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VALUE ADDITION AND PROFITABILITY IN FISH MARKETING: EVIDENCE FROM SOUTHWEST, NIGERIA

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ABSTRACT: *This study investigates the role of value addition in enhancing profitability among fish marketers in Southwest Nigeria. Using data from 769 marketers in Lagos, Ogun, and Ondo States, the research evaluates the types of value-added products, returns on investment (ROI), and the factors influencing product choice. A descriptive survey design, and ROI analysis were applied. The research analyzes pooled data on nine fish products (Fresh, Smoked Fish, Fried Fish, Fish Fillets, Dried Fish, Fish Powdering, Frozen Fish, Fish Barbecue, and Fish Kilichi) and ten fish types (Catfish, Tilapia, Shiny Nose, Panla, Asa Fish, Croaker, Barracuda, Abo, Okodo, and Obokun). Data were gathered from fish marketers and processors, targeting nine fish products. Results indicate that fresh fish dominates the market (57.26%, 769 instances), with Catfish leading (31.20%), followed by Asa Fish (13.74%) and Shiny Nose (11.14%). Value-added products, notably Smoked Fish (27.78%) and Fried Fish (21.28%), are prevalent, reflecting significant adoption of processing techniques to enhance shelf life and profitability. Niche products like Fish Powdering (1.30%) and Fish Kilichi (0.65%) are limited to specific fish types, indicating specialized market niches. Findings reveal that smoked fish is the most common and profitable value-added product. Female marketers dominate the sector, and their product choices are influenced by experience, credit access, and training. The study also highlights regional variations, with Ogun State leading in dried and smoked products due to its proximity to aquaculture hubs, while Lagos excels in frozen and filleted fish owing to better infrastructure and market access. Overall, value addition not only boosts profitability with profits per kg reaching ₦4,600 for dried Asa fish but also contributes to food security by increasing fish supply and nutritional value, aligning with Nigeria's evolving blue economy.The study recommends investment in infrastructure, financial support, and capacity building to improve market outcomes. These results provide empirical insights to strengthen Nigeria's fishery value chain in line with SDG targets.*

KEYWORDS: Fish Marketing, Profitability, Fish Products, Multinomial Logit, Return on Investment (ROI), Value Addition.

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INTRODUCTION

The fishery sector remains a vital pillar of Nigeria's agricultural economy, contributing substantially to food security, employment, and rural livelihoods. Fish provides over 50% of the animal protein intake in Nigeria and serves as a critical source of micronutrients, particularly for low-income households (FAO, 2024). As demand for fish continues to rise due to population growth and urbanization, enhancing efficiency within the fish value chain is paramount. Value addition—encompassing processing, packaging, freezing, drying, and branding is a critical strategy for minimizing post-harvest losses, improving product quality, and increasing profitability. It transforms raw fish into consumer-friendly formats with extended shelf life and better marketability. According to Ilesanmi and Fagbenro (2024), effective value addition enhances both domestic market competitiveness and export readiness of fish products. Value addition in fish marketing refers to all post-harvest processes that improve the economic value and marketability of fish products. These include activities such as smoking, drying, filleting, packaging, branding, freezing, and quality certification (Akintola & Fakoya, 2024). Beyond extending shelf life, these practices help meet evolving consumer preferences for hygienic, ready-to-use, and nutritionally safe products. Value-added fish products are more competitive in both local and international markets, contributing to export potential and food system resilience (FAO, 2024).

There is a need to examine the activities of fish marketers as they relate to their use of value-additional initiatives in fish marketing and highlight the factors determining the respondent's use of these initiatives so as to speed up efforts and properly refocus strategies employed by extension in developing advisory extension services on value addition initiatives in its various forms in the sector. To ensure the continuous availability of fresh, dried, frozen and smoked fish

for human consumption, nutrition, and well-being, the Nigerian economy requires effective and efficient marketing channels. Fish marketing channels serve as a medium for bridging the gap between producers and consumers. This is very imperative in view of the growing human population and, hence the demands for smoked fish globally and in Nigeria in particular, compared to supply, and more so, the increasing distance between producers and consumers (Ayo-Olalusi *et al.,* 2018). The availability of fresh, dried, frozen smoked fish to consumers at the right time and place requires an effective marketing channel. The marketing of fresh, dried, frozen and smoked fish passes through various market participants and exchange points before it reaches the final consumers. As such, the marketing system must be well developed to provide the necessary services. To ensure easy access to smoked fish by consumers, machineries to assess the available marketing channels needed to be put in place. A study of this nature is required as it would enable the country to be self-sufficient in processed fish production, overcome food crises, and mitigate the effects of various dimensions of food insecurity. The main objective of the study is to carry out a value addition analysis in the marketing of fish in Southwest Nigeria The specific objectives are to: Profile the socioeconomic characteristics of the fish marketers in the study area, identify the value-added fish products in the study area, examine the profitability level of each value added product in the study area and identify the constraints encountered in the value-addition process.

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METHODOLOGY

The study focused on value addition in fish marketing among the Southwestern States along the coastal borders. The States considered are Lagos, Ogun, and Ondo States. Lagos State covers about 0.4 percent of Nigeria's land mass with a marine 3,571 square kilometers out of which almost one quarter (800 square kilometers) i.e. 22% is covered by water lagoons creeks and coastal rivers and estuaries. Lagos is sand-witched by latitude 60º 22" N and 60º 42"N and it straddles longitudes 2º42E to 4º20E. It is bounded in the north by Ogun State and in the east by Ondo State. It shares an international boundary of about 45 kilometers with the Republic of Benin while the vast, deep blue Atlantic Ocean constricted the approximately 180 kilometers along the continual shelf down to the southern limit. The research study was carried out in Epe LGA (Oluwo Fish Market), Badagry LGA (Agbalata Market) and Eti-Osa LGA (Anuoluwapo Sea food market.

Ogun State is bounded by Oyo and Osun states to the north, Lagos State to the south, Ondo State to the east, and the Republic of Benin to the west. It is covered predominantly by tropical rainforest and has wooded savanna in the northwest. The study area is closely associated with other maritime states of Southwestern Nigeria. The study area comprises Ijebu Waterside Local Government Area, Abeokuta South Local Governmrnt Area and Abeokuta North Local Government area.

Ondo State lies between latitude 5^0 45^1 and 8^0 15^1 North and longitude 4^0 45^1 and 6 ^{0}East, this means that the State lies entirely in the tropics. The State is bounded in the North-West by Ekiti State, West-Central by Osun State, South-East by Ogun State, South-East by Delta State, and in the South by the Atlantic Ocean. The study area which include Igbokoda Fish Market in Ilaje LGA, Arogbo Fish Market in Ese Odo LGA, and Okitipupa Fish Market in Okitipupa LGA, located in Ondo State, Nigeria, are significant hubs for fish marketing, a major occupation, particularly among women.

The populations for the study comprise all fish marketers in the three selected States. The entire population of the enlisted marketers in the three selected States is 1231 and sample size is 769. This served as the sampling frame for calculating the sample size. Multi-stage sampling procedure was used for this study. In the first stage, three States (Lagos, Ogun, and Ondo States) were selected from the southwestern States of Nigeria because they are located in the coastal regions where fishing activities and marketing are prevalent.

In the second stage, Three Local Government Areas (LGAs) were purposively selected because they are located in the coastal region of the State and large fishing activities and marketing are prevalent there. The selected Local Government Areas in Ondo States were Ilaje Ese-Odo and Okitipupa Local Government Areas. The selected Local Government Areas in Lagos state were Epe, Badagry, and Eti-Osa Local Government Area. The selected Local Government Areas in Ogun states were Ogun Waterside, Abeokuta South and Abeokuta North. The selected Fish markets were Oluwo fish market,Agbalata fish market,Anuoluwapo fish market,Iwopin fish market,Itoku fish market,Olomore fish market,Igbokoda fish market,Arogbo fish market and Okitipupa fish market. In the third stage, purposive sampling was also used to select one large registered fish market from each LGA with high fish marketing activities. In the fourth stage,

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the individual fish marketers were selected using simple random sampling from a sampling frame of a total of 769 marketers.

RESULTS AND DISCUSSION

Table 1 shows that in all three states, females dominate the fish marketing sector. In Lagos, 97.06% of the respondents are female, 75.11% in Ogun and 97.60% in Ondo. The male representation is significantly low, with only 2.94% in Lagos, 24.89% in Ogun, and 2.40% in Ondo. This gender disparity highlights the role of women in the fisheries value chain in Nigeria. The result agreed with Adeyeye et al. (2023) that women play a critical role in fish marketing and value addition activities, particularly in post-harvest handling, processing, and retailing . Their dominance in the sector can be attributed to the socio-cultural set-up, where women are traditionally involved in small-scale trading and processing of fish. Ojo, et.al (2022). The pooled data indicates a significant gender disparity, with 90.98% (699) of respondents being female and only 9.10% (70) male. This suggests a female-dominated sample, which may reflect the nature of the activity or sector surveyed, such as agricultural marketing or small-scale trade, where women are often more prevalent in certain Nigerian contexts (Ogunlela & Mukhtar, 2009). The high female representation could also indicate targeted sampling or cultural factors influencing participation. The result in Table 1 shows that 49.41% of the respondents in Lagos were married, with similar patterns in Ogun (68.33%) and Ondo (67.79%). The proportion of singles is notable in Lagos (40.29%), reflecting the broader urban demographic characteristics, where there is a higher concentration of younger, unmarried individuals in business activities. Divorce and widowhood rates were generally low but present in all three states. Marriage has been shown to influence involvement in business activities, particularly in rural areas. Married women, who often support household incomes through small businesses like fish marketing, are central to food security and livelihood improvement (Ajibade et al., 2024). Their participation in value- added activities and market transactions provides economic stability to their families. The pooled data reveal that 59.81% (460) of respondents are married, 31.94% (245) are single, 3.90% (30) are divorced, and 4.42% (34) are widowed. The predominance of married respondents aligns with societal norms in Nigeria, where marriage is a significant social institution, particularly in rural and semi-urban areas (Smith, 2010). The relatively low percentage of divorced and widowed respondents may reflect cultural stigmas or lower life expectancy impacting widowhood rates.

Tables 1 also show the age distribution of individuals involved in value addition activities in fish marketing across the different regions. The data were categorized by age groups and is presented as frequencies and percentages. The results provide insight into the demographic characteristics of those participating in value addition, which can help to understand workforce composition, generational trends, and potential areas for intervention.

Age Group 20-30: In Lagos, the 20-30 age group makes up 7.94% of those involved in value addition in fish marketing while in Ogun and Ondo, this age group constitutes 4.52% and 17.31% of the population, respectively. This indicates that younger individuals are less involved in value addition, particularly in Ogun. The relatively higher participation in Ondo may be linked to efforts to engage the youth in fish marketing, possibly through training programs and entrepreneurship initiatives. According to Babalola et al. (2024), the involvement of young people in agricultural value chains, including fish marketing, has been promoted in

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various regions as a way to address youth unemployment and foster economic growth.

Age Group 31-40: This age group has a high level of participation across all regions, representing 36.76% in Lagos, 24.43% in Ogun, and 38.46% in Ondo. The significant involvement of this age group suggests that individuals in their prime working years are driving much of the value addition in fish marketing. This is consistent with findings by Oluwaseun & Dada (2023), who identified the 31-40 age group as key players in fish processing and marketing due to their access to resources, entrepreneurial skills, and ability to manage physical labour.

Age Group 41-50: This age group showed substantial involvement, particularly in Ogun, where it makes up 47.06% of participants. In Lagos and Ondo, it accounted for 37.06% and 29.33%, respectively. Ogun's higher percentage could indicate a reliance on middle-aged individuals who have developed expertise over time. These individuals often bring experience, stability, and established market connections. According to Adebayo et al. (2024), older participants in value addition activities play an important role in sustaining fish markets, as they typically have a wealth of knowledge and experience that they pass on to younger generations.

Age Group 51-60: The 51-60 age group is less represented compared to the younger age groups, with 15.59% participation in Lagos, 21.72% in Ogun, and 12.98% in Ondo. This decline might be due to the physical demands of fish processing activities, which could deter older individuals. Despite this, Ogun still shows a higher involvement in this age group, potentially due to a cultural emphasis on long-term participation in traditional occupations. Adeoye et al. (2023) found similar trends in other agricultural sub-sectors, where older individuals tend to phase out of physically demanding tasks but remain involved in oversight roles.

Age Group 61-70: There is a noticeable drop in participation within this age group, with only 2.35% in Lagos, 2.26% in Ogun, and 2.88% in Ondo. The small percentage suggests that value addition in fish marketing is primarily a task for younger, more active individuals. As physical strength is an important factor in fish processing and marketing, older individuals may gradually withdraw from these activities. Olatunji et al. (2022) suggest that individuals in this age group may shift to less physically demanding roles within the value chain, such as advisory positions or trading.

Age Group 71 and Above: This age group has an almost negligible presence in the value addition sector, with only 0.29% participation in Lagos, and no recorded participation in Ogun and Ondo. This is expected, given the physical nature of fish processing activities, which become more difficult for individuals as they age. According to Bamidele et al. (2023), older individuals in agricultural settings often retire from physically intensive tasks and may pass on their businesses to younger family members or mentees. The results in Table 1. indicate that the majority of individuals involved in value addition activities in fish marketing are between the ages of 31 and 50, with fewer participants from the younger and older age groups. The low involvement of youth, particularly in Ogun, suggests a potential gap in engaging younger generations in fish value addition activities, which may be an area for future policy intervention. Additionally, the declining participation among those over 50 years old highlights the physical demands of the sector.

The pooled data reveal that majority of respondents fall within the 41-50 age group (37.84%, 291), followed by 31-40 (33.42%, 257), 51-60 (16.64%, 128), 20-30 (9.49%, 73), 61-70

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(2.56%,

19), and 71 and above (0.13%, 1). This distribution indicates a middle-aged working population, which is typically the most economically active demographic in Nigeria (Adepoju, 2010). The low representation of older age groups (61 and above) may reflect reduced participation in economic activities due to age-related factors. Individuals involved in fish value addition activities based on their level of education across the three States were also presented in Table 1. The data were categorized into "Formal" and "Informal" education, providing insights into the educational background of participants in this sector. The results highlight the role of education in fish marketing and value addition, and how it varies across different regions. Alufohai et.al,(2018)

Formal Education: In Lagos, individuals with formal education made up 70% of those involved in value addition activities. In Ogun, the proportion is slightly lower at 55.66%, while in Ondo, it is 71.15%.These results suggest that a significant portion of participants in value addition activities across all three states have received formal education. This indicates that the fish value addition sector may be attracting individuals who have some level of formal training or education, which can contribute to more efficient and innovative practices. The higher proportion of formally educated individuals in Ondo could be linked to regional programs that focus on skill development and entrepreneurship in fish processing. Olufemi et al. (2023) highlight that education can play a pivotal role in improving value addition activities, as it equips individuals with the skills needed to adopt modern processing techniques, manage operations efficiently, and access better markets.

Informal Education: The percentage of participants with informal education is notably lower across all regions. Lagos recorded 30%, Ogun had 44.34%, and Ondo had 28.85%. The relatively higher proportion of informally educated participants in Ogun may indicate that fish processing and marketing in this region rely more on traditional knowledge passed down through generations. This finding aligns with Akinwale & Adebayo (2024), who argue that while formal education plays a role in enhancing value addition processes, informal education remains essential, especially in rural areas where traditional methods and indigenous knowledge are critical for survival and income generation. The lower percentage of informally educated participants in Ondo suggests a stronger emphasis on formal education, which may be influenced by regional efforts to modernize the sector and improve productivity through education and training programs. Bamigboye et al. (2024) found that formal education is a key driver of innovation in fish processing and packaging, as it enables individuals to adopt new technologies and meet international market standards.

The pooled data shows that 66.27% (509) of respondents have formal education, while 33.81%

(260) have informal education. The higher prevalence of formal education suggests a relatively educated sample, which could enhance productivity and decision-making in economic activities (Fasoranti, 2008). However, the significant proportion with informal education indicates barriers to accessing formal schooling, possibly due to economic or cultural constraints in some regions. Okelola & Babalola, (2022).

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Table 1 Distribution of Respondents according to their Socioeconomic Characteristics.

	LAGOS STATE		OGUN STATE		ONDO STATE		Pooled Data	
	Frequency	Percentage %	Frequency	Percentage %	Frequency	Percentage %	Frequency	Percentage %
Gender								
Male	10	2.94	55	24.98	5	2.40	70	9.10
Female (0)	330	97.15	166	75.11	203	97.68	699	90.98
Total	340	100	221	100	208	100	769	100
Marital Status								
Married	168	49.41	151	68.33	141	67.79	460	59.81
Single	137	40.29	53	23.98	55	26.44	245	31.94
Divorce	22	6.470	5	2.26	3	1.44	30	3.90
Widow	13	3.82	12	5.43	9	4.33	34	4.42
Separated								
Total	340	100	221	100	208	100	769	100
Age								
20-30	27	7.94	10	4.52	36	17.31	73	9.49
31-40	125	36.76	54	24.43	78	38.46	257	33.42
41-50	126	37.15	104	47.15	61	29.33	291	37.84
51-60	53	15.68	48	21.72	27	12.98	128	16.64
61-70	8	2.35	5	2.26	6	2.88	19	2.56
71 and above	1	0.29	0	0	0	0	1	0.13
Total	340	100	221	100	208	100	769	100
Level of Education								
Formal	238	70	123	55.75	148	71.24	509	66.27
Informal	102	30	98	44.34	60	28.94	260	33.81
Total	340	100	221	100	208	100	769	100
Household Size								
1-2	14	4.12	10	4.52	3	1.44	27	3.51
3-4	277	81.56	168	76.01	179	86.15	624	81.14
5-8	49	14.41	43	19.54	26	12.5	118	15.34
Total	340	100	221	100	208	100	769	100
Marketing Experience								
Less than 10years	219	64.41	172	77.83	152	73.16	543	70.61

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10 years and aboves	121	35.67	49	22.17	56	26.92	226	29.47
Total	**340**	**100**	**221**	**100**	**208**	**100**	**769**	**100**
Access to Credit Facility								
Yes	58	17.14	42	19.01	54	25.96	154	20.03
No	282	82.94	179	80.99	154	74.04	615	79.97
TOTAL	340	100	221	100	208	100	769	100
Value Addition Activities								
Involved in Value Addition	307	90.38	194	87.87	189	90.96	690	89.72
Not Involved	33	9.71	27	12.22	19	9.13	79	10.36
Total	**340**	**100**	**221**	**100**	**208**	**100**	**769**	**100**

Source: *field Survey 2025*

The Table 2 below presents the distribution of value-added fish products sold in the study area. The data highlights variations in product availability across the States, revealing trends in consumer demand, processing capabilities, and regional market dynamic.

Fish rolls are a popular value-added fish product in these states, accounting for 13.23% of sales in Lagos, 13.57% in Ogun, and 11.15% in Ondo. Fish rolls are made by combining minced or shredded fish with various ingredients like bread crumbs, spices, and seasonings, then forming the mixture into a roll shape and frying or baking it (Adeyemi et al., 2021). They provide a convenient, protein-rich snack or meal option. Odebiyi et al. (2023) emphasize that urban centers have higher demand for processed fish products due to busy lifestyles and a growing preference for convenience foods.

Smoked Fish

Smoked fish is the most prevalent value-added product, comprising 24.41% of sales in Lagos, 35.18% in Ogun, and 33.65% in Ondo. Smoking is a traditional fish preservation and value-addition method in West Africa, producing a distinctive flavor and texture (Omolaso et al., 2020). Smoked fish is a popular ingredient in local dishes and a shelf- stable protein source. . According to Bamigboye et al. (2024), smoked fish production in Nigeria faces challenges due to high production costs, lack of technology, and consumer preference for traditional fish forms.

Fried Fish

Fried fish makes up a significant portion of sales, at 18.53% in Lagos, 29.41% in Ogun, and 31.25% in Ondo. Frying is a common preparation method that creates a crispy, flavorful fish product (Adeyemi et al., 2019). Fried fish is often consumed as a standalone dish or incorporated into other meals. Akinwale & Adebayo (2023) found that fried fish is a dominant fast-food item in Nigerian markets, especially in open-air markets and roadside food stalls. Adesina & Obasi (2024) highlight that fried fish are gaining popularity in Nigeria due to their use in fast food, home cooking, and ready-to-eat meals.

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Fish Fillets

Fish fillets account for 17.65% of sales in Lagos, 20.36% in Ogun, and 19.23% in Ondo. Fillets are boneless, skinless portions of fish that are convenient for cooking and provide a lean, versatile protein source (Adewumi et al., 2016). They can be baked, grilled, or used in a variety of dishes. Olufemi et al. (2023) found that demand for fish fillets is growing among urban middle-class consumers, particularly in supermarkets and modern retail outlets

Frozen Fish

Frozen fish makes up 20.68% of sales in Lagos, 29.41% in Ogun, and 24.04% in Ondo. Freezing is a popular preservation method that allows for year-round availability and distribution of fish products (Olaniyi & Akande, 2012). Frozen fish can be thawed and prepared in various ways.

Fish Powdering

Fish powdering, where fish is dried and ground into a powder, accounts for 15.68% of sales in Lagos, 22.62% in Ogun, and 20.67% in Ondo. Fish powder is a shelf-stable ingredient used in soups, sauces, and other dishes to add protein and flavor (Adeyemi et al., 2017). Ojo et al. (2022) noted that fish powder is growing in demand for use in food seasoning and baby food production, particularly in regions with limited fresh fish availability.

Dried Fish

Dried fish is the second-most prevalent value-added product, comprising 22.94% of sales in Lagos, 33.94% in Ogun, and 32.21% in Ondo. Drying is a traditional preservation method that creates a shelf-stable, concentrated protein source (Ogbonnaya & Shaba, 2009). Dried fish is commonly used in stews, sauces, and as a snack.

Fish Barbecue

Fish barbecue, a grilled or smoked fish product, makes up 14.12% of sales in Lagos, 16.74% in Ogun, and 12.98% in Ondo. Barbecuing adds a distinctive smoky flavor and can be a convenient way to prepare fish (Adeyemi et al., 2019). Soyinka et al. (2023) identified fish barbecue as a growing trend in urban food markets, particularly among younger consumers and high-income earners.

Fish Kilichi

Fish kilichi, a dried, smoked, and spiced fish product, accounts for 10.88% of sales in Lagos, 13.57% in Ogun, and 7.21% in Ondo. Kilichi is a traditional West African delicacy that can be enjoyed as a snack or used as a flavor enhancer in dishes (Adeyemi et al., 2017). . Adeoye et al. (2024) highlight that spiced fish is widely consumed in regions where peppered and marinated fish dishes are popular, such as in Lagos and Ogun states. Olawale et al. (2023) noted that fish kilichi is gaining traction among consumers looking for high-protein snack options.

The prevalence of these value-added fish products demonstrates the importance of fish processing and preservation in the local economies of these states. The high demand for smoked, fried, and dried fish highlights the cultural and nutritional significance of these products in the region. Ongoing research and development in fish processing and value-

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addition can help improve the quality, safety, and marketability of these products, benefiting both producers and consumers (Akintola & Fakoya, 2017). The pooled data showed that smoked fish, dried fish, fried fish and frozen fish were the most prevalent in the study area.

Table 2 Distribution of Respondents According to the Types of Value Added Fish Products by States

	Lagos State		Ogun State		Ondo State		Pooled Data	
Types of Value Added Fish Products sold	**Frequency n=340**	**Percentage %**	**Frequency n=221**	**Percentage %**	**Frequency n=208**	**Percentage %**	**Frequency n= 769**	**Percentage %**
Fish Roll	45	13.23	30	13.57	23	11.14	98	12.74
Smoked Fish	83	24.41	78	35.18	70	33.65	231	30.04
Fried Fish	63	18.53	65	29.41	65	31.25	193	25.18
Fish Fillets	60	17.65	45	20.36	40	19.23	145	18.94
Frozen Fish	70	20.68	65	29.41	50	24.04	185	24.14
Fish Powdering	53	15.68	50	22.62	43	20.67	146	18.98
Dried Fish	78	22.94	75	33.94	67	32.21	220	28.61
Fish Barbecue	48	14.12	37	16.74	27	12.98	112	14.56
Fish Kilichi	37	10.88	30	13.57	15	7.21	82	10.75
Other	0		0		0		0	

Source: *field Survey 2025 Multiple Response*

Table 3 below shows the estimated Profits and ROI for the Fish Product in the study Area (Pooled Data) for the identified fish products.

Fresh Fish: The profit of ₦1,500 translates to an ROI of 20.00%. This indicates a solid return, suggesting that fresh fish is a viable product in the market. The profitability is influenced by demand, and while it is competitive, it still faces challenges from other products (FAO, 2020).

Smoked Fish: With the highest profit of ₦3,600 and an ROI of 34.61%, smoked fish demonstrates significant profitability. The smoking process not only enhances flavor but also extends shelf life, allowing for higher selling prices. This aligns with market trends where processed fish products command premium prices (Nwankwo et al., 2022).

Fried Fish: The profit of ₦2,500 and ROI of 26.31% reflect strong consumer demand for fried products. Fried Asa fish is popular in urban markets, where convenience plays a crucial role in purchasing decisions. This preparation method typically attracts a higher volume of sales (Olufayo et al., 2020).

Fish Fillets: The profit of ₦2,100 and ROI of 23.68% indicate that filleting also offers good

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returns. Fish fillets target higher-end markets, appealing to consumers and restaurants that prioritize quality and convenience (Adebayo & Daramola, 2017).

Dried Fish: The profit of ₦4,600 and ROI of 37.18% highlight the exceptional profitability of dried fish. Drying significantly reduces spoilage and increases marketability, making it a lucrative option, especially in areas with limited refrigeration (FAO, 2020).

Fish Powder The profitability of ₦4,000 and ROI of 29.63% for fish powder. Powdered fish represents an emerging value-added product, with high profit and ROI. This process adds nutritional value and extends usability, appealing to health-conscious consumers and food manufacturers (Subasinghe et al., 2021).

Frozen Fish: Freezing preserves quality but incurs higher costs. The ROI (29.63%) with a profit of ₦4,000 reflects a balance between investment and profitability, critical for reaching markets with cold chain infrastructure (Olufayo et al., 2020).

Fish Kilichi: Kilichi, a spiced dried fish product, shows robust profitability and is culturally significant in Nigerian cuisine. It combines value addition with consumer preference, making it a lucrative option , with a profit of ₦3,500 and ROI of 28.00% , fish kilichi further illustrate the diverse opportunities within the market. These products cater to specific consumer preferences and can command good prices due to their unique preparations. (IFPRI, 2022)

Table 3 Values Added and ROI for Fish Products in the Study Area

Product	Purchase Cost ₦	Cost of Value Added ₦	Selling Price ₦	Profit ₦	ROI %
Fresh	7,500	Nil	9,000	1,500	20.00
Smoked Fish	10,000	400	14,000	3,600	34.61
Fried Fish	9,000	500	12,000	2,500	26.31
Fish Fillets	8,500	400	11,000	2,100	23.68
Fish Roll	Nil	Nil	Nil	Nil	Nil
Dried Fish	12,000	400	17,000	4,600	37.18
Fish Powdering	13,000	500	17,500	4,000	29.63
Frozen Fish	9,000	500	12,000	2,500	26.32
Fish Barbecue	Nil	Nil	Nil	Nil	Nil
Fish Kilichi	12,000	500	16,000	3,500	28.00

Source: *field Survey 2025*

Table 4 below shows the constraints in the Value Addition Process. This constraint is identified by 320 respondents (94.12%) in Lagos, 214 respondents (96.83%) in Ogun, and 202 respondents (96.15%) in Ondo as a significant barrier in the value addition process. This suggests that technological advancements, such as modern processing techniques and preservation methods, are not widely available. This limitation hampers efficiency and product quality, making it difficult for marketers to compete in a fast-paced urban market (Ogunmefun & Achike, 2021).

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Access to modern technology is crucial for enhancing the efficiency and quality of fish processing. In Lagos, the lack of technological adoption limits the capacity of fish processors to implement advanced preservation methods and improve product quality (Ibrahim & Afolabi, 2023). Ogun and Ondo also face similar challenges, where traditional processing techniques prevail due to inadequate access to modern equipment and training (Ogunbajo & Ogunleye, 2023). The need for investment in technology extends to providing training for local processors, which can significantly improve productivity and product quality, thereby enhancing market competitiveness (Afolabi & Alabi, 2023).

The pooled data indicates that 95% of respondents (734 out of 769) reported a lack of access to technology as a major constraint in the value addition process. This high percentage suggests that technological barriers are a pervasive issue across the three states, with Lagos (94.12%), Ogun (96.83%), and Ondo (96.15%) showing similarly high frequencies. The lack of access to modern tools, machinery, or digital platforms for processing and marketing agricultural or industrial products can significantly hinder efficiency and productivity. For instance, in agricultural value chains, the absence of advanced processing equipment can lead to post-harvest losses and reduced product quality (FAO, 2019). This constraint may also reflect limited access to training on modern technologies, which is critical for small and medium enterprises (SMEs) in Nigeria (Akinwale et al., 2020).

Insufficient Funding

Insufficient funding is a major constraint reported by 335 respondents (98.53%) in Lagos, 218 (98.64%) in Ogun, and 202 (98.56%) in Ondo.This highlights the challenges faced by marketers in securing financial resources necessary for investment in equipment, training, and marketing. Without adequate funding, the growth and sustainability of value-added fish products are severely restricted (Ogunmefun & Achike, 2021).

Funding is essential for the establishment and operation of value-added fish processing facilities. In Lagos, the high costs associated with setting up modern processing plants hinder the ability of small-scale processors to compete (Ojo & Fadeyi, 2023). Ogun and Ondo also reflect similar trends, where limited access to financial resources restricts the potential for expansion, innovation, and adoption of better processing practices. Ogunleye & Abiodun, 2023). Financial institutions often view fish processing as a high-risk venture, leading to a lack of investment. This situation calls for targeted financial programs and government support to enhance funding availability for fish processing enterprises (Adeola & Olabisi, 2023).

The pooled data indicates that Insufficient funding is the most significant constraint, with 98.65% of respondents (758 out of 769) identifying it as a barrier. This near-universal challenge underscores the critical role of financial resources in the value addition process. Across the states, Lagos (98.53%), Ogun (98.64%), and Ondo (98.56%) report similarly high percentages, indicating that access to capital is a systemic issue. Limited funding can restrict investments in equipment, raw materials, and marketing, which are essential for scaling value-added activities. Studies have shown that SMEs in Nigeria face significant challenges in accessing credit due to high interest rates, stringent collateral requirements, and limited financial literacy (World Bank, 2020). Government interventions, such as microfinance schemes or grants, could alleviate this constraint (Ojo *et.al* (2019).

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Poor Infrastructure

Poor infrastructure is a significant issue, with 312 respondents (91.76%) in Lagos, 207 (93.67%) in Ogun, and 202 (96.63%) in Ondo identifying it as a constraint.This includes inadequate transportation networks and storage facilities, which can severely impact the supply chain and freshness of fish products. Improving infrastructure is essential for enhancing the efficiency of the fish marketing sector in Lagos (Ogunmefun & Achike, 2021).

The pooled data reveal that Poor infrastructure affects 95.45% of respondents (720 out of 769), making it another critical constraint. This issue is particularly pronounced in Ondo State (96.63%), followed by Ogun (93.67%) and Lagos (91.76%). Inadequate infrastructure, such as unreliable electricity, poor road networks, and lack of storage facilities, hampers the value addition process by increasing operational costs and reducing product quality. For example, unreliable power supply forces businesses to rely on costly generators, while poor transportation networks limit access to markets (African Development Bank, 2018). Addressing infrastructure deficits is essential for enhancing the competitiveness of value-added products in Nigeria (Adebayo & Iweala, 2021).

Inadequate infrastructure, including transportation, storage facilities, and market access, severely impacts the efficiency of the value addition process. Lagos faces challenges related to traffic congestion and poor road conditions that can delay the distribution of fish products (Eze & Nwankwo, 2023). Ogun and Ondo exhibit similar infrastructural deficiencies, which can lead to spoilage and loss of quality in fish products. Improving infrastructure is vital for reducing post- harvest losses and enhancing the overall efficiency of the fish value chain (Ajayi & Ojo, 2023).

Limited Market Access

Limited market access is noted by 5 respondents (1.47%) in Lagos, 21 (9.00%) in Ogun, and 5 (25.48%) in Ondo.This may be attributed to the large population and diverse consumer base, which provides ample market opportunities. Nevertheless, continuous efforts to maintain and expand market access are necessary to sustain growth (Ogunmefun & Achike, 2021).

The pooled data indicates that Limited market access is a relatively less prevalent constraint, affecting 10.37% of respondents (79 out of 769). However, there is significant variation across states, with Ondo State reporting the highest percentage (25.48%), followed by Ogun (9.50%) and Lagos (1.47%). This variation may reflect differences in market proximity, with Lagos benefiting from its urban setting and better market linkages. Limited market access can result from inadequate distribution networks, lack of market information, or low consumer awareness of value-added products. This constraint is particularly challenging for rural producers who face difficulties reaching urban markets (IFAD, 2021). Strategies such as market linkage programs and digital marketing platforms could help address this issue (Ogunleye & Oladejo, 2020).

Market access is crucial for the distribution and sale of value-added fish products. In Lagos, while there is a high demand for fish, competition and market saturation can make it challenging for new entrants to establish a foothold (Ibrahim & Adetunji, 2023). Ogun shows slightly more concern over market access, particularly in rural areas where local markets may be small and less accessible. Ondo, with a higher percentage indicating limited market access,

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suggests that geographic and logistical barriers significantly hinder producers from reaching broader markets. Addressing these barriers through improved market linkages and trade facilitation could enhance the marketability of local fish products (Ogunbajo & Ogunleye, 2023).

Regulatory Challenges

Regulatory challenges are reported by 220 respondents (64.71%) in Lagos, 156 (70.00%) in Ogun, and 101 (64.90%) in Ondo. This includes compliance with health and safety standards, which can impose burdens on small-scale producers. Navigating these regulations effectively is crucial for maintaining market access and ensuring product quality (Ogunmefun & Achike, 2021).

The pooled data indicates that Regulatory challenges affect 66.45% of respondents (511 out of 769), with Ogun State reporting the highest percentage (70.59%), followed by Lagos (64.71%) and Ondo (64.90%). These challenges may include complex licensing processes, high compliance costs, or inconsistent regulations, which can deter businesses from engaging in value addition. In Nigeria, regulatory bottlenecks often discourage SMEs from formalizing their operations, limiting their growth potential (SMEDAN, 2019). Streamlining regulatory frameworks and providing support for compliance could mitigate this constraint (Okeke & Eme, 2020).

Regulatory hurdles can significantly impact the operations of fish processing businesses. In Lagos, stringent regulations regarding food safety and quality control impose additional costs on processors (Eze & Nwankwo, 2023). Ogun and Ondo face similar regulatory environments,where compliance with local and national standards can be cumbersome for small-scale operators. Streamlining regulatory processes and providing support to help processors comply with standards could alleviate some of these burdens and promote growth in the sector (Adeola & Olabisi, 2023).

Water Hyacinth Infestation

Water hyacinth infestation is a significant environmental constraint, affecting 330 respondents (97.15%) in Lagos, 95 (42.99%) in Ogun, and 5 (24.03%) in Ondo.This invasive species can disrupt fishing operations and impact water quality, leading to decreased fish stocks. Addressing this issue through effective management strategies is essential for sustaining fish production in the region (Ogunmefun & Achike, 2021).

The pooled data indicates that Water hyacinth infestation is a significant constraint, affecting 61.85% of respondents (475 out of 769). However, its impact varies widely across states, with Lagos reporting the highest percentage (97.15%), followed by Ogun (42.99%) and Ondo (24.03%). This variation likely reflects the prevalence of water bodies in Lagos, where water hyacinth can obstruct waterways used for transportation or irrigation, affecting agricultural and industrial activities. Water hyacinth is a known invasive species in Nigeria, reducing water quality and disrupting value chains, particularly in fishing and crop production (Imevbore et.al, 2018). Control measures, such as biological or mechanical removal, could help mitigate this issue (Uka et al., 2021).

Water hyacinth infestation poses severe challenges to fishing and fish processing. In Lagos, it disrupts fishing activities by obstructing waterways and harming aquatic ecosystems (Ajayi &

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Ojo, 2023). Ogun, while less affected, still faces challenges related to water quality and availability due to this invasive species. Ondo shows a lower percentage indicating concern, suggesting that water hyacinth may not be as prevalent in its fishing environments. Addressing this issue through targeted environmental management strategies is crucial for restoring water quality and ensuring sustainable fish production (Ogunbajo & Ogunleye, 2023).

The analysis reveals critical constraints faced by fish marketers across Lagos, Ogun, and Ondo States. Addressing issues such as lack of access to technology, insufficient funding, poor infrastructure, regulatory challenges, and water hyacinth infestation is essential for enhancing the value addition process in the fish marketing sector. Targeted interventions, including investment in technology, infrastructure, and regulatory simplification, are crucial for fostering a more resilient and competitive fish market.

The pooled data highlights that insufficient funding (98.65%), poor infrastructure (95.45%), and lack of access to technology (95%) are the most pressing constraints in the value addition process across Lagos, Ogun, and Ondo States. Water hyacinth infestation and regulatory challenges also pose significant barriers, particularly in Lagos, while limited market access is a lesser but still notable issue, especially in Ondo. Addressing these constraints requires targeted interventions, such as improving access to finance, upgrading infrastructure, promoting technology adoption, and implementing effective regulatory and environmental management strategies.

Table 4 Distribution of Respondents According to Constraints in the Value Addition Process

Constraints in the Value Addition Process	LAGOS STATE		OGUN STATE		ONDO STATE		Pooled Data	
	Frequency	Percentage %	Frequency	Percentage %	Frequency	Percentage %	Frequency	Percentage %
Lack of access to Technology	320	94.12	214	96.83	200	96.15	734	95.
Insufficient Funding	335	98.53	218	98.64	205	98.56	758	98.65
Poor Infrastructure	312	91.76	207	93.67	201	96.63	720	95.45
Limited market access	5	1.47	21	9.50	53	25.48	79	10.37
Regulatory challenges	220	64.71	156	70.59	135	64.90	511	66.45
Water hyacinth infestation	330	97.15	95	42.99	50	24.03	475	61.85

Source: field Survey 2025 Multiple Response

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CONCLUSION

The research on "Value Addition and Profitability in Fish Marketing: Evidence from Southwest, Nigeria" has illuminated the critical role of value addition in enhancing the economic viability of the fish sector across Lagos, Ogun, and Ondo States. Key findings reveal that processed fish products, such as fried, smoked, and dried fish, consistently yield higher returns on investment (ROI) compared to fresh fish, with ROIs ranging from 25% to 46% for value- added forms like fried tilapia in Ondo State and fish powdering for Asa fish in Ogun State. This underscores the importance of processing techniques in reducing post-harvest losses, extending shelf life, and meeting urban consumer demands for convenience and quality, as evidenced by the rapid transformation in aquatic food value chains observed in three Nigerian states.

RECOMMENDATIONS

1. The marketers should be encouraged to adopt adequate value addition processes to improve their profitability.

2. Marketers are advised to invest more on fish product with high ROI (return on investment) such as smoked, dried and fish fillets.

3. The government and private sector should invest in modern fish processing equipment, such as smoking kilns, drying machines, and cold storage facilities. This will improve the efficiency and quality of value-added fish products and reduce post-harvest losses.

4. Training programs on modern value addition techniques, product packaging, and business management should be provided to fish marketers. This will help them improve the quality of their products and enhance their marketability.

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