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INNOVATING PV WATER PUMP BUSINESS FOR RENEWABLE ENERGY INDUSTRY IN INDONESIA USING BLUE OCEAN STRATEGY

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Abtract: The purpose of this study is to investigate and make decisions in determining features, innovation values and business strategies in the renewable energy industry from Sanspower (PT. Java Surya Teknik) which is focused on PV Water Pump products in order to create competitive products for the Indonesian market. Determining the right renewable energy technologies (RET's), as well as a strategy to accelerate commercialization that has different values from competitors, and avoids the red ocean market. This study uses a qualitative methodology using the Blue Ocean Strategy (BOS), testing the data using the triangulation method. This research was started from September 2021 to February 2022 to produce products in the renewable energy industry that are right for the developing country.

Keywords: *Solar Water Pump, PV Water Pump, Solar Water Pumping System (SWPS), Renewable Energy, Blue Ocean Strategy.*

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1. Introduction

PV Water Pump is the technology of choice for remote areas, locations with dry soil conditions for domestic and irrigation purposes (Benghanem et al., 2014). PV Water Pumps are also used for large-scale agriculture (Powell et al., 2021). Meanwhile, the energy source obtained from sunlight is one of the technologies that is affordable and easy to install in rural areas or in remote area locations. (Blum et al., 2013) (Benghanem et al., 2014). Most pumps for deep wells have a large power consumption. PV Water Pump is a solution for the eastern part of Indonesia which only has a 75% electrification rate, such as in East Nusa Tenggara (Wirawan & Gultom, 2021).

Based on research conducted by (Setiawan et al., 2014) in Indonesia using 2 DC Submersible Pumps with 32 solar panels and a total capacity of 3,200Wp with a total head of 250 meters with a water production target of 0.4-0.9 liters/second. In the local market, there are not many pump variants in the market, while in market conditions there are only certain brands with quite high prices. Meanwhile, the purchasing power of the Indonesian market is still below the selling price of the PV Water Pump product. As one of the distributors of PV Solar Water Pumps in Indonesia, PT Java Surya Teknik (Sanspower) also feels the same way. Seeing this phenomenon, Sanspower plans to design a special feature of PV Solar Water Pump specifically by analyzing the market and potential needs with the Blue Ocean Strategy method, which is expected to feature PV Solar Water Pumps that can be accepted by the wider Indonesian market. Currently, Sanspower has distributed hundreds of PV Solar Water Pumps, at least 1.6 million liters of water per day have been produced from these hundreds of pumps (Cahyadi, 2021)

2. Literature Review

Previous Study on PV Solar Water Pump.

Based on research (Aliyu et al., 2018) has summarized research related to innovators who have conducted research and implementation of PV Solar Water Pumps in several countries. Looking at table 1, we can see that the use of the DC pump type is very dominant and the application of technology will make the PV Solar Water Pump design lower, because it does not require an energy conversion system. This development data is very useful for planning the Blue Ocean.

Tabel 1. Summary showing the regions and application PV Solar Water Pump

Authors	**Location/Region**	**Study Approach**	**Application**	**Inverter**	**Motor Type**
(Omer, 2001)	Sudan, Africa	Survey	Domestic	Yes	AC
(Mokeddem et al., 2011)	Algeria, Africa	Experimental	Domestic and irrigation	No	DC
(Yahya & Sambo, 1995)	Nigeria, Africa	Experimental	Domestic	Yes	AC
(Hrayshat & Al-Soud, 2004)	Jordan, Middle East	Survey	Domestic	N/A	N/A
(Hammad, 1999)	Jordan, Middle East	Experimental	Domestic	No	DC
(Ghoneim, 2006)	Kuwait, Middle East	Simulation	Domestic	No	DC
(Bennouna & Ijdiyaou, 1994)	Morocco, Africa	Simulation	Irrigation	No	DC
(Kaldellis et al., 2011)	Greece, Europe	Experimental and simulation	Domestic and Irrigation	No	DC
(Kaldellis et al., 2009)	Greece, Europe	Experimental and analytical	Domestic	No	DC
(Reca et al., 2016)	Spain, Europe	Analytical	Irrigation	Yes	AC
(Van den Akker & Lamba, 2002)	India, Asia	Survey	Irrigation	No	DC
(Setiawan et al., 2014)	Indonesia, Asia	Experimental	Domestic	No	DC
(Zhanga & Yana, 2014)	China, Asia	Simulation	Irrigation	N/A	N/A
(Olsson et al., 2014)	China, Asia	Analytical	Irrigation and carbon sequestration	N/A	N/A
(Campana, Li, et al., 2015)	China, Asia	Analytical	Irrigation	N/A	N/A
(Gao et al., 2013)	China, Asia	Modelling	Irrigation	N/A	N/A
(López-Luque et al., 2015)	China, Asia	Modelling and Simulation	Irrigation	Yes	AC

(Yu et al., 2011)	China, Asia	Assessment	Irrigation	No	DC
(J. Zhang et al., 2014)	China, Asia	Modelling	Irrigation	No	DC
(Campana, Leduc, et al.,	China, Asia	Optimization and modelling	Irrigation	Yes	AC
(Manfrida & Secchi, 2014)	Italy, Europe	Simulation	Power Storage	Yes	AC
(Munir et al., 2007)	Iraqi-Syirian border,Middle East	Design	Domestic	Yes	AC
(Al-Ibrahim et al., 1998)	Madison, USA	Modelling	Domestic	No	DC
(Alajlan & Smiai, 1996)	Saudi Arabia, Middle East	Experimental	Desalination	Yes	AC
(Paredes-Sánchez et al.,	Spain, Europe	Design	Mining	No	DC
(Yang et al., 2014)	China, Asia	Analytical	Carbon sequestration	Yes	AC

(Setiawan et al., 2014) explained that the use of a PV Solar Water Pump with a DC pump type has better efficiency, the water flow rate is more maintained because there is not much head loss in the installation process. (Mokeddem et al., 2011) in his research in Algeria - Africa, explained that the PV Solar Water Pump system with a DC pump type is simpler, in some installations it does not require an additional battery as a backup. This type of installation will provide a much lower installation cost, and can still work normally during the day. (Hammad, 1999) uses a DC pump type in Jordan because it is much cheaper to operate when compared to a diesel engine. (Yu et al., 2011) explain that PV Solar Water Pumps have a fairly long service life of up to 25 years and lower operating costs for project grasslands in China.

Blue Ocean Strategy

Blue Ocean Strategy was first proposed (Kim W. Chan & Mauborgne, 2005). Blue Ocean Strategy is a strategy that emphasizes the company not to win the competition by carrying out a head-to-head strategy with competitors. In other words, Blue Ocean Strategy is a strategy to release you from the Red Ocean condition. Red Ocean conditions are conditions where there is very tight competition to get the same market as competitors. This allows the competition with competitors to be very tight and bring down each other.

(Abidin Mohamed, Zainal; Himan, Haim; Bahaman, 2013) and (Lohtander et al., 2017) use the Blue Ocean Strategy framework to find a decision to get out of the competition in their environment. (Ali Alghamdi, 2016) reviews how Blue Ocean Strategy is very important for an established company, namely, Saudi Telecom Company (STC), to revisit the achievements and impacts of Blue Ocean Strategy competitive advantage, organizationally at all levels to understand more in between market knowledge dimensions, competitive advantage dimensions, determining the relationship and the indirect impact of market knowledge. Meanwhile (Leavy, 2018) uses the Blue Ocean Strategy to find value innovation from new demand-creation.

The focus of the discussion in this research is to find the right features and product development for PV Solar Water Pumps as well as strategies to win sales in the Indonesian market. 3 stages for the implementation of the Blue Ocean Strategy:

Step 1. Strategy Canvas: the ultimate diagnostic tool and action framework for building a compelling Blue Ocean strategy. It will graphically depict the current strategic landscape and future prospects for an organization.

The horizontal axis on the Strategy Canvas captures the various factors into which the industry competes and invests, while the vertical axis captures the level of supply that buyers receive across all of these key competitive factors. The value curve or strategic profile is a graphic depiction of the company's relative performance across the competitive factors of its industry (Kim W Chan & Mauborgne, 2022).

Step 2. The Four Action Framework: developed by W. Chan Kim and Renee Mauborgne is used to reconstruct buyer value elements in constructing a new value curve or strategic profile. To break the trade-off between differentiation and low costs of creating a new value curve, the framework asks four key questions, shown in the diagram, to challenge the strategic logic of the industry. (Kim W & Mauborgne, 2022)

The Four Action Framework asks four key questions to translate insights into well-constructed strategies:

- What factors do the industry take for granted that should be eliminated?
- Which factors should be reduced well below industry standards?
- Which factors should be raised well above the industry standard?
- What factors has this industry never offered to create?

These questions help to challenge the strategic logic and business model of an industry to arrive at blue ocean moves that break the trade-off between differentiation and low cost.

Step 3. Eliminate-Reduce-Raise-Create (ERRC) Grid: This is a simple matrix-like tool that encourages companies to focus simultaneously on eliminating and reducing, and enhancing and creating while opening up new blue oceans (Kim W. Chan & Mauborgne, 2022).

This analytical tool complementing the Four Action Framework is used to encourage companies to not only ask the questions posed in the Four Actions Framework but also to act on all four to create new value curves (or strategic profiles), which are essential to unlocking new Blue Oceans. Grid gives companies four immediate benefits:

- This encourages companies to simultaneously pursue differentiation and low cost to break the value-cost trade-off.
- This soon marked a company that focused solely on improvement and creation, thereby lifting cost structures and often over-engineering products and services – a situation that is common to many companies.
- It is easily understood by managers at any level, creating a high level of involvement in its implementation.
- Since completing the grid is such a challenging task, it encourages companies to thoroughly research every factor that makes the industry competitive, helping them to discover the various implicit assumptions they unconsciously make in competition.

3. Research Method

In this paper, we will use qualitative methodology and Blue Ocean Strategy as a tool and framework by conducting individual interviews and a group discussion forum held at the Sanspower office, Graha Pena Building, Jawa Pos Jl. Ahmad Yani No. 88 1st floor room 102 Surabaya East Java Indonesia. Sources of information from this writing are Owner (3 persons), Sales Engineer (4 persons), Field Engineer (1 person), Consumers (10 persons/company) as primary data. Secondary data is collected with the help of authentic and well-known sources, such as books, journals, competitor data, implementation of the same in different locations and relevant websites.

Data collection begins in September 2021 to February 2022 and is carried out by virtual conference and face to face. During the CoronaVirus pandemic, the possibility of getting data face to face became constrained, to complete and obtain more accurate data, virtual conference became one solution, collecting data using Google Meet, Zoom, phone and Whatsapp Text. Triangulation technique is used for testing data from these sources.

(Gabriel & Kirkwood, 2016) uses an in-depth qualitative with triangulation approach to determine the business model of renewable energy technologies (RET's) used by entrepreneurs in the renewable energy industry sector, the business model carried out by entrepreneurs is influenced by different levels of government interest, governance and policy support and relative ease of activity to be easier to do (F. Zhang et al., 2014) using a triangulation approach to build and select innovations to determine the ergonomic design of a product. (Shakeel et al., 2017) conducted a study and investigation of how to plan effectively commercialize RET's. This test aims to identify RET's acceleration factors in Finland by adopting a triangulation approach to ensure accuracy and obtain a detailed situation picture of market, technology and regulatory needs. (Leavy, 2018) is planning a value innovation in building products with BOS and being aware of the emergence of new aggregations or disruptive technology.

4. Result and Discussion

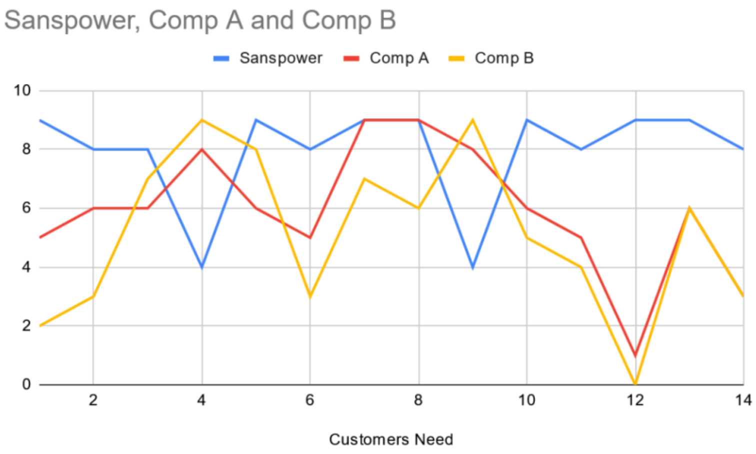
4.1. Results

In implementing and determining the Blue Ocean Strategy at Sanspower, there are 3 phases, namely the Strategy Canvas, the Four Action Framework and the ERRC Grid.

Step 1. Strategy Canvas

The canvas chart shows the condition of each competitor. Each competitor has its own advantages and disadvantages. In this study, 2 competitors are very close and compete with each other in the same market.

No	Customers Need	Sanspower	Comp A	Comp B
1,	Product Availability (Stock)	9	5	2
2.	Order delivery speed	8	6	3
3.	Availability of supporting tools	8	6	7
4.	Price affordability	4	8	9
5.	Availability of engineers	9	6	8
6.	Availability of sales engineers	8	6	3
7.	Simulation report/calculation simulator	9	9	7
8.	Online sales line	9	9	6
9.	Offline sales line	4	8	9
10.	Agency sales line	9	6	5
11.	Availability of spare parts	8	5	4
12.	Availability of service center for any damage	9	1	0
13.	Training for implementers	9	6	6
14.	Training to partner agents/integrators	8	3	3



From the data above, competition between companies is very close to competition from price. Sanspower sells much higher than other competitors. This happens because the company prioritizes warranty and accuracy of system implementation on customers. Seeing this fact, it is urgently needed a new breakthrough that is better, and not too trapped in the Red Ocean. Most competitors seek to sell at low prices, although they reduce other services as compensation.

Step 2. Four Action Framework

In the Four Action Framework the company focuses on discovering new conditions in the market. Most of the existing sales and brands only use pump types with high durability and more sophisticated technological features, while the decision to lower prices is one option that is impossible to do. What follows is how with the Four Action Framework, companies can gain new knowledge and get out of the Red Ocean.

1) Eliminate: Eliminates the addition of additional accessories that are not needed. The more technological features the pump will cost, the more expensive it will be.
2) Create: Designing a PV Solar Water Pump that focuses on the main function, which is to circulate water according to the condition of the solar energy obtained.
3) Raise: Choose the same technology but at a lower cost.
4) Reduce : Replace overly advanced features with the same features but at a lower cost.
5) A New Value Curve: PV Solar Water Pump for Middle Class Market

Step 3. ERRC

Eliminate	**Raise**
- Eliminate unnecessary extra accessories, focus on the main function	- Choose the same technology but at a lower cost.
Reduse	**Create**
- Reduce the sophistication of features with the same features but cheaper	- Pump design whose main focus is only to drain water according to the energy obtained.

From the Blue Ocean Strategy by using the 3 tools above, we get a new concept and market for the PV Solar Water Pump which is not too excessive in terms of features and accessories and is very suitable for market conditions in Indonesia. The following are features that must be realized from the implementation of BOS

Item	Desc	Lorentz	Sanspower	BOS Action
Feature	Setup Pump	Use Bluetooth & Smartphone	Button Pad	Reduce
Accessories	Hybrid power	Powerpack AC to DC	Diode Rectifier	Reduce
Accessories	Communication	GSM module	-	Eliminate
Accessories	Monitoring	Dashboard Monitoring	-	Eliminate
Feature	Motor Speed	Variable Multiturn level speed	Multiturn level speed	Reduce
Feature	Sensor	Speed Sensor	-	Eliminate
Feature	Display Speed	On Mobile App	On Display	Reduce
Feature	Power meter	Volt, Ampere, Watt on Mobile App	Volt, Ampere, Watt on	Reduce
Feature	Update firmware	Automatic update on cloud	-	Eliminate
Feature	Well Probe Sensor	External Well Probe	Internal Well Probe	Raise
Accessories	Irradiation	Sun sensor	-	Eliminate
Feature	Transfer Power Switch	Manual	Auto	Raise
Accessories	Protector	Surge Protector	-	Eliminate

4.2. Discussion

If we refer to the existing literature study, then with BOS we can design a PV Solar Water Pump that has the same functions but at a much more affordable price. The following is a price comparison from previous researchers who have used the PV Solar Water Pump when compared to the pump features from Sanspower:

No.	Author	Region	Application	Type Pump	Unit Price Lorentz	Sanspower Pump	Unit Price
1	(Chingosho et al., 2020)	Zimbabwe, Africa	Domestic	Lorentz PS2-1800	$3,000	SP-1500	$1,700
2	(Girma, 2017)	Ethiopia, Africa	Domestic	Lorentz PS 600	$2,930	SP-750	$1,470
3	(Nikzad et al., 2019)	Iran,Middel East	Irrigation	Lorentz PS2 600	$2,930	SP-750	$1,470
4	(Ba et al., 2019)	Mauritania, Africa	Domestic	Lorentz PS1200	$3,000	SP-1500	$1,540
5	(Setiawan et al., 2014)	Indonesia, Asia	Domestic	Lorentz PS1800	$3,250	SP-1500	$1,700

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6	(Zamanlou & Iqbal, 2020)	Iran,Middel East	Irrigation	Lorentz PSk2-25	$14,950	-	-
7	(Klimenta et al., 2021)	Serbia, Europe	Irrigation	Lorentz PS2-1800	$3,000	SP-1500	$1,700
8	(Boutelhig et al., 2018)	Algeria, Africa	Irrigation	Lorentz PS200	$2,310	SP-300	$1,460
9	(Boutelhig et al., 2018)	Algeria, Africa	Livestock & Irrigation	Lorentz PS600	$2,930	SP-1500	$1,700
10	(Boutelhig et al., 2018)	Algeria, Africa	Livestock & Irrigation	Lorentz PS1200	$3,000	SP-1500	$1,700
11	(Boutelhig et al., 2018)	Algeria, Africa	Livestock & Irrigation	Lorentz PS1800	$3,000	SP-1500	$1,700
12	(Yaichi et al., 2019)	Algeria, Africa	Experimental	Lorentz PS150	$1,710	SP-300	$1,460
13	(Allouhi et al., 2019)	Morocco, Africa	Domestic & Irrigation	Lorentz PS200	$2,310	SP-400	$1,460
14	(Abdolzadeh & Ameri, 2009)	Iran,Middel East	Experimental	Lorentz PS150	$1,710	SP-300	$1,460

It is hoped that product development planning with BOS will make the implementation of PV Solar Water Pumps wider, open up new markets and insights, and spur other researchers because the results of this innovation are very suitable for implementation in development countries, such as studies that have been carried out by previous researchers.

5. Conclusion

In this study it can be concluded that the Blue Ocean Strategy allows a business that is in the Red Ocean to have new space, reduce the risk of competition and be able to plan a new feature and technology that is right for the market. Blue Ocean Strategy helps to plan innovations for the better and provides great potential to be combined with other methodological approaches, to help make decisions that are more objective and customer-oriented. The Blue Ocean Strategy study conducted at PT Java Surya Teknik (Sanspower) helped from various aspects, not only providing consideration for decisions in innovation, but also new insights on competitive advantage, uniqueness, value innovation, and uncontested market space.

The results of this research also lead the company to be able to carry out a wider marketing pattern and get new demand potential that has not previously been seen by many other competitors and become a reference for future researchers in the fields of business strategy, value innovation and renewable energy.

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