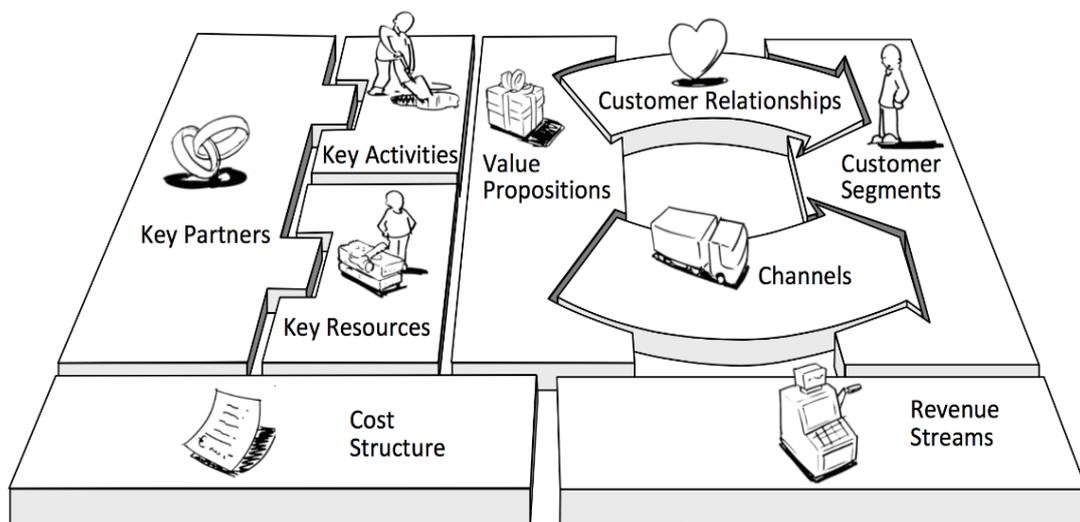


Fig. 1. Business Model Canvas

The elaboration of each aspect in the BMC is following:

1. Customer Segments, is a measure to define several consumer groups with different characteristics and needs and to be determined the consumer groups to be achieved and served. Consumers are the point of every business activity. Without profitable customers, a business could not hold.
2. Value Proposition, this implies that the combination of the values to a product offered to a market segment and delivering it to the fulfillment of the needs of a consumer group will create a value proposition. This value could be quantitative such as price, production speed etc. or qualitative such as design and customer experience. Several following elements according to (Osterwalder & Pigneur, 2010) are able to pay their contribution in creating values such as novelty, performance, diversity, design, brand, and price. Consumer satisfaction depends on the estimation of product performance in providing relative value to consumer expectations. If performance conformed to expectations, consumers will be happier (Ali, Zainal, & Ilhamalimy, 2021). According to (Ali, Zainal, & Ilhamalimy, 2021), consumer satisfaction depends on the estimated performance of the product in providing relative value to buyer expectations.

3. Channels, describe how the company communicates and reaches targeted consumers. Communication, distribution, and sales channels are the company interfaces mostly viewed by consumers. This channel includes several functions including:
  - a. Assist consumers in providing feedback on the value of a product.
  - b. Flexibility consumers which products to buy.
  - c. Deliver value to consumers and provide after-sales service.
4. Customer Relationships, is how the company creates and maintains a communication relationship with the consumers. In several product segments that allow reorder, this aspect becomes important to develop. Specifically, there are six ways to create relationships with consumers, including personal assistant, dedicated personal assistant, self-service, automated-service, communities, and co-creation.
5. Revenue Streams, is a part of business activities that aimed to map the source and the amount of income collected by the company in running a business. Therefore, the company must identify the value aspect for which consumers are willing to pay a certain price. Each income stream allows different schemes such as credit and cash systems etc. Business models could involve two types of revenue streams, namely through income transactions through consumer purchases one-time payments or recurring income from installment payments.
6. Key Resources, this concept attempts to describe the most crucial elements owned by a company to run a business. Each business model has different resources. By disclosing this resources aspect, the company is able to produce products that are full of selling value and could target the segments to obtain revenue. In general, these core resources could be physical, financial, intellectual or human. These resources could be owned directly by the company or partnered with key partners.
7. Key Activities, each business model has its own characteristics in running a business. The differences in these characteristics also cover differences in the pattern of activities carried out by companies in running a business. This aspect tries to aid companies to describe what activities are most crucial to execute, so the desired business model could run properly. The core activities could be categorized as follows:
  - a. Production, this activity includes designing, manufacturing, and creating a product in optimal quantity and good quality.
  - b. Problem solving, this activity is a company activity in solving an issue that is owned by individual consumers, such as consultants, hospitals and other service companies.
  - c. Platform/network, a business model built using a good platform will support other business activities. The activities such as creating websites, software, and strengthening brands could also be categorized as platform activities.
8. Key Partners, this concept maps and describes who will be the working partners of this business model, both from suppliers and distributors who will sustain the running of this business. An organization creates partnerships for several reasons, such as to optimize the business model, reduce risk, and obtain resources. Other partners such as banks should also be invited, considering according to (Ahani, et. al., 2019) segmentation and targets through mortgages could improve the performance of banks providing housing credit services.

Cost Structure, this aspect is very crucial and needs to be examined in detail, namely by revealing the most dominant costs incurred by running the desired business model. By determining the resources activities and partnerships of the organization, it will be easier to determine the existing cost structure. However, some business models also tend to be more cost-driven, therefore the company will determine the lowest cost structure before and apply it to all business aspects.

### 3. Results and Discussion

Industrialization opportunities for RUSPIN technology could be seen from several aspects. From the demand side, the market opportunity for RUSPIN technology is very large because the housing backlog among Low-Income Families (MBR) reaches 9,412,303 units (Kementerian PUPR, 2019). From the supply side, RISHA applicator is interested to be a RUSPIN applicator and ready to produce in large quantities. Furthermore, the applicator is also ready to move their workshop to project location if RUSPIN technology stated ready applied and marketed. The implementation of RUSPIN technology is shown in Fig. 2.



Fig. 2. Implementation of RUSPIN Technology

Housing developers are also interested to use RUSPIN as an alternative for MBR housing if RUSPIN technology is already accommodated in the Ministry of Settlement and Regional Infrastructure Decree (Kepmen Kimpraswil) Number 403/KPTS/M/2002, so it could be included in Home Ownership Credit (KPR) scheme. Based on these aspects, RUSPIN technology has an opportunity to be residential areas industrialization with market segmentation for MBR. The business model of RUSPIN technology is captured using BMC which explains how about the customer segments, value proposition, channels, customer relationships, revenue streams, key resources, key activities, key partners, and cost structure.

#### 1. Customer Segments

RUSPIN technology has competitive advantages, such as low-cost house structure building, easy and fast construction, and also high quality because RUSPIN is included in the earthquake-resistant house category. Depending on these advantages, RUSPIN technology is used to fulfill housing backlog needs in Indonesia by targeting MBR who has demographic characteristics:

- a. Families' income between Rp. 2,000,000 to Rp. 4,000,000 per month.
- b. Never owned a home before and never taken KPR.
- c. Minimum age 21 years old (included in the new family) until 55 years old.

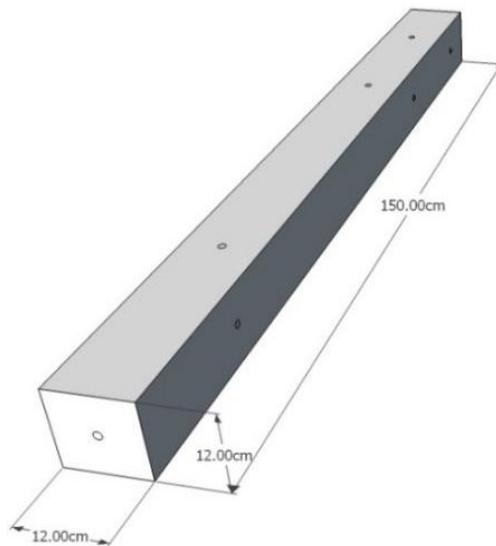
In addition, the subsidized or low-cost housing developers could also use RUSPIN technology as a house structure, so it contributed to reducing the housing backlog in Indonesia.

#### 2. Value Proposition

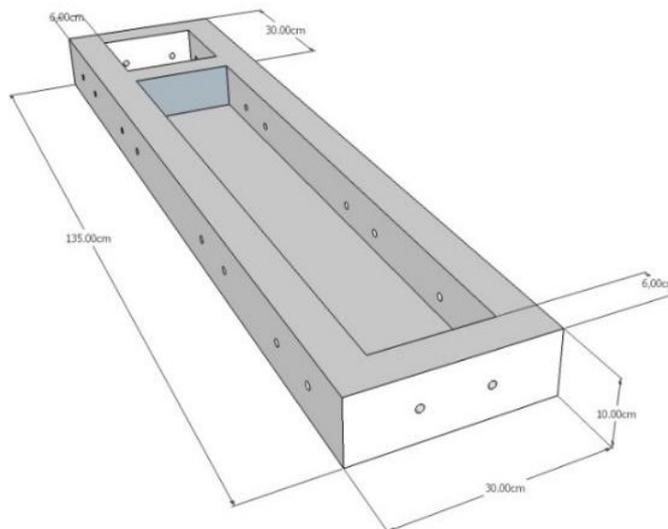
The value of RUSPIN technology which offers to MBR could be explained based on performance, price, and risk reduction aspects. From the performance aspect, RUSPIN technology

components are made fabricated on modular size (shown in Fig. 3 and Fig. 4), so the house structure construction could be finished faster than using a conventional method. By using RUSPIN technology, it only takes 4 days and needs 3-4 workers. Each panel is designed not to exceed 50 kg, so it could be lifted by 2 workers. To assembly the RUSPIN panel, 1 worker is needed by using the bolt-nut connection system.

From the price aspect, RUSPIN technology could provide a low-price and affordable housing solution for MBR who are sensitive to price issues. The value proposition of RUSPIN from the performance aspect could reduce the house construction cost, so RUSPIN technology could be included in the subsidized housing financing scheme. From the risk reduction aspect, RUSPIN technology is already tested by the Pusperkim and fulfills the Indonesian National Standard (SNI). Besides that, RUSPIN technology also claimed to be an earthquake-resistant house, so people have time to evacuate.



**Fig. 3.** Panel Component 1 of RUSPIN Technology



**Fig. 4.** Panel Component 2 of RUSPIN Technology

### 3. Channels

Business channeling for RUSPIN technology could be divided into offline and online. Offline channeling through direct selling (give a presentation to potential customers and one-on-one offering

by sending a proposal), spread leaflets/brochures, and place banners in every strategic position. Meanwhile, online channeling through social media (such as Facebook, WhatsApp, Instagram), blog, website, and also E-Product of PUPR Ministry.

#### 4. Customer Relationships

RUSPIN applicator could build customer relationships by providing services personally. Customers could communicate about their housing needs and have transactions both face-to-face directly and electronic media such as telephone and messaging. The applicator also could provide services after construction to handle any complaints from customers through personal service.

#### 5. Revenue Streams

In RUSPIN technology business model, revenue streams are divided into two types, namely transaction revenue and recurring revenue. Transaction revenue is income earned from customers through a one-time payment, while recurring revenue is income obtained from customers for continuous payments of purchasing RUSPIN panel products or RUSPIN structure construction services that are offered repeatedly. From both of these types, RUSPIN technology revenue comes from panel sales and construction services. Total sales projection in a year is Rp. 6,870,781,527.

#### 6. Key Resources

The resources that must be owned by RUSPIN applicator are divided into physical resources and human resources. In physical resources terms, the important assets for RUSPIN applicator are workshop/production unit building, production equipment such as panel molds P1 and P2, and also production support equipment. For the drying process of RUSPIN panel, the land is needed adequately. If applicator production capacity is 1 unit per day, then 96 units of panel molds are needed for P1 and 16 units for P2.

In human resources terms, the requirement to become a RUSPIN applicator is an applicator candidate must join training about RUSPIN including how to build and also what components are needed in the RUSPIN construction process. This training is needed to become a certified RUSPIN applicator and developer. To build a RUSPIN, 3 types of workers are needed based on their expertise, namely ironing workers, concrete workers, and installation workers. In this case, certain skills are needed to become ironing workers and RUSPIN installation workers.

#### 7. Key Activities

The key activities of RUSPIN applicator are design, production, and quality control. By understanding the technical of RUSPIN technology, the applicator could develop a RUSPIN design to be more aesthetic, so it eliminates the monotonous and rigid perception of precast houses. Production activities and the applicator's ability to develop production capacity are used as key activities to help accelerate housing construction for MBR in reducing the backlog. In the quality assurance process, the applicator must use sampling quality control to ensure that RUSPIN panel production in accordance with the quality standard.

#### 8. Key Partners

The stakeholders who have roles to support the business process and reduce the risk potential of RUSPIN technology are:

##### a. Pusperkim

Pusperkim is the owner of RUSPIN technology and has a role to provide socialization and training to applicator candidates, so each RUSPIN applicator is guaranteed to be certified for the ability. In addition, Pusperkim also introduce and educate the public nationally about RUSPIN technology.

#### b. Central and Local Government

The central and local governments are able to support this business through regulations or policies related to housing. Besides that, the local government also could support by providing clear data related to housing needs and spatial planning. There are some regulations from local government which urgently needed relating to land use, earthquake-resistant house, spatial planning, construction permit, financing and other issues.

#### c. Banking

KPR scheme facilities that offered by banks or regulations from Bank Indonesia are very influence people in buying a house. Administration easiness and the amount of down payment and also installment become the basics of people calculation to overcome house purchase financing issues.

#### d. Material Suppliers for Production Activities

Through partnerships with raw material suppliers, it could guarantee the material flows in the production process until become finished goods and deliver to the customers. The most important material supplier partnership is a partnership with accessories suppliers (nuts, bolts, rings, iron plates) and RUSPIN panel molds.

#### e. Logistic Service Providers

The logistic service provider has a role in providing various alternatives transportation mode for delivering the RUSPIN panel to the project location. This partner is needed if the applicator did not have any transportation vehicles such as pick up or truck. The weight of 1-unit RUSPIN is approximately 6 tons, so choosing the transportation mode will determine the effectiveness and efficiency of logistic costs.

### 9. Cost Structure

The cost structure components in RUSPIN technology business consist of:

#### 1. Investment Cost

RUSPIN technology investment includes investment in workshop building and production equipment such as cast mixers, vibrator hoses, rubber hammers, screw locks/bolt removers, generators, and operational vehicles. Total investment cost for RUSPIN technology business is Rp. 1,085,690,216.

#### 2. Operational Cost

Operational costs include the salary (workshop head, workshop head assistant, sales staff), labor wages, marketing costs, fuel costs, electricity costs, water costs, machine depreciation costs, and machine maintenance costs. Total operational cost in each year is Rp. 104,365,000.

#### 3. Material Cost

Material costs for making panels include costs for iron material, cement, sand, gravel, wire mesh, connection bolts, water costs, and generator/electricity fuel costs. Total material cost in each year is Rp. 5,770,338,148.

The financial feasibility analysis is shown in [Table 1](#). The business model of RUSPIN technology is illustrated in the BMC chart as shown in [Fig. 5](#).

**Table 1.** Financial Feasibility Analysis of RUSPIN Technology

Indicator	Value	Conclusion
Payback Period (PBP)	1.12 years	1.12 years < 10 years, feasible
Net Present Value (NPV)	Rp. 6,243,057,288,05	NPV > 0, feasible
Internal Rate of Return (IRR)	95.58%	IRR 95.58% > loan interest rate 13%, feasible
Profitability Index (PI)	6.75	6.75 > 1, feasible

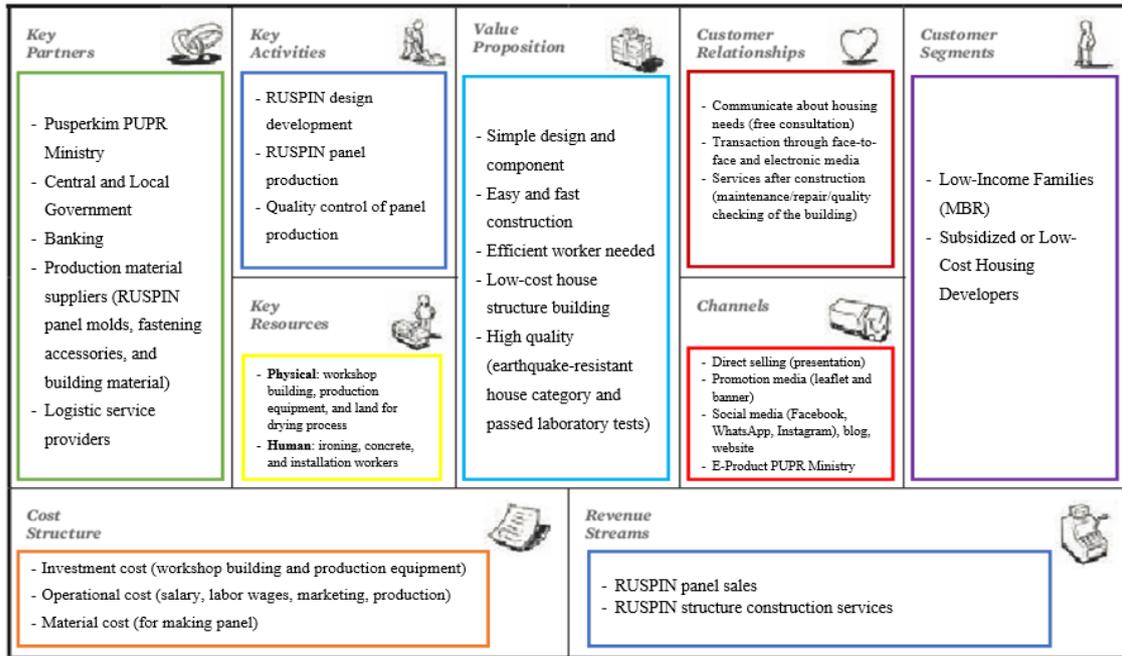


Fig. 5. Business Model Canvas of RUSPIN Technology

#### 4. Conclusion

The market opportunity for RUSPIN technology is very large, market segmentation of RUSPIN is families that do not own a home while the target market for Low-Income Families (MBR) is 9,412,303 units. In this case, RUSPIN has competitive advantages, such as low-cost house structure building, easy and fast construction, and also high quality (earthquake-resistant house category). RUSPIN technology has an opportunity to be industrialized by looking at the demand side (market opportunities), while from the supply side, efforts are needed to increase the number of certified RUSPIN applicators and developers. In this case, BMC is already formulated in the RUSPIN technology study.

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