PT PJB UPHT Calibration Laboratory Business Strategy with Business Model Canvas Method

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Abstract. Industry in Indonesia is facing the Asean Economic Community (AEC), which came on January 1, 2016. AEC have 3 pillars, namely: metrology, standardization, and conformity assessment. These 3 pillars facilitate the flow of products to meet quality standards for ASEAN market. The product standardization process requires calibration and test laboratories spread throughout Indonesia. PT PJB through its maintenance unit, namely UPHT and UPHB, has tried to establish a calibration laboratory to meet the quality standard requirements. Firstly, the calibration laboratory serve the internal needs of PT PJB, but seeing market opportunities, it can become a profit center by reaching calibration market. So that the PT PJB UPHT Calibration Laboratory can become a new line of business, the calibration laboratory business is developed to produce a value proposition as a profit center for PT PJB in calibration services. Business development of calibration laboratory is carried out using the Business Model Canvas (BMC). Through SWOT analysis and Blue Ocean Strategy, 2 Alternative BMC will be developed. Using Minaut decision making analysis, business models selected is alternative BMC 1 to be implemented in first two years and alternative BMC 2 to be implemented in the next years.

Keywords: calibration laboratory, calibration services, business model canvas, business strategy

1. Introduction
PT PJB is a subsidiary of PT PLN which has main products: readiness of the operation and electricity generation of power plants and service operation & maintenance of the plant. PJB has maintenance service unit which is divided into 2 regions, namely the Eastern Regional Maintenance Service Unit (UPHT) and the Western Regional Maintenance Service Unit (UPHB). The Maintenance Services Unit (UPHAR) aims to provide services in the area of planned maintenance and other work services such as overhaul, engineering, and projects to support the generating unit in an effort to achieve availability, reliability and efficiency. UPHAR also aims to develop modern, effective and efficient maintenance methods so that they are able to meet established standards, including the requirements for carrying out calibration on company-wide measuring and test equipment.

In carrying out its work the maintenance sector has a variety of tools used as measurement tools and calibration tools. These tools must be calibrated periodically to ensure the accuracy they have as a reference in carrying out measurement and calibration work. With the calibration schedule each year,
it is not necessary to pay a small amount for calibration services and special time needed for the tools to be calibrated so that within this time the tool cannot be used for work. On that basis UPHT and UPHB have a work program to establish a calibration laboratory that can carry out the calibration of their measuring instruments and serve the calibration service request from the generation unit. PT PJB calibration laboratory established through UPHT and UPHB is the company's effort to meet quality management in the calibration service field based on ISO / IEC 17025. In the first stage, the calibration laboratory has the main objective to provide calibration services for internal PT PJB. There are two objectives to be achieved with the establishment of a calibration laboratory that serves PT PJB internally, the first is to reduce the waiting time required for the tool to be calibrated so that it cannot be used for work. The second objective is that can reduce the costs each year for calibration service.

With the opening of the electricity industry to the private sector, especially in electricity generation, it will directly erode the market share of PT PJB power plants in Indonesia. Therefore, companies are required to develop business by expanding into promising businesses, especially still around the electricity industry. One of the business opportunities is in the field of calibration services, especially since the enactment of the ASEAN Economic Community (AEC) on January 1, 2016. In the ASEAN agreement, standardization, conformity assessment and metrology are the three main pillars to facilitate the flow of products that meet quality standards can circulate freely in the entire ASEAN region. Therefore, we need test and calibration laboratories spread throughout Indonesia with equitable capabilities to support the standardization of Indonesian products circulating in the ASEAN free market. The number of accredited calibration laboratories is still far from ideal compared to their needs based on data from BSN. It is indicates that the calibration market in Indonesia is large and continues to grow in line with the awareness of industry players to meet the quality requirements in the AEC.

PT PJB's calibration laboratory in order to be able to carry out its role both as a calibration service unit internally at PT PJB and as a new business unit that is a profit center by reaching the calibration service market outside the company must have the right business strategy. This research will map the business model currently underway by calibration laboratory and the development of the most suitable business model to become a new business unit. The design and business development is carried out using the Business Model Canvas (BMC). BMC is a picture of a business model with a concept that is simple, relevant, and can be understood by everyone [1]. BMC has nine basic building blocks that show how companies run their business models to make a profit. Through SWOT analysis and Blue Ocean Strategy (BOS), 2 Alternative BMC will be developed. SWOT analysis is the systematic identification of various factors to formulate a company's strategy [2]. This analysis is based on the relationship or interaction between internal elements, namely strengths and weaknesses, to external elements namely opportunities and threats [3]. BOS is the creation of unknown and untouched market spaces, by making new requests for the first time. BOS is a breakthrough company strategy to get out of the red ocean [4]. Minaut's decision making analysis is used to determine the BMC to be chosen. Decision making is an activity that must be carried out when required to solve the problem and choose several alternatives without preceding the occurrence of the problem. Rationally, the decision chosen was the best alternative at the time after considering resource constraints to achieve an ideal outcome [5].

2. Method
The study was conducted at the calibration laboratory of PT PJB UPHT in Gresik, East Java. The study was conducted using qualitative descriptive methods. The data used in this study are primary and secondary data. Primary data were obtained from interviews with the head of the calibration laboratory and from the results of the Focus Group Discussion (FGD) with 5 people who were calibration laboratory team. Secondary data is data that has been collected by other parties, in the form of documents, literature books, and the internet. Data collection techniques used in this study were carried out through: (1) Interviews, interview techniques conducted in the form of two-way discussions and communication by compiling a list of questions that were prepared in advance; (2)
FGD on the internal calibration laboratory team that has the capacity of knowledge related to the field of development strategy with the aim of enriching views on future business models.

Business model development is carried out through a series of analyses which begin with a descriptive analysis that analyses the current conditions. Identification nine elements of BMC is needed to determine the goals to be achieved by the organization according to the objectives to be achieved. Furthermore, each element is assessed in detail with a SWOT analysis of internal and external factors. BMC and SWOT is the basis in designing Alternative BMC 1. Next, an analysis is carried out using BOS with a four-step framework analysis tool and a write-off-reduce-improve-create scheme of the nine elements of the current business model canvas will produce alternative BMC 2. From the two alternative BMC, Minaut's decision analysis will be conducted to obtain the business model that is most suitable. The strategic action plan will be prepared to obtain the calibration laboratory business strategy. Analysis framework can be shown in Figure 1.

![Analysis Framework](image)

**Figure 1.** Analysis Framework

### 3. Research and Discussion

#### 3.1. Current Business Model Canvas

The identification of the BMC is currently done by interviewing the head of the calibration laboratory to obtain nine canvas building blocks of the calibration laboratory business model. The identification of nine BMC building blocks can be described in Figure 2.
3.2. Alternative Business Model Canvas I

To get the Alternative BMC 1, a SWOT analysis was carried out to improve the current BMC. To carry out a SWOT analysis of the BMC, a Focus Group Discussion (FGD) was conducted with the calibration laboratory team. Based on the results of the FGD, SWOT analysis of each building block was obtained on the BMC. From the SWOT of each canvas building block, internal identification (IFAS) and external (EFAS) factors will be carried out as shown in Tables 1 and 2.

**Table 1. Identification of Internal Factors**

| No | Building Blocks         | Strengths                                                                 | Weaknesses                                                                                     |
|----|-------------------------|---------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| 1  | Customer Segments       | The PT PJB UPHT Calibration Laboratory is under the widely known PJB and PLN groups | The PT PJB UPHT Calibration Laboratory is still new in the calibration service industry and is still unknown to prospective customers |
| 2  | Value Propositions      | Has a master calibrator that has the highest specifications in its class | The value proposition has not yet had a strong network impact and some value propositions only apply to PJB internal consumers |
| 3  | Channels                | The calibration laboratory is in the PJB group environment which has a communication channel that has been established in the PLN group, so that prospective customers in the PLN group environment are more easily connected | The new calibration laboratory is established so that it does not yet have communication and marketing channels for external customer segments |
| 4  | Customer Relationships  | -                                                                         | Does not yet have external customers                                                            |
Revenue Streams
It is still a cost center to serve internal PJB customers

Key Resources
Having 13 engineers who are competent and certified in carrying out the calibration process, especially in the scope of electricity, pressure and temperature
The calibration engineer is not focused on the calibration laboratory because he has the main task as a maintenance engineer at PT PJB UPHT

Key Activities
Calibration of measuring instruments and instrumentation is carried out in accordance with the requirements of ISO / IEC 17025 quality standards
Calibration activities cannot be carried out continuously for each working day

Key Partnerships
Still dependent on cooperation with PT Surveyor Indonesia as a consultant and KAN as an auditor of the ISO / IEC 17025 accreditation process

Cost Structure
The cost structure is dominated by the costs of meeting the facilities and infrastructure

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Table 2. Identification of External Factors

| No | Building Blocks      | Opportunities                                                                 | Threats                                                                                                                                 |
|----|----------------------|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| 1  | Customer Segments    | All power plants use measuring instruments and instrumentation that require calibration services | The competitor's calibration laboratory that already has a big name has channels, key resources and value propositions that are inherent in certain customer segments |
| 2  | Value Propositions   | The development of a value proposition that previously only applies to internal customers can be applied to external customers. | The development of a value proposition that previously only applies to internal customers can be applied to external customers. |
| 3  | Channels             | PJB has many business partners spread across all power plant units, calibration laboratories can utilize channels through these business partners to connect with potential customers | Competitor calibration laboratories, especially those that have already been established, have established channels so that it is more effective to connect with potential customers |
| 4  | Customer             | -                                                                           | Calibration laboratories cannot maintain customer relations if |
Relationships

5 Revenue Streams
Can have revenue streams from calibration of measuring instruments and instrumentation if it can attract external customers

6 Key Resources
The calibration laboratory program is supported by management
Remuneration of calibration engineer salaries from PJB is relatively higher compared to the calibration laboratory industry in general

7 Key Activities

8 Key Partnerships
Opportunities for collaboration with other parties in carrying out the calibration laboratory operational activities

9 Cost Structure
The development of a calibration laboratory will add to the cost structure

Table 3. Internal Factor Calculation

| No | Internal Factor                                                                 | Weight | Rate | Score | Building Blocks      |
|----|---------------------------------------------------------------------------------|--------|------|-------|----------------------|
| 1  | The PT PJB UPHT Calibration Laboratory is under the widely known PJB and PLN groups | 0.10   | 3    | 0.30  | Customer Segments    |
| 2  | Has a master calibrator that has the highest specifications in its class         | 0.08   | 4    | 0.32  | Value Propositions   |
| 3  | The calibration laboratory is in the PJB group environment which has a communication channel that has been established in the PLN group, so that prospective customers in the PLN group environment are more easily connected | 0.08   | 3    | 0.24  | Channels             |
| 4  | Having 13 engineers who are competent and certified in carrying out the calibration process, especially in the scope of electricity, pressure and temperature | 0.12   | 4    | 0.48  | Key Resources        |
| 5  | Calibration of measuring instruments and instrumentation is carried out in accordance | 0.02   | 2    | 0.04  | Key                  |
with the requirements of ISO / IEC 17025 quality standards

|                  | Partnerships |
|------------------|--------------|
| Subtotal         | 0.4          | 1.40         |

| WEAKNESSES       |              |
|------------------|--------------|
| 1 The PT PJB UPHT Calibration Laboratory is still new in the calibration service industry and is still unknown to prospective customers | 0.12 | 4 | 0.48 | Customer Segments |
| 2 The value proposition has not yet had a strong network impact and some value propositions only apply to PJB internal consumers | 0.10 | 4 | 0.40 | Value Propositions |
| 3 The new calibration laboratory is established so that it does not yet have communication and marketing channels for external customer segments | 0.06 | 3 | 0.18 | Channels |
| 4 Does not yet have external customers | 0.06 | 3 | 0.18 | Customer Relationships |
| 5 It is still a cost center to serve internal PJB customers | 0.08 | 3 | 0.24 | Revenue Streams |
| 6 The calibration engineer is not focused on the calibration laboratory because he has the main task as a maintenance engineer at PT PJB UPHT | 0.06 | 4 | 0.24 | Key Resources |
| 7 Calibration activities cannot be carried out continuously for each working day | 0.08 | 3 | 0.24 | Key Activities |
| 8 Still dependent on cooperation with PT Surveyor Indonesia as a consultant and KAN as an auditor of the ISO / IEC 17025 accreditation process | 0.02 | 1 | 0.02 | Key Partnerships |
| 9 The cost structure is dominated by the costs of meeting the facilities and infrastructure | 0.02 | 1 | 0.02 | Cost Structure |

|                  |              |
|------------------|--------------|
| Subtotal         | 0.6          | 2.00         |
| Total            | 1.0          |

**Table 4.** External Factor Calculation
1. All power plants use measuring instruments and instrumentation that require calibration services.

2. The development of a value proposition that previously only applies to internal customers can be applied to external customers.

3. PJB has many business partners spread across all power plant units, calibration laboratories can utilize channels through these business partners to connect with potential customers.

4. Can have revenue streams from calibration of measuring instruments and instrumentation if it can attract external customers.

5. The calibration laboratory program is supported by management.

6. Opportunities for collaboration with other parties in carrying out the calibration laboratory operational activities.

| Subtotal | 0.56 | 1.78 |

**THREATS**

1. The competitor’s calibration laboratory that already has a big name has channels, key resources and value propositions that are inherent in certain customer segments.

2. The development of a value proposition that previously only applies to internal customers can be applied to external customers.

3. Competitor calibration laboratories, especially those that have already been established, have established channels so that it is more effective to connect with potential customers.

4. Calibration laboratories cannot maintain customer relations if communication and marketing channels have not yet been established.

5. Remuneration of calibration engineer salaries from PJB is relatively higher compared to the calibration laboratory industry in general.
The development of a calibration laboratory will add to the cost structure

|   | The development of a calibration laboratory | 0.02 | 2 | 0.04 | Cost Structure |
|---|---------------------------------------------|------|---|------|----------------|
| Subtotal |                                  | 0.44 |   | 1.26 |
| Total |                                              | 1.0  |   |      |

From the results of the analysis of internal and external factor table calculations in Table 3 and Table 4, it shows that the value of each score, namely the internal factors for strength has a score of 1.40 and the weakness factor has a score of 2.00 with a difference of -0.60. While the external factors obtained for the opportunity to have a score of 1.78 and for threats have a score of 1.26 with a difference of +0.52. From the next identification process, the calculation process score to determine the quadrant position on the SWOT diagram.

Position of calibration laboratory in the SWOT diagram can be seen in Figure 3. Based on that, it is found that the calibration laboratory industry is in quadrant 3 which supports the turnaround, namely business conditions that are facing enormous opportunities, but also has several internal obstacles or weaknesses that must be faced. Business development efforts can be done by making improvements to the elements that are weaknesses in the company [6].

![Figure 3. SWOT Diagram](image)

The strategy used in business conditions in the turnaround quadrant is to apply the WO strategy as shown in Table 5.

### Table 5. The SWOT Matrix

| Strengths (S) | Weaknesses (W) |
|---------------|----------------|
| **SO Strategies** | **WO Strategies** |
| 1. (S1, S3) - (O1, O4) | 1. (W4,W5) - (O1,O2,O4) |
| Add customer segments that include power plants from both the PLN and private groups for calibration services for measuring instruments and instrumentation. | Add customer segments that include power plants from both the PLN and private groups for calibration services |
| **Opportunities (O)** | |
| **Threats** | **Strengths** |
| 2. (W2) - (O2) | |
| Strategies (S) | Implementing or Control (O) |
|----------------|-----------------------------|
| 2. (S2) - (O2) | Applying a value proposition to the calibration process that is faster than external calibration laboratories in all customer segments. |
| 3. (S1, S3) - (O3) | Open communication and marketing channels through business partners registered in PJB and PLN group. |
| 4. (S4) - (W5) | Assign 3 calibration engineers in the Workforce Formation of the calibration laboratory to run the calibration laboratory operations, for 10 calibration engineers who come from the maintenance field as supporters. |
| 5. (S2, S4, S5) - (W6) | Collaborating with other calibration laboratories as partners in comparative / proficiency testing. |
| 6. (W1,W8) - (O6) | Include the staffing costs of the calibration laboratory organic personnel in the cost structure. |

**Table: Threats (T)**

| Strategies (W) | Implementing or Control (O) |
|----------------|-----------------------------|
| 1. (W1,W2,W4,W5) - (T1,T3) | Focus on customer segments within the PLN group and the private sector affiliated with the PLN group. |
| 2. (W2) - (T2) | Rely on the PLN and PJB group flags in offering value propositions to customers. |
| 3. (W9) - (T5,T6) | Form an active marketing team in searching for potential customers. |

**ST Strategies**

1. (S1,S3) - (T1,T3)  
Focus on customer segments within the PLN group and the private sector affiliated with the PLN group. 

2. (S2,S5) - (T2)  
Offers more competitive rates compared to competitors' calibration laboratories. 

3. (S4) - (T5,T6)  
The calibration engineer is assigned only as an enrichment of his main task so as not to incur additional staffing costs. 

4. (S1,S3) - (T4)  
Rely on channels that have been formed under the banner of the PLN group. 

**WT Strategies**

1. (W1,W2,W4,W5) - (T1,T3)  
Focus on customer segments within the PLN group and the private sector affiliated with the PLN group. 

2. (W2) - (T2)  
Rely on the PLN and PJB group flags in offering value propositions to customers. 

3. (W9) - (T5,T6)  
Placing staffing costs as one of the main components in the operational cost structure. 

4. (W3) - (T4)  
Form an active marketing team in searching for potential customers.
Alternative BMC 1 was designed from the current BMC, which is being improved based on the SWOT analysis that has been done for 9 elements of the BMC. Improvements were made to 7 of the 9 canvas elements as shown in Figure 4.

3.3. Alternative Business Model Canvas 2

Alternative BMC 2 generated using the BOS analysis. The BOS analysis is carried out using a combination of a four-step framework and current BMC. The design of alternative business models combined with BOS principles raises four main questions, namely what can be created, eliminated, improved, and reduced referring to current and future conditions [7]. From the results of the BOS analysis obtained an alternative BMC 2 as shown in Figure 5.
From the results of the FGD carried out, factors were found in the BMC building blocks that needed to be improved, created and eliminated. Factors that can be improved, there are 8 factors in the 5 canvas building blocks that can be improved. The building blocks include: Customer Segments, Value Propositions, Key Resources, Key Activities, and Key Partnerships. (2) Factors that can be reduced, there are no factors that can be reduced at this time. (3) Factors that can be created, there are 20 factors in the 8 canvas building blocks that can be created (All building blocks exclude Key Resources). (4) Factors that can be eliminated, only 1 factor can be eliminated which is in the Key Partnerships block.

3.4. Business Model Canvas Selected
After obtaining the alternative BMC as explained previously, it is necessary to analyze the decision making to determine the best BMC for the calibration laboratory. Analysis of decision making is done using the Minaut concept. An alternative BMC 1 and 2 will be carried out a screening and evaluation process based on absolute criteria and desires that have been determined as shown in Table 6.

Table 6. The process of filtering and evaluating alternatives

| Absolute Criteria | Alternative BMC 1 | Alternative BMC 2 |
|-------------------|-------------------|-------------------|
| 1. Potential calibration income above Rp. 1 billion per year. | Potential calibration income of Rp 2.8 billion per year | The calibration revenue potential that can be obtained is greater than Rp. 3.83 billion per year |
| 2. At least have 1 external customer segment | Has a PLN and private power plant customer segment | Having electricity industry customer segments (PLN & private power plants, |
PLN transmission, PLN distribution, EPC), general industry

3. Has the resources to provide calibration services on 3 scopes
   It has 13 calibration engineers for 3 scopes, each scopes having 1 set of master calibrators
   Has 13 calibration engineers for 3 scopes, each scopes has 2 sets of master calibrators

| Desire Criteria | B | Info | N | BxN |
|-----------------|---|------|---|-----|
| 1. Have a variety of sources of income | 8 | Source of income: calibration services for measuring instruments and instrumentation | 6 | 48 |
| 2. Can generate maximum income potential | 10 | Potential income of Rp 2.8 billion per year | 6 | 60 |
| 3. Have as many customer segments | 7 | Has 2 customer segments | 4 | 28 |
| 4. Having a customer segment outside the PLN group | 9 | Private power plant customer segment | 6 | 54 |
| 5. Have calibration engineer in an independent workforce formation | 6 | Has 13 calibration engineers (FTK 3 engineers + 10 UPHT maintenance engineers) | 6 | 36 |
| 6. Has a broad scope of | 5 | Has 3 scopes | 9 | 45 |

Income sources: measuring and instrumentation calibration services, calibration training and ISO 17025

Earning potential is greater than Rp. 3.83 billion per year from calibration services and training services

Has a total of 13 FTK calibration engineers

PLN | 6 | 42
From Table 6 we get the data that alternative BMC 1 gets a value of 287 while alternative BMC 2 gets a value of 379. From the two alternatives, the results show that alternative BMC 2 more meets the requirements of the desired criteria compared to alternative BMC 1. The final step before making a choice is to further examine alternative BMC 1 and alternatives BMC 2 which has received weight assessment, are there any things that might be detrimental in the future if the alternative is chosen. For an assessment of the adverse consequences, see in Table 7.

**Table 7. Rating of adverse consequences**

| Alternative BMC 1 | M  | G  | M x G |
|-------------------|----|----|-------|
| Dependence on calibration engineers from the UPHT maintenance field | 6  | 7  | 42    |

| Alternative BMC 2 | M  | G  | M x G |
|-------------------|----|----|-------|
| Organizational development requires | 8  | 8  | 64    |

From the results of the assessment, it is found that alternative BMC 2 has a greater desire criterion value than alternative BMC 1 namely 379 compared to 287, but it is also known that alternative BMC 2 has higher adverse consequences than alternative BMC 1. This means that alternative BMC 2 has more promising business potential than alternative BMC 1 but it requires more effort to run it on time and cost. Therefore, with these considerations, a decision was obtained that alternative BMC 1 will be applied first and after 2 years will be replaced by alternative BMC 2.

4. Conclusion

The development of PT PJB UPHT calibration laboratory business model is done by using SWOT analysis to produce alternative BMC 1 and using BOS analysis to obtain alternative BMC 2. The selection of business models is done using Minaut decision making analysis and obtained business models selected as PT PJB calibration laboratory business strategies is alternative BMC 1 to be implemented in first two years and alternative BMC 2 to be implemented in the next years. Further research can be done so that the business model canvas can be applied, then a strategic action plan is carried out on the 4 main building blocks that are most influential on the implementation of the business model canvas.

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