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Transformations in Business: Case Studies on Governance, Economics, Finance, Performance, Logistics, and Sustainability for the Future

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PREFACE

The world of business is constantly evolving, with organizations navigating an array of challenges in performance, governance, sustainability, and innovation. This book brings together a series of insightful case studies and analyses that shed light on the dynamic business landscape in Indonesia. Through this collection, we aim to offer a comprehensive understanding of the key factors driving business success and resilience in one of Southeast Asia's most vibrant economies.

The chapters in this book explore a diverse range of topics, from the financial performance of major corporations like Toyota Motor Corporation Indonesia, to the complexities of corporate governance in companies such as PT XYZ. These case studies not only delve into the operational intricacies of various businesses but also examine broader issues such as sustainability, logistics, and the impact of technology on business practices.

In particular, this volume highlights the growing importance of sustainability in business, as seen in initiatives like the solar portable chillers in Central Bangka and innovative cold chain logistics strategies. The shift towards digital transformation and the role of technology in enhancing business processes are also prominently featured, with a focus on augmented reality and its applications in team collaboration.

Additionally, the chapters explore the social dimensions of business, emphasizing the role of cooperatives in poverty alleviation and community development in Indonesia. The rebranding of fishery cooperatives using modern business models and digital marketing strategies serves as a key example of how traditional businesses can evolve to meet contemporary challenges.

The contributions to this book represent a collaboration of scholars and practitioners who share a commitment to exploring the intersection of business, governance, and sustainability in Indonesia. Each chapter provides valuable insights into real-world practices and offers lessons that can be applied across industries, both in Indonesia and beyond.

We hope this book will serve as a valuable resource for academics, practitioners, policymakers, and students alike. By examining these case studies and analyses, readers will gain a deeper understanding of the complexities and opportunities inherent in the Indonesian business environment, while also being inspired to think critically about how businesses can evolve to address the challenges of the 21st century.

We extend our gratitude to all the authors and contributors who have made this work possible. Their expertise and dedication to advancing knowledge in the fields of business and governance have been instrumental in shaping this book. We also thank the readers for their interest and engagement with this collection of thought-provoking research.

Prof. Dr. Silky Vigg KUSHWAH
Prof. Dr. Kamal KUNDRA
Prof. Dr. Chand TANDON
Bursa, Türkiye – December 2024

CONTENTS

CHAPTER 1

Financial Performance Analysis of Toyota Motor Corporation Indonesia During the Period of 2019-2023

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ABSTRACT

Toyota Motor Corporation is one of the largest, if not the largest automotive company in the world. Like any company in the world during the tumultuous years of the early 2020s, Toyota Motor Corporation – along with its subsidiary in Indonesia – also faced various challenges due to the severity of the COVID-19 pandemic. This study is meant to explore the impact of the pandemic on the company's finances, by analyzing the company's profitability, liquidity, and solvency performance. By using a financial ratio analysis approach, this study identifies how market changes and operational challenges have affected profit margins, return of assets (ROA), and the company's debt-to-equity ratios (DER) during the time of the pandemic. The data used in this study is a quantitative data of the company's financial report ranging from the year 2019 through 2023.
Keywords: Financial Ratios, Toyota, Return of Assets (ROA), Net Profit Margin.

1. Introduction

Every company in the world is concerned about its profitability and performance. And in order to measure a company's performance and determine its bottom line, a financial analysis of the whole company is in order. Financial ratio analysis is a straightforward and surefire method to present an overall review of a company's health and its financial performance.

During the process of doing a financial analysis, ratio analysis serves as a dominant and logical structure to assist stakeholders. By using a financial ratio analysis approach, this study identifies how market changes and operational challenges have affected profit margins, return on assets (ROA), and the company's debt-to-equity ratios (DER). Under this method, financial ratios are categorized to cover key areas of a financial institution, including profitability, liquidity, asset management, and solvency. Business stakeholders focus on these areas to gain a comprehensive overview of operations. Not only do these ratios assist in the decision-making process, but they also emphasize factors related to risk management and boosting profitability.

Financial ratio analysis can be described as a vital tool used to evaluate a company's financial performance and position (Innocent et.al, 2013). It involves calculating and interpreting numerical relationships using financial statements. Namely, some of these statements are the balance sheet, income statement, and also cash flow statement. These ratios help summarize large amounts of financial data, allowing stakeholders to make important judgements on a business' financial performance. The analysis involves comparing these ratios to benchmarks or standards, such as industry averages, historical data, or predetermined targets, to assess the company's strengths and weaknesses in areas like profitability, liquidity, solvency, and efficiency (Tanor, 2015).

2. Objective of the Study

The objectives of the study are:

a. To determine COVID-19's impact on Toyota Motor Corporation Indonesia's financial performance during the period of 2019-2023.
b. To observe and evaluate the company's liquidity performance, and its adaptation to financial stressors caused by the pandemic.
c. To examine Toyota Motor Corporation Indonesia's solvency by reviewing the debt- to-equity ratio (DER) over the specified period.
d. To determine how operational challenges and market changes influenced the company's profits (ROA, ROE, ROIC) during 2019-2023.

3. Literature Review

Financial ratio analysis can be understood as a means to make sense of a company's weaknesses and strengths (Tyas, 2020). This information is critical for investors and

stakeholders as they need to determine whether the company could make maximum profits for them or not. Furthermore, these analyses are also a measuring tool for the company's performance, which in turn will provide investors and stakeholders with information on the company's financial conditions, risks, and also its opportunities.

There are plenty of uses that can come out of the analyses. For instance, it could be used as a screening tool when the company's trying to choose alternatives between an investment or a merger, a forecasting tool to evaluate the company's financial health, but also to evaluate the management's performance or diagnose problems that arises within the company itself (Darminto, 2011).

Types of Financial Ratios

There are several kinds of financial ratio calculations, and the result of these calculations can be used by a company's management for many decision-making processes, such as determining the company's policies (Putra et al, 2021). Namely, these calculations are as follows:

1) Liquidity Ratio

Liquidity ratios are a metric for a company's ability to meet its short-term debt obligations, providing an indicator of financial stability and operational efficiency. The main types of liquidity ratios include the Cash Ratio, which assesses cash available relative to current liabilities; the Cash Turnover Ratio, which evaluates cash use efficiency; the Current Ratio, which indicates the company's capability to use its currents assets to cover liabilities; the Quick Ratio (or Acid-Test Ratio), which evaluates the company's ability to meet short-term obligations with its liquid assets; and Inventory to Net Working Capital, which compares the proportion of inventory to the net working capital.

2) Solvency Ratio

Solvency ratios are a way to measure the extent to which a company's assets are financed through debt, revealing its long-term financial stability and risk. Key solvency ratios include the Debt-to-Equity Ratio (DER), which is a comparison between total debt to equity; the Debt-to-Asset Ratio, which is a proportion of total assets financed by debt; the Fixed Charge Coverage Ratio, which measures whether the company can cover fixed financial obligations; and Tangible Assets Debt Coverage, which assesses the degree to which tangible assets can cover outstanding debt.

3) Activity Ratio

Activity ratios are a measurement to see the effectiveness of how a company makes use of its resources to create revenue. These ratios explain the company's operational efficiency and resource management. These ratios are namely Fixed Assets Turnover, which is the efficiency of how fixed assets are used to produce sales; Receivable Turnover, which assesses how effectively the company collects its accounts receivable; Working Capital Turnover, which

indicates how efficiently working capital is used to support sales; and Inventory Turnover, which reflects the rate at which inventory is sold and replaced over a period.

4) Profitability Ratio (ROA, ROI, ROE)

Profitability ratios are a measure to a company's ability to generate profit over a specific period, which in turn reflects its overall financial health and performance. These ratios are Return on Assets (ROA), which explains how efficient a company uses its assets to produce profit; Return on Investment (ROI), which evaluates the return from the invested capital; and Return on Equity (ROE), which measures the profitability when compared to shareholders' equity, which also indicates how well the company uses investments to grow earnings.

5) Growth Ratio

Growth ratios provide an overview of a company's success in maintaining its economic position relative to growth in the economy and its business sector. These ratios help assess how effectively a company is expanding and sustaining its market presence.

6) Valuation Ratio

Valuation ratios indicate the management's effectiveness in increasing the business' market value compared to its investment cost. These ratios explain how well a company maximizes value for its investors.

Financial Performance

Financial performance refers to an analysis conducted to determine how effectively a company adheres to financial management principles (Van Horne, 2005). Company performance represents an overview of a company's financial condition, assessed through financial analysis tools. This assessment reveals the company's financial health, highlighting its strengths and weaknesses over a specific period, which reflects its operational performance.

Financial performance is crucial for a company as it provides insights into its ability to meet financial obligations, assess profitability, and determine whether it can distribute dividends to shareholders.

4. Research Methods

1) Type of Research

This study is a descriptive research with the aim of examining Toyota Motor Corporation Indonesia's financial situation throughout the beginning and the end of the COVID-19 Pandemic in the years of 2019-2023. As a support for the research, data is obtained from various literatures, journals, books, but also the company's financial performance report.

2) Data

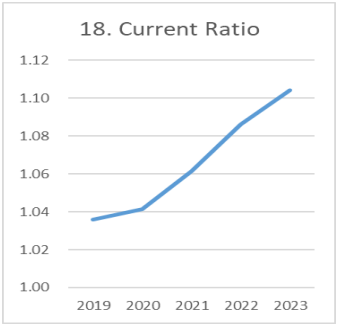
The data used for this study is a secondary data of the company's financial performance report from the years 2019 to 2023.

3) Research Object

The object of this study is Toyota Motor Corporation Indonesia, the biggest automotive corporation that operates within Indonesia.

5. Results and Discussion

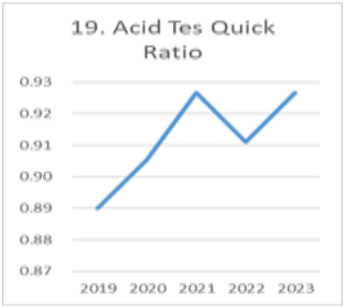
Liquidity Ratio of Toyota Motor Corporation Current Ratio



2019	2020	2021	2022	2023
Pre-COVID	COVID-19		Post-COVID	
18,879,237	18,642,531	22,776,800	23,772,290	26,459,781
18,226,938	17,902,377	21,460,466	21,842,161	23,959,715
1.04	**1.04**	**1.06**	**1.09**	**1.10**

Based on the calculations done in the financial report, the current ratio of Toyota Motor Corporation has been steadily increasing despite the presence of the pandemic. Indeed, even in the midst of turbulent economies and failing businesses, Toyota Motor Corporation has been thriving as seen in the data from 2020 to 2022. Overall, the current ratio of Toyota has increased during the duration of the pandemic.

Quick Ratio



2019	2020	2021	2022	2023
Pre-Covid	COVID-19		Post-COVID	
16,222,841	16,207,613	19,888,772	19,900,934	22,204,167
18,226,938	17,902,377	21,460,466	21,842,161	23,959,715
0.89	**0.91**	**0.93**	**0.91**	**0.93**

As the graph reflected, the quick ratio has seen some ups and downs during the time of the pandemic. The level of liquidity fluctuated between 0.91 and 0.93, mostly due to the fact that the current liabilities of the company keep steadily increasing throughout the years while the monetary current assets didn't grow as fast.

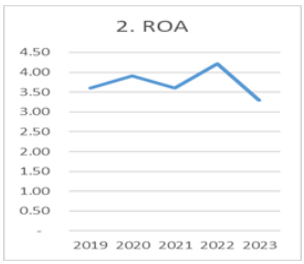
Solvency Ratio of Toyota Motor Corporation

Debt-to-Equity Ratio (DER)

2019	2020	2021	2022	2023
Pre-COVID	COVID-19		Post-COVID	
31,371,739	31,942,754	37,978,811	40,533,951	45,038,967
20,067,137	20,737,682	24,288,329	27,154,820	29,264,213
156	154	156	149	154
1.6	1.5	1.6	1.5	1.5

The debt-to-equity ratio of Toyota Motor Company reflects the state of the company's solvency. As reflected in the graph, the DER has been fluctuating between 1.6 and 1.5, but overall, it shows a steadily decreasing trend. It can be seen that during the COVID-19 pandemic, namely the years 2020 to 2021, the total debt of the company saw a jump of six million yen, while the total equity only increases by less than four million. It saw a sharp decrease entering 2022, but then increases again in 2023.

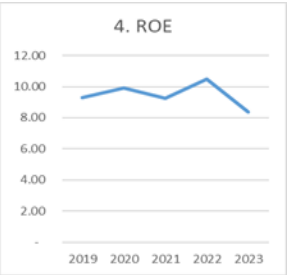
Profitability Ratio of Toyota Motor Corporation Return on Assets (ROA)



2019	2020	2021	2022	2023
Pre-COVID	COVID-19		Post-COVID	
1,868,085	2,058,899	2,245,261	2,850,110	2,451,318
51,936,949	52,680,436	62,267,140	67,688,771	74,303,180
0.0360	0.0391	0.0361	0.0421	0.0330
3.6	**3.9**	**3.6**	**4.2**	**3.3**

The return on assets of the company has an overall trend of stagnation with an inclination to decrease. The decrease could be seen as especially sharp during the post-COVID period, while it increases tremendously between 2021 to 2022. Overall, from the figures presented above, it's safe to say that Toyota Motor Corporation might still be in a good condition as long as the company still has a clear business strategy in mind.

Return on Equity (ROE)

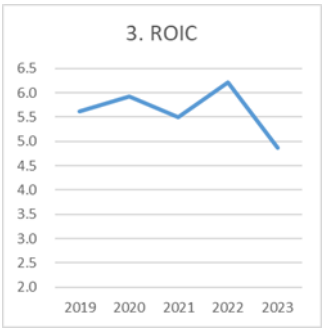


2019	2020	2021	2022	2023
Pre-COVID	COVID-19		Post-COVID	
1,868,085	2,058,899	2,245,261	2,850,110	2,451,318
20,067,137	20,737,682	24,288,329	27,154,820	29,264,213
0.0931	0.0993	0.0924	0.1050	0.0838
9.31	**9.93**	**9.24**	**10.50**	**8.38**

The return on equity of the company has a somewhat similar trend as its return on assets, with small fluctuations during the pandemic and a decreasing trend during the post-pandemic

period. Again, a steady increase could be seen in the year 2022, before going into freefall in 2023. However, this result might scare investors as there is a downward trend.

Return on Invested Capital (ROIC)



2019	2020	2021	2022	2023
Pre-COVID	COVID-19		Post-COVID	
1,868,085	2,058,899	2,245,261	2,850,110	2,451,318
33,211,938	34,778,059	40,806,674	45,846,610	50,343,465
0.0562	0.0592	0.0550	0.0622	0.0487
5.6	**5.9**	**5.5**	**6.2**	**4.9**

The return on invested capital has an even sharper trend than ROE and ROA, with a significant decrease during 2022-2023 while having a mild stagnant trend in pre-pandemic and pandemic periods. Again, this indication could be seen as bad, but investors might be convinced should the company have a sound business strategy for the upcoming future.

6. Conclusion and Recommendation

Conclusion

To answer the questions posed in the beginning of the paper, it can be concluded that;

a. The financial analysis of Toyota Motor Corporation Indonesia from 2019 to 2023 reveals a mixed picture of the company's financial health, particularly due to the effects of the COVID-19 pandemic. While the company is overall resilient in a couple of areas, it also reveals concerning trends in others, which needs urgent attention and strategic decision-making from the company's management.

b. Toyota Motor Corporation Indonesia's liquidity exhibited a consistent downward trend throughout the pandemic period, which means that the company could meet its short-term obligations, which is a sign that TMCI has adapted well to its financial stressors during the duration of the pandemic.

c. Regarding the company's solvency, TMCI's debt-to-equity ratio (DER) showed an overall decreasing trend, suggesting that the company is reducing its reliance on debt financing little by little.

d. Finally, market challenges and the pandemic itself had affected TMCI, as seen in the fluctuations of its profit indicators. As stated before, the ROA, ROE, and ROIC is in a slight downward trend, which reflects potential challenges in managing current liabilities alongside a slower growth in monetary current assets. This decline suggests potential issues with asset utilization, return on investment, and overall profitability.

Recommendations

a. The company can start planning a better asset utilization, since the declining ROA suggests an inefficiency in how Toyota Motor Corporation Indonesia uses its assets to create profit. They can start improving their asset use through a number of means, such as improving inventory management to reduce holding costs, or accelerating receivables collection.
b. Toyota Motor Corporation Indonesia can also begin strengthening their investment strategies, since its ROE and ROIC are also decreasing. This means that the company is struggling to generate return for investors, so TMCI should begin evaluate new investment decisions carefully and diversify in order to minimize risk of loss.

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CHAPTER 2

Description of Services of Pt. Asdp Indonesia Ferry (Persero) Kupang Branch (Case Study of Bolok Ferry Port)[1]

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ABSTRACT

This research is motivated by the low service of the Limited Company (PT). Angkutan Sungai, Danau dan Penyeberangan (ASDP) Indonesia Ferry Kupang Branch at Bolok Crossing Port. Some of the problems that the author found are ship departures that were not in accordance with the predetermined schedule, inadequate facilities and passenger acceptance that exceeded the ship's capacity. This study aims to determine the services carried out by PT ASDP Indonesia Ferry Kupang branch at Bolok Crossing Port as measured through five (5) dimensions, namely tangible, reliability, responsiveness, assurance, empathy. This research uses qualitative research methods with a case study approach. Types of data, are qualitative and quantitative data; data sources are, primary and secondary data; data collection techniques interviews, observation and documentation. The results of this study indicate that the services carried out by PT ASDP Indonesia Ferry Kupang Branch at Bolok Crossing Port are not optimal. The investigations include: first, the tangible dimension, inadequate facilities and infrastructure, such as chairs and fans in the waiting room; second, the reliability dimension, the accuracy of the information provided does not match the reality in the field, such as the difference in the departure time of the ship which is one to four hours different from the specified schedule; and third, assurance, the guarantee of security and safety of passengers is quite adequate, but for passenger comfort is not guaranteed because the number of passengers boarding exceeds capacity.

Keywords: Service; Port; PT ASDP; Ferry Ship.

[1] Results of Undergraduate Student Research

INTRODUCTION

Indonesia is a maritime country with a vast sea area and approximately 17,508 islands based on Law Number 6 of 1996 concerning Indonesian Waters. The Indonesian archipelago is connected by waters either oceans, rivers or lakes. Moving on from these features, transportation plays an important role in connecting one island to another.

Sea transportation is a mode of transportation that can connect between islands with relatively cheaper rates and the number of goods that can be transported more. In sea transportation there is a port as a place for ships to dock, up and down passengers, loading and unloading goods, and various port support activities.

The port located in Kupang City is the Bolok Crossing Port. This port is managed by Indonesian River, Lake and Ferry Transportattion - Limited Liability Company, (PT ASDP Persero) Kupang Branch. PT ASDP Kupang Branch is a state-owned enterprise engaged in the business of crossing services and integrated ports and waterfront tourism destinations (*Source: Company Profile PT ASDP Indonesia Ferry (Persero), 2023*).

The main component of port revenue is revenue from port services for ships, goods and other services provided by the port management. The role of PT ASDP Kupang branch in managing Bolok Port is vital in the development and growth of Kupang and other areas in East Nusa Tenggara.

The main purpose of public sector organizations is to serve the community (A.T. Wijesekera1 & R. Lalitha S. Fernando 2017). PT ASDP Indonesia Ferry Kupang branch continues to make service improvements in an effort to improve service quality so that customers feel satisfied, therefore PT ASDP Kupang branch needs to pay attention to these five main components, namely, *tangible*, *reliability*, *responsiveness*, *assurance*, *empathy*. PT ASDP Indonesia Ferry Kupang manages the Bolok Crossing Port with 52 shipping lanes and has six (6) active fleets of ships. Each ship has a different capacity, with the following details:

TABLE 1.1
SHIP CAPACITY

Number	Name of Vessel	Size	Passanger Capacity	Number of Vehicle Load	Number of Crews
1.	KMP Cakalang II	702 GT	150 People	35 Mixed Vehicle Units	25 People
2.	KMP Ile Labalekan	895 GT	200 People	35 Units Mixed Vehicle	30 People
3.	KMP Uma Kalada	881 GT	150 People	30 Mixed Vehicle Units	25 People
4.	KMP Inerie II	1031 GT	200 People	22 Mixed Vehicle Units	20 People
5.	KMP Lakaan	1869 GT	250 People	35 Mixed Vehicle Units	25 People
6.	KMP Ranaka	1029 GT	150 People	25 Mixed Vehicle Units	25 People

Source: PT ASDP Indonesia Ferry Kupang Branch Year 2023

The data above can be seen that each ship has a lot of capacity but often overloads occur, both from the service provider and service users recognise this. As a result, it causes inconvenience to service users on board, starting from the fact that they cannot get facilities, eventually passengers sleep on the floor and corridors of the ship. When passengers sleep on the floor and corridors of the ship, it causes other passengers who want to go shopping to the ship's canteen or to the toilet to be blocked by them, finally passengers cannot move freely on the ship.

There are also based on personal experience, the results of observations and reading in several information media found several problems, including:

1) Ship departures that are not in accordance with the specified time of two to four hours.
2) The inconvenience of passengers who often complain because of the long queue to get on the ship.

The problem is related to the services provided by PT ASDP Indonesia Ferry Kupang Branch. The company certainly has main tasks and functions for each field in carrying out services and the tupoksi must be carried out properly by the company so that the services provided are of high quality, but in reality there is still a gap between the services provided and the service standards that should be done. Public institutions and all their processes must serve and create opportunities to provide benefits to society as a whole (Mugarura & Zwelinzima, 2020).

Therefore, this problem must be addressed and corrected immediately, because if left unchecked it will damage the image of the services provided by the company and eventually service users are worried that they will move to other companies. Service quality is measured through how well the level of service provided can be equivalent to customer expectations (A.T. Wijesekera1 & R. Lalitha S. Fernando, 2017).

Based on the existing background description, the research problem can be formulated as follows: How is the service of PT ASDP Indonesia Ferry Kupang branch?

LITERATUR REVIEW

1. **Service**

   According to the American Marketing Association quoted by Donald in Hardiyansyah (2011) that service is basically an activity or benefit offered by one party to another and is essentially intangible and does not result in ownership of something, the production process may also not be associated with a physical product. Furthermore, Lovelock in Hardiyansyah, suggests that service is a product that is intangible, lasts a while and is felt or experienced ". This means that service is a product that has no form or shape so that no form can be owned, and lasts a moment or is not durable, but is experienced and can be felt by service recipients.

   Decree of the Minister of PAN No. 58 of 2002 classifies three types of services from government agencies and BUMN / BUMD. The grouping of service types is based on the characteristics and nature of the activities and service products produced. The three types of services are: administrative services, goods services, and services.

2. **Services**

Service is any action or activity that can be offered by one party to another which is basically intangible and does not result in any ownership. Its production can be linked or not linked to a physical product (Philip Khotler, 2012). Services have four main characteristics, namely: intangibility, inseparability, variability, and perishability.

According to Gronroos, service is a / series of activities that are invisible (not palpable) that occur as a result of interactions between consumers or customers with employees or other things provided by the service provider company which are intended to solve consumer or customer problems.

2.1 Service Quality Dimension

Dimensions or often called elements in service, of course, exist which are the benchmarks of the services performed. Parasuraman et al, coined the concept of servqual dimensions in measuring service quality. This technique knows the amount between customer expectations and expectations in the service received.

Parasuraman suggests five dimensions of service quality. The five dimensions are tangible (physical form), reliability, responsiveness, assurance, and empathy.

a. *Tangible* (Physical Form)

This dimension is concrete evidence of a company's ability to show the best for customers. Starting from the physical side of the appearance of buildings, facilities, supporting technology equipment, employee appearance and other facilities owned by the company.

b. *Reliability*

This dimension expresses the company's ability to provide services in accordance with consumer expectations regarding speed, timeliness, no errors, sympathetic attitude, and so on. The point is the ability to provide the promised service accurately.

c. *Responsiveness*

This dimension is that service providers are responsive to providing fast or responsive service, and are accompanied by a clear and understandable way of delivery. Speed and accuracy in providing services to customers is needed so that customers are not disappointed.

d. *Assurance*

Assurance is a dimension related to guarantees. The guarantee referred to here is the guarantee obtained by customers from the behavior of service owners. *Assurance* can be obtained from good communication, extensive knowledge, to attitude, and courtesy to customers. With *assurance* or certainty, customer confidence in the products provided to consumers is expected to increase as well. The essence of the *assurance* dimension is the knowledge and courtesy of the workers and their ability to give confidence to consumers.

e. *Empathy*

Empathy is related to customer satisfaction which is related to sincere attention, being close, and feeling what the customer feels. *Empathy* will help know the specific needs and desires of customers.

3. **Port**

According to Law of the Republic of Indonesia Number 17 of 2008 concerning Shipping, a port is a place consisting of land and / or waters with certain boundaries as a place of government activities and business activities used as a place for ships to dock, embark and disembark passengers, and / or loading and unloading goods, in the form of terminals and ship berths equipped with shipping safety and security facilities and port support activities as well as a place for intra and intermodal transportation movements.

RESEARCH METHOD

This research uses a qualitative method using a case study approach. Qualitative method is a research paradigm for researching on natural object conditions. The case study approach is how researchers develop an in-depth analysis of a case, be it a program, event, activity, or process. The research location is a place or object for conducting a study. The location chosen in this research is located at PT ASDP Indonesia Ferry (Persero) Kupang Branch and Bolok Crossing Port.

The focus of this research is to see the services of PT ASDP Indonesia Ferry Kupang Branch at Bolok Crossing Port which will be measured through five dimensions, namely: tangible (physical form), reliability, responsiveness, assurance, empathy.

The informants in this study include: Business manager of PT ASDP Indonesia Ferry Kupang branch, port security implementation unit (KP3) Sea at Bolok Port totaling 2 people, business class service users totaling 5 people and economy class service users totaling 6 people.

The data sources in this study used two types, namely primary and secondary data. Data collection techniques through interviews, observation and documentation. Data analysis techniques in this study are data reduction, data presentation and conclusion drawing verification.

RESEARCH RESULT AND DISCUSSION

1. **History of PT ASDP Indonesia Ferry (Persero) Kupang Branch**

PT ASDP Indonesia Ferry (Persero) was established based on the Decree of the Indonesian Minister of Transportation No. KM. 50/R/PHB-1973 on March 27, 1973 under the name ASDP Ferry Project. Started operating in the East Nusa Tenggara region on May 02, 1986, 3 land officers, with 1 (one) ship unit namely KMP. Krapu, which was captained by Kapiten Niki Julu and docked at the Kupang Fisheries Pier and Public Pier. The routes served at that time were: Kupang-Rote and Kupang-Larantuka.

In January 1987 one track was added, namely Kupang-Sabu. In 1989 2 (two) fleet units were added, namely KMP. Krapu II and KMP. Madidihang with the addition of the Larantuka-Waiwerang-Lewoleba route.

Figure 1
KMP. Kerapu II

Figure 2
KMP. Madidihang

Source: PT Industri Kapal Indonesia

Starting in 2004, the Kupang branch was entrusted with pioneering and commercial services. 1. pioneering routes: Ende-Waingapu, Waingapu-Ende, Waingapu-Aimere, Kupang-Lewoleba, Kupang-Ende, Kalabahi-Baranusa, Baranusa-Lewoleba, Lewoleba-Baranusa, and Kalabahi-Teluk Gurita. 2. Commercial Lines: Kupang-Rote, Kupang-Larantuka, Kupang-Sabu, Kupang-Kalabahi, Kupang-Aimere, Kupang-Waingapu, and Kalabahi-Larantuka.

With trust and service improvement, PT ASDP Indonesia Ferry (Persero) Kupang Branch continues to grow until now serving 21 tracks with a fleet of 9 ships and 3 ports. (Source: PT ASDP Indonesia Ferry (Persero) Kupang Branch).

Service is a / series of activities that are invisible (not palpable) that occur as a result of interactions between consumers or customers with employees or other things provided by the service provider company intended to solve consumer or customer problems (Gronroos in Tjiptono & Chandra, 2016).

To analyze the services provided by PT ASDP Indonesia Ferry (Persero) Kupang Branch, researchers use the opinion of Parasuraman, Zeithmal and Berry in Lupiyoadi (2006: 182) which states that quality service can be seen from several dimensions with the following discussion and research results:

1. *Tangible*

   Tangible is the ability of a company to display and provide the best for service users and which is successfully realized. Starting from the physical appearance of the building, facilities ranging from ticket purchase counters to being on board such as (chairs, fans, trash cans, toilets, and employee appearance).

   In a service the availability of buildings, facilities is very important, because if this is not available then all activities carried out will not be able to achieve the expected results. The service will be of quality if there are adequate buildings and facilities, then it is very possible that a service can run well.

   PT ASDP Indonesia Ferry (Persero) Kupang Branch as a service provider, especially in the field of Business, has Tupoksi to ensure the readiness of port facilities, traffic patterns, signs, and lighting in the port area through coordination, planning and

evaluation for the smooth flow of vehicle and passenger services. In this section, researchers only focus on the facilities provided at the port to the ship.

Figure 3
Bolok Port Waiting Room

Table 1.2
Data on Facilities Available at the Port Waiting Room
At PT ASDP Indonesia Ferry (Persero) Kupang Branch

Number	Type Facility	Condition		Total
		Good	Damaged	
1.	Chair	76	4	80
2.	Fan	2	4	6
3.	TV	1	-	1
4.	Cable Terminal Box	2	-	2
5.	Trash Can	2	-	2
6.	Suggestion Box	1	-	1

Based on the results of the interview, it was found that PT ASDP has prepared various facilities that are good enough to support all activities at the port, especially waiting rooms such as (chairs, fans, trash cans, suggestion boxes and toilets) but there are several facilities such as chairs that are inadequate because these facilities are still limited and cannot be used by all passengers and broken fans so that air circulation in the waiting room is not good.

Number	Name of Ship	Size	Passenger Capacity
1.	KMP Cakalang II	702 GT	150 People
2.	KMP Ile Labalekan	895 GT	200 People
3.	KMP Uma Kalada	881 GT	150 People
4.	KMP Inerie II	1031 GT	200 People
5.	KMP Lakaan	1869 GT	250 People
6.	KMP Ranaka	1029 GT	150 People

Source: PT ASDP Indonesia Ferry Kupang Branch

If observed based on data and interview results, it can be seen that each ship has a capacity of up to hundreds of people, but when compared to the seat facilities prepared by PT ASDP in the waiting room, it is still lacking almost half of the passengers, causing passengers to stand, sit on the floor, and look for seats outside the waiting room.

Meanwhile, the facilities inside the ship are good, only because PT ASDP accepts service users exceeding the ship's capacity, finally the service users cannot use facilities such as chairs and beds provided and they end up sleeping in the ship corridor and ship floor.

Based on observations in the field, supporting facilities such as suggestion boxes and trash cans are available. While the appearance of employees is also good they wear uniforms when working. The toilets in the waiting room are good, only the toilets in the ship are not very clean, the water also often runs out on the way which results in a very unpleasant odor in the ship, and it also greatly makes service users uncomfortable for hours in the ship.

Services in the physical form provided by PT ASDP are still lacking starting from chair facilities, fans and toilets, as a result service users are less satisfied with the services provided to them. Whereas services in physical form really determine the first impression to service users, when service users choose to use the services of PT. ASDP then they see the physical form provided well, surely they will also be happy to choose to use the right services, but otherwise when they use services and things they see are not good, surely they can only use the service once and will move to services provided by other companies.

2. *Reliability*

Reliability is the company's certainty in providing services that can be trusted and in accordance with the expectations of service users. This is related to speed, timeliness, accuracy of information, no errors. The point is the ability to provide the promised service accurately.

In a service, of course, a service that can be trusted is expected, especially the matter of timeliness and accuracy of information is one aspect that can reflect the service in a quality company or not.

PT ASDP Indonesia Ferry (Persero) Kupang Branch as a service provider, especially in the field of Business, has Tupoksi Ensuring the accuracy of port operational information including ship schedules, tariffs and other information to service users through print media, electronic media, direct socialization to service users and other information media for service improvement.

Based on the results of these interviews, it can be concluded that PT ASDP has various media, namely print media, electronic media, social media such as Instagram and Facebook, and through WhatsApp groups to convey good information related to schedules, ship fares and other information so that this information is easily known by service users.

However, related to the timeliness that has been scheduled with the situation in the field is not appropriate, the departure time of the ship differs by one to four hours from the specified schedule.

Figure 4
Ticket and Ship Departure Schedule in the Field

In the picture above, it can be seen that the ship schedule shared on PT ASDP Kupang's Instagram account for the Kupang-Kalabahi route should have departed at 12:00 WITA, but the situation in the field at 13:51 the ship was still docked at Bolok Port and it can be proven that this is also not the Kupang-Sabu route.

The punctuality of the scheduled time and the situation in the field did not match, with the departure time of the ship differing by one to four hours from the schedule. This is due to delays in docking, unloading which takes one to two hours, issuing a sailing order which takes up to one hour, the profit and loss factor when PT ASDP sees that the cargo has not met the target they will wait and even delay the departure of the ship, weather factors and the high and low waves.

The various things above show that the services of PT ASDP cannot be trusted and are not in accordance with the expectations of service users. The accuracy of information is very important in a service when the departure of the ship is not in

accordance with the specified time it will sacrifice the time of the service user, especially when they have a plan and they have estimated that they will arrive at their destination at what time but because of the late departure, it is certain to arrive no longer according to the time that should be in the end the service user will lose and their plans will be delayed. Surely this problem makes service users dissatisfied with the services of PT ASDP. PT ASDP should be more consistent with punctuality, otherwise this condition will damage the reputation of PT ASDP services.

3. *Responsiveness*

Responsiveness is the ability of field implementers to respond quickly to questions, requests, and problems faced by service users.

In a service, of course, the main obligation is to serve the public interest. This relates to the ability to know, understand the wishes, and answer service users' problems.

Based on the results of the interview, it can be concluded that PT ASDP has two containers for reporting problems, namely the 191 command center and can directly meet the officers. Regarding responsiveness to respond to passenger issues such as in responding to responses to questions, requests, and problems faced by service users, PT. ASDP has done it well.

4. *Assurance*

Assurance is a dimension related to guarantees. The guarantee referred to here is the guarantee obtained by service users in terms of security and safety, comfort, and receipt of compensation when the ship is late departing and the ship is delayed when using services at the company.

PT ASDP Indonesia Ferry (Persero) Kupang Branch as a service provider, especially in the field of Business, has the Tupoksi to ensure the availability of navigation equipment, ship safety equipment and cargo manifests through coordination with engineering functions, and port functions for smooth and safe shipping.

a) Security and Safety

Guaranteeing the security and safety of passengers while using services to arrive at their destination is very important, because then passengers can feel safe during the trip and it will also support the smooth running of sea transportation.

Based on the results of the interview, it can be concluded that security and safety on board is guaranteed, many safety equipment have been prepared by ASDP such as life jackets, life rafts, lifeboats, it's just that they don't explain to passengers how the safety equipment is used and where it is stored. An explanation of how to use safety equipment is very important because not all service users know how to use safety equipment.

b) Comfort

In a service, the security of service users really needs to be considered, they have spent their money and of course they want to get services that can make them comfortable, therefore as a service provider must be able to provide services that can make service users comfortable. Comfort here talks about the cleanliness of the ship, manifest cargo.

Based on the results of the interview, it can be concluded that PT ASDP has not been able to guarantee the comfort of both economy and business class passengers while on board until they reach their destination, because the level of cleanliness of the ship and toilet has not been resolved and the cargo received by PT ASDP exceeds the capacity of the ship by hundreds of people.

PT ASDP only thinks about safety equipment enough for all passengers but does not think about the impact on passengers from receiving passengers who exceed capacity. In fact, it is very disturbing to the comfort of passengers, limiting their space in the ship, not getting facilities, finally they sleep on the floor, stairs, ship corridors, and even sleep under the car on the lowest deck of the ship which is actually the function of the place to load vehicles and service user goods. As in the following picture:

Figure 5
Load Manifest that Exceeds Capacity

c) Provision of Compensation

In a service, of course, there must be a guarantee in terms of compensating customers when a service is not in accordance with the service standards provided. In this case, it is related to the provision of compensation from PT ASDP Kupang branch to service users whose ship departure is late or delayed.

Based on the results of the interview, PT ASDP only provides compensation in the form of an apology for service users when the ship is late departing and when the ship is delayed. So PT ASDP only provides guarantees in the form of apologies to service users, there are no other things such as providing food, souvenirs / goods, or discounted ticket prices.

5. *Empathy*

Empathy is related to service user satisfaction related to service providers who feel what service users experience. Empathy will help find out the specific needs and desires of customers.

The sub-focus on this dimension wants to see how PT ASDP feels and understands what passengers feel when using the services provided by PT ASDP.

Based on the results of the interview, it can be concluded that the empathy service from PT ASDP is still lacking because they lack a sense of empathy when they see passengers sleeping on the floor, ship corridors, even under cars, if they have a sense of empathy they will no longer accept passengers who exceed the ship's capacity limit.

CONLUSION

Based on the results of the research Description of Services of PT ASDP Indonesia Ferry (Persero) Kupang branch (Case Study of Bolok Crossing Port), the authors draw the following conclusions:

1. *Tangible*

   PT ASDP has prepared various facilities that are sufficient to support all activities at the port and on the ship, but there are several facilities such as chairs that are inadequate because these facilities are still limited and cannot be used by all passengers and fans that are damaged so that air circulation in the waiting room is not good. While the facilities on board are good, only because PT ASDP accepts service users exceeding the capacity of the ship, finally the service users cannot use facilities such as chairs and beds provided, finally they sleep in the corridor of the ship and the floor of the ship.
2. *Reliability*

   PT ASDP has various media to convey information both related to schedules, ship fares and other information through print media, electronic media, social media such as Instagram and Facebook, and through WhatsApp groups so that the information is easily known by service users. However, the timeliness and accuracy of the information is not accurate because the scheduled time with the situation in the field does not match, the departure time of the ship differs by one to four hours from the specified schedule.
3. *Responsiveness*

   PT ASDP's responsiveness in responding to questions, requests, and problems faced by service users is good.
4. *Assurance*
   a. Security and Safety

      Security and safety on board is guaranteed, many safety tools have been prepared by ASDP such as life jackets, life rafts, lifeboats, it's just that they don't explain to passengers how the tools are used and where they are stored.
   b. Comfort

PT ASDP has not been able to guarantee the comfort of both economy and business class passengers while on board until they reach their destination, because the level of cleanliness of the ship and toilets has not been resolved and the cargo that exceeds capacity greatly disturbs the comfort of passengers, limiting their space in the ship, not getting facilities, finally they sleep on the floor, stairs, ship corridors, and even sleep under the car on the lowest deck of the ship which is actually the function of the place to load vehicles and service user goods.

c. Provision of Compensation

PT ASDP only has the provision of compensation for apologies and has no other compensation.

5. *Empathy*

PT ASDP services in terms of sincere and close attention to each customer, also feel what the customer feels is still lacking because they lack a sense of empathy when they see passengers sleeping on the floor, ship corridors, even under cars, if they have a sense of empathy they will no longer accept passengers who exceed the ship's capacity limit.

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CHAPTER 3

Enhancing Corporate Governance at PT XYZ: A Case Study on the Adoption of ISO 37001 and ISO 37002

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ABSTRACT

PT XYZ, Indonesia's largest state-owned oil and gas company, operates in a high-risk environment prone to bribery and unethical practices, which it aims to address by adopting ISO 37001 and ISO 37002 standards for anti-bribery management and whistleblowing systems. The company faces challenges such as initial resistance, integration difficulties, and ensuring ongoing compliance, with objectives focused on fostering a culture of integrity, optimizing internal processes, and establishing effective systems for managing bribery risks. The results show that while progress has been made, continuous efforts are needed to align processes, measure effectiveness, and sustain improvements through regular audits and performance reviews. Recommendations for organizations include developing clear strategies, allocating resources, and engaging employees through training. Industry-wide, promoting standardization, knowledge-sharing, and regulatory alignment is essential, while businesses must ensure uniform application across subsidiaries. For customers, demanding transparency and supporting companies committed to ethical practices will help drive broader adoption of anti-bribery measures. The study also suggests that future research should focus on enhancing data collection, expanding analysis methods, and incorporating longitudinal studies to better understand the long-term impact of these standards.
Keywords: ISO 37001, ISO 37002, Anti-bribery, Whistleblowing, Corporate Governance

1. INTRODUCTION

1.1 INDUSTRY BACKGROUND

The oil and gas industry is a crucial global sector, providing essential energy resources, but it also faces significant risks related to corruption and unethical practices due to its economic impact, complex supply chains, and stringent regulatory requirements. As Indonesia's largest state-owned oil and gas company, XYZ operates in this high-risk environment, necessitating robust measures to manage risks associated with bribery and unethical behavior. To address these challenges, XYZ has adopted ISO 37001 and ISO 37002, international standards for anti-bribery management systems and whistleblowing mechanisms, respectively. These standards help XYZ develop effective policies, conduct risk assessments, and establish secure reporting channels to combat bribery and ensure transparency. By integrating these systems into its operations, XYZ not only mitigates industry-specific risks but also reinforces its commitment to ethical governance, setting a benchmark for good corporate practices and enhancing its reputation among stakeholders. (Nonci et al, 2020)

1.2 COMPANY BACKGROUND

XYZ, Indonesia's largest state-owned oil and gas company, plays a crucial role in the nation's energy independence. Appointed as the holding company for the energy sector in 2020, XYZ oversees six key Subholdings in diverse energy activities, such as upstream operations, gas, refining, petrochemicals, power, and trading. With over six decades of history, XYZ has evolved from its early roots in the 1950s, growing into a world-class national energy company. This evolution includes the significant acquisition of a majority stake in the French company Maurel et Prom, which expanded XYZ’s operations to 12 countries. The company’s vision is to become a leading global energy provider with a market value of USD 100 billion by focusing on integrated oil, gas, and renewable energy operations. XYZ's mission is to align commercial success with national energy security, supported by values of trust, collaboration, loyalty, harmony, adaptability, and competence. Through continuous transformation, XYZ aims to strengthen Indonesia's energy infrastructure and achieve sustainable growth in the energy sector.

1.3 PROBLEM BACKGROUND

PT XYZ has identified three main problems:

1. Implementation challenges highlight the difficulties XYZ faces in applying ISO 37001 and ISO 37002
2. Evaluating how effectively ISO 37001 and ISO 37002 enhance the Anti Bribery and WBS system at XYZ compared to international standards.

Therefore the raised questions are:

1. How can XYZ overcome the main difficulties in applying ISO 37001 and ISO 37002?
2. How can XYZ assess the conformity and effectiveness of the Anti-Bribery and WBS Management System compared to ISO 37001 and ISO 37002 requirements?

2. PROJECT DESCRIPTION

2.1 GOOD CORPORATE GOVERNANCE

According to the Regulation of the Minister of State-Owned Enterprises of the Republic of Indonesia Number PER-2/MBU/03/2023, which outlines guidelines for Good Corporate Governance (GCG) and significant corporate activities in state-owned enterprises, Good Corporate Governance is defined as the management of a company based on the principles of transparency, accountability, responsibility, independence, and fairness. Transparency involves openness in decision-making and the disclosure of relevant company information, fostering trust and reducing corruption. Accountability holds the board and senior management responsible for their actions through mechanisms like performance reviews and audits, preventing misuse of power and protecting stakeholders' interests. Responsibility emphasizes legal and ethical compliance, social responsibility, and sustainable practices, ensuring that the company adheres to both its obligations and its values. Independence ensures that the board and committees operate without conflicts of interest, enabling impartial oversight and prioritizing the company's long-term success. Finally, fairness ensures equal treatment of all stakeholders, particularly minority shareholders, and promotes inclusive decision-making. Collectively, these principles form the foundation of effective governance, fostering trust, transparency, and ethical conduct in corporate practices (Karsono, 2023; Rumengan et al., 2023; Aruan et al, 2022).

2.2 Anti-Bribery Management System

An Anti-Bribery Management System (ABMS) is a structured framework aimed at preventing, detecting, and addressing bribery and corruption within an organization, in line with ISO 37001:2016 standards. The primary goal of an ABMS is to ensure that the organization upholds the highest ethical standards, promoting integrity and transparency in all business activities. This system is essential for maintaining public trust, complying with legal and regulatory requirements, and protecting the organization's reputation. ISO 37001 outlines that an effective ABMS should include policies, procedures, and controls to guide the behavior of employees, management, and other stakeholders, helping to manage and mitigate bribery risks. Key components include implementing anti-bribery policies, conducting risk assessments, providing training, and establishing monitoring and reporting mechanisms to foster a culture of compliance. A core principle of ISO 37001 is the zero-tolerance policy towards bribery, which involves clear anti-bribery policies, robust reporting and investigation procedures, and ongoing training to ensure employees understand the legal implications and can identify potential risks. The implementation of an ABMS requires conducting a comprehensive risk assessment, developing targeted anti-bribery controls, and setting up confidential reporting channels for investigating potential bribery incidents. Leadership plays a crucial role in implementing the ABMS by demonstrating a strong commitment to anti-bribery practices, ensuring adequate resources are allocated, and conducting regular monitoring and audits to assess the system's effectiveness (ISO 37001; Putri et al., 2022; Ali et al., 2024).

2.3 Whistleblowing Management System

A Whistleblowing System is an essential tool for promoting transparency and accountability within an organization, providing employees and stakeholders with a secure method to report unethical or illegal activities without fear of retaliation. This system helps uncover wrongdoing,

such as fraud, corruption, or safety violations, that might otherwise remain hidden. By offering confidential reporting channels, it allows organizations to address issues promptly, thereby safeguarding the organization's integrity and encouraging a culture of ethical behavior (Kartika, 2024). ISO 37002:2021 aligns with these objectives by offering a structured framework for managing whistleblowing processes. The standard emphasizes the importance of designing an effective system with accessible reporting processes, confidentiality assurances, and strong protections against retaliation. ISO 37002 requires that all employees be informed about how to report concerns, often through training programs, and that reports can be made anonymously. The system must also include clear reporting mechanisms, such as hotlines or online platforms, and establish procedures for investigating and addressing reports. A whistleblower protection policy and transparent reporting procedures are critical to ensuring safety and support for individuals coming forward. Additionally, ISO 37002 stresses the need for regular monitoring and evaluation to ensure the system's continued effectiveness and to adapt to feedback and changing circumstances (Andriansyah et al., 2024).

2.4 Synergy and Coordination

Synergy and coordination are essential concepts in organizational management, crucial for improving efficiency and achieving shared goals. Synergy refers to the interaction between different elements within an organization that produces a combined effect greater than the sum of individual contributions. This occurs when departments, teams, or individuals collaborate, utilizing their unique strengths and resources to enhance performance and drive innovation. Synergy fosters a collaborative environment that improves problem-solving, generates creative solutions, and optimizes resource utilization (Castañer & Oliveira, 2020). Coordination, on the other hand, involves organizing and aligning activities within an organization to ensure they are working toward common objectives. It aims to streamline processes, avoid redundancy, and ensure all parts of the organization are functioning in harmony. Effective coordination requires clear communication, well-defined roles, and processes that facilitate seamless interaction across departments (Rosanti, 2022). In an organizational context, synergy and coordination are closely intertwined. While coordination enables smooth collaboration, synergy amplifies the benefits of this cooperation, leading to better outcomes. For example, when marketing and sales teams align their efforts, the resulting synergy can improve sales performance and marketing strategies. In complex organizations, such as conglomerates with multiple subsidiaries or holding companies, synergy and coordination are even more important. The holding company provides strategic direction and policies, while coordination ensures consistent implementation across subsidiaries. Synergy allows subsidiaries to leverage each other's strengths, driving innovation and competitive advantages. For instance, a technology holding company with diverse subsidiaries can coordinate R&D efforts and share innovations, creating synergies that lead to technological advancements and improved market positioning.

3. METHODOLOGY

3.1 SWOT ANALYSIS

SWOT analysis is a strategic tool used to assess an organization's Strengths, Weaknesses, Opportunities, and Threats, providing insights into both internal and external factors that can influence success and guide strategic planning. Strengths are internal assets, such as a strong brand, skilled workforce, or innovative technology, that help achieve goals and differentiate from competitors. Weaknesses are internal factors, like poor financial management or outdated infrastructure, that hinder performance and require improvement. Opportunities are external factors, such as emerging markets or technological advances, that can be leveraged for growth and competitive advantage. Threats are external challenges, like economic downturns or increased competition, that could negatively impact the organization, requiring strategies to mitigate their effects (Kumar, 2023).

3.2 TOWS MATRIX

The TOWS Matrix is a strategic planning tool that builds on SWOT analysis by linking internal and external factors to create actionable strategies. It helps organizations align their strengths and weaknesses with external opportunities and threats to develop strategies that capitalize on strengths, address weaknesses, seize opportunities, and mitigate threats (Dandage et al., 2019). Strengths-Opportunities (SO) strategies leverage internal strengths to exploit external opportunities, such as using strong R&D capabilities to innovate for market demands. Weaknesses-Opportunities (WO) strategies focus on addressing internal weaknesses to better capitalize on opportunities, like investing in new technology to remain competitive. Strengths-Threats (ST) strategies use internal strengths to counter external threats, such as leveraging a strong brand to fend off competition. Weaknesses-Threats (WT) strategies aim to address both internal weaknesses and external threats, such as implementing cost-cutting measures to stabilize operations during economic downturns.

3.3 GAP ANALYSIS

Gap analysis is a strategic tool used by organizations to identify the differences between their current performance and desired goals or standards. It involves evaluating existing practices or outcomes against predefined benchmarks, helping to pinpoint areas that need improvement. This process allows organizations to understand performance gaps, optimize operations, and align activities with strategic objectives, ultimately leading to targeted action plans that enhance efficiency and effectiveness (Kim & Ji, 2018; Surianugraha et al., 2020). In the context of ISO 37001 and ISO 37002, gap analysis focuses on assessing how well an organization’s anti-bribery and whistleblowing practices align with the standards’ requirements. This involves comparing current policies, controls, and procedures against the criteria outlined in these international standards. The analysis helps identify weaknesses, such as outdated procedures or inadequate resources, and supports the development of strategies to address them—like updating policies or improving training. The goal is to ensure that anti-bribery and whistleblowing systems meet international best practices, manage risks effectively, and ensure compliance with ISO standards, thereby reinforcing the organization’s commitment to ethical conduct and regulatory compliance.

4. RESULT AND DISCUSSION

4.1 SWOT ANALYSIS

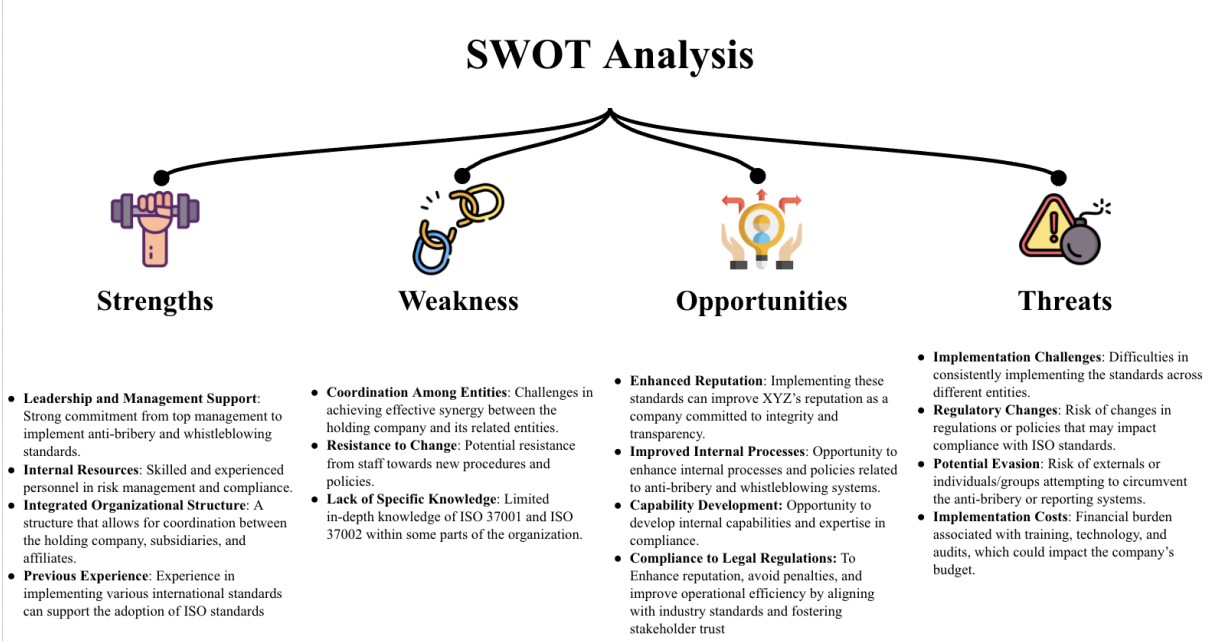

Figure 1 SWOT Analysis of PT XYZ

Figure 1 presents a SWOT analysis for PT XYZ (Persero) regarding the implementation of ISO 37001 and ISO 37002 standards. Strengths include strong leadership support, experienced risk management personnel, and an integrated organizational structure, which facilitate effective adoption of the standards. However, weaknesses involve coordination challenges across entities, potential staff resistance, limited knowledge of the standards, and technological limitations. Opportunities for XYZ include enhancing its reputation for integrity, improving internal processes, and opening doors to international collaborations. On the other hand, threats include difficulties in applying the standards consistently, regulatory changes, potential evasion of anti-bribery systems, and financial strain from training, technology upgrades, and audits, which could hinder the implementation.

4.1 TOWS MATRIX

Table 1. TOWS Matrix XYZ

TOWS Matrix	Strengths	Weakness
Opportunities	SO **Leverage Leadership and Management Support**: Use strong management backing to drive widespread adoption of ISO standards, promoting XYZ's reputation for integrity and transparency in international markets. **Capitalize on Previous Experience**: Apply past experience with international standards to effectively	WO **Utilize Internal Resources to Address Implementation Challenges**: Deploy skilled personnel to overcome difficulties in consistent implementation and address potential regulatory changes. **Overcome Resistance by Developing Internal Capabilities:** Address resistance to change by focusing on capability development.

	implement ISO 37001 and ISO 37002, enhancing internal processes and seizing opportunities for global market access.	
Threats	ST **Overcome Lack of Specific Knowledge Through Training**: Address gaps in knowledge by implementing comprehensive training programs to build expertise in ISO 37001 and ISO 37002, thereby improving internal processes and policies. **Mitigate Coordination Issues with Structured Programs**: Develop structured coordination programs to enhance collaboration among entities, leveraging opportunities to improve processes and internal capabilities.	WT **Manage Resistance to Change with Communication**: Address potential resistance from staff by establishing clear communication and change management strategies to ensure smooth adoption of new procedures. **Prepare for Regulatory Changes with Flexible Planning**: Develop flexible implementation plans and contingency strategies to adapt to potential regulatory changes, minimizing the impact of external threats on compliance efforts.

The TOWS Matrix in Table 1 provides a strategic framework for XYZ to address challenges and leverage strengths in implementing ISO 37001 and ISO 37002 standards. To capitalize on strengths, XYZ should leverage strong leadership support to drive ISO adoption and enhance its reputation for integrity. Additionally, its previous experience with international standards can aid effective implementation. To address weaknesses, XYZ should deploy skilled personnel to manage implementation challenges and overcome resistance to change by fostering adaptability. For external threats, the matrix recommends comprehensive training to build expertise in ISO standards and developing structured programs to improve coordination across the organization. It also emphasizes managing resistance through effective communication and flexible planning to address regulatory changes.

4.2 GAP ANALYSIS

Table 2 Gap Analysis of PT XYZ

Aspect	Previous State	Current State	Recommendations
ISO 37001 and ISO 37002 Implementation	- Partial implementation of anti-bribery measures and inadequate whistleblowing mechanisms.	- Full implementation of both ISO 37001 and ISO 37002 across all relevant entities.	- Continue monitoring and evaluating the effectiveness of both systems.
	- Limited awareness among employees regarding the standards.	- Comprehensive training and awareness programs in place.	- Regular refresher training to maintain awareness.

	- Inconsistent application of policies across subsidiaries.	- Standardized policies and procedures implemented organization-wide.	- Conduct regular audits to ensure adherence to standards.
	- Lack of confidentiality and protection for whistleblowers.	- Established protocols for confidentiality and protection in the whistleblowing system.	- Promote the use of the whistleblowing system to encourage reporting.
	- Limited feedback on reporting processes.	- Clear feedback mechanisms in place for reporting incidents.	- Ensure transparency in the investigation and resolution process.

Table 2 presents a gap analysis of XYZ's implementation of ISO 37001 and ISO 37002, highlighting a shift from partial compliance to a fully operational framework. Initially, the company faced challenges with inadequate anti-bribery measures and lacking whistleblowing mechanisms, which hindered anti-corruption efforts and discouraged reporting due to concerns about confidentiality. Currently, XYZ has fully implemented both ISO standards, demonstrating a commitment to improved corporate governance and ethical practices. Comprehensive training and awareness programs have addressed knowledge gaps, fostering a culture of compliance. Previous issues with inconsistent policy application across subsidiaries have been resolved, ensuring standardized procedures and ethical practices throughout the organization. Effective whistleblowing mechanisms have been introduced, ensuring confidentiality and protection for reporters. While these improvements represent significant progress, ongoing monitoring, refresher training, and audits are recommended to ensure continued effectiveness, alongside efforts to encourage the use of the whistleblowing system to reinforce organizational integrity.

5. CONCLUSION AND RECOMMENDATIONS

5.1 CONCLUSION

In conclusion, XYZ’s implementation of ISO 37001 and ISO 37002 involves overcoming initial resistance and integration challenges while ensuring ongoing compliance and effective system management. To address these challenges, XYZ needs to foster a culture of transparency and accountability through targeted communication and training programs aimed at reducing resistance from both employees and managers. Aligning existing processes with the new standards will also be essential, requiring the identification of gaps and optimizing processes for smoother integration. By developing clear, actionable metrics, XYZ can effectively measure the success of its anti-bribery and whistleblowing systems, ensuring the management of implementation challenges in a structured way.

Furthermore, a systematic approach to ongoing assessments, such as regular audits and performance reviews, is necessary to maintain the effectiveness of the anti-bribery and whistleblowing systems over time. These assessments will help XYZ evaluate how well current practices align with ISO requirements and identify areas for improvement. By focusing on process optimization, clear metrics, and fostering a collaborative environment, XYZ can

successfully navigate the complexities of ISO 37001 and ISO 37002 implementation, ensuring long-term compliance and the development of a robust anti-bribery culture.

5.2 RECOMMENDATION

5.2.1 For Organizations

To implement ISO 37001 and ISO 37002 standards successfully, organizations must develop a clear strategy, including defined timelines, resource allocation, and responsibilities for integrating these standards into daily operations. It's crucial that all organizational levels understand the importance of these standards and are actively engaged. Promoting a culture of integrity through training and communication, supported by leadership advocacy, strengthens the adoption of anti-bribery and whistleblowing practices. Regular internal audits, external reviews, and the use of performance metrics are essential for assessing compliance and driving continuous improvement. For organizations with multiple entities, enhancing collaboration across subsidiaries and affiliates ensures uniform application of these standards through structured communication and centralized guidelines.

5.2.2 For The Industry

Industry-wide standardization of best practices for anti-bribery and whistleblowing systems is key to ensuring consistency and comparability across organizations. Promoting knowledge-sharing through conferences and collaborative platforms enables companies to learn from each other's successes and challenges. Regulatory alignment with international best practices helps streamline compliance processes, while the adoption of advanced technologies such as data analytics and automated monitoring can improve system effectiveness. Embracing innovation ensures that industry practices remain relevant and efficient in combating ethical risks.

5.2.3 For The Business

XYZ must develop a comprehensive strategy for integrating ISO 37001 and ISO 37002, including clearly defined goals, timelines, and resource allocation. A focus on fostering a culture of integrity through training programs and leadership engagement is essential for reinforcing ethical behavior across the organization. Regular audits, performance metrics, and benchmarking against international best practices will help ensure the effectiveness of its anti-bribery and whistleblowing systems. Additionally, enhancing coordination across XYZ's holding company, subsidiaries, and affiliates will ensure uniform application of the standards, facilitated by centralized guidelines, workshops, and training sessions.

5.2.4 For Customers

Customers can influence ethical standards by demanding transparency regarding anti-bribery and whistleblowing policies from businesses. Supporting companies committed to integrity and providing feedback on their ethical practices helps drive improvements and encourages broader adoption of ethical standards. Educating themselves about anti-bribery and whistleblowing practices empowers customers to make informed decisions and advocate for higher ethical standards, fostering a more responsible and transparent business environment.

5.3 Project Limitations

The investigation into the implementation of ISO 37001 and ISO 37002 at PT XYZ (Persero) faces several limitations that impact the comprehensiveness of the findings. One major limitation is the restricted access to detailed internal data and proprietary information, which is critical for evaluating the full effectiveness of these anti-bribery and whistleblowing systems. This constraint makes it difficult to assess how well the standards are integrated across all organizational levels. Additionally, the reliance on SWOT analysis, the TOWS matrix, and gap analysis introduces some limitations, as these methods may not fully capture the complexity of the challenges faced. For example, the subjective nature of SWOT analysis may result in biases, while the TOWS matrix and gap analysis might not account for unforeseen variables that influence implementation. Furthermore, the short timeline of five months limits the ability to conduct a comprehensive longitudinal study or observe the long-term impacts of the standards, restricting the scope for iterative feedback and refinements. Lastly, since the study is specific to XYZ, the findings may not be directly applicable to other organizations or industries, limiting the generalizability of the conclusions.

5.4 Future Project Suggestions

To address the limitations encountered, future projects should consider enhancing data collection methods to ensure better access to internal information and improve the depth of analysis. Strengthening collaboration with internal stakeholders for data sharing, while maintaining confidentiality, could facilitate a more thorough evaluation of anti-bribery and whistleblowing systems. Expanding the methodological approach by incorporating longitudinal studies, case comparisons, and qualitative interviews would provide a more nuanced understanding of the challenges and effectiveness of implementing ISO 37001 and ISO 37002. A longer project timeline would also allow for a more in-depth analysis of the sustained impacts of these standards and provide time for continuous feedback and adjustments. Finally, to improve the generalizability of the findings, future research should involve a broader comparative analysis across multiple organizations and industries, identifying common challenges and best practices to offer more universally applicable insights. This expanded scope would provide valuable recommendations that could benefit a wider range of organizations beyond XYZ.

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CHAPTER 4

Leveraging Augmented Reality and Spatial Presence in Team Collaboration: Bibliometric Analysis of Trend and Literature Review

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ABSTRACT

The role of augmented reality (AR) in improving spatial presence and team cooperation is identified in this research. Current trends, key research, and a cluster of AR and team dynamics themes are elucidated via a bibliometric study. Next, reviewing the literature, how AR promotes social and spatial presence, improves work performance and collaboration, supports training and development, and facilitates inclusive interactions in remote settings are summarized. Further discussion of issues such as user fatigue and the barriers to integrated technologies are also elaborated. This study highlights AR's potential to transform collaborative behaviors in teamwork dynamics and identifies key areas for upcoming research to leverage and maximize its implementation in diverse organizational settings by incorporating insights from recent studies.
Keywords: Augmented Reality, Spatial Presence, Team Collaboration, Digital Technology, Bibliometric.

1. INTRODUCTION

In a world where technology is developing at an unprecedented rate, its influence on human existence becomes more significant. The utilization of digital technologies in our daily lives is changing how we communicate with people and the environment around us, from influencing educational processes to revolutionizing entire sectors. The emergence of "working from home," virtual meetings, and real life simulations are some fine examples of this. The integration of human potential with eficient technologies is becoming undeniably important asenterring the Society 5.0 age, commonly referred to as the Super Smart Society (Narvaez Rojas *et al.*, 2021). One such finding that is changing a lot of industries is Augmented Reality (AR), a technology that produces immersive interactive experiences by combining digital data with real-world surroundings (Dargan *et al.*, 2023). AR offers a unique combination of immersion and interactivity, compared to other recent technologies like Virtual Reality (VR) or Mixed Reality (MR), which either fully or partially replace the physical world (Shin, 2019). The wide digital change occurring across industries is also driving the adoption of AR. For instance, Indonesia's achievement in the International Institute for Management Development's (IMD) 2023 World Digital Competitiveness Ranking (WDCR) demonstrates the country's commitment to digital innovation, with AR playing a significant role in fields (International Institute for Management Development, 2024).

Although AR has already made significant progress in various industries, including healthcare, entertainment, and manufacturing, its potential to enhance teamwork in businesses and organizations is especially alluring. The demand for technologies that enable smooth communication, engagement, and collaboration is rising as work in both co-located and distant settings become more frequent. Time savings, task reduction through automation, communication and collaboration, and effective data collecting and analysis are all made possible by AR (Al-Okaily et al., 2023). In particular, AR offers unending potential to transform teamwork by enabling spatial presence, which is the immersive experience of being physically present in a shared virtual area. AR is becoming a vital tool in professional contexts, particularly in team dynamics, organizational behavior, and collaborative work.

In response to this, this paper seeks to unravel the current state of AR in team collaboration and give a better understanding of how AR technologies are being utilized to promote collaboration and improve spatial presence. The analysis will be based on bibliometric study and literature review, especially by examining significant trends, key studies, and developing themes. Using this approach, several areas and knowledge gaps for future research can be pointed out, providing insights on the usefulness of AR.

2. LITERATURE REVIEW

AR places digital data atop the real word, improving how people perceive and engage with their surroundings. AR creates immersive experiences that can improve training, education, and real-world processes in a variety of industries by combining elements generated by computers (such as audio, visuals, and feedback) with real-world physical environments (Arena *et al.*, 2022). This technology is widely used in gaming, entertainment, and education; which has also advanced dramatically over time. AR's goal to revolutionize how people interact is becoming more widely acknowledged, especially due to the technology’s availability in gadgets like smartphones and smart glasses (Pfeifer *et al.*, 2023). With the capability to manipulate digital

things in real time, a transition away from passive information intake and toward active engagement and involvement can be achieved.

One key terminology, spatial presence, can be defined as the psychological sensation of being physically present in a virtual or augmented environment, and it is a crucial component of AR experiences (Wienrich *et al.*, 2021). The efficiency of AR applications is greatly determined by this phenomenon, especially in a group setting. High levels of spatial presence increase the likelihood of users being absorbed, engaged, and involved in the job at hand, which may boost motivation and improve performance (Huang et al., 2021; Khenak et al., 2020). Even when participants are geographically separated, the sense of being "there" in a common area can help disregard the distance between team members and promote deeper conversations (McVeigh-Schultz & Isbister, 2022). Therefore, designing experiences that promote cooperation and teamwork requires an understanding of how spatial presence is induced in AR settings.

Collaborating as a team means working together to achieve a common goal, where efficient coordination, communication, and resource and knowledge sharing are needed (Srivastava, 2020). In today's dynamic work environments, teams may be dispersed across multiple geographic locations, resulting in the challenge for developing efficient communication. Team members may now communicate and interact easily thanks to the development of digital tools and platforms, which have become crucial determinant of cooperation (Swart et al., 2022). However, the intensity of engagement and shared presence that comes naturally from face-to-face meetings is missing when using technologies (Kalmar *et al.*, 2022). Therefore, investigating advanced technology that can improve teamwork is essential for maximizing output and accomplishing organizational goals.

As businesses shift to use technology to enhance team dynamics, the connection between AR, spatial presence, and team collaboration becomes clearer. AR can improve spatial presence and improve the collaborative experience by enabling team members to engage with digital content in a shared setting (Marques, Silva, Alves, *et al.*, 2022). Team members can conduct remote discussions, visualize comprehensive information, and replicate real-world scenarios because, which helps them synergize, make better decisions, and solve problems. Organizations can create an atmosphere that not only promotes engagement but also taps into the combined efforts and synergies for collaborative workflows, ultimately resulting in better outcomes and innovation (Moencks *et al.*, 2022).

3. RESEARCH METHOD

A bibliometric study quantitatively analyze literature, evaluating publications' influence, trends, and patterns within a certain topic (Donthu *et al.*, 2021). As this study attempts to map current landscape of scientific research on AR, the bibliometric approach was taken since it can give a complete picture of a topic and objectively evaluate trends over time, which makes it ideal for analyzing how AR is unfolding. Researchers can also discover the scholarly structure of a field of study by assessing important metrics including co-authorship networks, publication volume, and citation counts.

Solid criterias were set to ensure rigor and relevance in finding and selecting relevant studies. In September 2024, the keyword "augmented reality" was picked to search for articles in Scopus database. Scopus was chosen as the main database due to its wide coverage of peer-reviewed articles, especially in the fields of social sciences, business, management, accounting, and

economics (Singh *et al.*, 2021). Scopus's features also provide important metrics for identifying research trends and the impact of publications, compared to other databases such as Web of Science or Google Scholar. Furthermore, Scopus has powerful exporting functions that enable bibliographical dataa analysis in applications such as VOSviewer, a bibliometric visualization program. VOSviewer was selected for its capacity to create network maps based on citation networks, co-authorship, and keyword co-occurrence, which enable the understanding of the relationships between authors, institutions, and research themes.

A number of criteria was set to gurantee thorough and sound article selection process. First, the search was limited to publications between 2020 and 2024 to picture the latest advancements in the use of AR. Moreover, this timeline is choosen in consideration of growing interest of AR technology during and after the COVID-19 pandemic. It also covers a period of rapid technological improvement, notably in AR technology. This time frame is especially pertinent to the study since the epidemic increased the use of immersive technologies in remote training and learning settings. Furthermore, the search was restricted to publications in the domains of (i) Business, Management, and Accounting, and (ii) Economics, Econometrics, and Finance.

Only peer-reviewed journal publications were chosen for the analysis in order to maintain academic rigor. Additionally, articles from journals that had published three or more papers on the subject were given priority, giving preference to sources that significantly advance the current discussion in the field. Moreover, articles by authors with multiple publications on the topic were highlighted to identify leading contributors to the research domain. To ensure academic relevance and impact, several considerations were applied: (i) articles with a minimum of 5 citations were included; (ii) a minimum number of documents of an author was set to 3; (ii) allowing the study to focus on works that have demonstrated influence within the academic community.

Following the initial search in Scopus, 22,121 articles were identified. After limiting the fields relevant to the study's scope, 926 articles were finalized for bibliometric analysis. The data was exported from Scopus into VOSviewer after the pertinent articles were finalized. A thorough mapping of research trends and collaboration networks within the area was made possible by the use of VOSviewer to show co-authorship networks, citation linkages, and keyword co-occurrence. This visualization approach aids in locating gaps in the literature that require more investigation as well as research clusters that are concentrating on related issues. It also sheds light on which authors and organizations are spearheading AR research, which is useful information for potential future partnerships.

The co-occurrence of bibliometrics later led to the distinctive but little-researched concept of "spatial presence." As a result, a thorough analysis of articles about "spatial presence," "augmented reality," and "team collaboration" based on Google Scholar will be conducted. By using these integrated approaches, the study identifies important areas of attention and understudied gaps in the literature, laying the groundwork for future research paths.

4. RESULT AND DISCUSSION

Bibliometric Analysis

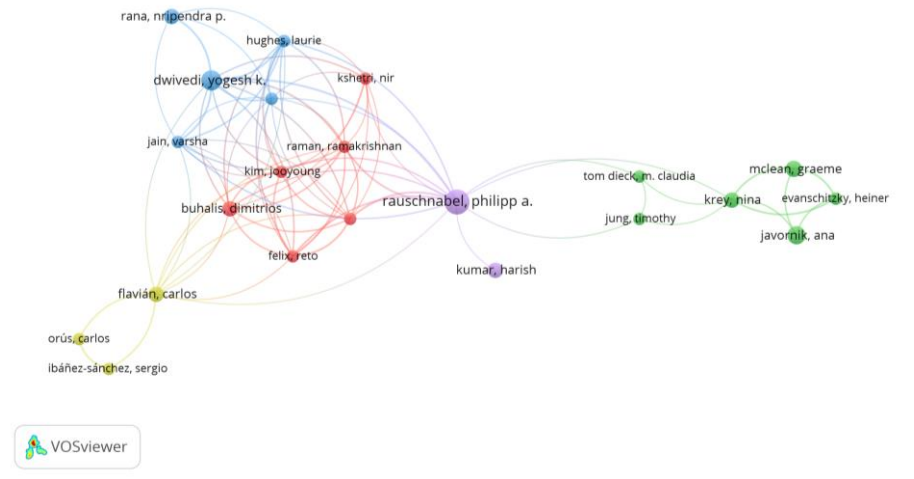
a. Analysis Results from Co-Authorship

The results of this study directly support and build upon earlier research in a number of ways by offering a thorough grasp of collaboration patterns in studies pertaining to AR, spatial

presence, and team collaboration. According to the co-authorship study, important scholars including Yogesh K. Dwivedi, Dimitrios Buhalis, and Philipp A. Rauschnabel are crucial to the advancement of this discipline (Figure 1A). In line with the theory of multidisciplinary collaboration, which maintains that technological innovation—especially in AR applications—requires a convergence of expertise from various fields like information technology, management, and psychology to achieve maximum effectiveness, their collaboration network highlights the value of multidisciplinary contributions (Papakostas *et al.*, 2022).

More precisely, this study supports earlier research showing AR's ability to improve spatial presence in teamwork (Caroux, 2023). It has been demonstrated that spatial presence—the feeling of "being there" in a shared virtual environment—improves team engagement and performance, particularly in distant work settings. In relation to this, the findings support the idea that AR usage can bridge the physical gap between geographically distributed team members, which is also consistent with prior research on AR's role in facilitating more immersive interactions (Rauschnabel et al., 2017).

Furthermore, the period distribution presented in Figure 1B notes that interest in AR for team collaboration has steadily increased, particularly since the incidence of the COVID-19 pandemic. This aligns with the theory that the pandemic accelerated the adoption of digital technologies across sectors, including education and professional environments, where AR is used to enhance collaborative experiences previously dominated by face-to-face meetings (Marques, Teixeira, *et al.*, 2022). As the demand for remote collaboration grows, AR technology has become central to supporting team productivity, confirming trends identified in previous literature.



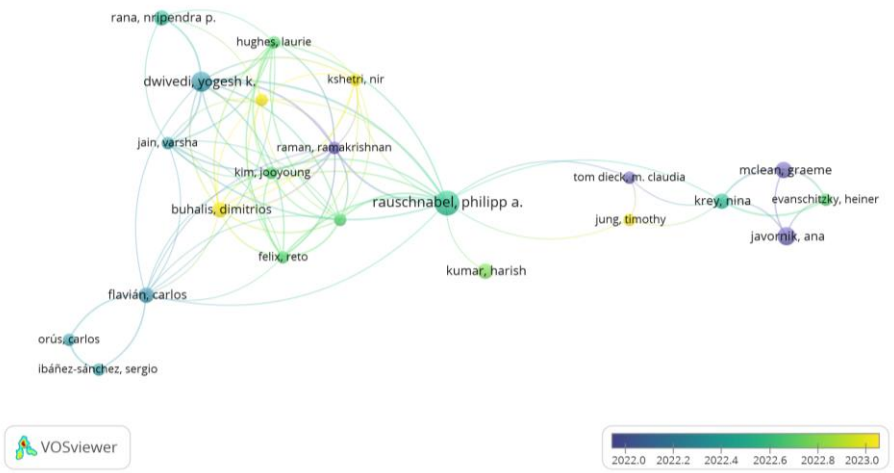
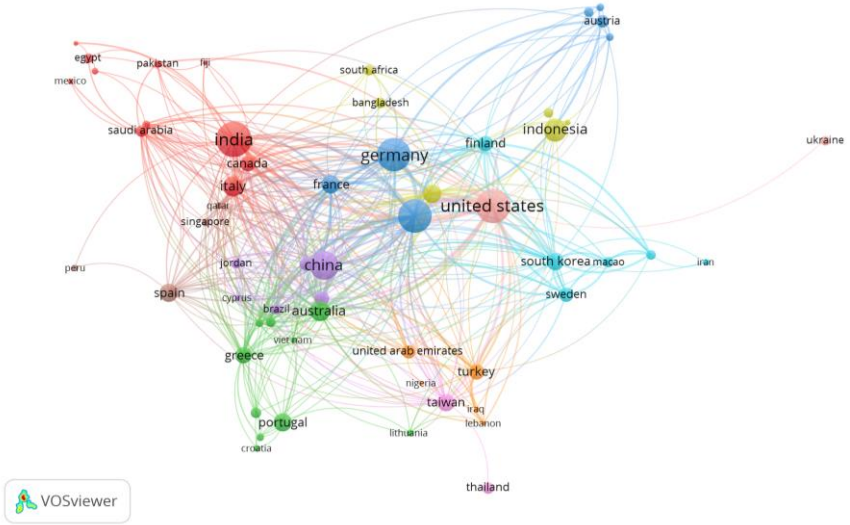


Figure 1. Co-Authorship Results Author Wise. (A) Network Map. (B) Overlay Map.

Nonetheless, some of this study's findings contradict past research. For example, early research focused on technical issues with AR implementation, like hardware and infrastructure constraints (Oke & Arowoiya, 2022), suggest that collaboration among researchers has continued to flourish despite these challenges. Furthermore, the co-authorship heatmap in Figure 1c highlights the collaboration between important academics who work together to deepen our understanding of AR in collaborative settings. These events resulted in the idea of a knowledge network, in which a small number of highly accomplished scholars push the growth of a new topic (Beck *et al.*, 2022).



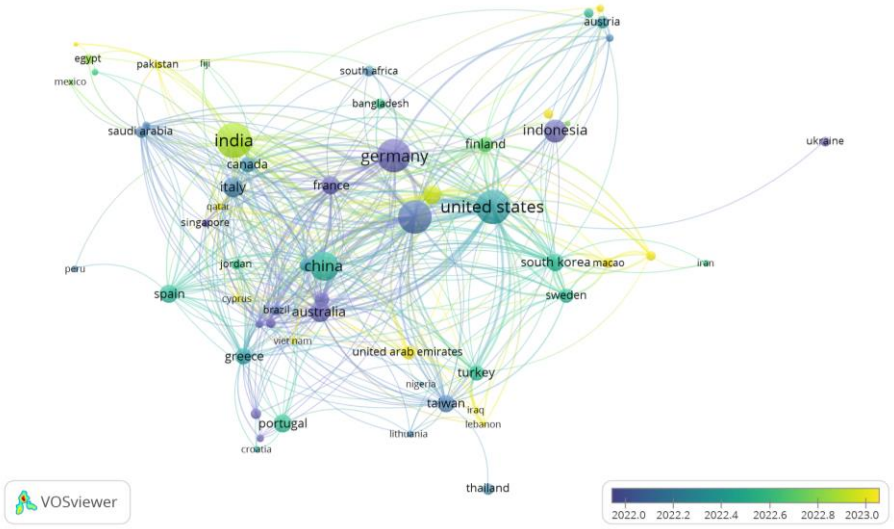


Figure 2. Co-Authorship Results Country Wise. (A) Network Map. (B) Overlay Map.

Figure 2's results provie a complete overview of international collaboration in AR and teamwork research. The network map presents that some nations such as China, India, Germany, and the United States, are crucial to the advancement of this subject. These nations' larger nodes illustrate their substantial contributions and extensive international cooperation. Strong international partnerships are revealed by the intricate web of connections surrounding these nodes, with the United States emerging as the most significant nation, followed by Germany and India. This implies that these technological and economic centers play a major role in AR research, supporting the fact that top global economies drive technological innovation and cooperation in AR.

With vivid yellow clusters surrounding the US, Germany, India, and China, the heatmap further highlights the level of research effort and leadership of these nations in AR research partnerships. This degree of activity suggests a significant concentration of research relationships between academia and industry, indicating that these nations are the main drivers of AR development both domestically and internationally.

Additionally, the network's inclusion of nations like South Korea, Finland, and Indonesia—albeit with lesser nodes—indicates that contributions are coming from other regions of the world. The increasing participation of these countries disproves the notion that AR research is exclusively conducted by Western nations. Rather, it concludes how AR is becoming into a worldwide cooperative endeavor. This change might be a result of global academic collaboration and the growing accessibility of digital tools.

The figure's extensive network of co-authorship connections emphasizes the value of global cooperation in the advancement of AR technologies. Portugal and Austria, two nations that aren't typically thought of as technological leaders, are connected to larger hubs, demonstrating their involvement in international research initiatives. This implies that a globally interconnected research community is driving innovation in AR rather than being limited to solitary national initiatives, which is crucial for accelerating technological breakthroughs and guaranteeing their broad use.

b. Analysis Results from Co-Occurrence

Figure 3 highlights important information on the most commonly used keywords in AR and related studies. With solid connections to concepts like "virtual reality," "artificial intelligence," "metaverse," and "machine learning," "augmented reality" emerges as the main node at the core of this research. These links show how AR interacts with a variety of recent technologies and applications, illustrating its multidisciplinary nature. The fact that AR is closely related to industries like tourism, e-learning, mobile applications, and customer involvement suggests that its use extends beyond both consumer and industrial markets. This finding is supported by the accompanying heatmap, which highlights cluster of significant research efforts, especially in relation to AR and related technologies like virtual reality and artificial intelligence. The emergence of new subjects like metaverse suggests that people are becoming more interested in unerstanding how AR may be incorporated into larger digital ecosystems. This keyword clustering indicates that AR is viewed as a game-changing technology that enhances both virtual and real-world experiences by integrating with other domains, hence broadening its applicability across industries.

These results are especially pertinent to the study's goals, which are to investigate how AR might be used to improve spatial presence and teamwork. Researchers are piqued to pay attention to AR's capacity to produce immersive settings that foster teamwork, as seen by the frequent co-occurrence of phrases like virtual reality, spatial presence, and collaboration. The idea that AR may greatly increase team collaboration by increasing spatial awareness and engagement is directly supported by the connection between AR and machine learning, which also suggests that intelligent systems are being developed to better user interaction in virtual settings. These results also add to the study's theoretical framework, including notions of spatial presence and interdisciplinary collaboration. The prominence of terms like virtual reality and spatial presence supports earlier studies that emphasize AR's capacity to create a feeling of "being there" in virtual spaces, which improves teamwork effectiveness (Caroux, 2023). Additionally, the incorporation of concepts like metaverse and artificial intelligence points to a change toward a more complex research environment where AR interacts with cutting-edge technologies. This is in line with interdisciplinary cooperation theory, which highlights how crucial it is to pool knowledge from many disciplines in order to optimize AR's capacity to improve teamwork. Furthermore, the term map's inclusion of more recent ideas like blockchain and metaverse suggests potential avenues for further investigation. By implying that AR's function in teamwork will keep changing as it incorporates with other cutting-edge technologies, these subjects cast doubt on preconceived notions. As AR, the metaverse, and blockchain technologies merge, this could result in more immersive, scalable, and secure collaborative spaces (Marques, Teixeira, *et al.*, 2022).

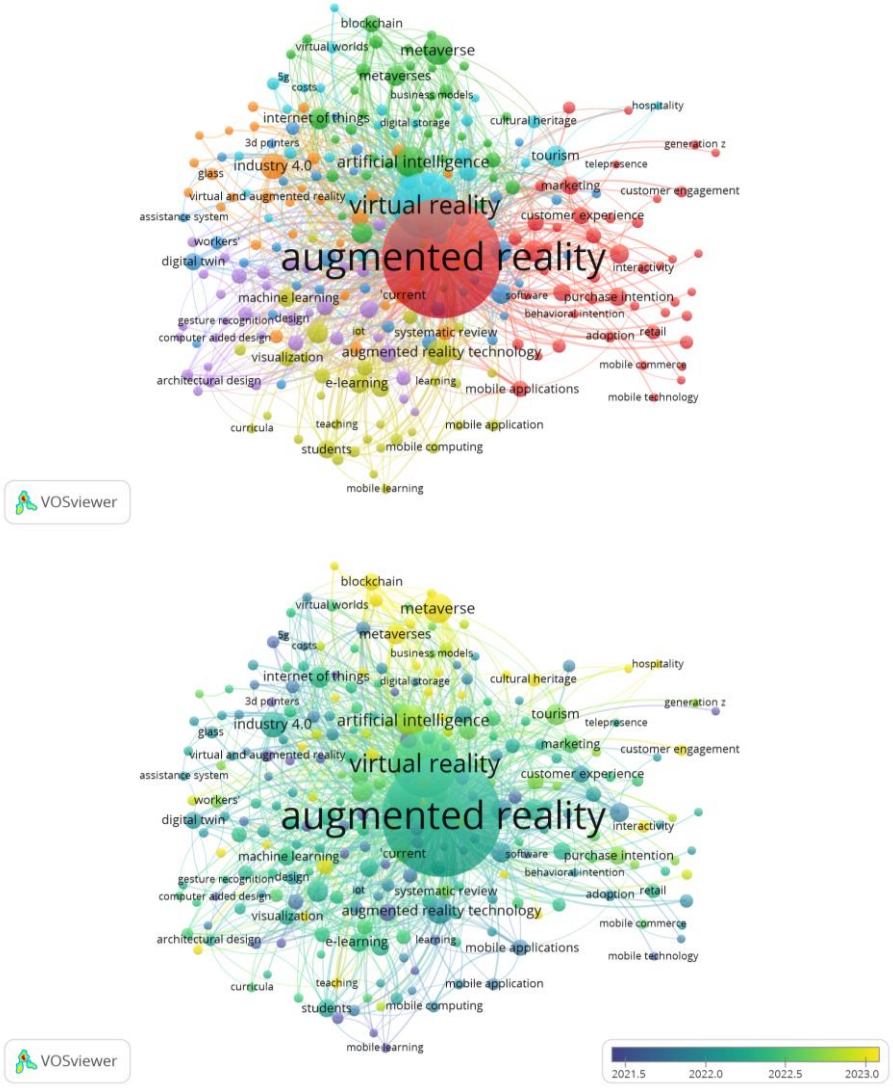


Figure 3. Co-Occurrence Results Keyword Wise. (A) Network Map. (B) Overlay Map.

c. Analysis Results from Co-Citation

A co-citation network comprising important writers in the fields of AR, spatial presence, and teamwork research is shown in Figure 4. Key players like Dimitrios Buhalis, Tom Dieck M.C., and Philipp A. Rauschnabel demonstrate considerable impact in the field. It can be noted that AR research is interdisciplinary, which draws from domains such as virtual reality, artificial intelligence, and collaborative technologies. The heatmap highlights the critical contributions of these writers, especially Rauschnabel and Tom Dieck, whose work is fundamental to expanding our knowledge of AR's capacity to improve spatial presence, which is essential for fostering better teamwork. The existence of several clusters validates the notion that AR research gains from interdisciplinary perspectives and supports the view that AR's potential is multifaceted. These results support the study's goal by illustrating how AR improves spatial presence and creates immersive virtual worlds that fill in geographical gaps in teamwork. Additionally, the clustering supports the hypothesis of multidisciplinary collaboration by demonstrating how combining expertise optimizes AR's performance in collaborative environments.

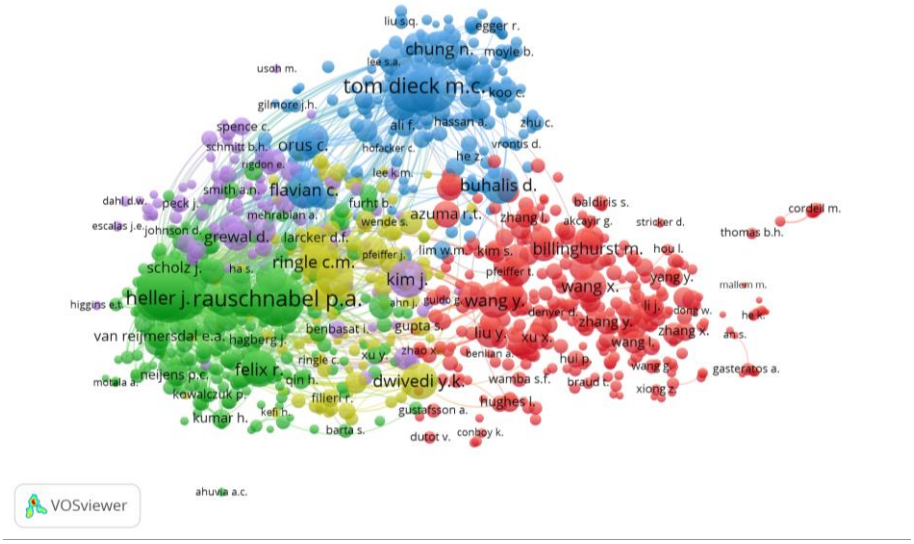


Figure 4. Co-Citation Result Author Wise. (A) Network Map.

Augmented Reality, Spatial Presence, and Team Collaboration

The bibliometric results revealed many insights, specifically topics such as spatial presence that are understudied compared to other topics such as education, artificial intelligence, customer engagement, etc. Furthermore, the term 'team collaboration' does not appear in the co-occurrence analysis, even though that 'spatial presence' is closely linked to 'team collaboration' in the field of management (Chen et al., 2024; Khojasteh & Won, 2021; Oprean et al., 2018). Therefore, articles discussing these topics were selected based on eligibility and accessibility (Figure 6) and reviewed comprehensively (Table 1).

Table 1. Articles on Augmented Reality, Spatial Presence, and Team Collaboration.

Articles	Authors	Summary of Findings
Collaborating remotely: An evaluation of immersive capabilities on spatial experiences and team membership	(Oprean et al., 2018)	Emerging technologies' immersive features enhance the sense of presence in distant environments, and the perception of being in those remote settings strengthens the feeling of belonging within the team.
Re-locations: Augmenting personal and shared workspaces to support remote collaboration in incongruent spaces	(Fink *et al.*, 2022)	Relocating remote users' workspaces brings in aspects of co-located collaboration, such as spatial awareness and social presence.
Exploration of exocentric perspective interfaces for virtual reality collaborative tasks	(Chen *et al.*, 2024)	Exocentric perspective interfaces significantly enhanced task performance, usability, social presence, and overall user experience, while also minimizing virtual reality sickness.

A vision for contextualized evaluation of remote collaboration supported by AR	(Marques, Silva, Teixeira, *et al.*, 2022)	The vision enabled by AR offers enhanced insights, leading to a more thorough understanding of events and a more comprehensive characterization of the work effort.
Introducing a video-based strategy for theorizing social presence emergence in 3D virtual environments	(Kohonen-Aho & Alin, 2015)	Social presence emerges in virtual teams that operate in 3D virtual environments.
Immersive gathering: insights into virtual workplace meetings	(Held *et al.*, 2024)	Extended reality and AR offer significant advantages for remote business meetings, as participants experience enhanced interaction, a stronger sense of togetherness, and a smoother conversational flow; facilitating nonverbal communication, enabling more natural interactions, and closely resembling face-to-face meetings.
Online site visits using virtual collaborative spaces: A plan-reading activity on a digital building site	(Sun *et al.*, 2022)	Virtual collaborative site visits provide distinct opportunities for conveying the spatiotemporal contexts of locations online, serving as an effective remote alternative for learning.
Exploring sex differences in collaborative virtual environments for participation equality and user experience	(Yang *et al.*, 2024)	User experience, empathy, and perceived equality are critical for successful team collaboration in both virtual and augmented settings. Technology must facilitate equitable participation to enhance collaborative outcomes.
Augmented Reality Visualization of Autonomous Mobile Robot Change Detection in Uninstrumented Environments	(Reardon *et al.*, 2024)	AR visualizations improve spatial presence and team collaboration in change detection tasks, emphasizing the role of visual representation in enhancing understanding and collaboration across various settings.
Employees' training experience in a metaverse environment? Feedback analysis using structural topic modeling	(Saeed et al., 2024)	The integration of real-time collaboration, enhanced practicality, alignment with technology training, real-time feedback analytics, and customizable learning environments underscores the significant potential of the metaverse to transform training and development functions within human resource management.
Emerging immersive communication systems: overview, taxonomy, and good practices for QoE assessment	(Pérez *et al.*, 2022)	AR technology influences Face, Visit, Meet, and Move which strongly relate to spatial presence, team collaboration, and immersive communication systems.
Social benefits of living in the metaverse: The relationships	(Oh *et al.*, 2023)	AR enhances spatial presence in the metaverse, which significantly predicts supportive interactions among

among social presence, supportive interaction, social self-efficacy, and feelings of loneliness		young users, thereby fostering social self-efficacy and reducing feelings of loneliness.

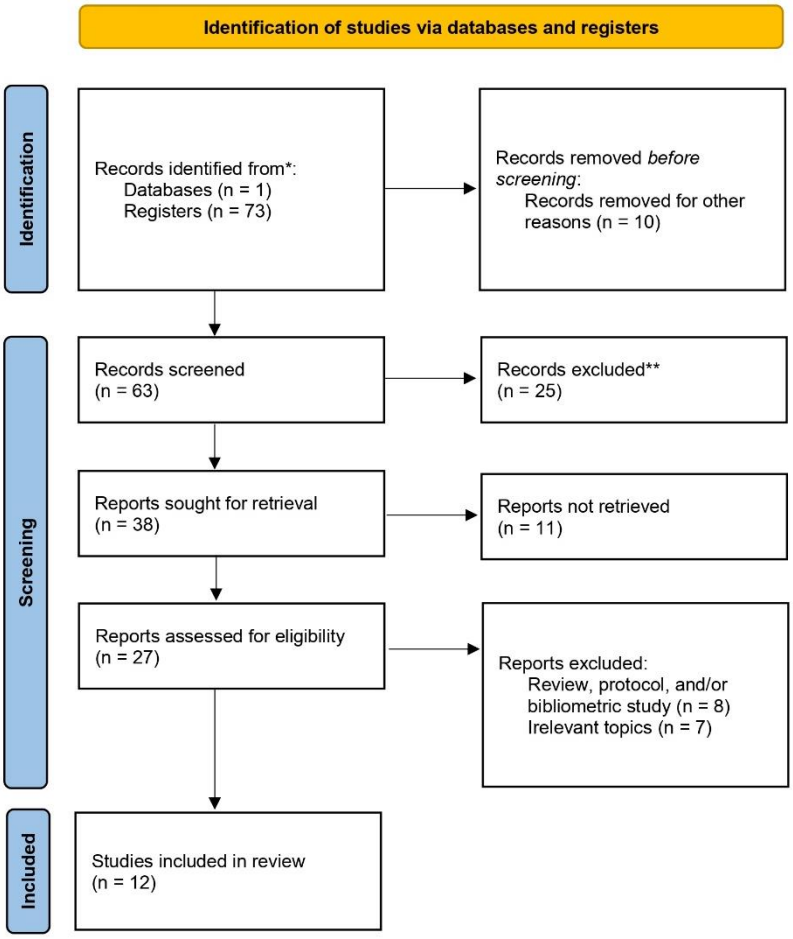


Figure 6. Articles Selection Flow Diagram based on PRISMA 2020.

AR is becoming more widely acknowledged as a game-changing tool that improves teamwork, especially in remote and hybrid work environments. AR enhances task performance, promotes harmonious teamwork, and allows real-time contact by magnifying spatial and social presence. This study of the research addresses issues like possible future applications by synthesizing data on AR's effects on spatial presence, social dynamics, and cooperation efficiency.

1. Augmented Reality and Spatial Presence

To recap, spatial presence is an important component of AR experiences, showcasinig the feeling of "being there" in a distant or virtual setting. AR improves users' interaction with virtual elements in actual places by fusing digital and physical aspects, which strengthens the sense of presence. Oprean et al. (2018) emphasize how AR improves co-presence, or the sense of being with other people, as well as self-location, or the sense of being physically there. These components are essential for productive remote collaboration, encouraging team engagement and closeness in spite of geographic distance.

Fink *et al.* (2022) examined virtual workspaces with AR assistance, observing that through shared spatial awareness, these settings strongly promote a sense of co-location. In remote

teams, gesture-based referencing and spatial cues are crucial for preserving smooth coordination and communication. Marques, Silva, Teixeira, *et al.* (2022) went one step further and highlighted how AR may improve situational awareness by using geographic data, which boost spatial understanding when performing works like virtual site visits. The "togetherness" that is present in video conferencing is not entirely replicated by AR-based annotation tools, despite the fact that they increase work engagement. This suggests that video sharing and AR tools should be integrated to increase spatial presence.

Reardon *et al.* (2024) examined how AR visualizations enhance spatial presence and teamwork, especially in change detection tasks, in order to add to this conversation. Their research showed that the kind of data visualization used affects how effective AR is, underscoring the significance of visual representation in promoting comprehension in AR settings. Compared to raw data representations, aggregated visualizations may improve change detection, but dynamic viewpoints and previous training greatly increased participants' capacity to identify changes. Held *et al.* (2024) highlighted social XR on sites such as Meta Horizon Workrooms, pointing out that avatar-based interactions and spatial audio enhanced a feeling of "togetherness." However, the usage of unrealistic avatars made it difficult to sustain genuine connections—something that needs to be improved in order to create more engaging team experiences.

Saeed et al. (2024) further bolster these conclusions by providing examples of how immersive virtual meeting venues in the metaverse improve spatial presence. According to their study, employees collaborate in real time, and when compared to regular video conferencing, spatial awareness improves participation during meetings and results in richer interactions. When paired with AR, the metaverse's immersive qualities offer a huge boost in encouraging productive teamwork. These observations are supported by Pérez's research on immersive communication systems, which groups systems according to essential characteristics including Face (visual communication), Visit (remote presence), Meet (shared immersion), and Move (embodied engagement) (Pérez *et al.*, 2022). The results show that while elements that encourage physical involvement lead to a higher sense of engagement and collaboration, systems that offer real-time immersive views considerably improve spatial presence. This highlights even more how crucial it is to combine AR with immersive communication platforms in order to optimize user experiences and improve teamwork. The connection between user involvement and social presence is further clarified by Oh *et al.* (2023), who investigated how collaborative spaces are affected by the metaverse. According to their research, having more friends in the metaverse is positively connected with social presence, indicating that having a larger social network improves one's feeling of being "there" with other people. Furthermore, spending more time in the metaverse has a favorable impact on how people perceive their social presence, highlighting how crucial user interaction is in virtual environments.

AR successfully mimics social presence, which is the feeling of being connected to others in a virtual environment. Kohonen-Aho & Alin (2015) illustrated how AR settings may mimic real-world social interactions, fostering a sense of community among team members despite their physical distance from one another. By encouraging empathy and understanding among team members, informal microbehaviors like small talk greatly improve social presence. Held *et al.* (2024) discovered that AR enhances the dynamics of in-person meetings by integrating non-verbal clues such as body language and gestures, enhancing the flow of conversations and fortifying the sense of "togetherness." Additionally, this technology promotes more fair team

involvement. Yang *et al.* (2024) demonstrated how AR reduces gender disparities, fostering inclusivity and fostering a more democratic, participatory workplace. Their research on remote collaboration user experiences emphasized the importance of empathy and perceived equality of participation in improving team dynamics. Female participants reported stronger empathy in face-to-face and video settings than in virtual ones, despite the fact that both genders responded equally to media circumstances. This suggests that future AR applications should take empathy-driven collaboration into account. Oh *et al.* (2023) demonstrated that supportive interactions are positively correlated with increased social presence, we may further highlight the significance of social presence in collaborative contexts. Their results show that the impacts of social networks and metaverse time on supportive interactions are largely mediated by social presence. This emphasizes how important it is to foster social presence in AR environments in order to enhance team dynamics and collaborative results.

2. Task Performance and Collaboration Efficiency

It is commonly known that AR can improve task performance and collaboration effectiveness, especially in complicated settings. Chen *et al.* (2024) found that by lowering cognitive burden, enhancing usability, and speeding up job completion times, AR interfaces like World in Miniature (WIM) and 2D Maps performed better than conventional interfaces. These results highlight how crucial intuitive AR interface design is to optimizing teamwork. Reardon *et al.* (2024) Their research on change detection tasks further examined AR's function in real-time decision-making in dynamic, high-stakes situations. They discovered that spatial awareness and teamwork are greatly impacted by the kind of AR visualization that is employed. According to their research, dynamic viewpoints combined with clear instructions greatly increase work performance, while aggregated visuals boost change recognition. The practical implementation of these results in a warehouse environment highlights how crucial visualization accuracy is to poor teamwork. Additionally, Saeed et al. (2024) highlight AR's usefulness in corporate environments. AR's ability to improve team performance is demonstrated by the metaverse's integration of real-time feedback analytics, which improves workflows and promotes collaborative learning experiences.

3. Training and Development through Augmented Reality

AR has a lot of possibilities for training and growth beyond direct communication. Saeed et al. (2024) looked studied AR-based training programs in metaverse settings and found that fast feedback, configurable situations, and real-time cooperation enhanced team learning results. AR simulations' immersive qualities improve skill transfer to real-world situations by bridging the gap between academic understanding and practical application. Sun *et al.* (2022) backed up these conclusions by demonstrating how AR-based virtual site visits enhanced spatial awareness and team communication, highlighting the significance of AR in training situations. These findings imply that AR can improve training effectiveness and teamwork by establishing immersive, lifelike settings that encourage participation and education.

4. Augmented Reality, Social Interaction, and Self-Efficacy

AR affects social dynamics in virtual settings in addition to practical collaboration, especially in promoting self-efficacy and social connections. Oh *et al.* (2023) Examine the connections among AR, social presence, and metaverse social self-efficacy. According to their research, AR can improve supportive connections and lessen loneliness, giving users a sense of community

and boosting their social confidence. This illustrates how AR technologies have wider social benefits, especially when it comes to virtual teamwork.

With AR as a key element of future collaboration settings, emerging technologies keep improving immersive communication solutions. Pérez *et al.* (2022) describe an immersive communication taxonomy that highlights how AR affects spatial presence, teamwork, and quality of experience. These technologies have the potential to change how people collaborate in a variety of fields, especially as AR develops to create more dynamic and realistic virtual environments. Kohonen-Aho & Alin (2015) examined in more detail how nonverbal clues and casual encounters in AR settings enhance social presence. These virtual and real-world micro-behaviors are essential to comprehending how AR promotes social engagement and interaction, which in turn promotes productive cooperation. The encouraging exchanges demonstrated how AR might increase social self-efficacy, promoting teamwork and active engagement.

5. CONCLUSION AND RECOMMENDATIONS

This study demonstrates how AR possibly revolutionize teamwork by improving spatial presence. On the other hand, solid co-authorship among researchers and keyword networks are revealed by the bibliometric study, stating the importance of interdisciplinary approach in perfecting AR applications. AR successfully bridges geographic distances, encouraging participation and efficiency in distant work settings, especially in the COVID-19 pandemic's spike in digital usage. Despite complex barriers and challenges, the development of AR technology points to a promising future. All things considered, AR strengthens social and spatial presence, boosts task performance, and encourages fair participation, making it an essential tool for future collaborative environments.

These results have considerable implications for companies looking to improve teamwork in a world that is becoming more digital and remote day by day. Businesses may enhance spatial presence and increase communication and cooperation among geographically dispersed teams by utilizing AR technologies to create immersive virtual places. In the end, this increased sensation of presence can promote innovation and improve project results by facilitating more efficient idea-sharing and problem-solving. Furthermore, optimizing work performance and collaboration efficiency requires user-friendly augmented reality interfaces that put usability first and reduce cognitive burden. Organizations should consider combining AR with video-sharing features to fill in social presence gaps and provide a more immersive experience that mimics in-person interactions and improves team cohesion.

Additionally, creating a stimulating and productive learning environment requires the thoughtful incorporation of AR into training and development programs. Organizations should invest in AR-based training programs that provide real-time feedback and configurable scenarios, therefore producing benefits such as improved skill transfer from virtual to real-world applications. Organizations have to provide their employees with the skills and resources they need to flourish in a digital world by fostering a culture that values technical innovation and interdisciplinary cooperation. In addition to increasing operational effectiveness, these calculated expenditures will establish businesses as leaders in their fields, prepared to take advantage of AR's full potential for long-term expansion and improved teamwork.

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CHAPTER 5
Moving Towards a Successful Cooperative: The Significance of Cold Chain Logistics

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ABSTRACT

A successful small-scale fishermen (SSF) cooperative can be realized through a range of elements, including population habits and culture, the development of cold chain logistics infrastructure, government support, fisherman participation, and so on. However, the first stage is to comprehend and identify the crucial success factor (CSF) that will support and prioritize the implementation of its plan. The paper intends to address these concerns. This study discusses the eight CSFs that are to blame for the poor performance of SSF cooperatives in Central Bangka Regency. Using the DEMATEL approach and expert knowledge, a prominence and causal connection diagram was created to investigate the influencing strength of CSFs. The top three major CSFs (causes) influencing the establishment of SSF cooperatives are cold chain logistics infrastructure (CSF6), access to the fish market (CSF2), and funding (CSF8). The study is conducted on an island in Indonesia; however it might be expanded to a worldwide environment by selecting appropriate CSFs. The study's conclusions may be used by local governments and cooperative management to improve the feasibility of cold chain logistics using renewable energy by adopting relevant solutions, which is the study's significant contribution.
Keywords: Cold Chain Logistics, Cooperative, SSF, Bangka Island, DEMATEL.

Introduction

Indonesia has extensive fishing reserves with promising prospects for developing the fishing industry and boosting fishermen's socioeconomic conditions (Glaser et al., 2015). Because Indonesia is an archipelagic country, its economy depends heavily on its fisheries for employment, food security, and export earnings (Warren & Steenbergen, 2021). It is unfortunate that the fishing industry only makes up 3% of the country's GDP, despite having abundant fisheries resources and high demand of fisheries goods. The industry in Indonesia remains strikingly dominated by small-scale fishers (SSF), with 90–95% of fish production estimated to come from this sector (Ariansyach, 2017), provide employment for over 7.3 million people and yield government revenue (Adhuri et al., 2016). In the sustainable development agenda, SSF plays a significant role in different aspects such as hunger, economic growth, poverty, women's empowerment, and livelihood (Mukherjee et al., 2022).

In Indonesia, the majority of fishermen (those who make their living from fishing) come from low-income families (Ariansyach, 2017). SSF are one of the most vulnerable members of society. Significant problems include illiteracy and unemployment, as well as inadequate knowledge about current fishing technologies (Suwandi & Harlyandra, 2024). This deadly loop is complicated by the absence of adequate infrastructure, both in terms of logistics and funds. As a result, fishermen are being exploited by intermediaries or middle men who function as money lenders, dealers, and subcontractors (Ahsan et al., 2016; Mutiar et al., 2018; Suwandi & Harlyandra, 2024).

Despite possessing great potential in aquaculture, the SSF could not exploit it to significantly improve their socioeconomic condition owing to the absence of organizational assistance such as infrastructure and funding (Kalikoski et al., 2019; Stacey et al., 2021). According to FAO (2002), about 5.8 million fishermen belong below the poverty line. So-called fisheries cooperatives and SSF guidelines should focus on achieving zero hunger and poverty (Halim et al., 2020; Wilson, 2017) According to SSF guidelines, local fishermen can form organizations (known as co-operatives) to eliminate poverty (Nakamura et al., 2021; Said & Chuenpagdee, 2019; Stacey et al., 2019).

Poverty in coastal communities is caused by several factors. Mutiar et al. (2018) states that rural coastal communities rely on fisheries and agriculture. These are vulnerable to coastal erosion, storms and other dangers. This causes income instability in coastal regions. Coastal towns also rely on the sea, which necessitates sustainable economic growth. (Mutiar et al., 2018). The people thinks that there is still fortune in the ocean. This assumption creates challenges in managing the community's economy (Suwandi & Harlyandra, 2024).

Another problem is that there is a period when fishermen cannot do fishing activities and that is when the fishermen's lean season begins. Many fishing families do for alternative sources of finance to fulfil their needs is to borrow from middlemen. The relationship between middlemen and fishermen itself is quite easy to find due to several factors such as the absence of other alternative sources of finance and limited market access. Middlemen often build prolonged social relationships to ensure fishermen's attachment to them (Suwandi & Harlyandra, 2024). This makes it more difficult for fishermen to improve their welfare. For this reason, a solution is needed to break the marketing chain to middlemen by developing fishermen by forming fishermen groups. There are 12 cooperatives in central Bangka, including

one in Sungai Selan, however, it has not improved the population's welfare because they only operate as savings and loans.

Central Bangka Regency is one of the districts in the Bangka Islands with a lot of potential for fish resources (Kurniawan et al., 2019). The district covers an area of ± 227,911.00 acres, surrounded by 12 small islands with a coastline length of ± 195 km. most of the population (3200) works as SSF. The fisheries sector in Central Bangka Regency benefits from the presence of fish landing bases (PPI), and the establishment of the Indonesian Fishermen Cooperative (KONELI) in 2018. The cooperative has 120 members, all of whom engage in capture fishing. The cooperative does not get fish supplies, as these are purchased by businesses with cargo ships in the middle of the ocean. The majority of fish caught by fishermen is sold to traders, who then transport the catch to cargo ships. Rather than making the time-consuming journey to the PPI and the cooperative, fishermen sell to traders on collection vessels, allowing them to stay at sea longer. The average time spent at sea is 20 days, with 5 days spent on land. Intermediaries sell some fish on the street before reaching the PPI, located in the river's interior at a long distance, about 3 hours from the coast (Figure 1). Consequently, the fish supply from the KONELI cooperative to the traditional market has been constrained, leading to an increase in prices. Until recently, the fishermen's cooperative lacked the necessary infrastructure to collect fish from fishermen at sea, including a vessel with a cooling system. Furthermore, the cooperative lacks a cold storage facility to maintain the freshness of fish upon its arrival. Additionally, cooperatives and fishermen lack the marketing tools and infrastructure needed to make it easier to sell fish that have been captured.

Figure 1 Map of river traveled by fisherman to small fish landing base

Fisheries co-operatives in coastal regions have many chances to promote the well-being of their inhabitants, but they also deal with several challenges, such as lack of funding and knowledge about business, technological advancement in supply chain and logistics, and market access. Below is the table that summarizes the opportunities and challenges faced by fisheries cooperative stakeholders in small islands (Table 1)

Table 1. The Cooperative Opportunities and Challenges

Stakeholder	Opportunities	Challenges
Members and cooperative board	Fulfilling demands and response to changing nature	Lack of skills and knowledge
	Increase profit and Growth	Lack of funding, Lack of access to market
Business Partner	High demand for processed seafood	Traditional cold chain and logistics
Government	Advancement in Technology	Funding and assistance
Academics	Globalisation & Growth	Assistance to cooperative management

Although the cooperative has been in operation for six years, it lacks effective management practices for receiving and marketing fish and substantial funding for expansion and development. Research findings from the University of Bangka Belitung (UBB), show that all fishermen depend on middlemen because it is the middlemen who buy the catch and help with financial difficulties.

There's been a lot of interest in the academic community in fishery cooperatives could help fishermen produce green products, improve the decentralized operation of SSF (Zhao et al., 2019), influence of fishery cooperative support on safety factors (Chai & Hu, 2021), leverage their competitive advantage by integrating competent management abilities with multinational corporations (Sanyal et al., 2023), and climate change effects on aquaculture production (Maulu et al., 2021). Despite the enormous public and scientific discussion around the development of fishery cooperatives, there is presently an insufficient amount of research available on how cold chain and logistics (CCL) might benefit fishing cooperative growth and increase local and regional incomes. To facilitate the growth of fishery cooperative, it is essential to identify the critical success factors (CSFs) associated with the development of cooperative-based organizations.

Furthermore, it is necessary to implement suitable cold chain logistics (CCL) and assess the implications of doing so. The study focuses on building CSFs and prioritizing the implementation in fishery cooperatives, selecting the best practices for managing cold chain logistics, and fostering cooperatives' resilience to food shortages while increasing village and regional revenue. Therefore, our research questions are as follows:

RQ1 What are the critical success factors (CSF) in developing fisheries cooperative

RQ2 In what order should these CSFs be implemented?

RQ3 What is the best practice for managing cold chain logistics in small islands?

This study investigates CSFs and the implementation of cold chain logistics practice in a fishery cooperative organization incorporating multi-disciplinary fields such as supply chain, operations management, social innovation, and fisheries science. The next section reviews relevant literature and is followed by a discussion of the multiple cases and methods. Finally, the results and discussion are presented before the conclusion section.

Theoretical Framework

Fishery Cooperative

According to (Gupta et al., 2020) cooperative entrepreneurs can improve society by making people and businesses more accountable and responsive to their local communities However, the objectives achieved are not solely profit-oriented but also have a positive social impact. According to (Clamp & Alhamis, 2010), cooperative development is often a self-help economic activity that benefits cooperative members. The difference between a cooperative entrepreneur and a civic entrepreneur is that the former is accountable to the community, while the latter is accountable to their members and the strategic requirements of their businesses (Clamp & Alhamis, 2010). Cooperative goals are for the benefit of their members, including improving welfare, providing needs, helping capital, and developing businesses.

According to (Saz-Gil et al., 2021) cooperatives are considered to be important forces behind the formation of social capital. However, to interact with other market participants to see potential chances for social value and bring change in communities, it needs to acquire certain competencies (Ridwan, 2022). Proactive human capital and the ability to innovate have been shown to contribute to societal value (Broadstock et al., 2020). Social entrepreneurs take part in continuous innovation processes, adapt, learn, take bold actions to obtain resources, and are deeply committed to their community. They also face constant obstacles such as an ongoing shortage of resources, a lack of experience in certain markets, greater uncertainty and risk, low credibility, and limited external relations (Arango-Botero & Arias, 2020). Given that the majority of fisherman are from low-income households, there is an evident need for access to financial resources, technical skills, and organizational capacity to allow enhanced catch fisheries, storage, processing, and marketing (Lynch et al., 2016).

According to Indonesia Law Number 12 of 1967, Indonesian cooperatives are people's economic organizations with a social character and consist of people, and economic arrangements as joint efforts based on the principle of kinship. The cooperative is expected to become a driver for the growth of entrepreneurs and cooperation so that the facilitation of marketing or promotion, legal protection, and incentives for the development of the business networks. There has been a significant growth of social enterprises in the form of cooperatives in Indonesia in the past 5 years, expanding into new sectors such as the creative industries, agriculture, and fisheries. Despite the benefits that cooperatives could bring, the number of cooperatives in Indonesia has decreased by 2% since 2016 (Katadata, 2022). Particularly, the number of SSF cooperatives is only 1.052 or only 1% out of the total 98.638 total cooperative organization in Indonesia.

Cold Chain Logistics of Sea Products

Cold chain logistics (CCL) are specialized supply chains and logistics that utilize distribution centers and cold stores. Products that are sensitive to temperature, such as vaccines or perishable food, need to be delivered and stored via cold chains. These goods may lose their quality and safety if they are not kept at the proper temperatures, which might have disastrous effects on the final consumer (Sebatjane, 2024). An integrative and effective cold chain system must keep perishable food at the proper temperature level from collection to ultimate consumption (Han et al., 2021). Reducing food loss and waste requires maintaining CCL integrity, which calls for the coordinated development of numerous linkages as well as

transparency and data exchange among important businesses and stakeholders (Han et al., 2021). Cold Chain Logistics (CCL) of sea products is a complete approach to the preservation, quality, and safety of perishable sea products, assuring timely and effective delivery to consumers (Fig.1).

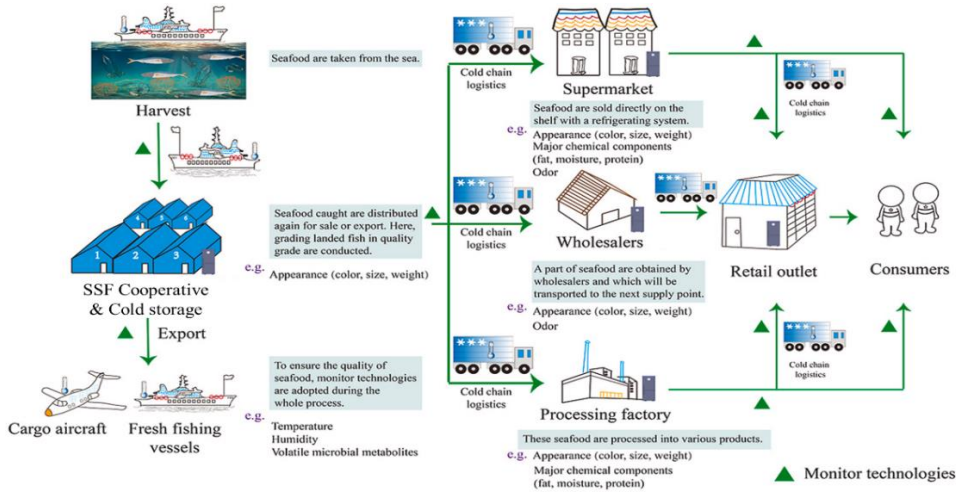

Figure 1. Flow chart of ideal condition delivering seafood, from catch to consumer

This complete solution includes strategic infrastructure deployment, stakeholder integration, and enhancements to value and performance across the cold chain (Mustafa et al., 2024). Refrigerated carriers, cold storage, portable cold containers, and traceability measuring instruments are all part of a traditional CCL of marine goods infrastructure Cold chain logistics (CCL) is crucial for raising fishermen's incomes as well as reducing losses and promoting the revival of cooperatives in small islands (Han et al., 2021).To facilitate market access and boost income for fishermen and the region, it is essential to implement infrastructure such as cold storage and feature-enriched information technology (Han et al., 2021). However, cold chain logistics are a significant source of carbon emissions since they require a lot of energy to operate and most distribution vehicles run on fossil fuels. Cold chain operations in small islands can pose a significant threat to the environment regarding carbon monoxide emissions, discarded packaging materials scrapped toxic materials, and other forms of industrial pollution (Al-Refaie et al., 2020).

Critical Success Factors (CSFs)

CSFs are the elements or conditions that are necessary for a business or organization to achieve a favorable outcome. According to Rad et al. (2022), CSFs are the factors that will propel businesses toward quicker expansion, better performance, and more efficiency. The supply chain and sustainability projects are attracting researchers to apply CSF-based methodologies to help businesses make important decisions and reduce risks (Gardas et al., 2017). One such recent study is by (Prakash et al., 2022). which identifies the CSFs for cold chains using the DEMATEL approach. Ansari et al. (2019) used CSFs for performance outcomes of supply chain remanufacturing.

Methods

This study has chosen a semi-structured interview with SSF and the head of the regional planning agency as well as the fisheries department in Central Bangka regency, as it offers flexibility in probing to investigate the performance of existing supply chain networks and cooperatives. Figure 2 shows the research procedure.

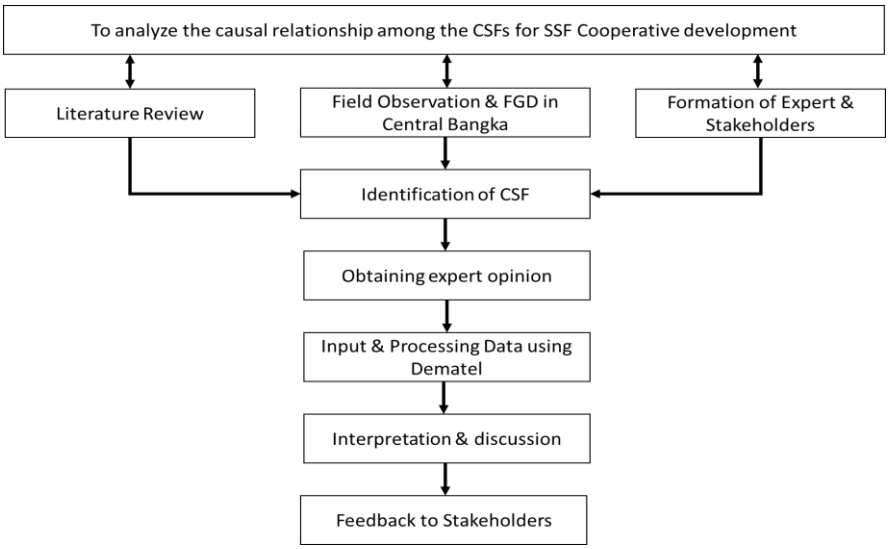

Figure 2. Research Procedure

Further, CSFs in cold chain logistics was identified through an interview, FGD literature review. A list of CSFs can be seen in Table 2.

Table 2. CSF for SSF Cooperative

	Factors	Sub factors	Related literature
CSF1	Habit and belief	Borrow money from middlemen, mindset 'there is still fortune for tomorrow'	(Suwandi & Harlyandra, 2024), (Mutiar et al., 2018), (Ridwan, 2022)
CSF2	Access to fish market	GPS, thermal sensor, RFID	(Han et al., 2021), (Prakash et al., 2022), (Al-Refaie et al., 2020)
CSF3	SSF Knowledge and skill	Business operation and operate the fishing gear	(Kurniawan, 2018), (Han et al., 2021), (Ma et al., 2024)
CSF4	SSF involvement in cooperative organization	Trust on cooperative management, creativity	(Kalikoski et al., 2019), (Ma et al., 2024)
CSF5	Green practice	The use of solar panel instead of fuel gas, plastics recycling	(Ma et al., 2024), (Sebatjane, 2024), (Stacey et al., 2021)
CSF6	Cold chain logistics infrastructure	Vessel equipped with cooling hatches, Cold Storage, Refrigerated truck	(Mustafa et al., 2024), (Goedhals-Gerber & Khumalo, 2020), (Vishvakarma et al., 2022)
CSF7	Triple helix involvement /support	Academician, business and government active involvement	(Said & Chuenpagdee, 2019), (Basbeth et al., 2024),
CSF8	Funding for cooperative organization	Government, Industry, Academician	(Stacey et al., 2021), (Arifandy et al., 2020),

To answer the RQ1 and RQ2 questions what are the CSF and in what order should these CSFs be implemented, feedback was gathered from fisheries experts on a certain scale (1-5) to identify the link between CSFs, and to create the direct connection matrix. To that purpose, we recruited a well-known specialist in fisheries. Three experts were approached, and engaged in the exercise. To analyze the data, this study used the Decision-Making Trial and Evaluation Laboratory approach (DEMATEL). This method finds its use in the causal analysis to allow investigators to distinguish the involved criteria in a system into cause-and-effect groups. This method allows decision-makers to identify and prioritize the criteria/causes of a more significant impact (Zhou et al., 2011).

According to (Sivakumar et al., 2018), DEMATEL provides information on multiple directional connections, whereas AHP has only unidirectional connection and several separate matrices required for amalgamation (Sivakumar et al., 2018). DEMATEL has been followed or used by many investigators from various areas as it helps in studying the fundamental relationships (Gölcük & Baykasoğlu, 2016). It helps in classifying dominant reasons and provides a precise decision-making ability.

The following section presents the application of DEMATEL to prioritize the CSFs the using the data from three experts. The basic steps of DEMATEL are as follows:

Step 1.

Generate the initial relationship matrix for each expert using Equation (1). The matrix is a pair-wise comparison generated using the scale (0 – No influence, 1 – Very low influence, 2 – Low influence, 3 – Medium influence, 4 – High influence, 5 – Very high influence), to depict the interrelationship of factors. The matrix Ak is obtained from each expert where each element aijk represents the influence of barrier i over j and n indicates the total number of factors considered. Furthermore, the diagonal of pairwise comparison matrix has a value of 0 which means factors do not have influence on itself. In total, k matrices are obtained where k represents the number of experts.

$$A_k = \begin{bmatrix} 0 & a_{12k} & a_{13k} & \dots & a_{1(n-1)k} & a_{1nk} \\ a_{21k} & 0 & a_{23k} & \dots & a_{2(n-1)k} & a_{2nk} \\ \dots & \dots & \dots & \dots & \dots & \dots \\ \dots & \dots & \dots & \dots & \dots & \dots \\ a_{(n-1)1k} & a_{(n-1)2k} & a_{(n-1)3k} & \dots & 0 & a_{(n-1)nk} \\ a_{n1k} & a_{n2k} & a_{n3k} & \dots & a_{n(n-1)k} & 0 \end{bmatrix} \quad (1)$$

Step 2. The overall direct relationship matrix A is obtained as follows. This step integrates the opinion of all experts (Tabel 3)

$$A = \frac{[a_{ij}]}{k} \quad (2)$$

where A is the overall direct relation matrix; aij the average of aijk of all experts; and k total number of experts

Step 3. The normalized overall direct-relation matrix B is calculated as follows:

$$B = [b_{ij}]_{n\times n} = \frac{A}{\max\limits_{1\leqslant i\leqslant n}\sum_{j=1}^{n} a_{ij}}, \text{ where } 0 \leqslant b_{ij} \leqslant 1 \quad (3)$$

B normalized overall direct relation matrix (Tabel 4)

Step 4. The total relation matrix D is obtained using the following relation:

$$D = [D_{ij}]_{n\times n} = B[I-B]^{-1} \quad (4)$$

where I denoted as an identity matrix and D total relation matrix (Tabel 5)

Step 5. The sum of the rows and the sum of columns are calculated as given below and are separately denoted as R and C within the total-relation matrix D:

$$R = [r_{ij}]_{nx1} = \left[\sum_{j=1}^{n} d_{ij}\right]_{nx1} \quad (5)$$

$$C = [c_{ij}]_{1xn} = \left[\sum_{i=1}^{n} d_{ij}\right]_{1xn1} \quad (6)$$

The rank and cause/effect were computed using Equations (5) and (6) show in Table 6 and Figure 3. The process includes steps to helps in computing C, R, R+C and R - C values. R represents direct and indirect effect of the factor on other factors; C represents direct and indirect effects on the factor by other factors; R+C represents the importance of the factor; R-C is the effect of factor. If R-C is positive, the factor affects other factors, otherwise the factor is impacted by other factors.

To answer RQ3, we investigate supply chain practices in Central Bangka Regency. It requires looking into the networks involved in the processes from catching, landing, and distribution.

Result and Discussion

Causal interrelationship of CSF is developed with the application. Table 3 show the average score direct relationship and Table 4 shows normalized direct relationship, Table 5 show the total relationship matrix, and Table 6 show the degree of prominence and causal effect interaction.

Table 3 Average score direct relationship

	CSF1	CSF2	CSF3	CSF4	CSF5	CSF6	CSF7	CSF8	Sum
CSF1	0	3	1.66	2	2.66	1.33	2	2.66	15.33
CSF2	2	0	3.33	2.33	3	3	3.33	3.33	20.33
CSF3	2.33	2.33	0	2.66	2.33	3.66	3	2	18.33
CSF4	2	2	3.33	0	2	2	3	2.66	17
CSF5	2	2.66	2.33	2.66	0	2.33	2.66	2	16.66
CSF6	2	2	1.66	2.33	2.33	0	3	2.33	15.66
CSF7	3.33	2.33	2	2	2.66	1.66	0	2.33	16.33
CSF8	3	2	3	2	3	2.33	2.66	0	19

Table 4. Normalized direct relationship

	CSF1	CSF2	CSF3	CSF4	CSF5	CSF6	CSF7	CSF8
CSF1	0	0.148	0.082	0.098	0.131	0.066	0.098	0.131
CSF2	0.098	0	0.164	0.115	0.148	0.148	0.164	0.164

CSF3	0.115	0.115	0	0.131	0.115	0.180	0.148	0.098
CSF4	0.098	0.098	0.164	0	0.098	0.098	0.148	0.131
CSF5	0.098	0.131	0.115	0.131	0	0.114	0.131	0.098
CSF6	0.984	0.098	0.082	0.115	0.115	0	0.148	0.115
CSF7	0.164	0.115	0.098	0.098	0.131	0.082	0	0.115
CSF8	0.148	0.098	0.147	0.148	0.148	0.115	0.131	0

Table 5. Matrix D

	CSF1	CSF2	CSF3	CSF4	CSF5	CSF6	CSF7	CSF8	R
CSF1	-0,067	0.121	0.028	0.055	0.092	0.107	0.048	0.094	0.385
CSF2	-0.058	-0.058	0.119	0.058	0.098	0.098	0.109	0.128	0.495
CSF3	-0.077	0.083	-0.061	0.093	0.072	0.153	0.098	0.053	0.414
CSF4	0.002	0.057	0.130	-0.059	0.048	0.047	0.102	0.095	0.422
CSF5	-0.016	0.102	0.069	0.095	-0.057	0.073	0.082	0.052	0.399
CSF6	1.044	-0.056	0.005	0.023	-0.015	-0.065	0.063	-0.015	0.984
CSF7	0.101	0.073	0.052	0.053	0.089	0.037	-0.064	0.072	0.412
CSF8	0.044	0.047	0.104	0.105	0.104	0.065	0.073	-0.064	0.479
C	0.972	0.037	0.447	0.423	0.434	0.424	0.509	0.415	

Tabel 6. Degree of prominence and causal effect

	R+C	Rank	R-C	Cause/Effect
CSF1	1.357	2	-0.586	Effect
CSF2	0.865	5	0.126	Cause
CSF3	0.861	6	-0.033	Effect
CSF4	0.844	7	-0.001	Effect
CSF5	0.833	8	-0.034	Effect
CSF6	1.408	1	0.560	Cause
CSF7	0.922	3	-0.096	Effect
CSF8	0.895	4	0.0641	Cause

As can be seen in Table 6, CSF 6 obtained the highest R+C score (1.408) and R-C 0.56. Further, the plot of R=C and R-C was created (Fig.2)

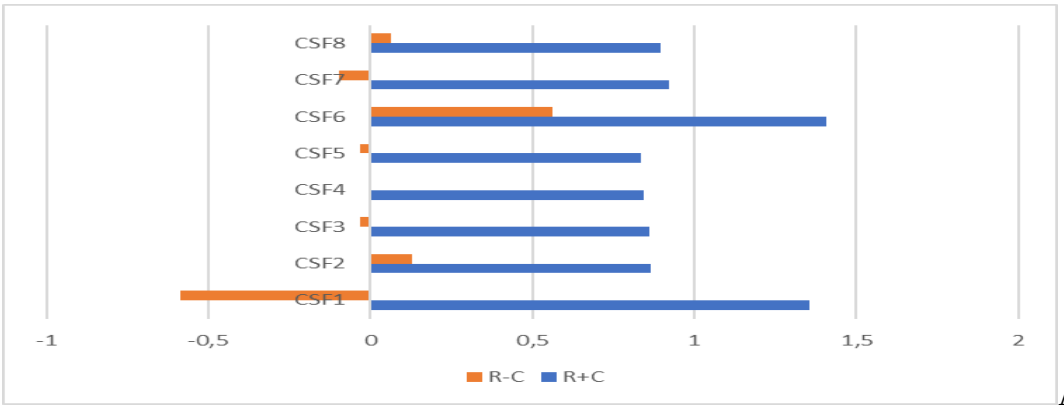

Figure 2. Graph represent the value of R+C and R-C

From Figure 2, it can be seen that the significant CSFs (cause) which affect the development of SSF cooperative. These are: cold chain logistics infrastructure (CSF6), access to fish market (CSF2), Funding (CSF8).

Discussion

The aim of this study is to identify the CSFs of SFF cooperative, interrelationships among those and prioritize CSFs to help in implementation in SFF cooperative in Bangka Island. The data for pairwise comparison matrix is obtained from the designated expert team and DEMATEL method is applied to understand the causal interrelationships. The result presented in Table 6 shows the prominence and cause/effect of all the CSF. CSF are ranked, on the basis of the prominence R+ C score as follows: CSF6, CSF2, CSF8 (Fig. 2). Among the CSF, high score of cold chain logistics infrastructure (CSF6), access to market (CSF2), and funding (CSF7) are the top CSF based on the R+C and R-C. The cold chain logistics infrastructure related factors are ranked highest among all other CSFs.

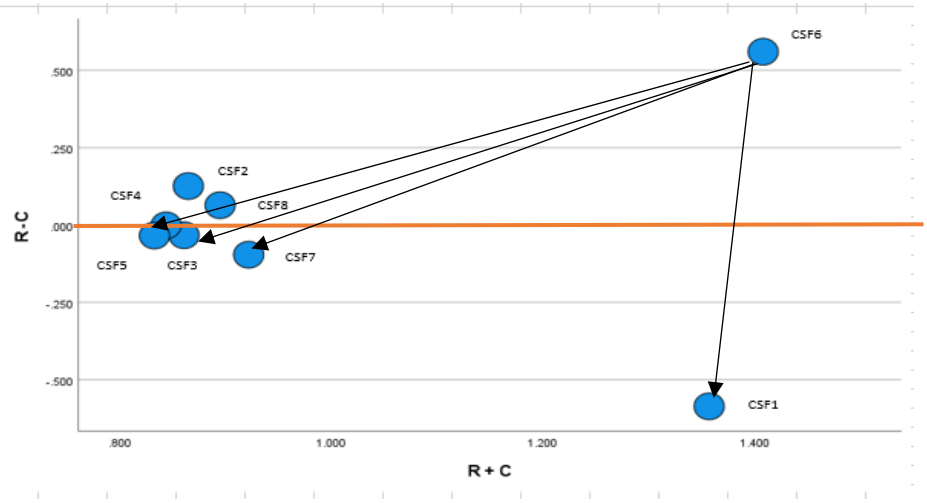

Figure 3. Prominence and causal effect diagram

As can be seen in Fig.3 cold chain logistics infrastructure (CSF6), access to market (CSF2), and funding (CSF7) are the cause of other CSFs (above zero). CSF6 affect CSF1, CSF3, CSF5, CSF7. Further discussion is presented in the section below.

1) Infrastructure for the cold chain logistics (CCL) (CSF6)

The tools used by SSF in Central Bangka regency are relatively simple. The vessels used are small, < 1 GT with length = 7 m and width = 1.2 m. The vessels used by fishermen, size <5GT, and the fishing gear used by fishermen in Sungai Selan Sub-district are floating bagan, crab nets, shrimp nets, and millennium nets. The catches are quite varied ranging from various types of small pelagic fish, crabs, squid and shrimp. The fishermen's operational range is 3-5 miles from the coastline. The fishermen's catches are usually sold directly to collectors will then be stored in their cold storage facility, and sold directly to consumers and restaurants.SSF dont have their own ship equipped with cooling hatch, cold storage and cooling truck for the delivery to consumer. A considerable quantity of fish, which have not been sold, are discarded due to their deterioration.

Cold chain logistics is of prime importance for SSF and fishery industry in Bangka Island. Fresh seafood products contain nutrients favorable to microbial growth, which renders these foods more sensitive to temperature fluctuations and more vulnerable to defects. Han et al. (2021) discussed breaks in the cold chain may accelerate the rate of food spoilage and even make subsequent application of the cold chain irrelevant. The deterioration of sea products is

generally caused by the growth of bacteria and/or mold, which increases the risk of foodborne diseases in humans and thus presents a risk for public health (Han et al., 2021). Goedhals-Gerber and Khumalo (2020) discussed the importance of the cold chain logistics especially in developing countries food losses occur mainly in the post-harvest circulation stage and are due to inappropriate postharvest handling, poor cold chain, transport, resulting from a lack of logistics infrastructure and of knowledge of how to handle perishables.
Therefore, appropriate and uninterrupted temperature control all the way to the market is important to maintain food safety, reduce waste, and improve the overall economic performance of the cold chain.

To keep fresh produce cold and monitor the temperature, systems have been developed to check the environment using IoT technology. The use of RFID and GPS systems is advantageous for efficient cold chains (Vishvakarma et al., 2022). Intelligent models are developed based on RFID, internet of things and wireless sensors for effective cold chains, which help the manager to keep track of the nodes (Sharma et al., 2020). Below is the alternatives of CCL to be implemented in SSF cooperative in Sungai Selan district: the portable cold storage and cold storage both with renewable energy (Fig.4)

Figure 4. CCL for rural area in Central Bangka Regency

2) Access to market (CSF2)

By establishing a cooperative that is equipped with adequate cold chain logistics (CCL), farmers can gain access to markets that have previously been controlled by middlemen. The cooperative will assume responsibility for market pricing, sales and distribution. Cooperatives link farmers to the market and help implement supply-side in fishery and rural area (Ma et al., 2024). They have also helped members sell more products at a better price (Ma et al., 2024). Cooperatives help integrate small-scale fishermen (SSF) with modern cold chain logistics system (CSF3).

SSF cooperative organization should be formed to improve the welfare of all group members (Kurniawan, 2018). They have also helped members sell more products at a better price (Ma et al., 2024). Cooperatives also share technology and information, helping to spread and use new farming techniques and giving SSF advice on markets and fishing (CSF2). Cooperatives can solve fishermen's problems such as the absence of cooling boxes, ice cubes and adequate fishing equipment (Basbeth et al., 2024). Fisheries cooperatives aim to help their members and the coastal community to build a stronger economy. It will also help the local economy to grow faster, especially in coastal areas where many fishermen work (Arifandy et al., 2020). To further empower the cooperative, its role must be expanded by providing

maximum services, such as managing the storage of caught fish, distributing and marketing, and offering more opportunities.

3) Funding for Cooperative organization

The formation of a cooperative is a decision to build a strategic alliance or intercompany cooperation among fishermen in order to achieve a competitive advantage (Mulyati & Afrinata, 2018); Cooperatives should work with other financial institutions to improve management and attract partners who can invest capital for mutual benefit. Financial sector institutions play a vital role in Bangka island for several decades. However, the banking sector has not yet engaged with small businesses, including street vendors and traders in traditional markets. The government (CSF8) supports their development with money and policies (Fig 3).

Conclusion and Recommendation

This study addresses the use of DEMATEL in the investigation of CSFs that impact the growth of SSF cooperatives in Bangka Island's Central Bangka Regency. Eight CSFs were examined in light of the expert talks and literature review. The DEMATEL framework is used to build a cause/effect diagram and get a knowledge of the linkages between the two.

The important CSFs (cause) that influence the growth of SSF cooperatives are identified in this study. CSF6 is cold chain logistics infrastructure; CSF2 is fish market access; and CSF8 is cooperative institution finance. Understanding the most important success factor, the least important CSFs, and the relationships between the CSFs will be made easier by the results. The managers' knowledge of the CSFs will increase as a result of this comprehension. Better knowledge and awareness of these elements will assist practicing engineers in eliminating the crucial success factor for the adoption of cooperative methods.

Implications and limitations of the study

The CSF implementation could include providing vessels with solar-powered cooling hatches, solar-powered cold storage in fish landing bases, and helping cooperatives to perform better by funding and assisting the use of the CCL technology. It could also involve advancing technology in Sungai Selan district on Bangka Island. The study’s findings can be used to extend social exchange and behavioral adoption theory and conceptualize the best practices of seafood products from the lens of a cold supply chain. It is anticipated that the cooperative will have a vessel of sufficient size equipped with a cooling hatch from the government or state-owned company (BUMN), allowing fishermen to sell directly to the cooperative that have a cold storage.

These are the limitations of the current study: (a) the sample data was gathered to finalize the CSFs from a single nation; (b) the DEMATEL approach was the only method used to analyze the sample data; and there is a chance that a framework could be proposed with the CSFs to offer a means of implementation. However, a comparative analysis of the operational characteristics of similar entities in other developed countries such as Malaysia, Philippines, and India indicate a high degree of alignment. It can therefore be concluded that the findings can be widely generalized and extended to SMEs in other developing countries. Furthermore, the demonstrated methodology allows new findings to be identified by including suitable CSF

for other organizations in developed countries. The results of this study will provide local government with a roadmap to improve their SSF Cooperative practices.

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CHAPTER 6

Sustainability in Action: Squid Attractor and Solar Portable Chillers in Central Bangka Regency

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ABSTRACT

Central Bangka Regency is one of the squid fishing centers in Bangka Belitung Province, located in Bangka Island. The Bangka squid is an important major source of income for the fisheries sector in this region. However, the squid fishery in Bangka waters has several problems. These include damage to coral reefs and seagrass beds, which are important for squids due to tin mining on land and at sea. To comply with fisheries regulations integrated solutions are required. These solutions must be adopted from the upstream (conservation of the squid habitats) to the downstream (improve cold chain logistics. This study investigates the effectiveness of squid attractors using cylindrical drums and the effectiveness of a solar-powered portable cooler to be implemented to help small-scale fishermen (SSF) promote sustainable management and utilization of fish resources. This study used various methods from identifying community needs to designing, producing, testing, mentoring, and disseminating technology. The study also employed a survey using questionnaires to get the community and partners' perceptions. The construction of the attractors and the presence of squid eggs were directly observed underwater. The fishing efficiency using the squid attractor was found to be 60-70%, solar coolers work well in the sun and keep food cool for 5-6 hours.
Keywords: Attractors, Artificial Squid Nest, Stock Enrichment, Sustainability, Solar Portable Chiller.

Introduction

Indonesia is the world's second-largest exporter of squid (Loligo sp) which is currently not cultivated; hence production is heavily reliant on natural catch results. Bangka squid (Loligochinensis. Gray) is a high-value squid and an export commodity. This species of squid is becoming increasingly difficult to get in Indonesian waters, demonstrating that the ecological squid (Loligosp) is diminishing. Central Bangka Regency is one of the squid fishing centers in Bangka Belitung Province, located within the Republic of Indonesia Fisheries Management Area (WPP-NRI) 711. The Bangka squid is an important major source of income for the fisheries sector in this region. The marine waters around Central Bangka are where the squid spawn, nest and grow up. A 2022 study by SEAFDEC-UNEP-GEF-INDONESIA says the squid fishery in Bangka waters has several problems. These include damage to coral reefs and seagrass beds, which are important for squids due to tin mining on land and at sea. Squids are vulnerable to changes in the marine environment, so they need specific environments. (Nurlaili et al., 2023). Tin mining harms the habitats of squid in coastal waters. The intensity of squid fishing is increasing, which is leading to a reduction in the number of squid caught each year. The main challenges are the unavailability of fishing grounds, the ineffectiveness of fishing methods, the poor quality of squid, and the lack of suitable squid processing equipment. The government is being urged to assist in resolving the issues facing squid fishery in Central Bangka

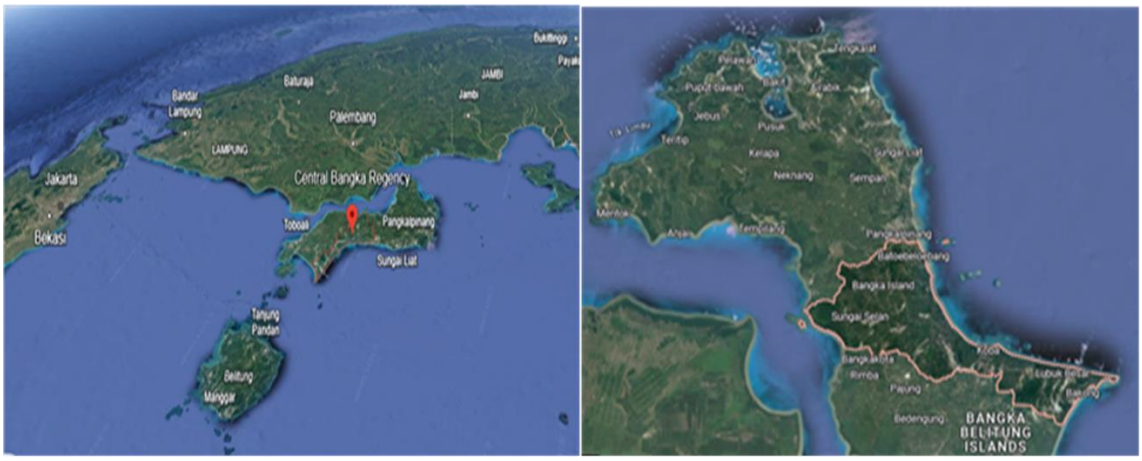

Figure 1. The location of Central Bangka Regency

To comply with Minister of Marine Affairs and Fisheries Regulation No. 50 of 2017, integrated solutions are required. These solutions must be adopted from the upstream (conservation of the squid habitats) to the downstream (improve cold chain logistics). According to Baskoro and Santoso (2022), squid habitat conservation can be done by installing attractors, and improving the freshness of squid, can be done by implementing cold chain logistics.

Squid attractors are created by mimicking the behavior of squids, which spawn and attach their eggs to the substrate (hanging items or marine plants). Artificial squid nests offer benefits such as a) creating a new ecosystem, b) serving as a collection tool, becoming a nursery and raising area, c) which can eventually evolving into a prospective fishing area, and d) simple technological transfer to the community in the context of strengthening coastal communities. Baskoro et al. (2019) found that attractors collected squid 2 times more than outside. Artificial

squid nests are an excellent concept since they can assist squid survival while also providing fishermen with a fresh supply of fish. They are also inexpensive and easy to produce.

As a result, it is important to execute and evaluate the performance of squid attractors on Bangka Island and test solar-powered portable coolers. Our research questions are as follows:

RQ1. What is the effectiveness of the squid attractor?
RQ2. What is the effectiveness of a portable cooler?

This study investigates the effectiveness of squid attractors using cylindrical drums and the effectiveness of a solar-powered portable cooler.

Theoretical Framework

Squid Attractor

Squid spawning and growth habitats are disappearing quickly in coastal areas for several reasons, including fishing, pollution, and land use. If squid resources are going to be exploited, it's got to be with comprehensive fishing regulations and robust aquaculture operations. (Saputra et al., 2024). That starts with the spawning phase (hatchery) and ends with releasing juveniles into the wild. These measures enhance the sustainability of squid resources by increasing stock levels (Aras & Hasmawati, 2016; Baskoro & Santoso, 2022).

Squid attractors have been tested and are effective in the real world. Squid attractor planting has been established in East Lombok (M. S. Baskoro & Santoso, 2022), Pelabuhan Ratu, Bangka Belitung, and Kaimana (Basbeth et al., 2024) province. Squid that will release their eggs concentrated in an area is expected to be potential areas for stock enrichment and integrated fisheries development (Jamal, 2017). Squid attractors are the most effective approach for providing different places for essential habitats in the squid life cycle (Baskoro et al., 2019).

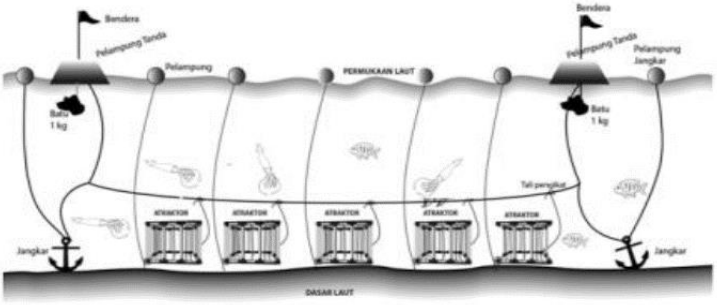

Figure 2. Squid attractor configuration

Baskoro et al. (2019) suggest that attractors can be made from suitable materials, including drums or bamboo, There are three significant factors to be considered for an ideal location for attractors: a) water quality, b) water depth, and c) habitat appropriateness. Another key factor to consider is the water depth (4-6 meters), drums spaced (5-8 meters apart), the sea area's temperature, and water mass (Baskoro & Santoso, 2022). The effectiveness of squid attractors was calculated by the formula of (Baskoro et al., 2019):

$$EA = \frac{\text{The number of atractor blocks overgrown with squid eggs}}{\int \text{Total block attractor}} x100\%$$

Note: EA≥60 %= very effective; 60%>EA≥30 %= effective; and EA<30 %= less effective

Solar Powered Portable Cooler

Fishing vessels in Central Bangka Regency, Indonesia, are mostly small-scale vessels with less than 10 GT. Small-size fishing vessels use ice blocks as a chilling medium during fish handling in the sea (Yudhi et al., 2024). Improper use of ice blocks will cause spoilage to the catch. Therefore, improvement in technology is needed. Because of the tiny size of the fleet, many fishermen place their catches on the ship's deck. This will make the quality of small fishermen's catches decrease (Rudiro et al., 2019). Portable coolers are designed to accommodate tiny fishing boats. They use a refrigeration system with components like refrigerators, condensers, and evaporators (Setiawan et al., 2018). Khairi (2023) indicates that portable coolers can reduce costs by 90% compared to conventional coolers, with a per-kg cost of fish spent at a rate of only Rp127.00 / kg of catch. Furthermore, the cooler requires a total power requirement in no-load conditions of 374.94 Wh and a 4 kg load condition of 651.93 Wh. The time required to cool the portable cooler to a temperature of 5°C is 34 minutes to 76 minutes with a 4 kg cooling load.

Methods

This research was conducted in Central Bangka Regency from Aug to November 2024. This study used various methods from identifying community needs to designing, producing, testing, mentoring, and disseminating technology. The study also employed a survey using questionnaires to get the community and partners' perceptions. The data collected is primary data obtained from the experimental process of operating the squid attractor. The data collected will include the placement of the squid attractors and the associations of fish in the area where the squid attractors are placed.

Squid attractor installation

A site survey was conducted at sea using a fishing boat to determine where to install squid nests. A team of divers observed the bottom substrate and water currents. The result is a map of the location suitable for installing a squid attractor. A total of 20 units of squid attractors were successfully installed into the sea according to the designated location points.: Point 1 (-2.463107; 106.506868), Point 2 (-2.444917; 106.505487), Point 3 (-2.46395; 106.49533), Point 4 (-2.488213; 106.492247).

Figure 3. Activities to prepare and install the artificial squid nest

The technical preparations required for squid attractors are typically a) squid attractors creation, and b) selecting installation sites. Drum design and rope attachment are critical to ensuring that the gear generates low-lighting conditions at the bottom of the ocean. Following the site survey, assistance is given in creating squid attractors. To help in squid nest construction, 25 fishermen were invited and split off into 5 smaller groups. The activity's goal is to improve fishermen's ability to create squid nests without assistance.

Installation of squid nests was conducted the day after the mentoring. A total of 20 attractors were installed at 4 locations at a depth of 2 m - 5 m., with a distance of 5 m (Fig. 3). The activity aims to place the attractors that are positioned on the water's bottom and remain in place, to achieve an increase in the catch per unit (CPUE) value, namely the presence of squid eggs attached to squid attractor with a success indicator that the percentage value of the effectiveness of egg attachment is above 60% (Santoso & Baskoro, 2016). The effectiveness of the squid attractor was calculated using equations that have been used in previous studies. The level of effectiveness of the squid attractor (EA) can be determined by referring to the formula. The effectiveness of squid attractors can be analyzed by calculating the success rate of squid attractors in collecting squid eggs. To evaluate the perception of the installment of squid attractors, questionnaires were distributed, and 34 responses were received.

Solar-powered Portable Cooler Installation

The cooler has two portable chilling units that are suitable for small-scale fishermen (SSF) to utilize to cool fish to 5 degrees Celsius Installation of portable coolers customized to the demands of fishermen, which may be done on fishing boats or land (Fig. 4).

Figure 4. Preparation on the making of solar portable chiller

The fishermen received assistance while managing their catches. The coaching process will focus on the fishermen's ability to use cooling aids.

Result and Discussion

Squid attractor effectiveness

Loligo chinensis squid eggs have adhered to up to 70% of the employed drum squid attractors one month following their installation (Fig. 5). Each used drum squid attractor has an average of 234 egg capsules, with each capsule holding 4-5 individual squid candidates, so that one unit of used drum squid may yield between 930 and 1,170 individual squid candidates.

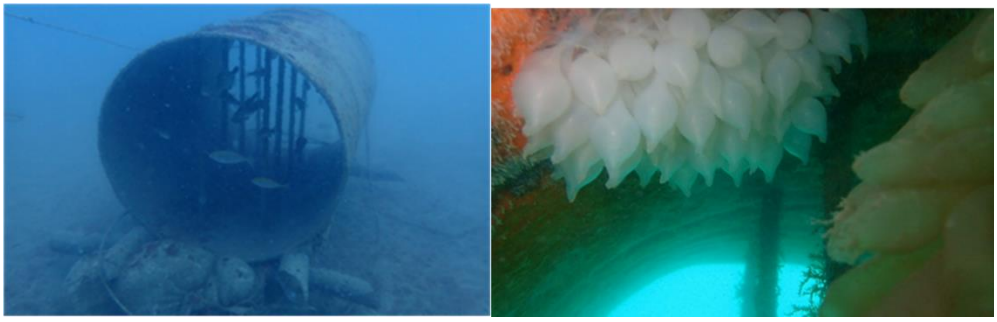

Figure 5. Squid nest and squid eggs

The squid attractors that have been erected in four sites for two to six weeks have an average effectiveness (EA) of 70% (very effective). The questionnaire results showed that 97.1% of fishermen's perception agreed that squid nests can help facilitate fishing, enrich fishery resource stocks, and increase fishermen's income. Efforts must be made to enrich fish stocks to ensure a profitable and sustainable business.

Solar-powered Portable Cooler Effectiveness

Identification of needs carried out on September 2, 2024 continued by the assembly of the portable cooler on September 10-17, 2024. The next step is to test the portable cooler which was conducted on September 18, 2024 To socialize the portable cooler, an induction of portable coolers was held at Kulur Ilir Village Hall, Central Bangka on September 19, 2024. The goal of this initiative is to collect information on cooler demands from fishermen and provide a success indicator in the form of a list of requirements for producing portable coolers. The existence of renewable energy-based portable coolers that can be used by fishermen has been provided.

Discussion

The attractors plastered with squid eggs were erected at depths of 3m and 5m, whereas those positioned at 7m deep were very marginally linked to squid eggs This is expected based on the behavior of squid that dwell and travel in deep seas when they spawn and search for a safe spot to attach their eggs to the bottom in shallow coastal or inshore waters. The availability of solar portable cooler which has efficiency in the process of transportation, and installation, tested for temperature comfort, and successfully performed for 5 – 6 hours, is necessary for fishermen.

Conclusion and Recommendation

All actions based on the key accomplishment goals were completed successfully. The active participation of the proposed team, partners, students, and the community resulted in optimal synergy in each activity execution. The consequences of the actions have begun to be felt by numerous parties, particularly fishermen who are beneficiaries. The existence of squid eggs linked to artificial squid nests demonstrates that this invention has the potential to help preserve squid resources while also increasing fishermen's output.

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CHAPTER 7

Social Capital, Cooperative, and Poverty Alleviation in Central Bangka, Indonesia

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ABSTRACT

The study examines cooperatives' role, contribution, and challenges for poverty reduction among small-scale fisher communities using the social capital approach. Social capital is being used as a popular and low-cost strategy for poverty reduction among marginalized communities. The study mainly covers the reflections of the small-scale fishers as experiential narratives on the role of cooperatives. The structures and processes of cooperatives in addressing the vulnerability and socio-economic development of small-scale fishers have been analyzed in the study. The study conducted in fishing villages of Central Bangka, Indonesia, predominantly used a quantitative paradigm to understand how social capital influences cooperatives' functioning to help small-scale fishermen develop coping mechanisms as a poverty reduction strategy. This review examines how social cooperatives mediate the relationship between social capital and poverty alleviation Belonging to social networks makes communities more resilient and less vulnerable, which strengthens cooperation and reduces poverty. This study contributes to the literature on poverty alleviation and social capital by providing a conceptual model. Researchers and policymakers can use this study's findings to address poverty eradication. These results can be used for future research. Further research can test the hypotheses and the study's model using a quantitative approach.
Keywords: Poverty Alleviation, Social Capital, Cooperative Growth, Small-Scale Fishermen, Bangka Island.

Introduction

"And the sea will grant each man new hope …"
–Christopher Columbus

Central Bangka is a district in the Bangka Belitung Islands Province with potential for development. Coastal communities rely heavily on fisheries resources, for their economic well-being. These circumstances have a major effect on the socioeconomic sustainability of coastal towns, as the sustainability of these communities is greatly influenced by the marine and coastal environment (Justiani & Manullang, 2019).

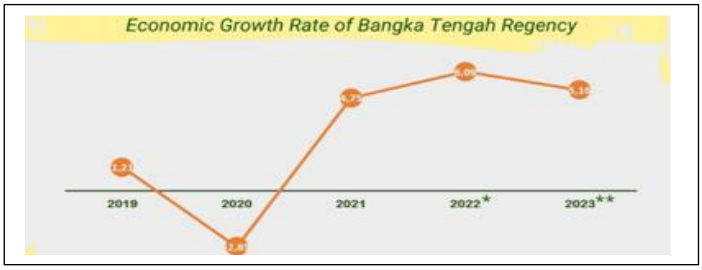

Figure 1. Economic Growth Rate of Bangka Tengah Regency

As can be seen in Fig. 1 economic growth tend to be steady in the last three years. In 2023, the number of individuals classified as poor in the Central Bangka Regency was 10,580, representing a slight increase from the 10,030 individuals identified as poor in 2022. The poverty index, which was 0.64 in 2023, exhibited minimal change from the previous year's value of 0.63.

The most critical aspect of the lives of fishermen in coastal regions is the seasonal variability in fishing activities at sea. The fishing season is particularly susceptible to fluctuations, with the famine season posing a significant challenge for fishermen in terms of income generation due to the inherent difficulties in fishing (Alfatah, 2022) During the fishing season, a source of revenue is generated through the sale of catch to middlemen or intermediaries. These parties serve two distinct roles: as fish traders and as providers of loans. Fishermen are required to sell their fish at a significantly reduced price to repay the loan. Poverty among fishermen is influenced by a variety of variables, one of which is the extremely long chain of fisheries commerce. This circumstance causes fishermen to experience injustice because intermediaries who contribute capital decrease prices (Bidayani et al., 2023)

Intermediaries in the fishery supply chain treat SSF unfairly. They cause delays, increase costs, and lack control (Anania et al., 2020). Intermediaries buy products cheaply from SSF and sell them at a higher price to customers. The chain makes less money for SSF and costs more for customers. SSF often can't transport their products from the farm to the market because it's too far and they don't have cooling facilities (Msuya, 2020; Nade, 2021). Cold storage unavailability, lack of knowledge, and financial problems also stop SSF from selling its products directly to customers.

A lack of market intelligence hampers the ability to manage a successful supply chain. (Otieno, 2020; Rwekaza & Anania, 2021). This situation creates a difficult financial strain for fishermen, who are forced to make this choice to continue their livelihood. Additionally, they

are often required to pay considerable interest rates (Merdeka, 2023). Improving the supply chain could help improve fish trading, as these factors contribute to high consumer prices (Bidayani et al., 2023)

According to (Merdeka, 2023) over the past three decades, there has been no significant change in the lives of fishing communities in Central Bangka Regency. The concentration of poverty in Indonesia is primarily situated in rural regions, in contrast to urban areas (Faiziah et al., 2024). The best organizations to improve the socio-economic standing of Indonesia's small-scale fishing villages are acknowledged to be fishermen's cooperatives (Ajija et al., 2019; Mahanayak & Panigrahi, 2021; Yunani & Supriadi, 2020). According to (Mnguni & Mdiniso, 2024; Solomon, 2023) cooperatives have been instrumental in addressing the core vulnerabilities faced by small-scale fishermen (SSF), and investment in social capital can reduce household poverty status (Adepoju, 2019; Sanyal et al., 2023). Many have been written by previous researchers however, the extent to which social capital could have both direct and indirect impacts on poverty alleviation through cooperation has been overlooked by previous studies.

In light of the first Sustainable Development Goal (SDG), to eradicate poverty this article explores the potential of integrating social capital, and cooperation as a sustainable approach to alleviating rural poverty. This study examines the potential contribution of social capital, and the mediating role of small-scale fishermen cooperatives in reducing poverty in Central Bangka, Indonesia.

Theoretical Framework

Poverty

Poverty as a multidimensional concept is defined as the deprivation of human dignity, opportunities, and satisfaction across a range of areas, including food, nutrition, power, education, health, traffic, and income (Alkire & Foster, 2011; Arndt et al., 2016; Chen & Ravallion, 2008; Si et al., 2015). Singer (2006) posits that those experiencing poverty lack the requisite competence, confidence, power, and opportunities to enhance their lives and improve their circumstances. Those living in poverty often have restricted access to employment opportunities, and consequently, a lack of hope for a more secure future.

As Chen and Ravallion (2008) posit, poverty can be classified in terms of absolute and relative contexts. Absolute poverty can be conceptualized as a situation where there is an insufficient fulfillment of both tangible and intangible needs that contribute towards the overall well-being of humanity. Nevertheless, relative poverty occurs when an individual deems their present circumstances to be inferior in comparison to those of others within the same or disparate social contexts.In light of the aforementioned considerations, the World Bank offers a quantitative monetary metric for measuring poverty. Under this measure, individuals whose income is below USD$2.0 per day are classified as poor, while those whose income is below US$1.25 per day are considered to be experiencing extreme poverty.

Nonetheless, Singer (2006) advocated for a qualitative approach to categorize poverty into the following six subcategories: food poverty, nutrition poverty, power poverty, education poverty, health poverty, and traffic poverty. Despite global efforts to combat poverty, particularly in developing countries, the number of people experiencing rural poverty is rising.

In light of this, academic research on strategies for reducing rural poverty, particularly in developing countries, has received significant attention in recent decades (Alkire et al., 2017).

Poverty alleviation demands collective action on the part of a multiplicity of stakeholders and a process of political, social, and institutional reform. In other words, poverty alleviation for fishermen is not only a matter of sustainable resources; it is also a matter of policy and governance within the community (Sugi, 2023).

Social Capital and Poverty

The idea of social capital is now accepted in economic research. There's evidence that social capital can help economic growth and performance (Hanushek & Woessmann, 2020; Muringani et al., 2021). Some studies in developing countries have shown that social capital can play an important role in reducing poverty. For example (Woldehanna et al., 2022), found that social capital was an important factor affecting household income in rural Ethiopia. Similarly, (Wu et al., 2023) found that social capital affected welfare by reducing the chances of households in China falling into poverty. Nguyen et al. (2020) found that entrepreneurial orientation assists in transforming social capital into organizational performance

The findings indicated that households with elevated levels of social capital exhibited an increase in household expenditure in rural Tanzania. (Ababio et al., 2023) demonstrated that social capital and its constituent dimensions have contributed to a reduction in poverty levels in rural Ghana. Kehinde et al. (2021) in Southwestern Nigeria and (Yunus, 2021) in Aceh, Indonesia illustrated that social capital, as measured by group participation, has a positive effect on household expenditure (which serves as a proxy for poverty).

Social capital is the way people interact with each other and the institutions around them. It's about the relationships, solidarity, empathy, and goodwill people experience in their everyday lives. Scholars agree that social capital refers to networks, shared norms, and values that help people to work together. (Adepoju, 2019; Nasution et al., 2015). Kansanga et al. (2020) say that social capital is made up of the resources created in human networks that help society achieve its goals. We can see if social capital exists by looking at how people are organised. This includes trust, rules, and connections. The World Bank has identified six ways it can be measured: Groups and networks, Trust and solidarity, Collective actions and cooperation, Information and communication, Social cohesion and inclusion, and Empowerment and political action

Social capital is a key driver of economic growth and human well-being, as it facilitates the smooth functioning of social and economic systems (Adepoju, 2019). Social capital is a potential source of economic growth and economic performance (Pham & Mukhopadhaya, 2022). Social capital creates a synergy that benefits all members of a community (Nosratabadi et al., 2020). Some studies in developing countries showed the important role of social capital in reducing poverty (Kehinde et al., 2021; Osei & Zhuang, 2020; Pham & Mukhopadhaya, 2022). social capital was an important factor affecting household income in rural Terengganu (Abdul-Hakim et al., 2010; Mauzud, 2022). (Nosratabadi et al., 2020) found that social capital food accessibility and reduces hunger. Conversely, sharing knowledge and information among community members expands the farms' markets and increases community resilience to unexpected shocks.

SSF Cooperative and Poverty

It could be argued that the concept of 'cooperatives' has been a part of civilization for a very long time (Groves, 1985). An additional perspective is that it is when people work together in pursuit of a common goal and rely on one another to meet their social and economic needs (Ghebremichael, 2013). Fishery co-operatives are collective enterprises owned and managed by a group of fishermen who work together to improve their livelihoods (Freeman & Svels, 2022).

Cooperatives began with the idea that people can achieve more together than alone (Mnguni & Mdiniso, 2024). Gava et al. (2021) highlighted the cooperative contribution to the elevation of rural poverty in Bosnia and Herzegovina. Cooperatives can help smallholder farmers by providing marketing, input distribution, credit, and information. This can help fishermen adopt new technologies more quickly (Manda et al., 2020). Conversely, cooperatives have also the potential to act as powerful economic engines, both in terms of job creation and poverty alleviation, within rural communities (Candemir et al., 2021; Dash et al., 2020; Gava et al., 2021; Shen et al., 2022).

The establishment of cooperatives can help fisherman improve their skills and learn about technology, marketing, and management. Cooperatives can be established to solve financial problems and improve productivity, processing, storage, and transportation capabilities (Sanyal et al., 2023). As Anbumani (2007) suggests, the establishment of cooperatives can help to meet a variety of social, cultural, and economic needs through the medium of their democratic and self-governing associations. Cooperatives can play an important role in supporting economic advancement for marginalized small-scale fishermen.

Given that the majority of fishermen hail from economically disadvantaged backgrounds, it would be beneficial for them to have access to the requisite financial resources, technical expertise, and organizational capabilities to enhance their capture fisheries, stockpiling, handling, and commercialization (Lynch et al., 2016).

Social Capital and SSF Cooperative

Scholars have identified social capital factors as a key contributor to the economic resilience of small-scale fisheries cooperatives. They propose that social aspects can be leveraged as an alternative solution to reduce poverty (Islam et al., 2023). According to (Islam et al., 2023) small-scale fishers in Langkawi Island have better access to social capital. Among the social capital factors, relationships, networks, and community participation were the main things that helped fishers' households do well. However, according to Nasution et al. (2015), the relationship between poverty and social capital in rural Indonesia has two-way causalities. Participating in social activities, or having social capital, has been shown to increase spending and lower poverty. It also discovered that people's social capital is influenced by their spending. This implies a connection between poverty and social capital in rural regions.

The study by Kustepeli et al. (2023) discovered that agricultural development cooperatives play a big part in building and strengthening social capital, and supporting the livelihoods of rural households.

Hypothesis Development

Based on this research model, the following hypotheses are developed:

Hypothesis 1 (HI):	Social capital has a positive effect on poverty alleviation
Hypothesis 2 (H2)	SSF Cooperative has a positive effect on poverty alleviation
Hypothesis 3 (H3):	SSF cooperative mediates the relationship between social capital and poverty alleviation

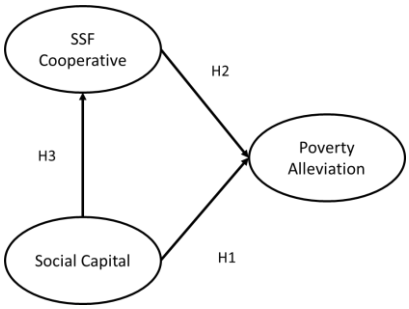

Figure 2. Conceptual Model of the Study

Methods

Central Bangka Regency consists of 6 sub-districts, 7 urban villages, and 56 villages. In 2017, the population reached 205,510 people with an area of 2,155.77 km² and a population distribution of 81 people/km² (Figure 3),

Figure 3. Central Bangka Regency

Several households in three districts, Koba, Pangkalan Baru, and Sungai Selan is half of the total district (4500 households). The number of fishery cooperatives in three districts is 5 (20%)

of the total fisheries cooperatives in Central Bangka Regency. Number of households in the three district is approximately 400 households. For this study, it is suggested to use a proportionate sampling method, to collect a sample which is about 40 households in these three districts. This study examined how social capital and cooperation can help to reduce poverty. A path analysis with a structural equation model to be used to examine the relationship between variables.

Conclusion and Recommendation

The concept of social capital, and the resulting synergy from the interactions of community members, has been demonstrated to enhance poverty alleviation and the growth of cooperatives. This study presents a comprehensive and integrated picture of how social capital affects poverty alleviation and cooperative growth. Its main contribution is to demonstrate how social capital can improve cooperative growth and poverty alleviation. These results also present a basis for future research. Future research can apply a quantitative research methodology to test the hypotheses presented in this study and test this study's conceptual model.

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CHAPTER 8

Rebranding Fishery Cooperative Using a Cooperative Business Model and Digital Marketing

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ABSTRACT

Cooperatives are not as well-known or well-researched as corporate organizations. This is probably because they are owned and controlled by the people who use their services. In practice, there are still many small-scale fishermen cooperatives that have not functioned optimally to improve the welfare of their members. Small-scale fishermen cooperatives still face several obstacles including the lack of mastery of technology and access to information, lack of knowledge about the management of production cooperatives, and marketing the results. So, the purpose of this community service is to socialize and train cooperative management and members in understanding cooperative business models, cooperative management, and digital marketing. At the end of this mentoring activity, the mentoring participants, namely the management and members of small-scale fishermen cooperatives, were able to understand business models and manage and conduct digital marketing. From the post-test results of the mentoring participants, it can be seen that they understand well how to manage cooperatives and digital marketing.
Keywords**:** Cooperative Business Model, Digital Marketing, Small-scale Fishermen, Bangka Tengah, MSME.

Introduction

Indonesia has extensive fishing reserves with promising prospects for developing the fishing industry and boosting fishermen's socioeconomic conditions (Glaser et al., 2015). Central Bangka is a district in the Bangka Belitung Islands Province in Indonesia, with coastal areas found in almost all subdistricts. The fisheries and marine sector in Central Bangka have great potential for regional progress, community welfare, and supporting human life. In 2023, 1,898 households in the Central Bangka District were involved in capturing fisheries. This figure is distributed across all Central Bangka subdistricts, including Koba, Lubuk Besar, Pangkalan Baru, Namang, Sungai Selan, and Simpang Katis. Bangka Island offers a diverse range of economic opportunities across numerous sectors. These include marine capture fisheries, which collectively account for 30,000 tons of fish production, aquaculture, and fish processing, as well as the promotion of tourism.

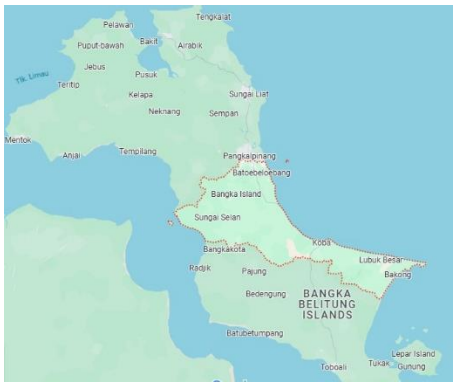

Figure 1. Map of Central Bangka Regency

Despite the considerable magnitude and estimated worth of the blue economy, the situation for fishermen is becoming increasingly concerning year on year. This is due to a combination of factors, including a reduction in fishing grounds, a decline in fish stocks, and contamination of water sources from industrial waste generated by the mining industry. In 2019, the number of individuals classified as poor was 9.80 thousand. By 2023, this figure had increased to 10.58 thousand. The poverty severity index increases from 0.1 in 2019 to 0.12 in 2023 (Fig.1). Furthermore, the open unemployment rate (TPT) percentage in Central Bangka Regency is a cause for concern, reaching 3.88 thousand in 2022. (Januar, 2024)

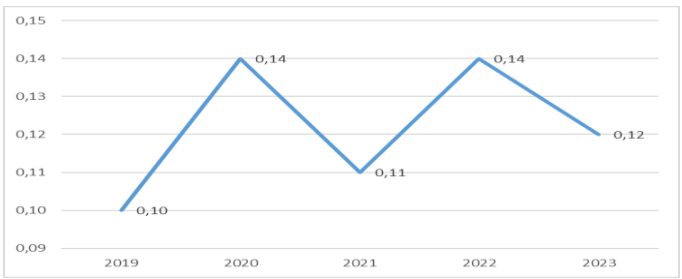

Figure 2. Poverty Severity Index in Central Bangka Regency

The World Bank defined the “Blue Economy” as “the sustainable use of ocean resources for economic growth, social inclusion, and the preservation or improvement of livelihoods while at the same time ensuring environmental sustainability of the oceans and coastal areas” (Bank et al., 2017). The blue economy comprises many sectors, including ocean-based activities like fishing, marine transportation, and tourism. It urged provincial and district governments to implement Blue Economy principles to improve people's welfare and protect the ocean and its resources from destruction (Sari & Rahmayanti, 2022).

Fishery cooperatives are traditional economic entities that play a significant role in supporting fishermen. They facilitate information exchanges, improve communities' negotiating power with market intermediaries, build partnerships, networks, and linkages to other organizations, and foster the sharing of traditional knowledge (Sari & Rahmayanti, 2022). Through service provision and empowerment of small-scale fishers, fishery cooperatives contribute to lifting them out of poverty and building their resilience to climate and market shifts (Sapovadia, 2004). The number of cooperatives in Central Bangka Regency is 99 and 9 of them are fishermen cooperatives. However, the fishermen's cooperative is considered unable to contribute maximally to the welfare of the population.

In light of the information presented above, the objective of the community service activities is to provide knowledge and skills, to the residents of central Bangka Regency, and evaluate the effectiveness upon program completion. The community service program is a part of the matching fund program facilitated by the Ministry of Higher Education Republic of Indonesia. The program includes squid processing instruction, an introduction to the basic concepts of a cooperative business model, cooperative rebranding, and the establishment of a cooperative institution among small-scale fishermen (SSF). It also includes digital marketing training for fishermen's spouses and other coastal community members.

Theoretical Framework

Cooperative Business Model

Cooperatives are organizations that protect the vulnerable. In a cooperative, members with limited means combine their resources and efforts to achieve objectives that would otherwise be impossible. Cooperatives are democratic organizations, and Abraham Lincoln's phrase about democracy—for the people, by the people, and of the people—is completely compatible with the cooperative model (Sapovadia, 2004). Cooperatives are social companies based on trust and collaboration (Saz-Gil et al., 2021). They differ from investor-owned firms in their emphasis on social capital, a basic element of these organizations. Cooperatives are supported by social networks built on reciprocity and trust, which serve as the foundation for their operations.

Cooperatives have more complex objectives that focus on providing ongoing support with benefits to its members, while ensuring that the cooperative can generate sufficient retained earnings to continue operations (Mazzarol et al., 2011). Whereas an investor-owned firm would seek to extract maximum profits, a cooperative would seek to optimize profits for its members (D'Amato et al., 2022). Unlike investor-owned firms, where the separation between customers, suppliers, and shareholders is common, cooperative members are both patrons (customers/suppliers) and owners (shareholders) (Matabi et al., 2022). By definition, a cooperative has a social component to support its goals, normative ideals, and guiding

principles to address social problems (Bianchi & Vieta, 2020). It takes active management of a dynamic, constantly shifting environment and dedication to the cooperative values-based model to balance social and economic goals (Saastamoinen & Puusa, 2024).

Because of its operational aim and humanistic principles, cooperatives have been acknowledged as a business model that may effectively tackle these issues, because they naturally adjust to and adapt to socioeconomic situations and obstacles (Colombo et al., 2024; Tortia & Troisi, 2021). Furthermore, according to (Filippi et al., 2023), cooperatives are seen as essential to achieving sustainable development goals. The strategic management of cooperatives must take the underlying philosophy and values into account to accomplish ethical business practices (Ghauri et al., 2021; Sacchetti & Tortia, 2021). Scholars agreed that the biggest impacts of cooperatives, competitiveness, competitive advantage, and cooperative survival are all centered on a cooperative values-based logic (Ajates, 2020) ((Novković et al., 2023; Rabong & Radakovics, 2020).

A study in Mexico indicates that experienced fishing cooperatives can employ precautionary measures to control fishing efforts (Méndez-Medina et al., 2021). In the long term, sustainable fishing efforts can result in an equilibrium population size, providing a continuous and potentially high catch (Gordon 1954). Therefore, fishing cooperatives have been presented as a potential solution to address some of the most critical challenges facing small-scale fisheries management. Cooperatives can boost revenue by negotiating larger margins and economies of scale (Bennett et al., 2024). Furthermore, they can successfully make collective decisions to address issues of overfishing (Berkowitz et al., 2020; Fache & Pauwels, 2020) and achieve sustainable harvesting when prices rise (Ertör-Akyazi, 2020).

The fishermen are typically from disadvantaged backgrounds, which limits their access to financial resources and technological knowledge. By working on the creation and execution of laws controlling access to and use of local fishing resources, collective action can help fishing communities in the catch fishery sectors adopt sustainable fishing methods (Elsler et al., 2022). To attain this goal, small-scale fisheries frequently form fishing cooperatives (Gosari et al., 2019; March & Failler, 2022). For example, well-functioning fishing cooperatives offer their members stable financial benefits and social security (Basurto et al., 2020; Schlüter et al., 2021).

Indonesia's fish export industry is experiencing sustained growth, driven by a high demand for products such as shrimp and tuna. By 2023, Indonesia had become the seventh largest fish exporter globally, with an export value of $3.51 billion. Although there are 153,060 cooperatives, savings, and loans still account for 52% of the cooperative activity. The "spread" or the distinction in services between deposits and loans is still what it depends on, and banks and fintech have undermined cooperatives' captive market. Cooperatives will not be able to participate in cross-sectoral businesses if they function only as savings and loan cooperatives. In current conditions, not much exists in the institutions that promote horizontal integration to create social aggregation through "spin-off" procedures or corporate sharing. The primary objective of the cooperative is to establish a business network at the initial cooperative level through the process of "spin-off," which involves the division of a business into separate entities.

The second objective is to encourage its members to establish a diverse range of businesses by forming a formal legal entity integrated into one under the control of a group or holding. The "spin-off" of businesses by co-operatives is a strategy designed to address the

needs of cooperative members. Cooperatives must rapidly establish retail business services, health insurance services, and fishing equipment services. Accordingly, the objective of community service activities in Central Bangka Regency is in the early stage to enhance awareness and comprehension of cooperative principles and to facilitate an appreciation of traditional and innovative cooperative business models.

Digital Marketing for Cooperative

The small-scale fisheries (SSF) industry's value chain can be efficiently supported by information and communication technology (ICT) (technology in the artisanal sector). One useful strategy for bringing together various SSF actors is co-design. SSFs must have access to tools including a marketplace, labeling, traceability, e-commerce, seafood processing, and seafood delivery. The SSF industry must be ready for everything (Bolognini et al., 2023).

For many businesses and cooperatives, the adoption of digital technology has been seen as a significant barrier. This digitization is distinguished by the extensive use of information technology at every stage of the value chain within a certain sector. The development of smart fisheries is transforming the agricultural sector, including the fishing industry, from the standpoint of sustainability on all levels—economic, social, and environmental. Cooperatives, the most common legal form for long-standing companies, are expected to be crucial in the adoption of new technologies in several countries (Ciruela-Lorenzo et al., 2020). Digitization is a modern step in the development of information and communication technologies based on digital technologies, i.e., based on the representation of signals in discrete bands rather than in the form of a continuous spectrum. The advantage of digital systems over the widely used analog systems is that, under simple conditions, signals can be transmitted without distortion (Mnatsakanyan et al., 2021). Making management in the fisheries industry more effective through the use of enabling the use of digital marketing is especially relevant at the moment because the fisheries sector is a system of fully interconnected industrial and business elements, such as fishing, fish processing, and farming, fisheries conservation, production support services, scientific research, and education (Dubinina et al., 2020).

Several aspects will impact the adoption of a new marketing tool in the fisheries industry as a whole, including cost, convenience of use, time, and others. Furthermore, digital marketing tools can help reestablish connections between buyers and sellers (Bolognini et al., 2023). The study by Cristobal-Fransi et al. (2023) revealed that cooperatives in Catalonia have enhanced their online visibility in recent years, particularly in the realm of e-commerce. This advancement can be attributed to the necessity for heightened market orientation, which has emerged as a key driver. Although there has been a positive evolution in recent years, fishery cooperatives' tools still exhibit low levels of interactivity.

To increase interactivity, it will be necessary to implement consumer reviews and feedback, develop blogs, and establish a social media presence on websites or other social network sites. This performance must be improved, and will depend on the role organizations assign to their online presence, their understanding of the advantages of adopting new technologies as they become available, and their level of innovation. This will depend on budgetary constraints. In recent years, some aspects of interactivity have also been developed as tools to support online commerce (Cristobal-Fransi et al., 2023).

Many fishery business groups in Central Bangka are engaged in processing seafood, especially utilizing one of Central Bangka's superior commodities, namely squid. Some of the products include Ciequ (Fig.4), which is a sea product processed in the form of pilus from various commodities such as crabs, fish, and also various other squid preparations. The constraints faced by MSMEs in Central Bangka in general are in the marketing and expansion of business scope. MSMEs that are still moving traditionally are quite constrained to be able to adapt to digital technology and market modernity that moves dynamically. MSMEs have also not been able to optimally utilize various digital channels that can potentially increase selling prices and marketing reach. Therefore, this community development is to advise and train cooperative members and management to enhance their online presence to improve consumer perception since a strong online presence will enhance the organization's reputation. Thirty-five managers and members of the fishery cooperative are invited, and they receive training in digital marketing.

Methods

The training activities were facilitated by the Head of the Central Bangka Regional Planning Agency and took place at the office of the Central Bangka Regional Planning Agency. We invited a total of thirty-five individuals to attend the training session. Fifteen female housewives additionally worked in sales and marketing and twenty male fishermen in the group

Interactive workshops and material delivery sessions were used to perform the training process for themes related to cooperative business models and digital marketing. The Business Model Canvas (BMC) is the tool we use to convey the cooperative business model's content. First, we ask them to complete the nine columns on the BMC. Second, the participants were invited to use the business model canvas to come up with a better approach to running a cooperative organization. Following the first session on the cooperative business model, we sent out questionnaires to find out people's opinions and plans to get involved in starting a cooperative (Fig. 1)

Figure 3. Cooperative Business Model – Training Activities

In the second session on the digital marketing topic, we conducted interviews about types of social media and how they are used. The main objective was to increase participants' understanding of using social media and e-commerce to market their products and create marketing collateral. The facilitator taught about using social media more effectively, using several digital platforms, such as social networking, photo editing software, and e-commerce. This approach was developed to provide participants the chance to apply the knowledge they had acquired to active engagement through conversations and hands-on activities (Fig. 1).

Figure 4. Digital Marketing Course

To gauge the degree of understanding and expertise in cooperative management and social media use for digital marketing, we conducted interviews to learn about cooperative management procedures and the kinds of content used for social media marketing then used a questionnaire to administer a survey after the training to determine how well the participants understood the material that had been presented. Participants' perceptions and intentions to form a cooperative are represented by a Likert scale of 1 - 5. A score of 1 indicates a low level of agreement and a score of 5 indicates a high level of agreement with the statements in the questionnaire.

Result and Discussion

Cooperative Business Model Intention to Develop and Perceived Benefit

Following the poll, the mean score on a 5-point Likert scale was 4.5, indicating a strong interest among participants in establishing and developing a superior business model for cooperative organizations. Please refer to Table 2 below for a summary of the questionnaire responses.

Table 2

	Score	
	Before	After
Intention to Develop Cooperative		
I intend to develop the existing fishery cooperative in my area	2	3
I will always try to seek effective ways to serve members and customers	2	3
I plan to sell fish in an auction managed by a cooperative	3	4

I intend to sell and buy innovative fishing equipment	3	4
I intend to develop a store within the cooperative and sell my fish processed product	3	4
Avg	2.6	3.6
Perceived Benefit		
Cooperative will create more jobs for the community	3	4
Cooperative will attract more investment to my community	2	4
Cooperatives provide many desirable employment opportunities for resident	2	4
Cooperatives will improve the incomes of small-scale fishermen	3	5
Our standard of living will improve because of cooperatives	3	5
Avg	2.6	4.4

As illustrated in Table 2, there has been a notable improvement in the intentions before (2.6) and after the session (3.6). The perceived benefit score improved from 2.6 to 4.4 In summary, there has been a 41% overall increase in the perceived benefit and a 28% improvement in the intention to develop cooperatives. The overall increase is 34% is proves that the course can improve the perceived benefit and intention to develop a cooperative.

Digital Marketing Understanding

A pretest was given to the participants at the start of the session to gauge their initial comprehension of the subject matter. As seen by the pretest findings, most participants knew very little about digital marketing, e-commerce, and social media as marketing tools. Few participants received the highest possible score of (5), with the majority earning between 3 and 4. This suggests that participants' understanding of the fundamental ideas and uses of digital marketing still needs to be expanded. A post-test was administered following the session to gauge how much the participants had learned. When compared to the pretest, the post-test results demonstrated a notable improvement. As can be shown, the majority of participants were able to obtain a score of 5, indicating a strong comprehension of the presented information. In contrast, there were hardly any ratings lower than 4, suggesting that the training was successful in raising the participants' general level of knowledge. The following figure displays the results of the pre-test and post-test.

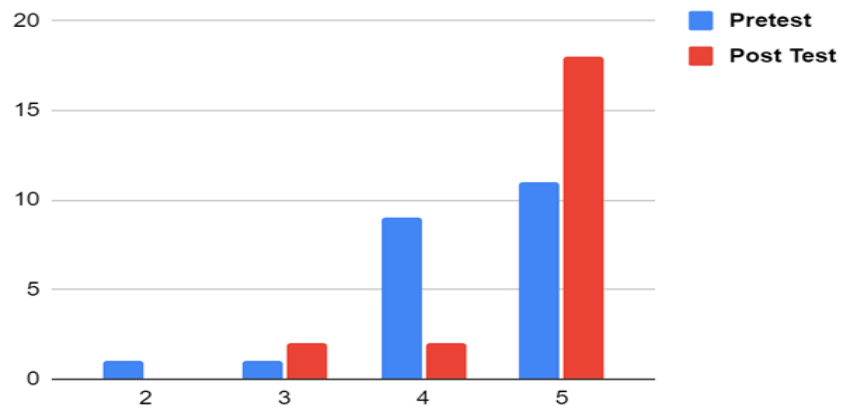

Figure 5. Pre-test and Post-test result in Digital Marketing Course

The greatest improvement was seen in participants who initially scored 4 on the pretest, where they showed an improvement to a score of 5 after the training. This indicates that the interactive learning method, with a combination of theory, discussion, and hands-on practice, successfully facilitated participants in understanding and applying the materials provided. Overall, the post-test results reflect the success of the training in achieving its main objective, which is to improve participant's skills and knowledge in using digital media for marketing and branding their products. The increase in scores also indicates that the material presented is relevant and easy to understand, and is able to answer the needs of participants in developing their digital marketing strategies.

Conclusion and Recommendation

The objective of community development in Central Bangka Regency is to disseminate knowledge about cooperatives and digital marketing. Community development has been successfully executed, resulting in an enhanced positive outlook and a willingness to develop cooperative institutions. All of the aforementioned objectives have been effectively achieved. The concept of cooperatives has been well understood, leading to an increased positive perception and intention among fishermen. Recommendations for future action include the formation of cooperatives and assistance with their formation to gain wider market access, as well as the facilitation of further training in collaboration with the Ministry of Cooperatives and Related Agencies in Bangka Island.

The Matching Fund 2024 program has had a real impact on partners and MSME players in Central Bangka. The digital marketing training was very useful, as it provided new insights and practical strategies to expand the market for local products. Partners and audiences feel more confident in utilizing digital technology and are optimistic that we can take our business to the next level. The solid collaboration between Kedaireka, the government, and the community is also key to the success of this program. Partners appreciate the opportunity provided and hope that this activity will continue in the future.

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