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## Business Strategy To Increase Company Profit: Leveraging New Business Model CRO (Contract Research Organization) At Laboratory Animal Division PT. XYZ

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### ABSTRACT

The increasing prevalence of infectious and non-communicable diseases has spurred pharmaceutical and biotechnology companies to intensify research and development efforts for new drugs, particularly vaccines. The COVID-19 pandemic has prompted many companies and research institutions to find solutions. Preclinical testing in animals is mandatory in vaccine development, which highlights the importance of animals to ensure the safety and efficacy of drugs before clinical trials (conducted in humans). The surge in demand for animal testing presents a unique opportunity for PT XYZ to leverage the Laboratory Animal Division (LAD) as a Contract Research Organization (CRO). By offering services such as providing laboratory animals, providing materials of animal origin, and facilitating testing, PT XYZ transformed DHL from a cost center to a profit center.

This research aims to identify customer needs and evaluate the business potential of CRO in DHL PT XYZ. This study combines qualitative data analysis with the Kepner Tregoe method and quantitative with the Analytical Hierarchy Process (AHP) method. This study recommends that PT XYZ prioritize the implementation of strategies aimed at improving service quality, expanding the variety of animal breeds and services, and obtaining relevant certifications. The results of this analysis and business strategy cost leadership are essential to increase customer satisfaction, grow market share, and ultimately achieve the company's revenue growth target.

**Keywords:** Contract Research Organization (CRO), Business Strategy, Profit

### Introduction

The global health situation of a disease can change at any time, which is seen with the emergence of a new disease or a disease that already exists but turns malignant. According to the World Health Organization (WHO) website, disease outbreaks are usually caused by an infection, transmitted through person-to-person contact, animal-to-person contact, or from the environment or other media, such as the occurrence of Minamata in Japan, which was first discovered in 1965. However, sometimes, the cause cannot be known even though an investigation has been carried out. Several environmental factors that cause the disease include the following: water supply,

sanitation facilities, food, and climate. A lack of these factors can develop diseases. Climate can affect disease transmission in a variety of ways. The distribution and population size of disease vectors can be heavily affected by local climate. Flooding after heavy rains can result in sewage overflow and widespread water contamination. In addition, some evidence suggests that pathogens can be spread from one region to another along air streams or by wind. In addition, according to WHO (2020), several sectors impact health, climate, and environmental change: energy, water, agriculture and food, transportation, land use planning, labor, housing, and industry/services.



Handling of health, environmental, and climate factors requires serious and appropriate handling because it can affect these factors. A common example is the increase in untreated waste, such as plastics and hazardous chemicals, that can potentially cause several diseases. Also, increased population mobility, water scarcity, and increased air pollution can accelerate the growth of various diseases. In line with WHO, according to Abdelrahman (2020), environmental changes cause mutations in the Influenza A virus. In addition, several deadly diseases that disrupt the respiratory system have sprung up.

Due to the development of the disease and the high number of deaths, it is necessary to search for new drugs. According to regulations from the US Food and Drug Administration (US FDA), new drugs before being tested on humans, the drug must be tested *in vivo* on living organisms (animal lab), and researchers must find out whether it has the potential to cause serious harm, also called toxicity.

Currently, several noncommunicable diseases are also developing. Based on WHO (2023) noncommunicable diseases (NCDs) can kill 41 million people every year, or equivalent to 74% of deaths globally. As many as 77% of deaths occur in low-and-middle-income countries with common diseases such as cardiovascular disease, cancer, chronic respiratory diseases, and diabetes. Some factors that can increase the occurrence of NCDs are tobacco use, lack of exercise, alcohol consumption, consumption of unhealthy foods, and air pollution.

Based on the development of infectious and non-communicable diseases, mainly based on the experience of the COVID-19 pandemic era in 2019, with the number of deaths around 3 months (March 28, 2020) reaching 25,251 people, many companies and research institutions are trying to conduct research to find and produce new drugs, especially vaccines. In general, all new drug candidates will be tested pre-clinically using laboratory animals. Referring to the regulation of the head

Indonesian Food and Drug Authority / FDA (Badan Pengawas Obat dan Makanan / BPOM) No. 16 of 2015 regarding the management and assessment of new development drugs, all new drug candidates before entering the drug registration stage, the new drug will go through non-clinical stages and clinical trials. Characterization and validation of new drug development produced on a laboratory scale using process stages established for pilot-scale manufacture.

Animal models will still be needed because new drug tests cannot be directly applied to humans as stated by Deb et al. (2020) state that although passing animal models can save time, effort, and money, it is not possible to perform safely and challenge studies for disease in humans. Also, animal studies provide the foundation to study disease. Further, it is challenging to study the progression of disease in humans, but it is easy in an animal model as they can be sacrificed for histopathology to follow the cause of infection. Although cell lines can also be used to study the infection process, animal models provide the advantage of studying viral multiplication with respect to the symptoms and physiology of an organism. Thus, it becomes important for a new disease to be studied in an animal model. Further, studying animal models will also provide detailed information about the potential reservoirs like of SARS-CoV-2 in an organism. One of the significant disadvantages of bypassing animal models is that it has been observed in the case of viral infections that sometimes the administration of vaccines enhances the susceptibility of the subject to the disease. This phenomenon is known as antibody-dependent enhancement and is common for vaccine candidates of HIV/AIDS virus and Dengue virus.

The increasing number of companies and research institutions on new drugs is sometimes not supported by facilities for testing both *in vivo* and *in vitro*. In this case, PT XYZ has business strategy to provide affordable life science products with a vision *To Become a World Class Life Science Company*

with *Global Competitiveness* and a mission to *Provide and Develop Life Science Products of International Standards to Improve the Quality of Life* has encouraged PT XYZ to have the opportunity to increase company profits from the animal laboratory sector by assigning the Laboratory Animal Division to assess business potential with the CRO concept by receiving samples from external companies to be tested at PT XYZ facilities, selling animals and animal materials for testing purposes. Thus, LAD will change from a cost center to a profit center.

According to Shih (2015), in the medical field, a CRO works like a hired agent with the corresponding knowledge and experience to conduct and complete tasks for a sponsor. It has become increasingly apparent that CROs play pivotal roles in the chain of discovery/design, developing products to market through in vitro, in vivo, and ex vivo testing during preclinical experimentations and clinical trials.

Initially, the LAD provided for the company's internal needs by breeding laboratory animals and providing animals and materials of animal origin. To produce quality output, all facilities in the LAD are monitored through internal audits within the scope of quality, environment, and occupational safety and health. This is in line with WHO regulation 957 Annex 7 (2010), where the CRO must meet the following system quality requirements documents as follows:

- a. Organization chart including the arrangements for quality assurance
- b. Internal audits and self-inspection
- c. Corrective and preventive action plans (CAPA)

LAD also receives audit visits from stakeholders such as BPOM, World Health Organization (WHO), customers, etc. Apart from that, to support its business processes, LAD has qualified personnel, and the IACUC team (Institutional Animal Care and Use Committee), animal Specific Pathogen Free (SPF), standardized facilities/ Animal Biosafety Level (ABSL), have received certificates

(BPOM and WHO), ISO 17025 and in the process to get AAALAC (Association for Assessment and Accreditation of Laboratory Care International).

According to Shih (2015), the increasingly high volume of sponsored outsourcing work has caused a boom in the for-profit business in the past decade. With this CRO program, it is hoped that LAD will become a profit center through several programs offered to external parties, including In vivo tests such as testing the effect of drug samples (neurovirulence test, safety test, and potency test), In Vitro / biomolecular tests for animal health monitoring such as Enzyme-Linked Immunosorbent Assay (ELISA), Western Blot and Polymerase Chain Reaction (PCR) for guinea pig, rabbit, rat, mice, monkey and chicken. Apart from that, the materials of animal origin that will be offered include specified pathogenic-free (SPF) chicken eggs, mice, rats, rabbits, and guinea pigs. Thus, PT XYZ needs to identify existing customers' needs and evaluate the CRO business's potential at PT XYZ's LAD, which will be discussed in this research.

## 1. Materials and Methods

This research aimed to identify existing customers' needs and evaluate the CRO business's potential at PT XYZ's LAD with the hope that existing customers are not only buyers but can also conduct tests at PT XYZ so that PT XYZ can increase the company's revenue. A research methodology is needed to conduct this research. This methodology will guide the collection, analysis, and discussion of data analysis results.

According to (Davidavičienė, 2018), The method can be described as a set of tools and techniques for finding something out or reducing levels of uncertainty. Opinions according to (Saunders, 2012; (Pugu, Riyanto, & Haryadi, 2024)) on (Davidavičienė, 2018), methods are the techniques and procedures used to obtain and analyze research data, including questionnaires, observation, interviews, and statistical and non-statistical techniques. According to (Davidavičienė, 2018), methodology addresses the philosophy

of method in addressing such questions as “Is this the most appropriate technique?”, “How valid are my findings?”, “Can the findings be extrapolated to other situations?” and so on. Another opinion refers to (Saunders, 2012) (Davidavičienė, 2018) that the methodology is a theory of how research should be undertaken, including the theoretical and philosophical assumptions upon which research is based and the implications of these for the method or methods adopted.

Currently, LAD has customers both internally and externally. Internal customers consist of departments conducting routine tests on products before they are released to the market. External customers consist of universities and research institutions that use animals or animal-derived materials for research. Even though external customers are not targeted in terms of value, they have the potential to increase revenue, so it is hoped that there will be synergy between PT XYZ and external customers in the hope of creating customer loyalty that will increase the company's revenue.

## 2.1 Research Design

Research design is a framework used as a guide to answer research questions and

objectives. According to (Khanday and Khanam, 2019), The research design is a procedural plan that a researcher adopts to answer questions validly. It is a logical and systematic plan prepared for directing a research study. It specifies the study's objectives and the methodology and techniques to be adopted for achieving the objectives. It constitutes the blueprint for the collection, measurement, and analysis of data. It is the plan, structure and strategy of investigation conceived so as to obtain answer to research question. According to (Saunders, 2007), research design is a framework or blueprint to answer research questions. Moreover, research design describes the explicit purpose of research based on research questions, data sources, and constraints. Furthermore, Saunders (2023) provides a "research onion" model that describes the stages in research design. This model consists of several layers that the researcher will use when making decisions and considerations and that help the researcher design and conduct the study, as shown in Figure 1. The 'research onion' developed by Saunders et al, 2019.

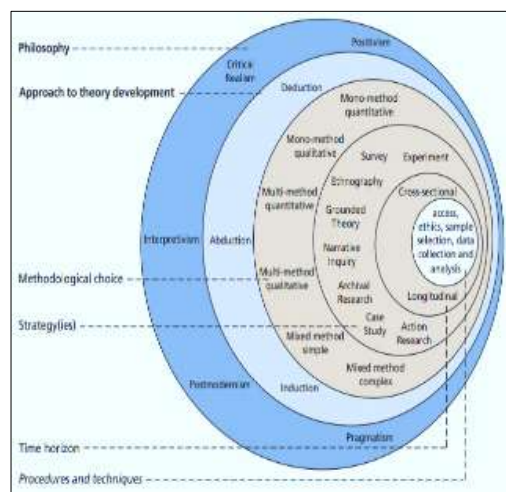


Figure 1. The 'research onion' developed by Saunders et al, 2019

### a. Philosophy

Philosophy is a broad term that refers to the study of fundamental questions about

existence, knowledge, values, reason, mind, and language. According to (Saunders et al, 2023) the term research philosophy refers to a system of beliefs and assumptions about the development of knowledge or a system of beliefs and assumptions about what constitutes acceptable, valid, and legitimate

knowledge; the nature of reality or being, and the role of values and ethics in relation to research.

There are five management philosophies in business management related to research as shown in Figure 2

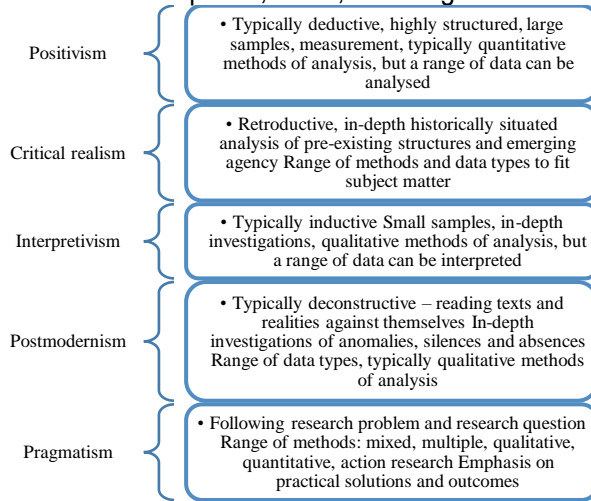


Figure 2 Philosophy on business management (Saunders et al, 2023)

Looking at Figure 2, the research follows the philosophy of pragmatism because the method used is data collection with

questionnaires and assurance by conducting interviews with the flow as shown in Figure 3.



Figure 3 The process to collect data

**b. Research Approach**

The research approach is the second layer in the research union which consists of deduction, abduction, and induction.

- **Deduction**  
 It is an approach that starts with a theory, which is then proven through data testing. The approach starts with a hypothesis followed by testing the hypothesis. The data obtained can support the hypothesis or vice versa; if it does not support the theory, it can be rejected or modified.
- **Abduction**  
 This approach begins with making observations of a fact and trying to find and formulate a theory about how that fact can occur. Abduction is commonly used in

business and management research when existing theories are not enough to explain the phenomenon

- **Induction**  
 It is an approach that begins with data collection and developing a theory to explore a series of phenomena and then continues by developing a theory based on the findings.

Based on these three research approaches, this research is part of the induction type because it starts with the data collection and then ensures data suitability through on-site customer interviews, as shown in Figure 3 **The process to collect data**. The data obtained

will be qualitative and quantitative. quantitative data is intended to obtain experience data during the use of animals and materials of animal origin, and qualitative data is obtained when filling out questionnaires and interviews.

### c. Methodological Choice

The methodological choice is the third layer of onion research introduced by Saunders et al.

#### Qualitative

- Non-numerical data obtained from data collection using techniques such as interviews, questionnaires or other techniques that are not related to numbers

#### Quantitative

- A numerical data obtained through a questionnaire or data analysis

#### Mixed method

- It's a data collection technique that combines qualitative and quantitative methods. Triangulation can occur in this method where in one research there are two data collection techniques (qualitative and quantitative) as is the case in the method of data collection through interviews.

### d. Research Strategy

It is the fourth layer in the research onion consisting of various methods, namely experiment, survey, ethnography, grounded theory, narrative inquiry, archival research, case study, and action research. The research is more oriented towards case studies because data has been confirmed by various methods carried out in previous studies. According to (Saunders et al., 2007), research strategy involves the empirical investigation of a particular contemporary phenomenon within its real-life context, using multiple sources of evidence.

### e. Time Horizon

It is part of the fifth layer of research onion, which discusses the research period. It consists of cross-sectional, which is a study that is carried out with a target and a

(2023) and consists of qualitative, quantitative, and mixed methods.

Based on this information, the research uses a mixed method because data collection uses qualitative and quantitative methods to obtain comprehensive data and ensure the correctness of the data obtained.

predetermined time, and longitudinal, which is research that is carried out over a long period. In general, longitudinal research is used for research unrelated to business. This research uses a cross-sectional method where research is carried out in a predetermined period and time with a predetermined data collection method, and surveys are conducted through questionnaires and interviews

### f. Procedures and Techniques

It is part of the sixth layer of the research onion, which consists of various procedures and techniques that researchers, such as access, ethics, sample selection, data collection, and data analysis, must follow. This research will discuss qualitative and quantitative methods, further discussed in the next chapter.

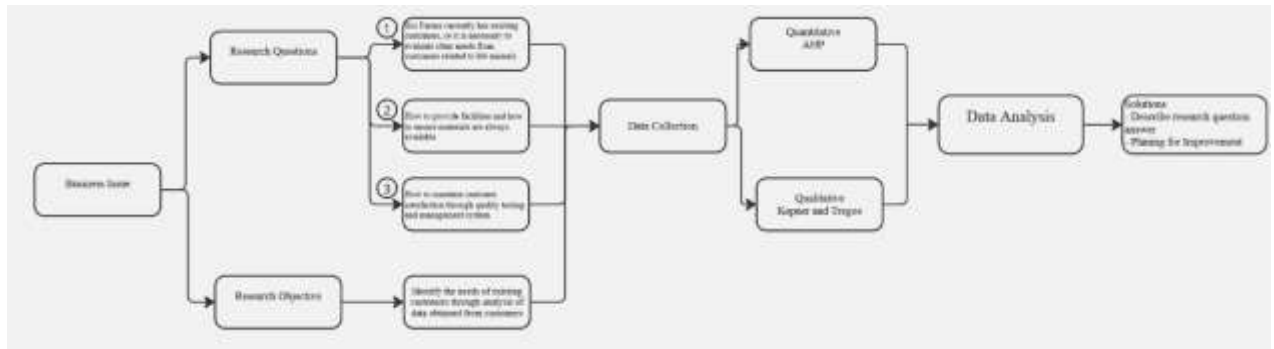


Figure 4 Research design framework

## 2.2 Data Collection Method

As stated in the research design framework, data collection was obtained from two data sources, namely primary data and secondary data, with the following explanation:

### a. Primary Data

Primary data in this research was obtained from existing customers consisting of qualitative and quantitative data with the flow as shown in Figure 22 with the following explanation:

- Designing a questionnaire

1.1 Interviews with the head of the LAD are the primary basis for preparing the questionnaire. Data from

Table 1 List question

Table 1 List question

No	Question
1.	Experience in service, including ease of purchase
2.	Kinds of animals
3.	Quality of animals
4.	Price of animals
5.	Payment method
6.	Kinds of material of animal origin
7.	Kinds of animals feed
8.	Kinds of bedding
9.	Quality of material from animal origin
10.	Quality of animal feed
11.	Quality of bedding
12.	Price of material from animal origin
13.	Price of animal feed
14.	Price of bedding

- Put the questionnaire in Google Form  
 The questions that will be asked to customers, as in the table, are arranged so that

there are columns of identity and institutional origin to identify the respondent.

- Google Forms distribution  
The completed questionnaire with questions is submitted to respondents using a Google form link. All questions are expected to be filled in before the visit so that LAD can obtain an overview of the information.
- On-site interview  
After the Google form is submitted, a visit will be made to confirm any assessments and suggestions received through the Google form. The discussion lasted about an hour, and we tried to dig deeper into customers' needs who may not be recorded in Google Forms. It is hoped that comprehensive information will be obtained regarding customers' needs now and in the future.
- Collecting Data  
Data is collected from Google Forms and during interviews, which can be downloaded in Excel. According to (Alshenqeeti, 2014) four types of interviews are commonly conducted, which are as follows:
  - Structured interview  
The main feature of this interview is that the interviewer and the interviewee have little freedom because the answers to the questions are mostly yes or no. This interview can be said to be similar to a quantitative interview by using a questionnaire
  - Unstructured interview  
The main feature of this interview is that the interviewer and the interviewee have little freedom because the questions are mostly yes or no answers. Using a questionnaire, this interview can be said to be similar to a quantitative interview.
  - Semi-structured interview  
The main feature of this interview is a more flexible, structured version, such as the opportunity for the interviewer to respond to the interviewee's response. This interview can be equipped with a checklist that allows the interviewer to obtain in-depth information and as a guide in the interview process.

- Focus group interview  
The main feature of this interview is that it is more focused because of the selection of participants and because it is more focused on specific topics.

Based on these four types of interviews, the research is carried out using a semi-structured interview method. Interviews are conducted using questionnaires submitted to customers and flexibly between two parties.

## b. Secondary Data

It is data obtained by researchers indirectly with the following benefits and characteristics:

- It can be the initial information/idea of research that helps in the formulation of questions, the development of hypotheses, or identifying relevant variables. Generally, researchers need secondary data as an initial overview of research that will be conducted or used for further research.
- Support to complete primary data. Secondary data can strengthen primary data by supporting research arguments and conclusions.
- Data can be in books, journals, reports, and other data relevant to the research.

In this research, combining primary and secondary data is expected to increase more in-depth discussions and conclusions. The types of data used are journals, reports, and other internal documents that are already available at LAD. The data is used to improve knowledge, identify deficiencies, develop understanding, and can be used as a reference for the need for investigation in research. The Company's internal reports, such as the Annual Report, can be used to overview the Company's profile and its relation to related divisions internally, primarily related to the Company's Management operations. In addition, there is a specific report owned by LAD that contains information sharing related to strategy and operational management that will be used as a comparison and analysis in this research.

## 2. Finding/ Results



### a. Qualitative Data Analysis

Qualitative data is non-numerical data to analyze and interpret non-numerical data to obtain complex information and ensure the data accuracy of respondents who have

completed the questionnaire. Thematic data analysis is a method chosen to identify and analyze patterns or themes in data with steps such as in Figure 5



Figure 5 Flow of thematic data analysis

- Familiarization with data: the researcher reviews the qualitative results of the questionnaire combined with interviews.
- Generating initial codes: Each relevant data is coded by the researcher
- Searching for themes: the grouping of codes into specific themes to make it easier to evaluate the results
- Reviewing themes: ensure the suitability between the theme and the questionnaire research questions. If the theme is irrelevant, then moving the code to another theme can be done, but if the move is not possible, then a new theme needs to be added.
- Defining and naming themes: Ensuring the definition and theme to be used
- Producing the report: The preparation of the report by discussing the data obtained is

mainly related to the effect of the data obtained on the research.

To get accurate results, this thematic analysis will be supported by the Kepner – Tregoe analysis. The advantages of the Kepner-Tregoe method are as follows:

- Structured and systematic  
It provides a structured and systematic framework for analyzing situations, problems, decisions, and potential problems. This helps avoid a hasty or purely intuition-based approach and ensures that all aspects of the problem are thoroughly considered.
- Focus on the root of the problem  
Emphasizing the importance of identifying the root cause of the problem, not just addressing the symptoms. By finding the

root of the problem, the implemented solution will be more effective and prevent similar problems from reappearing.

- **Objectivity and Rationality**  
Encourage decision-making based on facts and data, not emotions or personal biases. This helps ensure that decisions are made logically, fairly, and accountably.
- **Clear prioritization**  
Helps prioritize issues and actions based on their impact and urgency. This allows resources to be allocated efficiently and effectively to address the most critical issues first.
- **Anticipating Problems**  
It involves analyzing potential problems that may arise in the future, thus allowing for preventive measures to mitigate risks or negative impacts.
- **Collaboration and Communication**  
Encourage collaboration and communication between individuals or teams involved in problem-solving. This facilitates the exchange of information and ideas and ensures that all parties have the same understanding of the problem and the chosen solution.
- **Applicable to Various Situations**  
It can be applied to different types of problems and decisions, both in business, technical, and personal contexts. This flexibility makes it a valuable tool for individuals and organizations from various fields
- **Improving Problem-Solving Skills**  
Individuals and teams can improve their problem-solving skills, becoming more analytical, objective, and proactive in facing challenges.

#### **b. Quantitative Data Analysis**

It is a process of interpreting numerical data with the aim that the information, conclusions, and decisions taken can be measured. There are two groups of quantitative data as follows:

- **Categorical data**  
Data with variables that can be grouped. It consists of two types: descriptive data or

nominal data (data that is not based on order or rank, such as color and gender) and rank data or ordinal data (data characterized by order or rank, such as education level data).

- **Quantitative data:**  
This is numerical data that various statistical methods can analyze. It consists of two groups: continuous data (in a specific range that can be measured, such as temperature and distance data) and discrete data (in numerical data and measured in discrete units, such as the number of employees in a company).

The final research uses quantitative data that will be analyzed using the Analytical Hierarchy Process (AHP) method. This method is used to analyze customer satisfaction. It will specifically look at the rating of needs of each consumer so that it can be used for internal improvement in **PT XYZ**. AHP was first introduced by Thomas L. Saaty in 1970 and has been used to organize and analyze complex decisions in areas such as business and management. Its advantages are that it provides priority ratings, can be used for decision-making, and helps structure complex problems. According to (Saaty and Vargas, 2012), AHP is the general theory of measurement used to derive ratio scales from discrete and continuous paired comparisons in multilevel hierarchic structures. The steps in using AHP analysis are as follows:

- **Define goals and problems.** Identify problems and goals to be achieved.
- **Build a Hierarchy structure.** Arrange a hierarchy of objectives from objectives, criteria, and alternatives.
- **Perform a pair comparison.** Compare the elements of each hierarchy using fundamental numerical values to see the relationships of each element
- **Calculate weights:** Perform weight calculations of each element being compared.
- **Analyze consistency:** Assess pairwise comparisons to ensure their validity.

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- Making a Decision: The highest priority will be chosen as the best solution to a problem.

AHP can be processed using spreadsheets, but due to the complexity of the alternative, software is needed to maintain accuracy and minimize calculation errors. Thus, the research will use the AHP Online System (OS) BPMSG (Business Performance Management Singapore) online application. The advantage of this software is that it is easy to use, has been developed according to the original principles of AHP, and can be validated. According to (Goepel, 2018), AHP-OS BPMSG is a complete and free software for education and research purposes where the methods and algorithms are well documented and validated.

### 3. Discussion

This chapter discusses the results of the analysis of the methodology used in the research to overcome the gap. Based on the research design framework, this chapter will discuss the results of qualitative analysis using the Kepner-Tregoe method. After that, a quantitative analysis will be carried out using AHP analysis to see the priority needs of each customer. Combining the Kepner-Tregoe and AHP analyses can complement each other in addressing the gap to clarify the follow-up that will be carried out, eventually leading to accurate conclusions.

#### 4.1 Kepner- Tregoe Analysis

Chapter 3 discusses the implementation of qualitative data collection, namely by questionnaire and interview methods. Interviews were conducted from January to June 2024 for customers directly involved in using animals, materials of animal origin, and other products. The interview was conducted using the semi-structured interview method, where the principle of flexibility was applied with the aim that the questions submitted could be answered by the respondents in-depth and comprehensively and that relevant data could be obtained for solving the problems. In addition, the guidelines and checklists of

questions asked refer to questionnaires that have been submitted previously. A summary of the interview results relevant to the study is described in the *Table 2 Responses to questions from respondents*.

Table 2 Responses to questions from respondents

No	Questions	Respondent's Response						
		Customer 1			Customer 2		Customer 3	
		Resp A	Resp B	Resp C	Resp D	Resp E	Resp F	Resp G
1.	Have you ever bought lab animals/animal origin materials/feed/bedding from PT XYZ?	Yes	Yes	Yes	Tests on mice, tests on mice, tests on rabbits, in vitro tests (ELISA, Western Blot, etc.)	Yes	Yes	Yes
2.	If Yes, what kind of animals/animal origin material/feed/bedding do you need	Rat	Rat	Rat	Safety, Potency	Rat, Animal Feed	Rat	Rat
3.	In addition to animals, materials of animal origin, feed, and bedding, What services do you need from PT XYZ	No	In vitro test facility of external samples	External in vivo testing facilities	ISO 17025 (Laboratorium), ISO 9001 (Quality), ISO 45001 (OHS), ISO 14001 (Environmental), AAALAC	External in vivo testing facilities	External in vivo testing facilities	External in vivo testing facilities
4.	If needed, there is a testing facility. What type of animal tests are needed	In Vitro Test (ELISA, Western Blot, etc)	Test on Rats	Test on Rats	Quality, Animal Breed, Ease of Service	Test on mice, in vitro test (ELISA, Western blot, etc)	Test on Rats	Test on Rabbits
5.	If there is a need for testing facilities. What type of research/testing is needed	Safety, Potency	Potency	Potency	Quality of service, Quality of Materials of Animal Origin	Safety, Potency	Safety	Potency
6.	To support testing, what type of certificate do you need	No	ISO 17025 (Laboratory)	ISO 17025 (Laboratory), ISO 9001 (Quality)	Internal Sample Testing, Feed/bedding used for veterinary care	AAALAC	AAALAC	ISO 9001 (Quality), ISO 14001 (Lingkungan), AAALAC
7.	What are your reasons for choosing animals, materials of animal origin, feed, and bedding from PT XYZ?	Quality	Animal Type, Ease of Service	Quality, Animal Breed, Ease of Service	400 rats	Quality, Animal Type	Quality	Quality
8.	What do you think needs to be improved	Quality of service	Animal Quality	Animal Quality	No	Feed Quality	Feed Quality	Quality of Service



		Respondent's Response						
No	Questions	Customer 1			Customer 2		Customer 3	
		Resp A	Resp B	Resp C	Resp D	Resp E	Resp F	Resp G
9.	Purpose of purchase of animals, materials of animal origin, feed, bedding	Internal Sample Testing	Internal Sample Testing	External Sample Testing	No	Internal Sample Testing, Feed/bedding used for veterinary care	Internal Sample Testing	Internal Sample Testing, External Sample Testing
10.	In 2024, how many animals, materials of animal origin, feed and bedding are needed. Please be able to detail your needs every month according to the type of animal and the material of origin of the animal to be ordered	180 rats	30 rats	36 rats	No	25 rats	25 rats	Rats: 200-300
11.	Is there a plan for the needs of lab animals that are not found in Indonesia, such as lab animals with genetic modifications?	No	No	No	No	No	No	Yes
12.	If there is an estimate of the need for lab animals that do not exist in Indonesia, I hope it can be conveyed the number of needs, especially in 2024	No	No	No	No	No	No	Not yet confirmed
13.	If Yes, what type of test will be carried out	No	No	No	No	No	No	Rats for cancer models
14.	Is there a need for zebrafish test animals	No	No	No	Yes	No	No	No
15.	If Yes, what type of test will be carried out	No	No	No	No, because already have a consultant	No	No	No
16.	If there is an estimate of the need for zebrafish, it can be conveyed the number of needs, especially in 2024	No	No	No	No	No	No	No
17.	Is there a need for a consultation on test animals?	No	No	No	No	Yes	No	Yes
18.	If yes, do they need to be provided?	No	No	No	No	Yes	Yes	Yes

Resp: Respondent



The interview data from was then analyzed with Kepner-Tregoe to support the identification of problems, goals, priorities, and alternative solutions based on the data provided.

To analyze this data using the Kepner-Tregoe method, we need to identify problems, define goals, set priorities, and analyze alternative solutions with the following description:

a. Problem

- Quality of Service needs to be improved.
- The quality of animals needs to be improved.
- Feed quality needs to be improved.

b. Purpose

- Maintain and improve the quality of products and services.
- Offers a wide range of animals and ease of service.

c. Product Requirements

- Rats are the most needed lab animals.
- Lab animal feed is also needed.
- Some respondents needed mice and guinea pigs.

d. Service Needs

- External in vivo testing facilities are the most in-demand services.
- In vitro testing facilities of external samples are also needed.

After identifying the problem, purpose, product needs, and service needs, the following results of the Kepner-Tregoe analysis are as follows:

a. Situation Identification

This data comes from a survey on customer needs and preferences related to laboratory animals, materials of animal origin, feed, bedding, and related services from PT XYZ.

b. Problem Identification

- Quality: Some respondents expressed the need for improvements in the quality of services, animals, and feed.
- Animal Breeds & Services: The need for various animal breeds and support services, such as testing facilities, must be met.

c. Define Goals

- Main Objective: Increase customer satisfaction and expand market share.
- Special Purpose:
  - Improve the quality of services, animals, and feed.
  - Offers a wider variety of types of lab animals.
  - Provide adequate testing facilities.
  - Acquire relevant certifications to increase customer trust.

d. Priority Analysis

- Quality: Improving quality is a top priority because several respondents mentioned it and is directly related to why they chose PT XYZ.
- Animal Breeds & Services: Offering a variety of animal breeds and testing services is the next priority as it can attract more customers and meet their specific needs.
- Certification: Obtaining relevant certifications is essential for increasing customer trust and a company's competitiveness, but it can be the next priority once product quality and variety are improved.

e. Alternative Analysis & Creating an Action Plan

- Quality Improvement:
  - Conduct regular internal audits to identify areas for improvement in services, animal quality, and feed.
  - Working closely with suppliers to ensure consistent animal and feed quality.
  - Improving staff training to provide better customer service.

f. Variety of Animal Breeds & Services

- Conduct market research to identify the types of lab animals that are most needed.
- Developing partnerships with suppliers to expand the variety of animal breeds offered

- Invest in in vivo and in vitro testing facilities to provide customers with more complete services.
- g. Certification
  - Identify the certifications that are most relevant to the industry and customer needs.
  - Develop a plan to meet the requirements of the certification.
  - Undergo an audit process and obtain certification.

### 3.2 AHP Analysis

To get more comprehensive results in determining customer needs, the researcher conducted a quantitative analysis using the

AHP method. This analysis is carried out to identify and determine the main priority of each customer's needs, which can then be taken accordingly, especially when facing complex problems involving many criteria and alternatives. The study faces fourteen alternatives that produce ninety pairwise comparisons that must be determined so that the top priority decisions that need to be followed up immediately can be made. The results of the pairwise comparison against all criteria are shown in Table 3 **Pairwise comparison result of customer 1**, Table 4 **Pairwise comparison result of customer 2**, and Table 5 **Pairwise comparison of customer 3**.

*Table 3 Pairwise comparison result of customer 1*

No	Question	Customer 1					
		Respondent 1		Respondent 2		Respondent 3	
		Priority (%)	Rank	Priority (%)	Rank	Priority (%)	Rank
1.	Experience in service, including ease of purchase	4.0	6	4.9	3	14.4	2
2.	Kinds of animals	14.2	1	27.3	1	13.9	4
3.	Quality of animals	14.2	1	2.1	14	1.5	14
4.	Price of animals	4.0	6	4.9	3	3.9	6
5.	Payment method	14.2	1	17.1	2	17.5	1
6.	Kinds of material of animal origin	14.2	1	4.9	3	14.4	2
7.	Kinds of animals feed	1.7	13	4.9	3	3.8	7
8.	Kinds of bedding	4.0	6	4.9	3	11.4	5
9.	Quality of material from animal origin	14.2	1	4.9	3	3.2	9
10.	Quality of animal feed	2.5	12	4.9	3	3.2	9
11.	Quality of bedding	4.0	6	4.9	3	3.2	9
12.	Price of material from animal origin	3.4	11	4.9	3	3.2	9
13.	Price of animal feed	1.7	13	4.9	3	3.2	9
14.	Price of bedding	4.0	6	4.9	3	3.2	9

Table 4 Pairwise comparison result of customer 2

No	Question	Customer 2					
		Respondent 1		Respondent 2		Respondent 3	
		Priority (%)	Rank	Priority (%)	Rank	Priority (%)	Rank
1.	Experience in service, including ease of purchase	10.0	1	2.9	6	16.7	1
2.	Kinds of animals	10.0	1	14.7	1	16.7	1
3.	Quality of animals	10.0	1	14.7	1	16.7	1
4.	Price of animals	2.0	11	2.9	6	16.7	1
5.	Payment method	1.9	14	2.9	6	3.3	5
6.	Kinds of material of animal origin	10.0	1	2.9	6	3.3	5
7.	Kinds of animals feed	10.0	1	14.7	1	3.3	5
8.	Kinds of bedding	10.0	1	2.9	6	3.3	5
9.	Quality of material from animal origin	10.0	1	2.9	6	3.3	5
10.	Quality of animal feed	10.0	1	14.7	1	3.3	5
11.	Quality of bedding	10.0	1	14.7	1	3.3	5
12.	Price of material from animal origin	2.5	10	2.9	6	3.3	5
13.	Price of animal feed	2.0	11	2.9	6	3.3	5
14.	Price of bedding	2.0	11	2.9	6	3.3	5

Table 5 Pairwise comparison of customer 3

No	Question	Customer 3	
		Respondent 1	
		Priority (%)	Rank
1.	Experience in service, including ease of purchase	10.0	1
2.	Kinds of animals	10.0	1
3.	Quality of animals	10.0	1
4.	Price of animals	2.0	11
5.	Payment method	1.9	14
6.	Kinds of material of animal origin	10.0	1
7.	Kinds of animals feed	10.0	1
8.	Kinds of bedding	10.0	1
9.	Quality of material from animal origin	10.0	1



No	Question	Customer 3	
		Respondent 1	
		Priority (%)	Rank
10.	Quality of animal feed	10.0	1
11.	Quality of bedding	10.0	1
12.	Price of material from animal origin	2.5	10
13.	Price of animal feed	2.0	11
14.	Price of bedding	2.0	11

Based on Table 3 **Pairwise comparison result of customer 1**, Table 4 **Pairwise comparison result of customer 2**, and Table 5 **Pairwise comparison of customer 3** The first rank is the main priority that needs to be evaluated immediately. Each respondent has a different priority. Because there are 14 criteria and ranking results from several different respondents, as shown in Figure 6 *AHP summary chart* this study will discuss two criteria: kinds of animals and quality of animals, which were chosen by at least five out of seven respondents, and price due to business strategy.

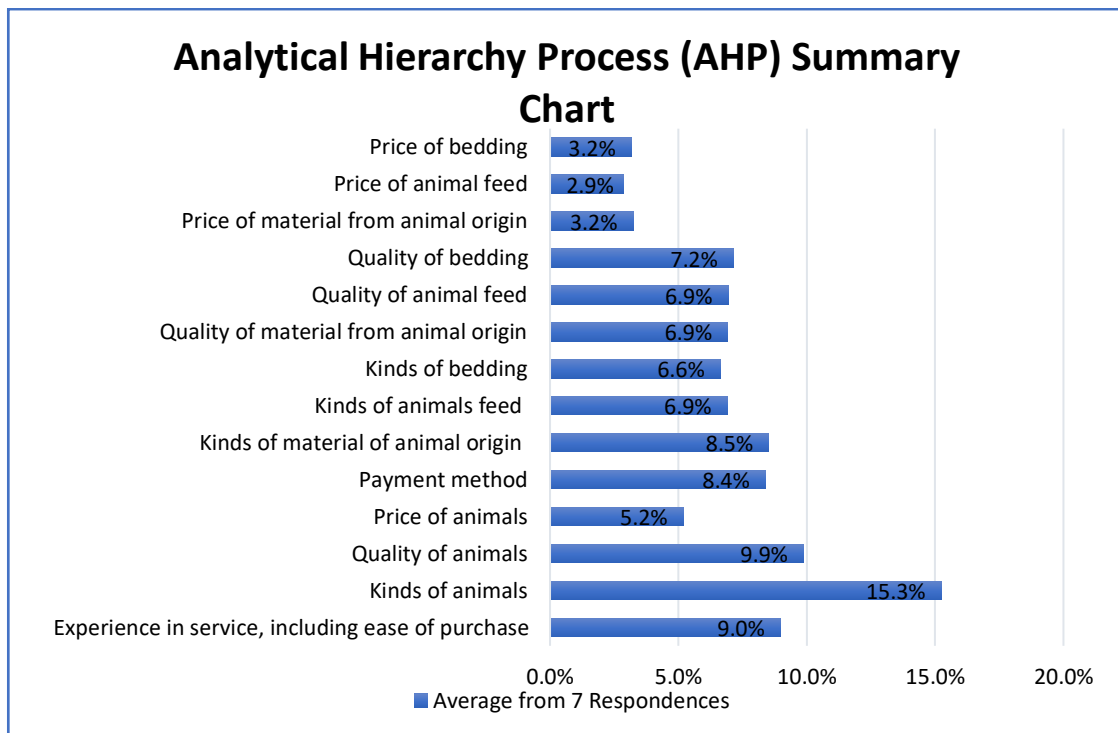


Figure 6 AHP summary chart

a. Kinds of animals

1.5 From the data Table 3 **Pairwise comparison result of customer 1**, Table 4 **Pairwise comparison result of customer 2**, and Table 5 **Pairwise comparison of customer 3** It can be seen that there is uniformity in the use of animal types among the respondents. LAD **PT XYZ** has various types of animals that can be used for research purposes or testing product Table 6 **Types of pre-clinical test**.

samples. Based on (Peraturan Badan Pengawas Obat dan Makanan Nomor 18 Tahun 2021 Tentang Pedoman Uji Farmakodinamik Pra Klinik Obat Tradisional , 2021) the test animals used in pharmacodynamic tests are mice, rats, guinea pigs, and rabbits. In addition, referring to (**PT XYZ, 2022**) that some of the tests using animals are as shown in

1.6

Table 6 Types of pre-clinical test

No	Pre-clinical Test	Deskripsi
1	Acute dermal toxicity test	Detects toxic effects that appear within a short period of time after administration of a single dose of test preparation
2	Oral subchronic toxicity test	Detects toxic effects that occur after repeated administration of test preparations
3	Dermal subchronic toxicity test	Detects toxic effects that occur after repeated administration of test preparations
4	Oral chronic toxicity test	Detects toxic effects that occur after repeated administration of test preparations
5	Carcinogenicity test	Detecting and obtaining information/identifying the carcinogenic properties of test preparations after repeated doses of test preparations
6	Teratogenicity test	Obtain information on fetal abnormalities that occur due to the administration of test preparations
7	Vaginal mucosal irity test	Testing test preparations that are in direct contact with vaginal tissue
8	Eye irritation test	Detects toxic effects that appear after exposure to test preparations in the eyes
9	Dermal acute irritation test	Detecting toxic effects that occur after exposure to test preparations on dermal
10	Skin sensitization test	Identifying a substance that has the potential to cause skin sensitization
11	Uji pharmacodynamics	Studying the effects of traditional medicine on the function of various organs in animals

b. Quality of animals

In general, **PT XYZ** has various certificates for producing quality products. This certificate was obtained not only for vaccine and antisera products but also for other products, such as animals and materials of animal origin, which have been included in the scope of certification. For quality, **PT XYZ** has received an ISO 9001 certificate, which will be renewed every year. Referring to the 2022 Annual Report, **PT XYZ** is routinely inspected and audited by relevant ISO certification bodies every year in the form of surveillance audits and periodic re-certification every 3 years, and until now, **PT XYZ** has consistently remained certified and met the required ISO requirements. In addition, to support quality, **PT XYZ** has also integrated other ISO systems with proof of having obtained ISO 45001:2018 (Occupational, Health and Safety Management System/ OHSMS) and 14001:2015 (Environmental Management System/ EMS) certificates. According to (Purwanto, et al., 2020) the implementation of an integrated management system (IMS) can provide various positive benefits, including:

- Increased employee awareness: Employees become more aware of the importance of quality, safety, food security, and the environment in company operations
- Improved corporate image: The company is seen more positively by the public due to its commitment to quality, safety, food security, and the environment.
- Improved product quality and safety: The company's products meet higher quality and safety standards, increasing consumer confidence.
- Increased customer satisfaction: Customers are more satisfied with the company's products and services due to their quality, safety, and consistency.
- Market share growth: The company's good reputation and product quality allow it to reach more customers and new markets.

- Improved internal organization and communication: The company's internal processes become more efficient, and communication between departments improves.
- Increased productivity: Employee productivity increases due to a safer work environment and more efficient processes.
- Reduction of non-compliant products: The number of defective or non-compliant products is reduced, reducing waste and costs.

Integrating ISO in **PT XYZ** and LAD is the scope of auditing so that it can be ensured that animals and materials of animal origin from the market have met international standard quality requirements. In addition, referring to , the customer wants ISO 17025 and AAALAC certificates. Based on the 2022 Annual Report, **PT XYZ**'s laboratory has received ISO 17025. This implementation has an impact on LAD and requires improvements, especially in animal testing laboratories. In line with (Khodabocus & Balgobin, 2011) that the positive impact of the implementation of ISO 17025 is as follows:

- Impact on Laboratory Personnel:
  - Increased Confidence: With clear and documented procedures in place, laboratory staff will feel more confident in carrying out their duties. They can identify errors more easily and understand the source of the problem, so they can take the necessary corrective action.
  - Better Understanding: Training related to ISO 17025 will improve staff's understanding of the importance of quality and how to achieve accurate and reliable results.
  - Involvement in Decision Making: ISO 17025 encourages staff involvement in decision-making processes related to quality management systems, which can increase motivation and a sense of belonging to the laboratory.
- Impact on the Laboratory itself:
  - Recognition of Technical Competence: ISO 17025 accreditation is formal proof that a

laboratory has the technical ability to perform specific tests. It gives competent laboratories a formal identity.

- Performance Benchmarks: These standards provide clear benchmarks for evaluating laboratory performance, allowing continuous improvement.
- Marketing Advantage: Accreditation can be a significant competitive advantage, increasing customer trust and opening up new market opportunities.
- International Recognition: Through mutual recognition agreements, test results from accredited laboratories will be internationally recognized, reducing trade barriers.
- Risk Minimization: The implementation of an effective quality management system will help identify and reduce risks associated with laboratory activities.
- Impact on clients:
  - Customer Confidence: The accreditation body's logo on the test result report provides assurance to the client about the reliability and accuracy of the results provided.
  - Cost Reduction: By reducing or eliminating the need for retesting in the importing country, manufacturers and exporters can save costs.
  - Customer Satisfaction: Accurate and reliable results will improve customer satisfaction and strengthen business relationships.

In response to customer requests for AAALAC certification, LAD has made various preparations such as training, documentation, identification of equipment and facilities that may be evaluated. Although AAALAC certification is not mandatory, this certification process is still continued because LAD customers come from within and outside the country. Based on the Referring to the business feasibility study report (2022), AAALAC International accreditation is very important because animal testing is a sensitive issue for some people or for certain countries. On the other hand, there are still many animal

use tests that are the only safe way. AAALAC International accreditation ensures that test actors (CROs or other institutions) continue to treat test animals well when conducting the testing process. The ownership of AAALAC International certification by a CRO will help the CRO product to be superior to alternative products without AAALAC certification, especially if the CRO market orientation is in developed countries where most consumers are concerned with animal welfare.

### c. Price

According to the results of AHP Figure 6 *AHP summary chart* **Error! Reference source not found.**, four criteria have the lowest graph: price of bedding, price of animal feed, price of material from animal origin, and price of animals. Based on the 2023 PT XYZ annual report, the business strategy carried out is cost leadership so that the price offered is not an obstacle for customers. The advantage of this strategy is that it creates a lower product price than competitors, which causes a large amount of demand from customers and potentially increases revenue. PT XYZ implements this strategy by setting competitive product prices so all circles appreciate it. It is part of PT XYZ's support for law no. 17 of 2023 concerning health and supporting SOE programs in national economic recovery.

In line with the results of Kepner and Tregoe and AHP's analysis, this strategy causes the need for strength in improvements so that improving quality and standardization through the product certification process that PT XYZ focuses on can impact the implementation of this business strategy. In addition, some of the things that cause business strategy cost leadership at PT XYZ to run well are as follows:

- Competitors in animal provision services are still a few
- Have a marketing channel in product marketing
- Have a good relationship with customers, such as quick response to customer

suggestions and complaints. In addition, there is a customer gathering every year

- Have qualified and experienced human resources
- Have a structured and accountable financial recording system
- Have a risk management system in place to identify aspects that have risks to the business

## 5. Conclusion

Since the CRO program was instructed, LAD PT XYZ has been striving to meet the target, namely increasing revenue. Although this research does not analyze the revenue generated further, it discusses things that will impact or support the CRO program in achieving the revenue increase target. The thing that is possible to increase revenue by utilizing existing customers through identifying needs and desired services from customers. A business feasibility study has been carried out, but the details of the customer evaluation need to be followed up, which is then carried out in this research.

To overcome this problem, a comprehensive analysis was carried out by combining the qualitative analysis of the Kepner-Tregoe analysis and the quantitative analysis of AHP. This analysis is carried out to see the ranking of customer needs and to analyze other needs obtained from qualitative data. The following is a summary of the analysis that has been carried out on the research as follows:

- Kepner-Tregoe's qualitative analysis approach has identified the problems, i.e., quality, breed of animals, and services.
- AHP's quantitative analysis approach has identified a ranking of problems that need to be solved immediately. In addition, the results of AHP's analysis related to price show that the cost leadership of a business strategy is able to survive and run well.

The combination of these two analyses suggests that LAD PT XYZ is focused on improving quality, expanding the variety of animal breeds and services, and obtaining relevant certifications. In addition, the

combination of the results of this analysis can also help the solution strategy in providing facilities and ensuring the availability of materials of animal origin through the trend analysis strategy of customer needs. Thus, LAD PT XYZ has an excellent opportunity to increase customer satisfaction, expand market share, and achieve business goals for increased revenue.

Some recommendations from the research are as follows:

- Implementation based on analysis needs to be carried out immediately. Coordination between the actions to be carried out, available resources, and scheduling needs to be arranged so that implementation can be carried out properly. In addition, control in its implementation needs to be maintained by reviewing the procedures that have been established and regular communication with various stakeholders.
- Although this data is relevant to current conditions, further research with other existing customers is needed to obtain in-depth information about other possible needs from customers in various areas.

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