

Exploring Sustainability and Dynamics of Power and Trust in Fishing Supply Chains

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Abstract

In recent years, sustainable supply and value chains for fishing have attracted the attention of many researchers. However, the existing literature lacks studies that explore different perspectives on sustainability within these fishing supply chains. This study is therefore unique because it not only addresses this gap but also examines the often-overlooked roles of power and trust in achieving sustainability. By using a quantitative approach, this study aims to provide new insights into these complex relationships.

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Firstly, the research aims to determine whether the perceptions of three distinct groups regarding sustainability indicators differ significantly. Secondly, it investigates the impact of institutional, collective, and bargaining power on the trust dynamics among supply chain participants. To achieve this, a comprehensive approach was employed, using structured questionnaires to collect data from 100 supply chain actors, including fishers, agents, and retailers, in Goa, India. The data were then carefully analysed using descriptive statistics, ANOVA in SPSS, and Partial Least Squares-Structural Equation Modelling (PLS-SEM) in SmartPLS 4.

The study identified significant perceptual differences in four of the 19 sustainability indicators at a 10% significance level. The findings from PLS-SEM reveal important links between the power and trust dynamics among supply chain participants. These insights will help policymakers and stakeholders understand how supply chain participants perceive sustainability and clarify the relationship between power and trust. This understanding can support efforts to build trust within supply chains. Additionally, the study offers valuable insights that can directly inform policies to improve sustainability in fishing supply chains.

Keywords: marine fisheries, supply chain, sustainability, trust, power.

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1. Introduction

Oceans and seas cover two-thirds of Earth's surface and contain 97% of its water, which is crucial for ecosystems and sustainable development. They are the world's largest source of protein, supporting over 3 billion people worldwide (FAO, 2024). Additionally, oceans play a significant role in alleviating poverty by providing jobs and sustainable livelihood opportunities for a substantial portion of the global population (Roberts et al., 2024). However, the mismanagement and overexploitation of oceans and marine resources are increasingly concerning for nations worldwide (Andriesse et al., 2021; Cordeiro, 2019; Gallic & Cox, 2006; Ho & Ngo, 2013; Hosch et al., 2019; Schmidt, 2005).

The First Global Integrated Marine Assessment, completed in 2015 as part of the United Nations Regular Process for Global Reporting and Assessment of the State of the Marine Environment, reveals that marine pollution, unsustainable resource extraction, the physical destruction of marine habitats, and climate change—resulting from increased CO₂ emissions— are significant factors placing tremendous pressure on the resilience of marine resources. These issues threaten the ability of these ecosystems to sustain biodiversity. As such, achieving sustainability has been at the forefront of these issues. The United Nations' Sustainable Development Goals 2030, adopted by the General Assembly in 2015, gave special attention to these resources by designing a stand-alone goal (SDG 14) to make life below water sustainable.

Sustainability originates from the Latin term “sustinere,” meaning “to sustain.” One of the earliest documented references to this concept can be found in “*Sylvicultura Oeconomica*,” a book by Hans Carl von Carlowitz published in 1713 (Heinberg & Lerch, 2010). However, it garnered significant attention with its mention in the Brundtland Report, released by the World Commission on Environment and Development in 1987 (Mugoni et al., 2024). This report defined sustainable development as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (Burton, 1987).

Although this concept has received criticism for several reasons, it remains the most widely adopted definition. Sustainability has attracted the attention of researchers worldwide working in sustainable businesses and economies (Aguado et al., 2016; Trégarot et al., 2020). It has been studied across many fields using various approaches, and the fisheries industry is one such field with strong relevance (Fernandes & Sukthankar, 2024; Pauly et al., 2002; Rajapathak, 2015). In recent years, the sustainable fishing supply and value chains have attracted the attention of many practitioners and researchers (Rivera-Valle & Silva, 2024; Hopkins et al., 2024; Shamsuzzoha et al., 2023; Iue et al., 2022; Virdin et al., 2022; Tsolakis et al., 2021; Gutiérrez & Morgan, 2015). To achieve sustainability, policymakers worldwide have formulated several plans and policies (Costa et al., 2022). However, recent reports suggest that implementing these policies faces many limitations (McKinley et al., 2019; Sunny et al., 2021). Some researchers highlight that a major issue in the implementation stage is disagreement among key supply chain participants about how sustainability can be achieved in the fishing sector (Abbasi, 2017; Obregón et al., 2020). This results in a lack of cooperation and joint initiatives from the participants (Boenish, 2020). Therefore, it is crucial to examine this dimension by highlighting the specific aspects on which the parties in the fishing supply chains appear to disagree. Moreover, researchers have emphasised the role of power and trust dynamics in this aspect (Pita et al., 2012; Hansen, 2009). Several researchers have noted that trust and power can alter the course and strength of relationships between individuals, and that, in turn, this can impact the level of cooperation and coordination between them (London et al., 2017; Vandchali Rezaei & Chen, 2021). Fisheries is a sector that is known to be dominated by power dynamics. Similarly, many authors suggest that trust among supply chain players significantly affects their willingness to cooperate (Babbar et al., 2019; Salam, 2017; Deep et al., 2022; Robbins, 2016). Since achieving sustainability would require cooperation among individuals, it is important to examine the role of power dynamics in trust between supply chain participants (Gölgeci et al., 2018; Möllering, 2019).

Therefore, this study examines differences in participants' perspectives on indicators of fisheries sustainability across the fishing supply chain. Thereafter, the study explores the impact of power on trust dynamics in the fishing supply chains. This will help understand perceptual differences around the idea of sustainability from a broader perspective, which may help identify the factors stakeholders need to address to achieve the Sustainable Development Goals. Moreover, although several studies highlight the key role that trust and power dynamics can play in the journey towards sustainability, very few have evaluated whether these two dimensions are interlinked. Exploring this aspect in this study will help shed light on it and contribute to identifying causal relationships among the drivers of sustainability in the broader context.

2. Literature Review and Theoretical Framework

2.1 Perceptions about Fisheries Sustainability Indicators

Researchers emphasise the need for supply chain sustainability to enhance resilience across sectors. Viewing the sector holistically is crucial, yet there is a lack of studies on sustainable supply chains in developing countries like India that examine differences in perceptions among fishing supply chain players regarding sustainability. While much research exists from a Western perspective, there is limited exploration of this topic in Asia, indicating a need for further investigation. Asia, home to 85% of the world's population, plays a vital role in sustainability due to its rapidly growing economies. Researchers have highlighted that sustainability is viewed differently across supply chains (Gölgeci et al., 2018; Prodhan et al., 2023; Rivera-Valle & Silva, 2024). As such, it is crucial to examine this viewpoint and highlight the key aspects where the differences are rooted. Therefore, we hypothesise as follows.

H_1 : There is a significant difference in perceptions of fishing supply chain participants about the fisheries sustainability indicators.

2.2. Relationship between Power and Trust

Researchers have explored the relationship between power and trust in various contexts (Jain et al., 2014; Sridharan & Simatupang, 2013). These elements

are important drivers of supply chain performance (Ke & Wei, 2008; Schutte et al., 2022; Touboulic et al., 2014). Trust has been a focus of several studies in management, and researchers have shifted from examining trust between individuals to examining trust between firms (Kim & Kim, 2024).

Researchers have emphasised that trust is important in achieving sustainability in supply chains (Paluri & Mishal, 2020; Yeung et al., 2009; Yulinda et al., 2021). Trust is also an important factor driving supply chain cooperation (Hoa et al., 2021). Similarly, many studies, such as Autry & Golicic (2010) and Rivera-Valle & Silva (2024), have found that power imbalances can hinder the adoption of sustainability in supply chains; consequently, these power imbalances are identified as critical dimensions to examine in supply chain relationships. Adopting sustainable practices can strengthen stakeholders' trust in the fishing industry and support the sector's sustainable development (Fleming et al., 2020). Therefore, trust and power dynamics can yield significant insights for policies aimed at sustainable growth (Gölgeci et al., 2018; Rivera-Valle & Silva, 2024; Vandchali et al., 2020).

While numerous researchers have examined the relationships between power and trust in supply chains, this study specifically focuses on three forms of power: collective, institutional, and bargaining. Since previous studies have explored these forms of power less and can have considerable significance from a supply chain perspective, they have been considered in this study. Hence, in this study, relationships between institutional factors, collective bargaining power, and trust among participants in the fishing supply chains have been examined.

Bargaining Power

Bargaining power refers to a party's ability to exploit and influence a transaction to maximise its gains (Crook & Combs, 2007). Given the highly perishable nature of the products traded in fisheries, bargaining power can play a crucial role in supply chain dynamics. This may also influence trust among supply chain participants (Dwyer & Walker, 1981). As such, it is critical to explore this relationship. Therefore, we hypothesise as follows.

H_2 : Bargaining power has a significant impact on trust.

Collective Power

Collective power refers to the influence a group or association can exert on activities within a particular sector, with both positive and negative consequences. In the fisheries sector, research worldwide has revealed the existence of syndicates and lobbies that influence participants' behaviour (Prodhan et al., 2023). Examining this aspect from a supply chain perspective is essential. Hence, we propose the following hypothesis.

H3: Collective power has a significant impact on bargaining power.

Defining power as dominance can entail the suppression of certain marginalised groups (Twali et al., 2023). Collective powers can indicate the presence of forces that could dominate the functioning of the fishing industry. Several authors have highlighted that collective power forces may affect the presence and influence of institutional forces within the industry (Prodhan et al., 2023). Therefore, we hypothesise as follows.

H4: Collective power has a significant impact on institutional power.

Similarly, Belaya et al., (2008) argue that power and trust are strongly related in connection to supply chains. One strong form of power in the fisheries sector is collective power. In fisheries, since relationships between participants are closely linked to market dynamics, the presence of collective power may affect trust dynamics among players. Therefore, we hypothesise as follows.

H5: Collective power has a significant impact on trust.

Institutional Power

Institutional power refers to the authority exercised by governing authorities. This form of power can have significant implications for the successful implementation of sustainable practices in an area (Rivera-Valle & Silva, 2024). As such, institutional power seems to play an important role in implementing sustainable supply chain practices. Trust is also a critical driver of sustainability, so it is important to explore the dynamics between institutional power and trust (Prodhan et al., 2023). Therefore, we hypothesise as follows.

H6: Institutional power has a significant impact on trust.

Mediating Role of Bargaining Power between Collective Power and Trust

The presence of collective power in the fishing industry can affect participants' bargaining capacity and, in turn, trust among supply chain players (Belaya et al., 2008; Prodhan et al., 2023). If collective power in the fishing industry is high, participants' bargaining power may be reduced, leading to limited trust among supply chain participants. Therefore, we hypothesise as follows.

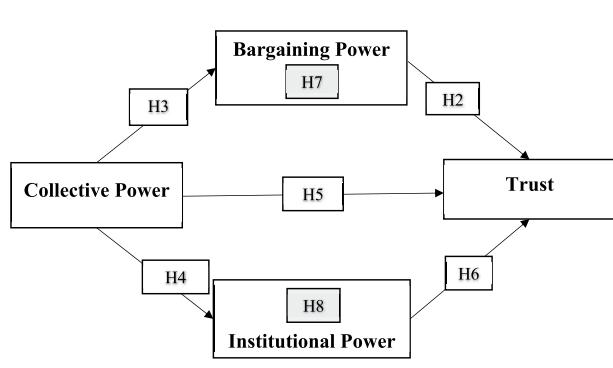
H7: Bargaining power mediates the relationship between collective power and trust.

Mediating Role of Institutional Power between Collective Power and Trust

The existence of greater collective power may not always negatively affect trust among supply chain players. The presence of collective power, such as cooperatives, may increase institutional power, potentially affecting trust among players in the fishing supply chain. The presence and strength of institutional power may determine the impact of collective forces on participants in the fishing supply chain. Hence, the nature of the relationship between collective power and trust may be mediated by institutional power. Therefore, we hypothesise as follows. *H8: Institutional power mediates the relationship between collective power and trust.*

Figure 1

Showing the Conceptual Model developed by the authors, showcasing the hypotheses testing direct as well as indirect relationships in the study



Note. Authors' work based on previous studies

Note: H_2, H_3, H_4, H_5, H_6 examine direct relationships, while H_7 and H_8 examine indirect (mediating) relationships.

The hypotheses proposed in this section have been graphically presented in Figure 1. H_2, H_3, H_4, H_5 , and H_6 will assess the direct relationships between the four constructs (bargaining power, collective power, institutional power and trust), whereas H_7 and H_8 will assess the indirect mediating impact of bargaining power and institutional power, respectively, on the relationship between collective power and trust.

3. Research Methodology

3.1 Study Area

The study examines Goa's fisheries supply chain. Despite being the smallest Indian state, Goa's strategic location supports its fishing industry (Faria, 2019). For decades, fishing has been a key part of the economy, providing direct and indirect jobs. The marine fisheries sector makes up about 3% of Goa's gross GDP and 17% of its agricultural GDP (GB & Mujawar, 2021).

This study adopts a quantitative approach based on data collected from primary sources. However, secondary data on the population size of participants in the fishing supply chains, collected from the Directorate of Fisheries, Government of Goa, assisted in selecting an appropriate sample for the study.

3.2 Data Collection

The study focuses on three main stakeholders in Goa's fishing supply chain: Fishers, Agents, and Retailers. Fishers include both large and small-scale operators. These stakeholders are key to the supply chain and are actively involved in fisheries activities daily, making them vital for sustainability. Data was collected using a structured questionnaire with three sections.

Before designing the questionnaire, the researchers conducted eight interviews with stakeholders in the fishing industry, including fishers, small-scale fishers, middlemen, and government officials. These insights are discussed in the analysis section.

The initial section of the structured questionnaire gathered information on the respondent's profile,

including their location, gender, age, and years of fishing experience. The second section assessed four constructs: institutional power (with 3 statements), collective power (4 statements), bargaining power (3 statements), and trust (3 statements). The third section examined sustainability indicators, categorised into economic sustainability indicators (13 statements), social sustainability indicators (11 statements), and environmental sustainability indicators (7 statements). A 7-point Likert scale was employed to measure the variables in both sections 2 and 3. A total of 110 questionnaires were distributed to respondents; 10 were discarded due to incomplete responses, resulting in a final sample of 100 respondents (43 fishers, 17 agents, and 40 retailers), indicating a response rate of 90.91%. These respondents were selected using simple random sampling, which ensures that everyone in the population has an equal chance of being selected, thereby minimising potential bias and ensuring the sample's representativeness (Nguyen & Abwao, 2023). The data collection process consisted of face-to-face interviews with the respondents. During data collection, the researchers adhered to ethical standards by informing respondents of the purpose of the study and obtaining consent from all participants.

3.3 Data Analysis

The data gathered through questionnaires were analysed using various statistical techniques, including descriptive statistics, ANOVA, and cross-tabulation, utilising SPSS version 27 and PLS-SEM in SmartPLS 4. ANOVA is a statistical test used to determine whether there are statistically significant differences in the means of measured variables. Accordingly, this study employed ANOVA to assess whether there are significant differences in supply chain participants' perceptions of sustainability indicators in fishing supply chains.

Additionally, PLS-SEM was used to investigate the effects of institutional, collective, and bargaining power on trust. PLS-SEM is an advanced data analysis method that helps researchers explore complex relationships and is commonly used to analyse causal relationships among latent constructs. Several researchers, including Al-Tarawneh et al. (2024), Begum et al. (2022), Deep et al. (2022),

Jermsittiparsert et al. (2019), Kaufmann and Gaeckler (2015), Mabkhot (2023), Prodhan et al. (2023), and Wasiq et al. (2023), have utilised this technique in studies within the field of supply chain management.

4. Analysis and Discussions

4.1 Demographic Profiling

Table 1

Descriptive of the Demographic Profile

District	Frequency	Gender	Frequency
North Goa	27	Male	65
South Goa	73	Female	35
Age (in years)	Frequency	Fishery experience (in years)	Frequency
18-40	7	Less than 15	47
41- 60	74	15-30	26
Above 60	19	More than 30	27

Note. Author's work using Primary data in SPSS software

Table 2

Cross-tabulation of respondents' role in the supply chain across gender

Gender	Role in the supply chain			Total
	Fisher	Retailer	Agent	
Male	41	8	16	65
Female	2	32	1	35
Total	43	40	17	100

Note. Author's analysis based on primary data using SPSS.

The demographic profile of the respondents, shown in Table 1, indicates that most participants are from South Goa, home to more fisher families than North Goa. Gender distribution reveals that 65% of respondents are male, reflecting a predominance of men in fishing. The age range of most respondents is 41 to 60 years, making up 74% of the total, while only seven are aged 18 to 40. Experience-wise, 47% have less than 15 years in the industry. A survey of 100 individuals in Goa's fishing supply chain reveals significant gender disparity; men dominate at the source level, while women hold a larger share at retail, masking overall gender parity issues (see Table 2).

4.2 Conceptualising Sustainability

This section outlines the main arguments derived from qualitative data gathered through unstructured interviews with eight selected stakeholders. Each stakeholder was invited to share their insights on sustainability and their ideas for optimising it within the fishing supply chain. Additionally, the respondents provided their perspectives on the practical challenges that may hinder the long-term adoption of sustainable practices. The following points highlight the key themes emphasised by the stakeholders.

- **Fisher's Perspective**

The four respondents who represented the fisher community emphasised that sustainability must be crucial to overall fisheries management plans. However, sustainability differs drastically among the fishers involved in artisanal and large-scale fishing. Large-scale fishers have emphasised the importance of prioritising economic sustainability over other dimensions, arguing that stakeholders in Goa do not exploit the fisheries.

"There is enough fish available in the oceans. I do not think there is an overfishing problem in Goa. The authorities limit the entry and exit options to control the number of vessels operating in the Goan waters."

The stakeholders emphasised the need for better infrastructure to support the growth of fisheries in Goa. The respondents also highlighted that the departmental authorities' patrolling and constant checks help to minimise illegal fishing activities.

This perspective was met with strong opposition from stakeholders representing small-scale fishers. These respondents contended that large-scale fisheries have been over-exploiting fish resources, resulting in increased challenges and threats to the survival of small-scale fishers. The stakeholders highlighted the undue influence exerted by those owning large fishing vessels, which affects the governance and policy-making processes in the fishing sector. They emphasised that small-scale fishers view sustainability as a concept that protects the rights of marginalised participants in the industry while striving to balance economic and social considerations for their livelihoods. The stakeholders argued that true environmental

sustainability can only be achieved if all parties are willing to forgo a portion of their revenue, adopting a long-term view of profitability that emphasises the social dimension.

These arguments highlight the key contradictions and significant drift in the viewpoints of the two sides based on the scale of their operations, which have existed in Goa since the early 1970s. The mechanisation of the Goan fishing industry in 1970 is known to have played a significant role in the conflicts and tensions that rose between the two sides, and this can still be witnessed in the ideologies of these two groups.

- **Fish Agents' Perspective**

The interview with the fish agents revealed that they do not have a significant role in adopting sustainability. This perspective sheds light on the limited awareness about how a fish agent could contribute to sustainability in the fishing supply chain.

"I think sustainability refers to using the right fishing practices and considering the environment and society when making decisions. Our job is to act only as a middleman. As such, we do not have a major role in this journey towards adopting sustainability."

This perspective highlights that the fish agents perceive the concept of sustainability to focus on environmental protection and social development. This highlights the limited understanding of the various dimensions that indicate a supply chain's sustainability. Literature places key importance on supply chain coordination, flexibility, resistance, and collaboration. It also argues that bargaining power, collective power, and trust among the supply chain players have a significant role in achieving sustainability. However, the lack of awareness regarding the intermediaries' role could significantly hinder the sustainability journey.

- **Fish Retailers' Perspective**

The qualitative interview with fish retailers revealed that they perceive their role in the fishing supply chain as insignificant, primarily involving procurement from wholesalers and sales to consumers. This perception contributes to limited access to vital information regarding sustainability.

However, research shows that retailers play a crucial role in promoting sustainability, being the direct link to consumers. Many studies indicate that supply chain demand influences sustainability, underscoring the importance of retailers in fostering sustainable practices.

- **Government Officials' Perspective**

The respondents representing government authorities argue that the policies framed for the fisheries sector support sustainable growth in fisheries. The authorities believe that controlling entry and exit points, specifying acceptable fishing practices, conducting regular checks and monitoring activities, and providing financial assistance to supply chain players are practical tools for achieving sustainability in the fishing industry. However, the resistance from fishers to report accurate information about their fish catch and the unwillingness of fishing supply chains to register with the authorities pose key challenges in achieving sustainability.

- **Integrated Viewpoint**

The above discussion highlights the stakeholders' varying viewpoints on the idea of sustainability in the fishing industry. This revealed that stakeholders' ideas are diverse and conflicting, and contradictory to others' opinions in certain areas. This reveals the root cause of the challenges in adopting sustainability. Therefore, we conclude that there is a need to align the stakeholders' perspectives to arrive at practical solutions to the issues. This study supports the researchers who argue that coordination and collaboration are crucial to the success of supply chains in the fishing industry.

4.3 Differences in Perceptions about Sustainability Indicators

Table 3 highlights supply chain players' perceptions of how sustainability can be achieved in fishing supply chains. Table 3 shows that responses to almost all the variables averaged approximately 4. However, a few variables showed positive or negative perceptions, highlighted in the table. ANOVA was used to examine whether there is a significant difference in the perceptions of fishing supply chain players regarding factors that can contribute to achieving sustainability in fisheries.

Table 3

Results of ANOVA to test differences in perceptions about sustainability indicators across the roles in Fishing Supply Chains

		What can lead to sustainability?	Mean Values				
H			Fisher	Agent	Retailer	Sig.	Decision
Environmental Sustainability							
H1a	EN 1	<i>Integrated Resource Management can facilitate sustainable fisheries practices.</i>	4.40	3.88	4.53	.080	Accept
H1b	EN 2	<i>Management of Illegal, Unreported and Unregulated fishing can facilitate Sustainable fisheries practices.</i>	4.63	4.53	4.78	.761	Reject
H1c	EN 3	<i>Mixing traditional methods with Modern innovative methods can facilitate Sustainable fisheries practices.</i>	4.84	4.47	4.55	.492	Reject
H1d	EN 4	<i>Local Environmental Knowledge can ensure Sustainable fisheries practices.</i>	4.56	4.59	4.68	.920	Reject
Economic Sustainability							
H1e	EC 1	Advanced technology can facilitate the adoption of Sustainable fisheries practices.	4.49	4.88	4.58	.629	Reject
H1f	EC 2	An integrated view of prospective long-term benefits of sustainability can facilitate the betterment of Sustainable Fisheries practices.	4.65	4.47	4.85	.593	Reject
H1g	EC 3	Adequate storage availability and cold containers facilitate sustainable fisheries.	4.37	4.53	4.73	.574	Reject
H1h	EC 4	Ease of access to processing and packaging facilities facilitates sustainable fisheries.	4.58	4.35	4.48	.839	Reject
H1i	EC 5	The availability of grading and testing facilities facilitates sustainable fisheries.	4.47	3.88	4.58	.207	Reject
H1j	EC 6	Changes in fishing-related practices/ gears can influence sustainable fishing.	4.77	4.12	4.75	.141	Reject
H1k	EC 7	Subsidies provided can improve the adoption of Sustainable Fishing practices.	4.98	4.41	5.23	.089	Accept
Social Sustainability							
H1l	SO 1	Restricting political influence and lobbying by the fishing industry can improve the adoption of Sustainable Fishing practices.	4.93	4.47	4.65	.406	Reject
H1m	SO 2	Social involvement can significantly enhance the adoption of Sustainable Fishing practices.	4.58	4.82	4.38	.497	Reject
H1n	SO 3	Better access to Education and Training facilities for learning Sustainable Fishing practices is important.	4.33	4.88	4.45	.369	Reject
H1o	SO 4	Participation in the cooperative organisation can encourage the adoption of Sustainable Fishing practices.	4.70	4.65	4.83	.844	Reject
H1p	SO 5	Sharing knowledge and Experience can be useful for quantifying the adoption of Sustainable fisheries tactics.	4.74	4.24	4.53	.445	Reject
H1q	SO 6	The strength of the social network can influence the adoption of Sustainable fishing practices.	5.07	4.12	4.63	.046	Accept
H1r	SO 7	Integration of stakeholders can influence the adoption of Sustainable fishing practices.	4.60	4.35	3.98	.097	Accept
H1s	SO 8	Succession policy and requirement for reporting to institutional authorities can influence the adoption of sustainable fishing practices.	4.51	5.06	4.35	.181	Reject

Note: Author's work using Primary data in SPSS software

Building on prior research in management, this study uses a 10% level of significance to evaluate the H1 hypothesis (Aguinis & Glavas, 2012; Podsakoff et al., 2003; Rothaermel, 2007; Wiklund, 2005). The findings reveal significant differences, at the 10% significance level, in perceptions regarding resource integration, the role of subsidies, the strength of social networks, and stakeholder involvement in achieving sustainability. Among the four indicators of environmental sustainability, notable disparities emerged in perceptions among fishers, agents, and retailers regarding the potential of integrated resource management to foster sustainable fisheries practices. Retailers reported the highest mean value, while agents reported the lowest.

Similarly, for economic sustainability indicators, there were significant differences in the perceptions among supply chain participants regarding the role of subsidies in facilitating the adoption of sustainable practices, with retailers again showing the highest mean values and agents the lowest.

Regarding social sustainability indicators, supply chain participants' perspectives on the influence of strong social networks on sustainable practices varied significantly. Fishers demonstrated the highest level of agreement, while agents showed the least. A comparable difference in perceptions was observed concerning the impact of stakeholder integration on promoting sustainable practices among fishing supply chain participants, with fishers again expressing the highest agreement and agents the lowest.

In summary, of the 19 indicators, only four (H1a, H1k, H1q, H1r) exhibited statistically significant differences in perspectives across the three participant types in the fishing supply chain. Thus, we conclude that supply chain players' perceptions regarding the pathways to achieving sustainability in fisheries do not vary significantly.

4.4 Relationship between Institutional Power, Bargaining Power, Collective Power and Trust

4.4.1 Measurement Model

We used PLS-SEM to examine the relationships among institutional, collective, and bargaining power, and trust in fishing supply chains. This method allows more accurate testing of complex relationships and hypotheses. The first step involves assessing the measurement model's reliability and validity with indicators such as Cronbach's alpha, composite reliability, Average Variance Extracted (AVE), and outer loadings. Specifically, Cronbach's alpha and composite reliability should be 0.7 or higher, while AVE should be at least 0.5. All variables must have outer loadings of at least 0.7, as per the standards set by Hair et al. (2017).

Table 4

Construct Reliability

Construct and Statements	SL	CA	CR	AVE
Bargaining Power				
BP 1<- Buyers have more power to control the cost than the seller.	0.938			
BP 3<- My bargaining power is limited because of the intense competition and rivalry.	0.946	0.873	0.940	0.887
Collective Power				
CP 1<- Syndicate members exercise power during the transaction.	0.831			
CP 2<-Syndicate members forced to sell fish at a lower price.	0.801			
CP 3<-Due to the dominance of the local leader, you did not get your expected profit.	0.887	0.863	0.906	0.707
CP 4<-Without concern of local leader doing fish business always tough.	0.842			
Institutional Power				
IP 1<- The local administration (government personnel body) monitors the market.	0.954	0.915	0.959	0.921
IP 3 <-The local administration fines those who adopt malpractices.	0.966			
Trust				

T 1<- I trust the supply chain players in the fishing industry.	0.889	0.806	0.910	0.835
T 3<- I trust the policies formulated by the authorities.	0.938			

Note. Author's Work using Primary data in Smart PLS 4 software

Note: SL: Standardised Loadings; CA: Cronbach's Alpha; CR: Composite Reliability; AVE: Average Variance Extracted

As shown in Table 4, each construct's Cronbach's alpha values exceeded the acceptable threshold of 0.7, and the composite reliability scores also surpassed this minimum. Additionally, the AVE values were above 0.5, confirming the constructs' reliability. Next, we examined each item's outer loadings to assess their significance in explaining their respective constructs. All variables' outer loadings were significant, as indicated by their p-values.

Table 5

Discriminant Validity-FLC

	Bargaining Power	Collective Power	Institutional Power	Trust
Bargaining Power	0.942			
Collective Power	0.604	0.841		
Institutional Power	0.041	0.211	0.960	
Trust	-0.140	-0.086	0.644	0.914

Note. Author's work using Primary data in Smart PLS 4

Table 5 shows the results of the Fornell-Larcker Criterion (FLC), which indicates discriminant validity of the constructs. The requirement for achieving discriminant validity using FLC is that the squared variance of the constructs used in the model should not be more than the AVE values of that particular construct indicated by the bold numbers (Hair et al., 2019). Table 5 reveals that this requirement is fulfilled; hence, discriminant validity has been established in our model.

4.4.2 Structural Model

Hence, the next step is to examine the structural model to test the significance of the relationships using path coefficients. The results were derived through a bootstrapping procedure using 5000 samples.

Table 6

Path Coefficients of the relationships tested in the model

H	Relationships	Beta	T-stat	p values	Inference
H2	Bargaining Power → Trust	-0.043	0.468	0.640	Reject
H3	Collective Power → Bargaining Power	0.604	10.473	0.000	Accept
H4	Collective Power → Institutional Power	0.211	2.144	0.032	Accept
H5	Collective Power → Trust	-0.206	1.665	0.096	Reject
H6	Institutional Power → Trust	0.689	14.465	0.000	Accept
H7	Collective Power → Bargaining Power → Trust	-0.026	0.448	0.654	Reject
H8	Collective Power → Institutional Power → Trust	0.146	2.096	0.036	Accept

Note. Author's work using Primary data in Smart PLS 4

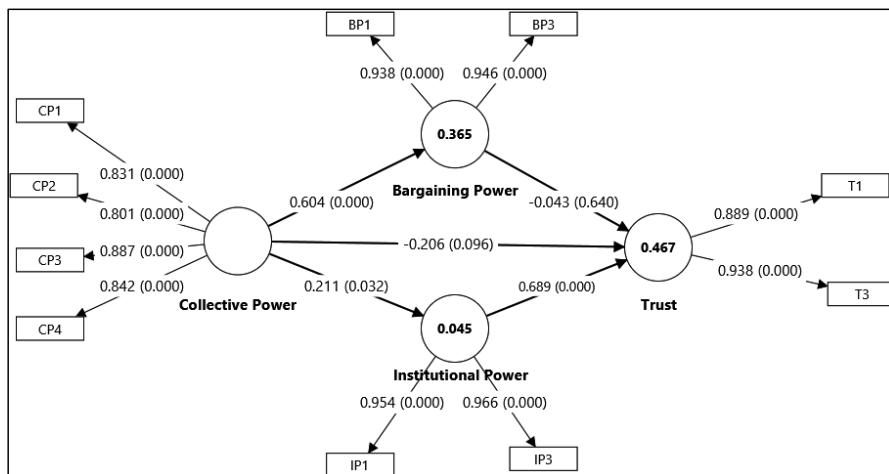
Note: H: Hypothesis; T-stat: T-statistic

Table 6 shows the significance of the relationships between the various constructs considered in our study model. The results indicate that bargaining power does not significantly impact trust between supply chain players since the p-value is 0.640, greater than the acceptable limit of 0.05. Hence, H2 is rejected. On the contrary, a statistically significant relationship between collective power and bargaining power is evident, supporting H3. The beta value of 0.604 indicates a positive association between collective power and bargaining power. Similarly, a significant positive impact of collective power on institutional power is indicated by the p-value of 0.032 and the beta value of 0.211. This suggests that H4 is supported. Regarding H5, the p-value of 0.096 indicates that collective power has no significant impact on trust. Hence, H5 is rejected. In the case of H6, the p-value (0.000) is less than 0.05, indicating a significant positive impact of institutional power on trust, thereby accepting the hypothesis.

Hence, we can conclude that the p-values are significant for three of the five hypotheses testing direct relationships. Figure 2 shows the final PLS-based structural model.

Figure 2

Graphical output of PLS SEM Model



Note. Author's work using Primary data in Smart PLS 4.

Next, we assessed indirect relationships using mediation analysis. Mediation analysis helps determine whether any factor amplifies the effect of an exogenous variable on the endogenous construct. This provides deeper insights into the nature and strength of relationships between independent and dependent variables. In this study, collective power was treated as the independent variable, while trust was considered the dependent variable. Moreover, bargaining power and collective power serve as mediators in the model, whose mediating influences on the relationship between collective power and trust are tested using hypotheses H7 and H8, respectively. Table 6 shows that bargaining power does not have a statistically significant mediating effect on the relationship between collective power and trust, thereby rejecting H7 (p-value = 0.654). A significant positive mediating effect of institutional power on the relationship between collective power and trust is observed, with a p-value of 0.036 and a beta of 0.146. Therefore, H8 is accepted. This indicates that institutional power plays a significant mediating role between collective power and trust.

5. Policy Implications and Recommendations

The findings of this study have significant implications for policymakers and stakeholders in the fishing industry, providing a roadmap for future policy development. They highlight the existing differences among players along the fishing supply chain in their views on sustainability. It is crucial to consider and assess

these perspectives when creating policies to achieve sustainability goals. We suggest adopting a broader view of the fishing industry, moving beyond the initial level of the chain that includes fishers. Our research shows that a supply chain-based approach to developing action plans for sustainable fisheries can offer a more effective way to improve sustainability in the fishing sector.

The urgent implementation of sustainable practices in the fisheries industry is crucial (Albasri & Sammut, 2022), and recognising the significant role that supply chain participants play in this effort is essential. Our study also identified a notable influence of institutional power on industry trust, indicating that government intervention to strengthen institutional power is necessary. Furthermore, we found a strong positive correlation between collective power and bargaining power, showing that fostering collective power can improve the bargaining position of supply chain participants. Therefore, we recommend promoting this collective power through continuous monitoring and streamlined cooperative processes.

6. Conclusion

The fisheries sector has experienced significant growth over recent decades, yet it faces various challenges resulting from numerous industry changes (Xie et al., 2023). The UN Sustainable Development Goals highlight the vital role fisheries play in the development of many nations worldwide. In this context, fishing supply chains have the potential to greatly contribute to sustainability efforts within the sector (Rowan, 2022). Therefore, it is essential to examine these supply chains more critically and in greater detail.

This study uncovers contradictions among fishers, agents, and retailers regarding sustainability. Interviews with stakeholders and officials highlight poor coordination across supply chains. However, a quantitative analysis using ANOVA showed no significant differences among participants in most variables, with only four out of nineteen variables showing disparities. These findings suggest a need for further mixed-method research to better understand the dynamics.

The study explored relationships between power and trust in fishing supply chains, focusing on three underexplored types: institutional, bargaining, and collective power. It examined whether institutional and bargaining power indirectly strengthen the collective power's effect on trust. Results showed that collective power strongly affects institutional and bargaining power, with institutional power also directly and indirectly affecting trust, thereby enhancing collective power's influence on trust among participants.

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Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

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