

# Fish Enterprise Financing and its Impact on Exports and Research and Development: The Case of Uganda's Fish Industry

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**Abstract:** *The literature on enterprise finances focuses overwhelmingly on manufacturing industry and clustering industry in the developing countries. This study aims to examine the source of financing and its impact on exports and research and development (R&D) in the Uganda fish industry. The study adopted a mix approach using qualitative questionnaire survey and quantitative approach to assess the source of financing and its impacts on exports and R&D. The findings reveal that fish enterprises' access to formal financial credit is limited to supporting fish production, exports and R&D. The developmental role of government, innovative lending technologies of financial institutions and leasing firms can be instrumental in addressing the SMEs' persistent financing difficulties to boost overall socio-economic developments.*

**Key words:** Finance, Fish, SMEs, Uganda

**JEL Classification:** J016, G2

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## 1. Introduction

The importance of financing Small and Medium Enterprises (SMEs) in developing economies has been extensively researched in the development economics literature (Berger and Udell, 1998, 2006, Beck *et al.*, 2006, Demirguc-kunt, 2007, Stiglitz and Weiss, 1981), but very little, if any, is known on the financing experiences' of fish SMEs in the Least Developing Countries (LDC). Several studies have shown that SMEs offer immense potential for industrial development and economic growth in developing countries. Fish SMEs in particular, contribute immensely to socio-economic development in LDCs in terms of employment, income for fishermen, foreign exchange through exports and providing animal proteins to those who depend on it for

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livelihood (Fulgencio, 2009, Kurien, 2003, Keizire, 2004). However, the full realisation of these benefits is often hampered by persistent lack of access to formal external financial credit to finance the operational and technological capabilities required to participate in fish export markets. Fish SMEs play an important role in the economy of Uganda allowing it access to formal external debt vital for growth and export development. Storey (1994) asserts that the fish SMEs' growth is constrained by high cost of funding; it is well established that availability and access to financial credit for investment is important for the SMEs' growth and sustainability.

The financing of fish SMEs differs from that of larger enterprises, resulting in varying financing decisions and behaviours. There are several important distinguishing factors between small and large businesses<sup>1</sup> linked to informational opacity (Berger and Udell, 1998, 2006); it thus affects the small firms' access to formal external debt. The lack of access to external finance may not be due to low demand but rather the difficulties of accessing it (Djankov *et al.*, 2007; Fafchamps, 1995 and Bigsten 2003). Accordingly, fish SMEs' effective demand for formal finance depends on their ability to resolve asymmetric information (Beck *et al.*, 2002; Rocca *et al.*, 2011; Stiglitz and Weiss, 1981). The lack of access to external financial debt may also be due to fish entrepreneurs' choice as well as weak local financial and institutional developments (Becks *et al.*, 2004; Levine, 1997:688-690; Rocca *et al.*, 2009:11; Hussein and Demetriades, 1996; Aryeetey, 2005).

When financial reforms were introduced in many developing countries, SME financing attracted much attention due to its envisaged role in supporting industrial development (Djankov, 2007, Fafchamps *et al.*, 1995; Beck *et al.*, 2006; Biggs 2006). However, despite its developmental role, fish SMEs continue to experience acute lack of access to formal finance due to various inherent internal and external constraints. Thus, in spite of the high risk profile, exposure to asymmetric information, lack of collateralised assets and informality that characterise most fish SMEs, policymakers and banks must formulate appropriate strategies to finance the needs of this important industry. Fish SMEs in Uganda have access to a wide range of financing avenues including personal, family and friends, trade credit, microfinance, savings and credit cooperatives, government credit schemes and a more formal commercial bank financing.

However, lack of access to formal credit to meet the needs of fish SMEs has motivated non-governmental organisations (NGOs) and other informal financing mechanisms to fill the gap. In spite of these developments, several studies (see Ledgerwood, 2000; Robinson, 2001; Rhyne and White, 2003; Hulme and Mosley, 1996, 1998) reported serious limitations prevail in addressing the long-term sustainable fish SME financing needs. This is attributed to high donor dependence and limited funding capacity to support business expansion and growth needs.

Governments in most developing economies have also in the past assumed direct responsibility to extend financial support to key sectors of the economy. They have therefore, been at the forefront of promoting carefully-crafted financial access programmes in terms of direct allocation of funds to the agricultural sector under various institutional arrangements (Jaabi, 2004). However, some of these interventions were short-lived due mainly to political hijacking, limited outreach, high non-performing loans and considerable losses. In most cases, the targeted groups are never reached. The continued lack of access to formal credit from commercial banks has been identified as a major constraint to enterprise operations and growth prospects (Becks *et al.*, 2006; Storey, 1994; Berger and Udell, 1998, 2006).

While empirical on enterprise financing focused largely on manufacturing and clustering industries in developing economies, this study examines the source of finance of fish SMEs and analyses its impact on fish exports and R&D in Uganda's fish industry. What are the main financing sources of fish SMEs and what are their impact on exports and R&D in Uganda's fisheries industry? The latter form the research questions of the study.

The paper begins by tracing the background of the Uganda fishery industry followed by a detailed literature review on the subject. This section also discusses the methodology and analytical approach adopted followed by the findings of the study. The paper concludes with a review of important findings and implications for the industry.

## **2. A Brief History of the Uganda Fish Industry**

The fish industry is a crucial component of the economy of Uganda contributing significantly to household incomes, food security, Gross Domestic Product (GDP), tax revenues, providing direct employment for over 700,000 people and indirectly supporting over two million people (Kiggundu, 2006; Hammerle *et al.*, 2010). The Poverty Eradication Action Plan (PEAP) that was first developed in 1997 and revised in 2004 highlighted fisheries as a key sector that can contribute to poverty reduction and economic growth (Esemu, 2012). Fish is also the largest agricultural export commodity overtaking coffee in 2005 and meeting nutrient needs of some 22 million people in East Africa (Ishengoma and Koppel, 2008).

It is important to note that agriculture plays a major role in the economies of LDCs in terms of generating incomes, employment and exports; thus, the role of finance is crucial to support its growth and development. Most countries in Sub-Saharan Africa (SSA) face physical and financial infrastructure limitations as well as challenges related to lukewarm business environment and institutional capabilities; hence, policy initiatives to support enterprise access to formal agricultural finance are essential for deepening of industrial growth.

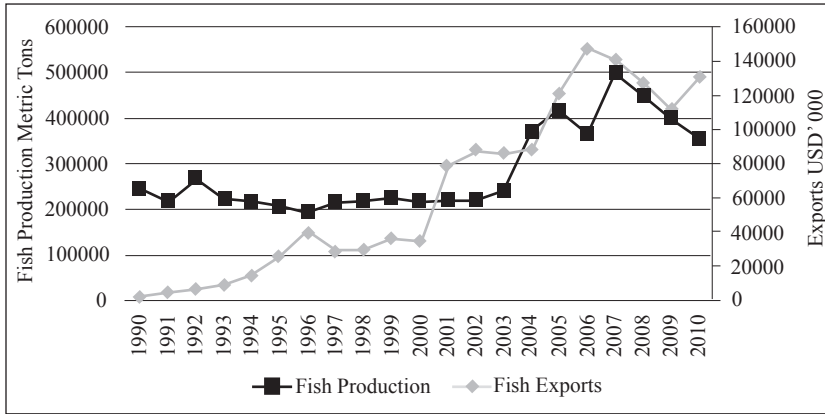
To boost fish production, processing and exports, access to finance is crucial to support institutional and technological capabilities, technical skills and acquire sophisticated fishing gears. Uganda's fish resource endowments in the inland lakes of Victoria, George, Albert, Edward and Kyoka are estimated at about 400,000 – 500,000 tonnes in 2005 (Fulgencio, 2009), but its sustainable exploitation remains a challenge. With the importance attached to the fisheries industry in Uganda, a study of its financing will be useful for policy makers.

There has been a phenomenal growth in fish exports from Uganda (see Figure 1), rising from USD1.9 million in 1990 to USD\$80 million in 2002 to USD\$147.2 million in 2006 before dropping to USD\$131 million in 2010 due to increasing competition in the main export markets in Europe and USA as well as threats to fresh water fish stocks overfished Nile perch (UBOS, 2011, see Figure 1). Fish catches (production) also grew rapidly from 245,223 tonnes in 1990 dropping to 218,026 tonnes in 1997 as a result of the fish export crisis. It recovered to 219,356 tonnes in 2000 surging up to 367,039 tonnes in 2006 to its highest at 500,000 tonnes in 2007 before declining to 352,600 tonnes in 2010 due to overfishing. The increase in fish production and exports were largely as a result of collaborative efforts in the industry, supportive sector policies, financial access facilitated by incentive programmes to financial institutions to lend to this vital sector as well as supply and value chain financing both locally and from overseas importers (Kiggundu, 2005; Namisi, 2005). Figure 1 shows fish production and exports from 1990 through to 2010, both recording impressive growth from 2000 when the industry recovered from the fish export crisis but from 2005 to 2006 the industry recorded declines in production levels. By 2000 when the crisis ended, fish processors and exporters had upgraded their production standards and processing systems to meet international health, sanitary and food safety requirements (Kiggundu, 2006).

The ban on the export of unprocessed fish<sup>2</sup> in Uganda has also attracted international and regional foreign firms into Uganda to exploit opportunities in the industry (Kiggundu, 2006; Fulgencio, 2009). The policy changes led to increase in fish production and exports as shown in Figure 1.

However, the growth in fish exports was briefly interrupted by the EU ban on fish imports from Lake Victoria during 1997-2000 through its directive 97/296/EC when salmonellae bacteria was discovered in samples of Uganda's fish exports (McCormick 1999; Kiggundu 2005). This coupled with an outbreak of cholera became a huge setback to the East African economies of Uganda, Kenya and Tanzania that were benefiting from fish exports to the EU. This triggered a joint response from key stakeholders to institute technological and institutional changes. From 2006, the industry recorded sharp declines in exports and catches largely due to overfishing of the main commercial fish species at the Nile perch as well as stiff competition from global fish markets.

Figure 1: Fish Exports, Uganda, 1990 – 2010



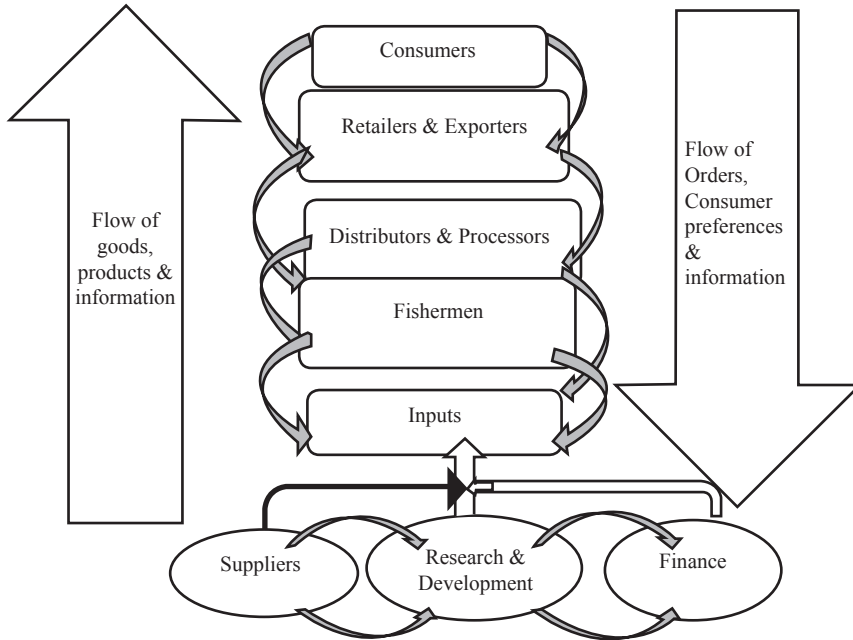
Source: Uganda Bureau of Statistics, (2011); Bank of Uganda (2011)

Notwithstanding the rapid growth in Uganda fish exports, technological upgrading and competence building are particularly important for fish SMEs in Uganda because fish is a perishable commodity which requires institutional and value chain capabilities to build and enhance quality and hygiene along the supply chain. This is necessary to boost production, processing and exports to lucrative markets. It is particularly important because the fish industry is faced with stringent technical barriers and strict sanitary standards which require huge financial resources to support investments in skilled human resources, state-of-the-art equipment and other capabilities to enable fish firms to compete in global markets where sophistication of products matter (Rasiah, 2007). Thus, fish SMEs access to formal finance sector is crucial and yet complex compared with enterprises in other industries, hence calling for public sector support in building the right institutions and addressing collective action problems.

Fish is a highly perishable commodity which, in principle, should have the shortest possible distribution chain with little involvement of intermediaries. However, in reality, the commodity goes through a complex distribution chain from fishermen to the consumer (see Figure 2). The requirement of sanitation and hygiene involved in fish handling are complex and costly, demanding huge access to finance, investment in equipment, human skills, plant layout, cooling systems and other technologies in the entire processing and export supply chain.

As shown in Figure 2, financing is needed for R&D and suppliers of inputs. Steady financing and long-term commitment to R&D are vital to maintain high standards and hygiene in an effort to produce high quality fish products enabling them to compete effectively in international fish markets.

Figure 2: Fisheries Supply and Value Chains



Source: Adapted from Katz (2006)

### 3. Literature Review

This section examines fish SMEs sources of financing and how it impacts on their performance. Different financing options exist for SMEs across developed and developing countries. Their access to formal finance depends on the SMEs' ability to address asymmetric information, visibility problems and collateral issues. The following sub-sections focus on financing sources and their impact on SMEs' performance.

#### 3.1 Financing Sources

SMEs have different financing options ranging from equity to debt financing. The nature of business, its characteristics and other financing needs along its life cycle will determine the most suitable type of financing. Capital structure decisions of SMEs differ from those of large corporations resulting in varying financing behaviours. Several important distinguishing factors between SMEs and large corporations have been overlooked due to asymmetric information (Berger and Udell, 1998, 2006). Large businesses use various financing options

including stock markets while small enterprises use external loans, trade credit and owners' equity or support from family and friends. Small fish firms face difficulties in participating in stock markets due to high costs and too much bureaucratic red tape (Rocca *et al.*, 2011).

SMEs in general and fish SMEs in particular, can avail financing sources categorised as internal and external sources. These include personal funds (own equity), retained earnings (accumulated profits) and external sources of family and friends, bank loans and overdrafts, microfinance loans, trade credit, government credit schemes, cooperative credits, share capital (outsiders), venture capital, leasing and hire purchase (Berger and Udell, 1998; Rocca *et al.*, 2011, Hulme and Mosley, 1996, 1998; Riley, 2012). With increasing challenges of tight liquidity, many organisations have to look for short-term finance in the form of overdrafts and loans in order to provide cash flow cushion.

Leasing and hire purchasing of equipment such as fish gears, cooler trucks, plant and machinery are crucial for fish SMEs to boost production capacity and participate in the export market. According to this arrangement, the lessor owns a capital asset but allows the lessee to use it and makes periodic payment under the terms of the lease. Hire purchase is a credit facility similar to leasing in the form of monthly instalment to the "lessor" except that ownership of the asset passes to the customer when he settles the final instalment whereas in leasing, the lessee never becomes the owner of the asset (Riley, 2012). These lending options are important especially in the face of collateral constraints as the underwriting assets serve as collateral in cases of default. In hire purchase and leasing, the asset can be repossessed in cases of defaults.

### *3.1.1 Asymmetric Information Theory*

SMEs access to commercial bank credits depends largely on their ability to address information opacity (Michaelas, 1999; Rocca *et al.*, 2011), collateral issues and the overall macro-economic environment (Demirguc-kunt, 2001; Berger and Udell, 1998, 2005; Beck *et al.*, 2006). Smaller and younger firms tend to report greater financing obstacles compared with larger and older firms (Berger and Udell, 1998:615-618, 2006; Becks *et al.*, 2004, 2006) mainly due to asymmetric information. Lack of access to relevant information and high transaction costs hamper fish SMEs' ability to borrow from external financial sources (Stiglitz and Weiss, 1981:393). Due to limited access to information on the businesses' income streams by external financiers, it becomes difficult to appraise loan applications and monitor them efficiently. As a result, external financiers are likely to limit their financing to fish SMEs to reduce the risk of non-performing loans. Most external financiers either reduce the amount of financing sought, ration or deny access altogether placing the SMEs in a vulnerable position (Stiglitz and Weiss, 1981: 393-405).

Formal financial information requirements in the form of audited financial statements and business plans are difficult for most SMEs to provide, or even if provided often lack details, quality and rigour (Berger and Udell, 2005:1-3; Michaelas et al, 1999:116). Most small enterprises are not known to keep proper record of transactions that will facilitate efficient appraisal and monitoring. The situation is further compounded with low collateralised assets to soften information asymmetries (North, 1990; Rocca *et al.*, 2009:12).

The problem of SMEs is more acute in LDCs like Uganda with a high risk profile, volatile rates of return, high incidences of start-up failure (see Storey, 1994), capital constraints and skilled human resources. This is aggravated by lack of accurate and reliable information, poor business environment, weak security-related transactions and property rights protection problems (Djankov *et al.*, 2007:299-305; Fafchamps *et al.*, 1994, 1995). “Hard” information required by external financiers such as audited financial statements, business plans, feasibility studies and collateralised asset-based lending are often easier in developed economies due to more sophisticated financial and institutional developments (Levine 1997; Becks *et al.*, 2006); SMEs in LDCs face difficulties in providing this data (Michaelas *et al.*, 1999; Berger and Udell, 2005).

### *3.1.2 Enterprise Life Cycle Financing*

Studies have shown that new businesses generally suffer from lack of information constraining their ability to access external funding (see Beck *et al.*, 2006; Berger and Udell, 1998, 2005; Stiglitz and Weiss, 1981). In addition, Berger and Udell (1998) argue that younger and smaller enterprises find it too expensive to service interests of external loans in addition to having less leverage as a result of information opacity culminating in difficulties in raising positive cash flows at start-up to servicing loan interest payments. .

Several studies including Becks et al. (2005, 2006, 2008), Ayyagari et al. (2003) and Fafchamps et al. (1994, 1995) have argued that capital shortage is a major problem affecting the SMEs’ performance and growth particularly in LDCs. It is argued that most small enterprises often opt for self-exclusion (Demand-Side Theory) due to difficulties in accessing and servicing external debts. This is blamed on slow industrial growth of SMEs (low institutional developments) and their low absorptive capacities coupled with low capabilities and scale to meet “hard” information requirements of formal external financiers (Berger and Udell, 1998, 2006). In line with the Pecking Order Theory of Myers (1984), enterprises finance their businesses in a hierarchical manner based on the relative costs of the various financing sources. The theory suggests that SMEs prefer internal financing sources (personal funds and retained earnings/profits) with lower costs turning only to external finance (debt and equity) when



internal funds are exhausted or inadequate. Therefore, enterprises with low capabilities, mainly new and small enterprises, tend to rely on retained profits as the lesser information sensitive security (Rocca *et al.*, 2009; Myers, 1984; Myers and Majluf, 1984) before external debt and equity capital in the later stages due to information and collateral constraints. Many are forced to resort to alternative informal financing sources, government credit schemes, NGO revolving funds and trade credit to address their financing needs.

Accordingly, trade credits offered by overseas importers of Nile perch in the EU played a vital role in helping Uganda to solve its fish exports crisis (Abila *et al.*, 2000, 2006; Keizire, 2004). Many provided pre-shipment financial support as well as loan schemes, plant and machinery and technologies for local processing and exporting firms to meet export requirements. Some eventually became equity shareholders in the local firms. Many assisted by investing in fishing equipment such as inland fish refrigerated trucks to transport fish from landing sites to processing centres and by providing high quality mesh gears, the cost of which are ordinarily beyond the means of many local fishermen. With low local firm capabilities, overseas buyers were also a vital source of knowledge for new fish product development, designs and marketing in the supply chain.

### *3.1.3 Supply-Side Constraints*

However, despite much progress in the industry, performance of fish enterprises are limited in terms of fish production and exports by supply-side constraints ranging from public policies, human skills, access to long-term finance, physical and market infrastructure, thus posing constraints on the industry and preventing it from reaching frontier phase in product development, control of market and supply chains and competitiveness in global markets (see UNCTAD, 2001; Fulgencio, 2009; Rogers and Pontius, 2009; Chandra and Kolavalli, 2006; Lall, 1992:168).

With these challenges, institutional innovations can be introduced to mitigate some of the problems associated with financial intermediation and address the most glaring consequences.

## **3.2 Financing Impact on Enterprise Performance: Exports and R&D**

Financing and enterprise performance nexus has attracted much theoretical modelling and empirical examination (Gorton and Rosen, 1995; Berger 2002; Saunders *et al.*, 1990, Ojo, 1999; Ayyagari *et al.*, 2003). The study of how financial leveraging exert substantially on enterprise performance is linked with the work of Ayyagari *et al.* (2003). The findings show a strong positive correlation between SME contribution to total employment and GDP per capita

in high income economies compared with Middle and Low-income economies associated with low levels of financial and institutional developments. Ayyagari et al. (2003) therefore shows empirically that with unfettered access to finance, SMEs have the potential to increase their contributions to total employment, GDP and the economy at large. The contributions become more meaningful in economies with positive correlations to other characteristics such as developments in financial intermediation, legal systems, business environment and competition (see North 1990; Levine 1997; Beck *et al.*, 2004, 2006, 2008, Demiguc-kunt 2007).

There is a broad consensus among researchers that financial leverage increases enterprise earnings with the assumption that debt is a relatively low-risk security (Haim and Marshall, 1998). As argued by tax-based theory, debt interest payment is deductible for tax purposes and there is no share dilution in leveraging enterprises. As debt is non-permanent, it permits greater flexibility for enterprises to adjust their financing requirements to replace external debt with accumulated profits to meet unexpected and unanticipated costs (Ojo, 2012; Michaelas *et al.*, 1999; Van Horne, 2002; Krishnan *et al.*, 2013). Haim and Marshall (1998) and Van Horne (2002) conclude that debt increases earnings of shareholders, though Pandev (2008) argue to the contrary that the introduction of debt into enterprise capital structure adds financial risks, thus providing varying returns to shareholders. However, Mark and Sheridan (2006) argue that the enterprises' desire to increase debt levels are expected when cash flows are higher associated with tax benefits of deductible debt interest payments. Thus, external financing plays a crucial role in supporting the growth and development of fish SMEs and in this way facilitates their role in the economy. Increasing access to formal finance and supportive policies in Chile (Katz, 2006), Malaysia (Rasiah, 2011) Taiwan (Mathew, 2006) and India (Naik, 2006) have helped the SMEs in these countries to expand production and exports of salmon fish, oil palm, technological upgrading and maize production respectively.

On the other hand, global trade particularly in fish products affects economies differently (Lall, 1992; Rasiah, 2007), benefitting those that have built right capabilities including financial and technological developments while preventing others (mainly LDCs) from exploiting the opportunities offered by global fish exports. Economies with enhanced financial access and technological capabilities are able to enjoy sustained increase in exports, growth, value addition and surging employment. The lack of it as in most Sub Saharan African (SSA) countries has denied the region similar experience (Lall, 1992 and Rasiah 2006, 2007, 2011). However, the fish export crisis brought about the much-needed collaboration among key stakeholders (government, meso-organisations, fish actors, banks, internal development partners, among others) to address constraints in the industry including finance, technologies, sanitary

conductions and hygiene in the supply chain which are key requirements of fish exports to European Union.

#### **4. Methodology**

This section explains the methodology adopted in the study. It shows the sample size, specifications of equations and the dependent and independent variables. The study employed a mix method using questionnaire survey and quantitative approach in addressing the research questions. Fish SMEs employing 6-100 full time employees are involved in highly concentrated fishing activities as defined by the industry.

##### **4.1 Data Collection**

The survey questionnaire was administered to fish industry players in both rural and urban Uganda and the targets were fishermen, fish traders, distributors, exporters and processors. The survey locations captured in the sample were drawn from Kampala and Entebbe (urban areas) and Kasenyi in Wakiso District, Musoko and Masese in Jinja (rural areas). The survey included key fish industry players at different stages of the value chain. It involved 35 fishermen, 46 distributors, 30 processors, 7 exporters and 42 traders with 55% being small-scale and 45% medium-sized enterprises. A structured questionnaire was used as the main survey instrument coupled with one-to-one personal interviews.

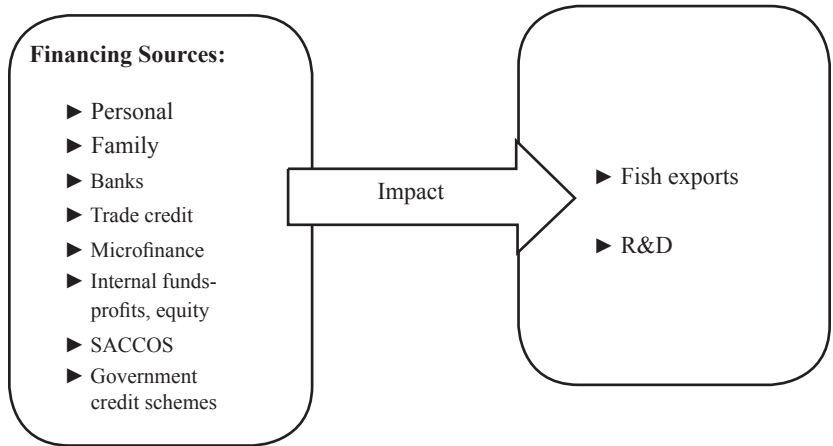
##### **4.2 Sample Size**

The sample in this study was purposively and randomly selected in the absence of a comprehensive data on the number of fish enterprises in Uganda. The sample size consisted of 160 respondents were recruited from key fish industry players. Purposeful random sampling was used as there was no formal list of fish enterprises to conduct structural random sampling. Using purposeful sampling, we targeted fish enterprises across the industry to show wide variations in their broad financing sources and performance (exports and R&D).

The survey conducted on fish SMEs captured different financing methods for small and medium enterprises at both start-up and working capital financing (see Figure 3). This included informal financing (personal and family support), semi-formal (trade credit, government credit schemes and cooperative credits) and formal financing (micro financing and commercial bank financing). Figure 3 shows the financing sources and their impact on exports and R&D. Fish SMEs that are able to access external finance to increase their catching capacity (production), exports and likely to undertake R&D. Most small enterprises, due to their size and age face, difficulties in accessing external finance in line with the

literature though through their linkages with medium and large fish enterprises, they are able to access trade credit which enhances their performance and efficiency. Small fish enterprises resorting to informal financing such as personal and family face constraints in their operations to acquire modern fishing gear, transporting the fish, meeting quality standards, adopting new processing methods, and in meeting EU export sanitary requirements.

Figure 3: Fish SME Financing Framework Analysis



Source: Author

### 4.3 Variable Measurements

Data on the following independent and dependent variables are collected, processed and analysed using the equations of export and R&D incidence. The variables used in the analysis included size, age, financial access, R&D and export incidences of the enterprises.

Size of the firms is measured by the number of fulltime employees. Due to the informal nature of many SMEs, keeping proper records of total assets and total sales may prove difficult, thus making use of number of employees as the best proxy of size. A firm employing six to 20 full time staff is defined as a small enterprises while those employing 21 to 100 full time employees are considered as medium enterprises. Age of the firms are measured based on the number of years in operation.

Fish enterprises reported a number of constraints that limited their access to formal finance ranging from lack of collateral and guarantors, high interest

rates and fear of defaults, among others. Request for external financial access was then examined against those that were approved and rejected. Financial Access (FA) was estimated as a dummy variable where:

Financial Access (FA) Approved = 1, FA Rejected = 0

To assess performance, we examine the export and R&D incidences.

Fish enterprises are asked whether they participate in export markets. Many of them still sell their produce to local markets while some to processing and exporting firms others export directly to sub-regional and overseas markets.

Thus, Export Incidence (EI) was estimated as:

(EI) 1 = Yes, (EI) 0 = No

R&D incidence (RDI) is a dummy used as proxy of technological upgrading measured as:

RDI = 1 if enterprise reported Yes (participates in R&D)

RDI = 0 if enterprise reported No (no participation in R&D)

## **5. Model Specification and Data Analysis**

Logistic regression is used as the dependent variables are dummies. Eviews Version 8 is used to test for correlation and levels of significance between dependent and independent variables. The impact of financing on performance indicators such as export and R&D incidences were assessed through the following model specifications.

$$EI = C + \beta_1 \text{Lnem} + \beta_2 \text{FinAccess} + \beta_3 \text{LnAge} + \beta_4 \text{Industry\_Actors} + \mu \quad (1)$$

$$RDI = C + \beta_1 \text{Size\_EM} + \beta_2 \text{FinAccess} + \beta_3 \text{Age} + \beta_4 \text{Industry\_Actors} + \mu \quad (2)$$

Note: Industry actors include fishermen, distributors and processors.

This section focuses on fish SMEs financing sources and its impact on exports and R&D. As shown below, access to external finance is crucial to participate in export markets in addition to sustained commitment in R&D to remain efficient and competitive in the global market. A survey conducted captured a wide range of financing methods used by fish enterprises. While many small enterprises turn to informal finance and semi-formal financing due to strict conditionalities attached to formal credit, medium-sized fish enterprises have a relatively broader access to formal finance due to more visibility, less information opacity, accumulation of collateralised assets, positive cash flows, among others. Fish enterprises financing sources is examined based on start-up and working capital financing from informal, semi-formal and formal external financing.

### 5.1 Start-up Financing

Fish SMEs, particularly small fish enterprises, start-up financing sources are dominated by personal and family funding totalling about 79.6%. . However, informal financing declined significantly among medium enterprises due mainly to size, absence of information asymmetries, visibility and formality.

Government credit schemes are not popular among small enterprises compared with medium enterprises suggesting more support for the latter. Bank financing was the least popular financing option among small enterprises mainly as a result of high asymmetric information and collateral constraints at start-up. This is in line with literature findings.

Table 1: Sources of Finance for fish SMES, (2010)

	Start-Up		Working Capital	
	Small Enterprises	Medium Enterprises	Small Enterprises	Medium Enterprises
Personal	57 (64.8%)	20 (27.8%)	38 (44.2%)	0 (0.0%)
Family	13 (14.8%)	2 (2.8%)	0 (0.0%)	0 (0.0%)
Bank	0 (0%)	3 (4.2%)	3 (3.5%)	18 (24.3%)
Trade credit	9 (10.4%)	7 (9.7%)	4 (4.6%)	15 (20.3%)
Microfinance	5 (5.7%)	8 (11.1%)	7 (8.1%)	20 (27%)
Equity/Internal funds	0 (0%)	5 (6.9%)	13 (15.1%)	7 (9.5%)
SACCOs*	2 (2.3%)	10 (13.9%)	18 (20.9%)	9 (12.2%)
Government credit schemes	2 (2.3%)	17 (23.6%)	3 (3.5%)	5 (6.7%)
<b>Total</b>	<b>88 (100%)</b>	<b>72 (100%)</b>	<b>86 (100%)</b>	<b>74 (100%)</b>

Source: Author's Survey (2011) Note: \* Savings and Cooperatives Credit Organisations

Personal, family and trade credit financing are more popular among small enterprises at start-up unlike medium enterprises as shown in Table 1. The implications are that fish SMEs and SMEs in general face formal financing difficulties across the developing world despite their important contribution to the economy. As the industry contributes significantly to the economy of Uganda (see Section 2), greater public sector support is required to enhance enterprise capabilities and ease their financial access to productive resources. Through industry support, some micro and small firms are encouraged to merge, form clusters or collaborate closely to overcome difficulties associated with operating tiny firms. With microfinance institutions and commercial banks having more sustainable financing models, adopting strategic and innovative lending technologies to overcome the challenges of weak business environment, poor physical and financial infrastructure can be instrumental in financing industry growth and development.

## **5.2 Working Capital Financing**

The working capital financing sources have skewed from informal personal and family financing to more formal external financing. Informal financing declined from 79.6% at start-up to 44.2% at working capital financing. Formal financing became prominent at working capital associated with more visibility and track record (less asymmetric information), bigger firm size and greater accumulation of collateralised assets as discussed by North (1990).

It is interesting to note that government financing declined for medium enterprise from 23.6% at start-up to 6.7% though it increased for small enterprises. However, despite an increase in formal financing at working capital level, many small enterprises still opted for retained earnings<sup>3</sup> and trade credit including pre-financing and informal credits as a result of difficulties in accessing formal financial credits (see Chittenden *et al.*, 1996; Bigsten *et al.*, 2003; Djankov *et al.*, 2007). The findings show that external financing is biased against smaller and younger enterprises. The implications are that small enterprises face severe difficulties in financing requiring them to form clusters and collaborate with public sector support institutions to increase their financing and business skills development.

## **5.3 Impact of Financing on Performance : Exports and R&D**

This section attempts to establish analytically the relationship between the dependent variable and -export incidence with host of independent variables including enterprise age, size, financial access and controlling for the other players in the industry such as fishermen, distributors and processors. Second, the model examines the influence of financial access, size and age on R&D incidence while controlling for industry players like fishermen, processors and distributors.

### **5.3.1 Financing Impact on Exports**

The model fit of logit regression shows that export incidence and all the independent variables except fishermen are statistically positive as indicated in Table 2. This suggests that access to formal finance, size and age matter in export performance. The huge financial outlay is needed to participate in the fish export market to acquire modern fishing gears, comply with quality standards, equip the in-house laboratory and develop systems to meet sanitary conditions. Meeting these financing requirements to acquire these equipment and plants at the factory level can be difficult for smaller and younger enterprises. Hence, a firm's age and size reported positive and statistically significant relationship with export incidence. Therefore, access to finance coupled with other supportive systems have increased fish enterprises' performance in the export market and

fish production as shown in Figure 1 associated with the key stakeholders' response after the trigger from the fish export crisis. Further access to pre-financing from overseas partners in acquiring mesh-size gears, refrigerated cooler trucks, support in product development and meeting EU quality standards helped increase enterprises' export performance. Some of these partners became equity holders in Uganda firms providing additional funding to consolidate their export performance. LR statistics also show positive and significant relationship at 1%. Fishermen show a negative relationship though insignificant suggesting they are unlikely to participate in the export market. They sell their catches to local distributors, agents of large processing and exporting firms and traders in the local market to meet domestic fish food security.

Table 2: Export Incidence, Firm Age, Size, Financial Access, 2010

$$\text{Logit EI} = C + \beta_1 \text{Size\_EM} + \beta_2 \text{FinAccess} + \beta_3 \text{Age} + \beta_4 \text{Industry} + \mu$$

	<b>Coefficient</b>	<b>Std Error</b>	<b>Z-Statistics</b>
C	-8.7475***	1.9517	-4.4824
Finaaccess	1.2762*	0.7182	1.7769
LnEM	1.8225***	0.6529	2.7911
LnAge	0.7908*	0.4493	1.7600
Fishermen	-0.7809	0.7944	-0.9831
Distributor	1.1002*	0.5739	1.9169
Processor	1.1037*	0.6188	1.7837
N	160		
LR Statistics	68.1193***		
		Export Yes (1)	77
		No (0)	83

Source: Author's survey (2011). Note \*\*\* and \* refer to statistical significance at 1% and 10% respectively

### 5.3.2 Impact of Financing on R&D

The model fit (LR statistics) in the logit estimation carried out between R&D incidence as dependent variable and host of independent variables are shown in Table 3. LR statistics, financial access, firm size and age show statistically positive and significant relationship with R&D. Financial access and size show significance at 1% while age shows 5% significant level. These suggest that size, age and financial access matter in undertaking R&D in line with works of Lall (1992) and Rasiah (2007). Contrary to the arguments of Robb (2002) that small firms can be dynamic in emerging and advanced economies, fish SMEs in LDCs face considerable challenges from weak business environment, financing constraints, inadequate skills and low domestic capabilities. From



the statistical test result in Figure 3, fish enterprises need many years to grow and build the necessary experience, skills, capabilities and connectivity to effectively undertake R&D; hence, firm’s age and size recorded positive and significant relationship with R&D.

LR statistics show positive and significant relationship at 1%. Fishermen and Distributors show negative relationship though insignificant meaning they are unlikely to undertake R&D while Processors show positive relationship.

Table 3: R&D, Size, Financial Access – Uganda, 2010

$$\text{Logit: RDI} = C + \beta_1 \text{EM} + \beta_2 \text{FinAccess} + \beta_3 \text{FirmAge} + \beta_4 \text{Industry} + \mu$$

	<b>Coefficient</b>	<b>Std Error</b>	<b>Z-Statistics</b>
C	-10.8960***	1.9032	-5.7252
FinAccess	1.8899***	0.6012	3.1435
LnEM	3.3311***	0.6346	5.2491
LnAge	1.1996**	0.5556	2.1590
Fishermen	-0.5683	0.7752	-0.7331
Distributors	-0.5956	0.7988	-0.7456
Processors	1.1380	1.0646	1.0689
N	160		
LR- Statistics	68.814***		
		RDI= 1	45
		RDI= 0	115

Source: Author’s survey (2011). Note \*\*\* and \*\* refers to statistical significance at 1% and 5%

The results show that financial access matter in enhancing fish enterprises’ technological capabilities in maintaining quality and standards as well as hygiene along supply and processing chains. Building technological capabilities require considerable financing to acquire technologies in fish capture, cooler trucks, state-of-the-art equipment for processing, training human skills, developing products, equipping in-house laboratory among others to meet high value overseas demand. The joint response in Uganda to address fish export crisis enabled the government to provide incentives to banks and the establishment of credit schemes at Bank of Uganda (The Central Bank of Uganda) to finance this vital industry. Financial institutions, leasing and hire purchasing firms also emerged to provide important investment and debt capital support for improved upgrading of processing chains. Through vertical linkages, fish SMEs access not only to pre-financing from large fish processors and exporters but also better prices for their catches contributing to their growth. The regional foreign firms operating in Uganda were also conveniently connected with international

foreign firms in product development and diffusion of relevant technologies for growth as well helping to adapt relevant technological capabilities to consolidate R&D towards frontier phase.

## **6. Policy Implications and Conclusions**

This paper examines enterprise financing sources and its impact on fish exports and R&D in Uganda's fisheries industry. The results that despite recognisable improvements, fish SMEs persistently faced acute lack of formal external credit. While the study does not refute the literature that age and size matter in financial access, the developmental role of the government triggered by the fish export crisis enabled fish SMEs to access resources including finance via close collaboration with key stakeholders. The role of overseas fish importers in EU and connectivity in the supply and value chains provided significant institutional and financial support to fish SMEs in increasing production and exports. The pre-financing support, investments in modern mesh-size gears, refrigerated trucks, and further equity participation in local firms on the part of both overseas importers and large fish enterprises became crucial in enhancing exports and adapting technologies.

With the agricultural sector facing significant risks, formal bank financing remains low despite being the food basket providing majority share of jobs and offering huge export potentials. This is a result of adverse business environment and infrastructural constraints (see Seuwaegen, Goedhuys 2002) that undermine fish SMEs' access to external finance, hence limiting exports and reducing their ability to adapt to potential technologies. To address this paradox, governments in collaboration with the financial sector and other partners need to strategies using innovative institutional lending methodologies and provision of incentive schemes to finance this vital sector despite a host of obstacles restricting lending.

The empirical evidence derived from this study has policy implications. At the apex level, broad-based macroeconomic stability and policy reforms aimed at creating a more dynamic economy can be an effective way in facilitating growth in fish industry. Several studies including Levine (1997) and Demirguc-kunt et al (2008) have argued that financial and institutional developments do ease financing constraints on SMEs. The different forms of direct government controls, policy inconsistencies and adverse regulations that discriminate against fish SMEs relative to large enterprises in their access to inputs, finance and other incentives, have over the years retarded SMEs' unrestricted access to external finance. Eliminating such distortions can be crucial in enhancing fish SMEs' access to external finance and other resources.

Fish SMEs face a host of problems particularly at start-up despite their vital contributions to the economy. As a result, the failure rates are very high in the initial three years of existence (see Storey, 1994) requiring multilateral

support to get established. There is a strong need to introduce projects and programmes to support fish enterprises at this crucial stage by building on skills through technical assistance and innovative lending technologies to increase their access to resources including finance.

With SMEs persistent lack of access to financial credit, leasing, factoring and hire purchase can be further developed in Uganda to deal in movable items such as fishing boats, engines, fish gears/nets, and refrigerated trucks which are vital for the firms' capacity building, Credit guarantee programmes are successful in Chile (Katz, 2006; Torre, 2008), Mexico (Schmukle, 2007); Malaysia (Rasiah, 2011), Nigeria (Ojo, 1999) and Vietnam (Cheong, 2008) and should be introduced in Uganda to enable availability of finance to fish SMEs. The programme engages the banking sector to retail funds to fish SMEs according to certain guidelines. The credit guarantee programme can assist in overcoming the inherent lack of collateral shown as a major obstacle in many studies.

The demand for high quality products and services is ever increasing globally over the last two decades for manufactured and perishable products such as fish requiring strict sanitary, safety and quality compliances. The ability of economies to put in place systemic pillars of infrastructure, technology, global connectivity and network cohesion at industry level vital as they stand to benefit from increased exports, growth, value addition and job creation. The strategic and leading roles of public sector agencies<sup>4</sup> and support from meso-organisations in enhancing enterprises' financing and technological capabilities are crucial in addressing collective action problems.

Future research can focus on other players to include government agencies, meso-organisations, input suppliers, industry associations, financial institutions among others to enable a broader analysis of fish SMEs financial, export and R&D potentials. With more time and financial resources, capturing more foreign fish enterprises in the survey sample can broaden financial access analysis vis-à-vis domestic firms.

With stringent EU quality standards, future research into the possibility of promoting intra-African trade can be a way forward in meeting the vast market demands within the continent. There is increasing evidence of low trade among African countries resulting in shortages of basic commodities including fishery products with resultant rising prices.

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## Notes

- <sup>1</sup> Large businesses use various financing options including stock markets while small enterprises rely on external loans and owner's equity or support from family and friends. Small enterprises do not participate in stock markets due to high costs and extensive bureaucratic red tape.
- <sup>2</sup> Similar policy initiatives by the Indian government triggered technological upgrading in maize production to support its poultry industry by lifting a ban on maize seed technology that unleashed healthy competitions between public and private laboratories to adapt imported technology to local conditions (see Naik, 2006 and Rasiah, 2006 on the oil palm industry in Malaysia). Past public investments in science and technology enabled local scientists to participate in technological adaptation, the potential missing in most LDCs of SSA.
- <sup>3</sup> Many opt for self-exclusion in line with the demand-side theory, blamed on slow industrial growth of SMEs and their low absorptive capacities coupled with low capabilities and scale to meet information requirements of formal external financiers
- <sup>4</sup> Most East and Southeast Asian economies owed their miraculous growth to significant government investment to support SMEs technological upgrading as small enterprises will find it difficult to pay full costs of R&D and technological upgrading

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