

# Developing Sukuk for Research and Innovation Project

Adita Dyah Asokawati<sup>1</sup>, Ayu Solihah Sadariyah<sup>2</sup>, Irfan Nurfalih<sup>3</sup>

<sup>1,2,3</sup>TAZKIA Islamic University College, Indonesia

The growth of creative economics in Indonesia, especially in research and innovation development, has a potential appointment for improving the growth of Indonesia's economy. Most developing countries including Indonesia have a fundamental problem, namely the lack of availability of state funds and investment for infrastructure development. One form of implementation of limiting the lack of development funds of a country is to use the concept of PPP (Public-Private Partnership). Basically, the concept of PPP is not much different from the concept of sukuk in the Islamic capital market. This research tries to know how the concept of mudaraba sukuk and istisna sukuk can urge the growth of research and development sector. As we know sukuk development has grown rapidly in the world, that becomes sukuk as capital base for financing the project. Therefore, for improving this research and development sector, the writer innovates and creates skim of capital for improving research and development sector in Indonesia.

**Keywords: Mudharaba Sukuk; Istisna Sukuk; Research & Innovation**

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\*Correspondence:

Irfan Nurfalih

[irfannurfalih@gmail.com](mailto:irfannurfalih@gmail.com)

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## INTRODUCTION

One of the problems faced by developing countries in their economic development is the availability of infrastructure. Infrastructure serves to support economic activity and strengthen inter-regional connectivity which in turn will have an impact on a country's economic growth. Most developing countries including Indonesia have a fundamental problem, namely the lack of availability of state funds and investment for infrastructure development and financing of the nation's work.

Future development financing needs that will be increasingly large cannot be financed by the government alone through tax revenues and other revenues. One form of implementation of limiting the lack of development funds of a country is to use the concept of PPP (Public-Private Partnership), where public and private companies work together in financing certain projects. This PPP concept involves the government, shareholders, consumers, experts, financiers, escrow agents and Special Vehicle Purpose (SPV) as the company that runs the project. The government contributes as the capital owner to the SPV in the long term.

Basically, the concept of PPP is not much different from the concept of sukuk in the Islamic capital market. The difference is that the PPP concept is implemented without regard to sharia aspects, such as there are still interest transactions in share ownership and capital lending. So, to avoid this, sukuk is more appropriate to be implemented in project development. There are 6 Sukuk schemes that have developed, including Ijarah, Murabahah, Mudhorobah, Istisna, salam, Hybrid and other schemes. The most common is the ijarah scheme with all its derivatives. From a Shariah perspective, sukuk ijarah is the most accepted Islamic bond format. However, the sharia restrictions that must be met are that there must be a back-up asset, in accordance with the principle of risk-sharing in accordance with sharia, the rate may fluctuate depending on demand, different from the principle of time value of money, the return is in the form of rent, not interest payments (Baita et al., 2023).

First Global Sukuk was issued in 2001 with a value of USD 225 Million with a BBB+ rating by MARC International, First Global Sukuk is an SPV owned by BIMB International Islamic Trust Labuan, and the Ijarah Structure belongs to the Guthrie group which is engaged in plantations and property. The sukuk issued is using the ijarah concept.

The development of Islamic instruments in Indonesia shows a positive trend, including sukuk. However, sukuk mudharabah has experienced insignificant development compared to sukuk ijarah. The problems faced by sukuk mudharabah in general consist of three aspects, namely; 1) aspects of market participants, 2) market aspects and 3) supporting aspects. Specifically, the problems from the aspect of market participants are 1) aversion to risk, 2) trust (moral hazard), 3) lack of understanding, 4) less varied investors, 5) low company rating. From the market aspect; 1) conventional dominance, 2) low emission value, 3) illiquid market, 4) greater risk, 5) and difficult valuation. Supporting aspects; 1) lack of incentives from the government, 2) accrual recording, 3) bureaucracy, 4) socialization, and 5) lack of understanding of underwriters (Afifah, 2012).

Overall, the priority problems include; 1) low emission value (market), 2) lack of socialization (support), 3) lack of incentives and support from the government (support), 4) lack of understanding from both issuers and investors (fundamental), and 5) aversion to risk (fundamental). The general solution priorities consist of; 1) government incentives (macro solution), 2) intensive socialization (fundamental solution), 3) new regulations and guidelines (roadmap solution), 4) product innovation (fundamental solution), 5) marketing (fundamental solution) and sustainable public offering (road map solution) have the same priority. When comparing the value of agreement between expert and practitioner respondents, through Kendall's Coefficient (W), the Kendall's Coefficient (W) of practitioners is the same as experts.

Regarding this, it is true that many things need to be considered such as the current economic conditions and how it will be with the next generation of creative and innovative people who need fresh funds at the beginning. Therefore, it must be seen again what is the main purpose for issuing this sukuk. For example, the Malaysian government issued sukuk not because it needed funds to finance state projects but to develop an Islamic financial system (Abdullah, 2004).

The Malaysian Global Sukuk uses the concept of sell and purchase, not put and call. When rating agencies rate government bonds, the credit rating is determined based on the government's ability and willingness to serve and fulfill existing obligations, as well as conducting qualitative and quantitative assessments of credit worthiness. Quantitative aspects include economic conditions, financial performance and existing obligations. While qualitative aspects include

political conditions or policy development taken (Yusof, 2004).

The creative economy industry is one of the new industries in Indonesia. One of the initiators of Indonesia's creative economy is Minister of Tourism and Creative Economy Mari Elka Pangestu. The creative economy is divided into several sectors, namely: advertising, architecture, art goods market, crafts, design, fashion, (video, film and photography), music, performing arts, (printing and publishing), (computer services and software), (television and radio), and (research and development). Of all these sectors, the research and development sector is still insignificant even though this sector has absorbed 28.89% more labor than the national labor absorption. So, judging from this achievement, the research and development sector has great potential and promise to be developed in the country.

The inventions of Indonesian children are abandoned due to lack of capital, both capital to develop existing products and products that will be produced. These are the works of the nation's children that must be supported by providing capital financing so that they are not only inventors but can be applied in Indonesia such as cancer vests for cancer patients (Raisa Amelia, February 2013), temperature power plants by students of one of the universities in Indonesia inventors and patent holders of 4G technology, nutmeg as an anti-diabetic drug (Kakatomi, January 2013), rapid detection of the jembrana virus that attacks cattle, converting seawater into fuel, saliva fertilizer and natural fermentation microorganisms, researchers (Indonesia Achievement, July 2011), and sosrobahu technology applied in the Philippines, Malaysia, Thailand, Singapore and even the United States (Leni, October 2011), namely the longest highway in Metro Manila Vilamore Bicutan section using sosrobahu technology and various other works of the nation's children. To support this, sukuk which acts as financing will support the lack of capital at the beginning to develop the potential contained in the nation's children so that it can be utilized and built in Indonesia not in other countries.

Therefore, there is a need for research and technology development in Indonesia, because it can make a significant economic contribution to the Indonesian economy, can create a positive business climate, can strengthen the image and identity of the Indonesian nation, supports the use of human resources and renewable energy, is a center for innovation and

creativity formation and has a positive social impact (Ministry of Trade, 2008).

The objectives of this research are: (1) To identify the factors inhibiting the growth of research and development in Indonesia; (2) To identify the concept of sukuk mudharabah and sukuk istisna to encourage the growth of research and development in Indonesia.

## THEORETICAL FOUNDATION

### Definition of Sukuk

The term sukuk is an adopted word from Arabic, namely '*sak*' which means certificate. Accounting and Auditing Organization for Islamic Financial Institution (AAOIFI) defines sukuk as equal-value certificates that are proof of undistributed ownership of an asset, benefit rights and services or ownership of certain investment projects or activities (Huda & Heykal, 2010).

The National Shari'ah Council (DSN) of the Indonesian Ulema Council (MUI) defines sukuk as a long-term security based on shari'ah principles issued by the Issuer to Sukuk holders which requires the Issuer to pay income to Sukuk holders in the form of profit sharing / margin / fee and repay sukuk funds at maturity (DSN-MUI, 2022).

The Capital Market and Financial Institutions Supervisory Agency (Bappepam-LK) defines sukuk as sharia securities or proof of ownership that is equal in value and represents an integral or undivided participation in the ownership of certain tangible assets, the value of benefits and services of certain project assets or certain investment activities, or ownership of certain project assets or certain investment activities (Bappepam-LK, 2009).

According to the Directorate of Islamic Financing of the Ministry of Finance, sukuk is a certificate of equal value that represents undistributed ownership of a tangible asset, the value of benefits (*usufruct*), or ownership of assets from certain projects or certain investment activities and sukuk does not provide interest but rather rewards, margins or profit sharing and the issuance of sukuk requires an *underlying asset* so that it is completely safe from usury.

From these definitions, it can be concluded that sukuk is a valuable capital market securities instrument issued by the Issuer to sukuk holders whose issuance requires *underlying assets* and requires the Issuer to pay profit sharing / margin / fee to sukuk holders within a certain period of time.

In principle, sukuk are the same as conventional bonds, both offering the sale and purchase of valuable certificates. However, the difference lies in the sharia concept used by sukuk. Sukuk is a capital market securities instrument for financing, has an *underlying asset* and the profit obtained from sukuk is not interest but margin / profit sharing / *fee*. So that it does not trade debt and credit.

Whereas conventional bonds are capital market securities instruments for lending transactions within a certain period of time, there is no *underlying asset* and the profit obtained by the lender is the interest on the loaned funds. From this difference it is clear that conventional bonds violate sharia rules because interest in sharia is usury. The following table shows the differences between sukuk and bonds.

**Table 1. Difference between sukuk and bonds (Huda & Heykal, 2010)**

Description	Sukuk	Bonds
Publisher	Government, Corporations	Government, corporation
Nature of the Instrument	Certificate of ownership/participation in an asset	Debt recognition instrument
Income	Reward, profit sharing, <i>margin</i>	Interest/coupons, <i>capital gains</i>
Time Period	Medium short	Medium length
<i>Underlying asset</i>	Need	No need
Related parties	Obligor, SPV, investor, <i>trustee</i>	<i>Obligor/ issuer</i> , investor
<i>Price</i>	<i>Market price</i>	<i>Market price</i>
Investor	Islamic, conventional	Conventional
Principal payment	<i>Bullet</i> or amortization	<i>Bullet</i> or amortization
Use of issuance proceeds	Must be Islam-compliant	Free

## Sukuk

There are several types of sukuk including sukuk mudharabah, the concept of sukuk mudharabah is the same as mudharabah contracts in general. There are investors as capital owners and there are mudharib as managers of the capital. The difference lies in the transaction, sukuk mudharabah transactions represent a certificate that is used to fund projects with the principle of mudharabah contracts. In sukuk, the sukuk issuer is referred to as the capital manager (or as *mudharib*), while the sukuk buyer is referred to as the investor (Ayub, 1951).

Definition of sukuk istishna according to AAOIFI: "These are certificates of equal value issued with the aim of mobilizing funds to be employed for the production of goods so that the goods produced come to be owned by the certificate holders". It can be defined that sukuk istishna is a certificate stating the same value issued with the aim of funding the manufacture of a product so that the product becomes the property of the certificate holder (Bappepam-LK, 2009). For example, the latest research related to sukuk in Indonesia can be seen at Armen et al., (2023), Faisal et al., (2023), and Surachman et al., (2023).

## Research and Development

Research and development are creative activities related to innovative ventures that offer scientific and technological discoveries and the application of such science and knowledge for product improvement and the creation of new products, new processes, new materials, new tools, new methods and new technologies that can meet market needs; including those related to the humanities such as language, literature and art research and development; and business and management consulting services (Ministry of Trade, 2008).

In addition, research and development is included in the creative economy subsector. In 2004, the growth of the creative economy reached 8.17%, higher than the national economic growth at that time of 5.03%. However, the average growth of the creative economy from 2002-2006 was only 0.74%. This shows that the creative economy has not grown strongly but has the potential to grow and develop optimally if supported by conducive conditions and business environment.

Thus, this creative industry or economy has a considerable opportunity to be developed looking at the

supporting factors. Among them are changes in market and consumer behavior, the growth of the era of non-mass production, a large portion of the domestic market and socio-cultural diversity in Indonesia.

But behind these great opportunities there are challenges that must be faced by this creative industry, namely: the readiness of creative human resources (HR), educational institutions that are able to produce Indonesian creative people, the readiness of State apparatus to support *intellectual property-based creative industries*, facing free trade and financial institutions for the creative industry (capital).

## RESEARCH METHOD

The author uses a qualitative method. Qualitative method is a research method based on the philosophy of postpositivism used to research on natural object conditions (as opposed to experiments). Where the researcher's position is as a key instrument, data collection techniques are triangulated (combined), data analysis is inductive/qualitative, and qualitative research results emphasize meaning rather than generalization (Sugiyono, 2009).

Qualitative research is descriptive. The data analyzed is not to accept or reject the hypothesis (if any). The results of the analysis are in the form of a description of the symptoms observed and not necessarily in the form of numbers or coefficients between variables.

This research is library research. As a literature study, this research method emphasizes literature as an object of study. Literature studies emphasize the study of experts' ideas, existing conceptions, rules that bind certain objects. Literature research in the field of economics is essentially the same as other fields of social science, which include; objects of existing theories and concepts, thoughts of experts, aspects of regulation, aspects of existing practices, and aspects of language (Subiyanto, 2010). The author adopts the latest ideas that are developing in the world of technology and then adopts them with sukuk schemes to formulate new formulas in the form of funding and financing mechanisms and systems through more innovative sukuk instruments.

### Data Type and Source

The type of data used in this research is secondary data. The data presented comes from various sources such as Proceeding Round Table Discussion on International Sukuk, Indonesia [berprestasi.web.id](http://berprestasi.web.id) and

data regarding the development of sukuk as a financing instrument to support the work of the nation's children and creative industries so that it can be applied in Indonesia.

## DISCUSSION

### Factors Hindering the Development of Research and Development in Indonesia

The following illustrates the national innovation capability as well as some factors that can illustrate the performance of research and the quality of education in general. It is also interesting to know how Indonesia is positioned among other countries. *The World Economic Forum's* report on *The Global Competitiveness Report 2011-2012* provides nine indicators of Indonesia's position relative to 142 countries surveyed. The table illustrates the position of five ASEAN countries, including Indonesia.

Indonesia is in the top 50 for the *Capacity of Innovation (CI)*, *Company spending on R&D (CSR&D)*, *University-industry collaboration in R&D (UICR&D)* and *Quality of the Educational System (QES) indicators*. Meanwhile, for indicators of quality of *math and science education (QMSE)*, *quality of management schools (QMS)* and *quality of scientific research institutions (QSRI)*, Indonesia ranks 50-70, but in contrast to information technology indicators in terms of both *Broadband Internet Subscribers (BIS)* and *Internet Bandwidth (IB)* Indonesia ranks above 100 (Schwab, 2011):

The data illustrates that Indonesia's research and innovation capacity is high, but as it is known that Indonesia is a developing country, there are factors that inhibit the growth of research and development, namely the lack of fresh funds or capital to develop creative and innovative research and development. As explained in the background, various research results of Indonesian children, one of which is the work of Ir. Tjokorda Raka Sukawati, his work has been applied in various foreign countries such as the Philippines, Malaysia, Thailand, Singapore and even the United States, namely *sosrobahu* technology. *Sosrobahu* technique is a construction technique used mainly to rotate the shoulder of the overpass concrete arm and was invented by Tjokorda Raka Sukawati. With this technique, the overpass arm is placed parallel to the road below, and then rotated 90° so that the construction does not interfere with the traffic flow on the road below. Tjokorda's invention was used by US engineers to build a bridge in Seattle.

Bogor Agricultural University Vice Rector Anas M Fauzi stated "Indonesia ranks 100th in the global

innovation index in 2012 while Singapore is 3rd, Malaysia 32nd, and Thailand 57th. The index is a combination of inputs, such as human resources and research & development capabilities, and outputs, such as the ability to produce products that can be absorbed by users.

What has been presented above is an international agency report obtained from a survey of the opinions of several respondents in Indonesia. The following can be seen other data from several relevant parties to complete the picture of innovation in Indonesia. Basically, our country has produced various innovations in various fields but the development and application are not running smoothly due to the lack of capital.

Indeed, the opportunities for innovation in Indonesia are great. With Indonesia's economic growth of around six percent today and a wealth of problems to be solved in various fields, the opportunities for innovation are great. Take for example some of the things that are urgent to be addressed nationally such as energy security, food and population problems. With a dense population of around 240 million people spread across the archipelago, this shows the magnitude of the problems faced by Indonesia. This is an opportunity for innovation because the need is great.

Indonesia faces many challenges in improving national innovation. Some of these are discussed below. Bogor Agricultural University Vice Chancellor Anas M Fauzi stated that "serious attention is needed on the upstream side, especially regarding budget support for research and development activities. Another problem faced in implementing innovation in Indonesia is the misalignment between providers and users' needs. Based on a World Bank report, the research and development budget allocation in Indonesia in 2008 was only 0.08 percent of gross domestic product (GDP) while Japan at the same time allocated 3.45 percent of GDP for research and development activities. Meanwhile, Bank Mandiri Tbk. economist Destry Damayanti stated, "Indonesia's low *global competitiveness* is partly due to education and efficiency factors.

From the explanation above, there are several factors that inhibit R&D (*Research and Development*) in Indonesia from running well, one of these factors is the lack of government support in terms of capital. Therefore, one of the economic instruments in the capital market, namely sukuk, can be an alternative to getting fresh funds (capital) at the beginning. So that the process of research and development growth in Indonesia can run smoothly because the main factor in

the difficulty of upgrading R&D (*Research and Development*) in Indonesia is due to the lack of capital.

## Sukuk Concept

Sukuk is an instrument that is used as a tool to absorb capital from within and outside the country. Sukuk is a forum for the government to obtain capital at the beginning of the project which is used in completing the project from start to finish. In addition, the *underlying asset* that must exist in sukuk, makes sukuk excellent for investors to invest because sukuk is more *crisis less risk*. On the other hand, the rapid development of sukuk over the last five years (2002-2007) is the reason why sukuk is used as a means of reaping capital as well as profits for investors and sukuk issuers. According to data published in Malaysia *Islamic Finance Information Service*, in 2000 the growth of sukuk only reached 366 million US dollars, while in 2007 it grew to 47 billion US dollars, the average growth reached 40%.

The secret of the rapid development of sukuk, especially in Malaysia, which controls 80% of the world sukuk market in 2012, is due to several factors:

### 1. Growth Sophistication Structure

The flexibility of sukuk structures that can change according to the desired project is a trigger factor for the significant development of sukuk such as sukuk murabahah (*cost-plus sale agreement*), sukuk mudharabah (*trust financing*), *sukuk* ijarah (*to-lease based*), sukuk musyarakah (*profit-sharing*) and sukuk istishna (*manufacturing contract-based*).

### 2. Legal Clarity

The clarity of sukuk law in accordance with Islamic sharia is the second factor that triggers the development of sukuk in the world.

### 3. A strategy that focuses on the development of comprehensive Islamic finance

Sukuk has become important in supporting the level of development of the product structure offered by Islamic banks and takaful. Financing on sukuk can be used as medium or long-term capital in Islamic banks and takaful.

## Mudharabah Sukuk for Research and Development Capitalization

The rapid development of sukuk in the world is only centered on a few types of sukuk. And those that are widely used include sukuk musyarakah, sukuk murabahah, sukuk istishna and ijarah. Meanwhile,

mudharabah sukuk are rarely used. The following is the percentage of sukuk usage based on the sharia contract principle:

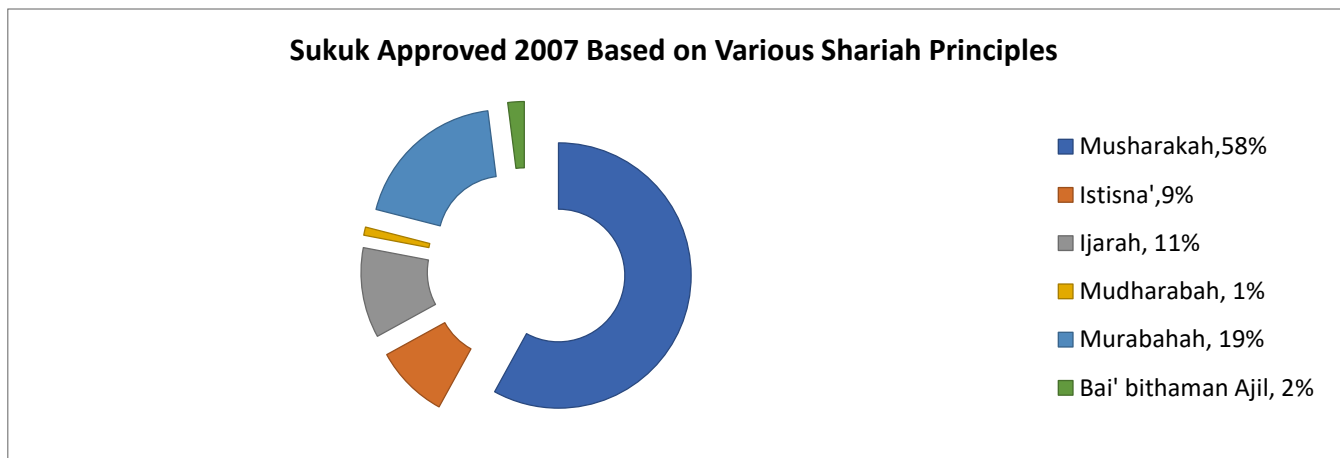


Figure 1. Sukuk Approved based on various schemes

Source: Malaysian ICM Quarterly Bulletin, (January, 2008), Securities Commission Malaysia

It has been explained in the previous discussion that the cause of the low level of use of sukuk mudharabah is one of the supporting aspects, namely the lack of incentives from the government, bureaucracy and socialization. And the fundamental solution offered in Kuni 'Afifah's thesis is product innovation, intensive socialization and *marketing* (Afifah, 2012). And we conclude from these problems there are two dominant factors that are at the core of the problem, namely development capital and consumers.

The field of research and development always offers something innovative, many product innovations created by the nation's children that need to be developed. So, we made a concept map of financing to develop the inventions of the nation's children who are less serious about the government. The financing is using sukuk mudharabah.

If the lack of product innovation is the reason for the low use of sukuk mudharabah in Indonesia, the field of research and development is full of innovations. So, this research and development has good potential in developing sukuk mudharabah in Indonesia.

The Concept Map that we offer is as follows:

1. The Research and Development Agency (government) in collaboration with a creative company, mandates the issuance of sukuk to the SPV to issue mudharabah sukuk with a certain value and within a certain period of time.
2. The SPV issues sukuk mudharabah and trades in the Islamic capital market and represents the expected *margin* or profit sharing payments over a certain period.

3. Investors purchase sukuk mudharabah, on the basis of trust in the SPV as sukuk issuer to carry out a project.

4. Proceeds from the sale of sukuk mudharabah are used for capital development in the field of research and development within an agreed period of time.

The lack of sukuk issuance using the mudharabah concept does not make a reason for some companies to use this type of sukuk. For example, PT Adhi Karya Tbk, which managed to reap a profit of Rp. 4 billion with a profit sharing amount of Rp. 2.966 billion. This is interesting, considering that in the research and development sector, related industries can use this sukuk to finance their projects, besides being profitable for the company, it is also profitable for investors.

The diagram above is a form of our innovation, how to make Indonesia's potential in research and development collaborate with the potential of sukuk mudharabah which can produce something profitable. Many inventions of the nation's children should be developed domestically. However, the invention is applied by other countries. Sukuk mudharabah is used to attract capital at the beginning obtained from investors (*shahibul maal*) and industry as project managers (*mudharib*).

### Istishna Sukuk for Ordering Research and Development Products

The development of istishna sukuk in Indonesia is not as fast as in Malaysia which reached 9% of the total

sukuk issuance. This is based on the products produced or sold by a country. Whereas the use of sukuk istishna is not only for ordering the latest invention products, this sukuk istishna can also be used and issued for the construction of infrastructure such as roads, bridges and others. Malaysia has used this istishna sukuk on the Penang Bridge construction project which is wholly owned by the Kingdom of Malaysia. In addition to the Penang Bridge, Malaysia also used sukuk istishna to build, develop, finance, operate and maintain a 2,100 MW power plant in Tanjung bin, Johor (Bappepam-LK, 2009).

Indonesia's opportunity to use this istishna sukuk is very large, considering that Indonesia is an archipelago and there are still many areas that have not been touched by development. So, we have a new innovation for Indonesia, in addition to the development of sukuk istishna can also be used in ordering as well as a source of capital for the development of product innovation of the nation's children. The brilliant potential of the nation's children must be supported by the contribution of capital and developed marketing. The mechanism for the issuance, purchase and sale of sukuk istishna can adopt the mechanism of sukuk istishna which has been successfully developed in Malaysia on power plants in the Tanjung bin area, Johor.

Therefore, it is unfortunate if Indonesia does not take this opportunity. The technical application of sukuk istishna is the same as the mudharabah sukuk that we have explained earlier. However, the difference is the initial agreement, sukuk istishna uses an order contract. Where investors and sukuk issuers agree to build, deliver and sell to investors certain assets (istishna 1). The purchase or reservation price is paid in 1 stage. Subsequently, the investor and sukuk issuer enter into another sales agreement, where the investor agrees to build and deliver the asset to the sukuk issuer (istishna 2). The sales price will be proportional to the total purchase price and the agreed profit.

For example, a project that can be funded by istishna sukuk is the sosrobahu technology by the nation's children. This technology can be used for bridge construction in Indonesia. Seeing the infrastructure that is still minimal and the territory of Indonesia which is included in the archipelago. In addition, the national electric car can be used as a project for the issuance of this sukuk. This national electric car can be an alternative to environmentally friendly transportation and not fueled by oil. Seeing that the world's fuel oil reserves are running low. And to support this big project, the

government is working with creative companies to produce this item and issue sukuk for capital costs.

From the previous explanations, it can be concluded that the trend of sukuk as financing is increasing. So, Indonesia as a Muslim majority country should apply this sukuk as financing capital. Indonesia's creative economy, which is growing rapidly, must be balanced with sufficient capital. Especially in the field of research and development, many innovative product inventions of the nation's children are abandoned and eventually taken by people because of the lack of serious attention from the government.

We see an opportunity in terms of research and development in Indonesia, we innovate the use of sukuk mudharabah and sukuk istishna in the development and growth of research and development in Indonesia. This innovation is a positive thing that must be implemented by the government, besides the government gets many benefits from the mechanism we offer. The problem of capital to manufacture the product will be handled by the issuance of sukuk mudharabah and the problem of who will buy after the product is manufactured will be solved by the issuance of sukuk istishna to order the product.

## CONCLUSION

There are several problems inhibiting research and innovation in Indonesia. Factors inhibiting the growth of research and development in Indonesia: (1) Lack of government incentives and support in the form of capital; (2) The level of education is still below standard; (3) The level of industrial efficiency (marketing) is not optimal; (4) Lack of understanding from both issuers and investors. The concept of sukuk mudharabah and sukuk istishna can be used to finance and encourage the growth of research and innovation development in Indonesia.

Furthermore, as a recommendation, the government should be more serious in encouraging the growth of research and development in Indonesia, because the sector has considerable potential to be developed. In addition, it is hoped that there will be other studies in addition to this research, to serve as a reference for the government in overcoming research and development problems in Indonesia. Future studies can use more robust methods for qualitative mapping such as the Saaty-ANP/AHP method, ISM and other methods.

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