

**EXPORT ORIENTED TUNA INDUSTRY IN SRI LANKA: AN ANALYSIS OF THE SOURCES OF EXPORT SUCCESS**

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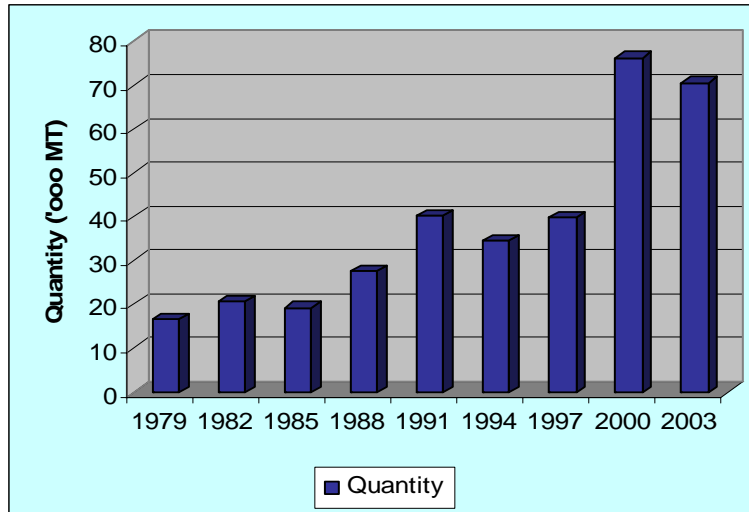
**ABSTRACT**

Tuna, after shrimps, forms the most valuable seafood product in both export and domestic market in Sri Lanka. The first section of this paper discusses the present status of tuna industry in Sri Lanka and the behavior of export markets. Secondly, this paper analyzes the impact of technological innovation, effort in international business, manager's perception on obstacles to export and utilization of public instruments on export performance of permanent and sporadic tuna exporters. Results of the empirical study suggested that 96% of export performance of tuna exporters was explained by tested independent variables. Permanent exporters were engaged in technological innovation in greater intensity than sporadic exporters. Especially, permanent exporters put more effort in international business than the innovation. Considering the manager's perception, external to the country barriers were made big burden on export performance while sporadic exporters have to suffer a lot. The behavior of public instruments was neutral on the improvement of export performance. Trade promotion instruments were the widely used tool among permanent exporters and sporadic exporters were less familiar with these tools.

**Keywords:** Export performance, tuna processors, technological innovation, effort in international business, managers' perceptions on obstacles to export, utilization of export promotion programmes

**INTRODUCTION**

Tuna is one of the premium fish in Sri Lankan waters. Tuna fishing has been expanding fast for the last several decades all over the world in general and the south Asian countries, especially in Sri Lanka. Big eye (*Thunnus obesus*) and yellow fin (*Thunnus albacares*) are the prominent species caught in Indian waters along with skipjack (*Katsuwonus pelamis*) and albacore (*Thunnus alauunga*). Sri Lankan tuna export basket consisting mainly with big eye (93%) and yellow fin (7%) (Department of Customs, 2004). Tuna processing for export in Sri Lanka was begun in early 1990s. But tuna processing for domestic market has long history and which dated back to 15<sup>th</sup> century. Home made dry, smoked and salted products of tuna only targeted for the domestic market. Today, tuna receives premium prices from both domestic and export market with continuous increase of demand together with the healthy dieting habits. Overtime, growth of the tuna industry fostered the development of fishing technology in order to build powerful vessels able to catch larger quantities of fish (Josupeit and Catarci, 2004). The bulk of tuna catches is taken by purse seine vessels long liners and pole and line vessels in Sri Lanka. Sri Lanka's contribution to the world tuna export market is about 2% (FAO, 2003).



**Figure 1. Time series analysis of tuna production in Sri Lanka**

Source: Department of Customs, Sri Lanka; 1979-2003

Time series analysis shows that tuna production in Sri Lanka had increasing trend in the beginning of 21<sup>st</sup> century (see figure1). But three years later it shows declining trend. This was line up with the introduction of strict catch control regulations by the government. Sri Lanka, on its creation inherited poor economy, poverty, unemployment, high unbalanced diet of the common man together with twenty years of civil war. Presently, seafood export industry is a low growing, mushroom, cottage industry governing by the private sector. Meantime research attention is also less on fishery economics compared with other fields. Especially, research interest on tuna processing industry is low. This study leads to fulfill the present need of the seafood processing industry in Sri Lanka. The introductory part of this paper discusses the present status of tuna processing industry of Sri Lanka. Body of the paper consisting with conceptual framework, research methodology and the empirical study of impact of technological innovation, effort in international business, manager's perception on obstacles to export and utilization of public instruments on export performance of permanent and sporadic tuna exporters. The findings together with discussion and conclusions are the ending part of this paper.

### **Present Situation of the Tuna Processing Industry in Sri Lanka.**

Tuna industry in Sri Lanka like other seafood is completely owned and operated by the private sector. Government assistance is mainly on technical and legal sectors. The main bottlenecks have been the absence of modern fishing fleet or highly expensive modern fleets, capital scarcity and favorable climate for the private sector investment. Only tuna processing establishments under export processing zones enjoying benefits of tax relief, low interest rate loans with government support on investment. A decade ago tuna fishery was remained confined to the small territorial waters by indigenous artisanal fishing techniques (Pole and Line) and small under-powered vessels. The production was mainly targeted to domestic market with limited processing. Most of the products were salted and dried for export as low value products of limited value adding. After opening up of export market, there was a very high desire for invest on modern high tech fishing fleets, advance harvesting techniques (long liners, super purse seine), trained fishers with high levels of quality control. Ninety percent of Sri Lankan tuna processing establishments belongs to the small (processing companies employed less than 50 employees and initial investment less than 4 million rupees [1US\$= 101 Rupees]) and medium (50-200 employees and minimum of 10 million rupees initial investment) scale categories and owned by the private sector. The main products are fresh and frozen whole tuna, fresh and frozen tuna loins (75%), smoked tuna and fresh and frozen fillets. Figure 2 describes the trends of tuna exports in both value basis.

Establishments under tuna fishing can be categorized into three sub groups;

1. Establishments for tuna fishing only  
(These companies mainly act as raw material suppliers for other processors or export only fresh tuna for Japanese sashimi market).
2. Establishments for tuna fishing and processing

(These companies have their own modern fishing fleets to supply raw material for processing and export both processed and fresh products.

3. Establishments for re-export of tuna

(These companies have own processing facility, but rely on raw material supplies from Maldives. Processed products were exported with their brand name. These companies tap the opportunity in Maldives and getting the advantage of underdeveloped quality control facilities of Maldivian producers)

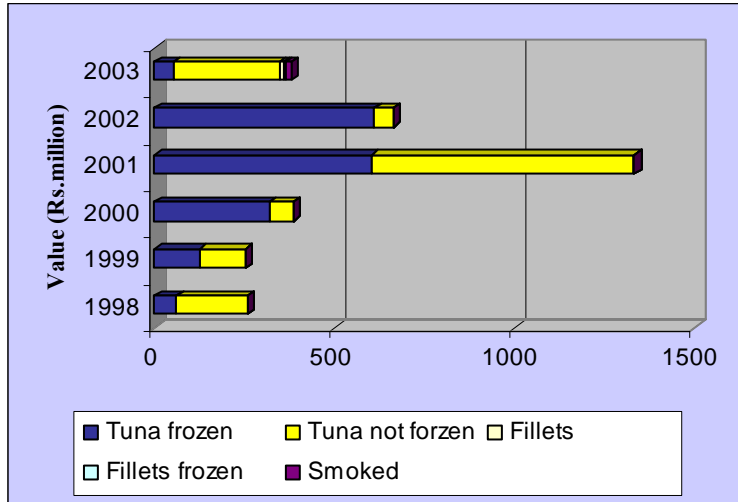


Figure 2. Analysis of tuna exports of Sri Lanka on value basis ( 1US\$ = 98.65 Rupees)

Source: Department of Customs, Sri Lanka, 1998 – 2003

Market Analysis: Import Market

The main import markets for Sri Lankan tuna products are United Kingdom, France, Germany, Switzerland and Netherlands for processed products and Japan for fresh and frozen tuna. Tuna has numerous health benefits, which leads to increase demand for fresh and processed products all over the world, especially in higher value markets. Tuna is rich in Omega-3 poly unsaturated fat (Josueit and Catarci, 2004). Japan remains the world’s primary market for fresh tuna for sushi and sashimi. This is Japan’s most popular and expensive seafood and demand is high throughout the year. In Japan, tuna is used for mainly sashimi (raw fish), sushi (raw fish with rice), canned tuna and katsubushi (made from fillets of skipjack which is boiled, dried, smoked and molded).

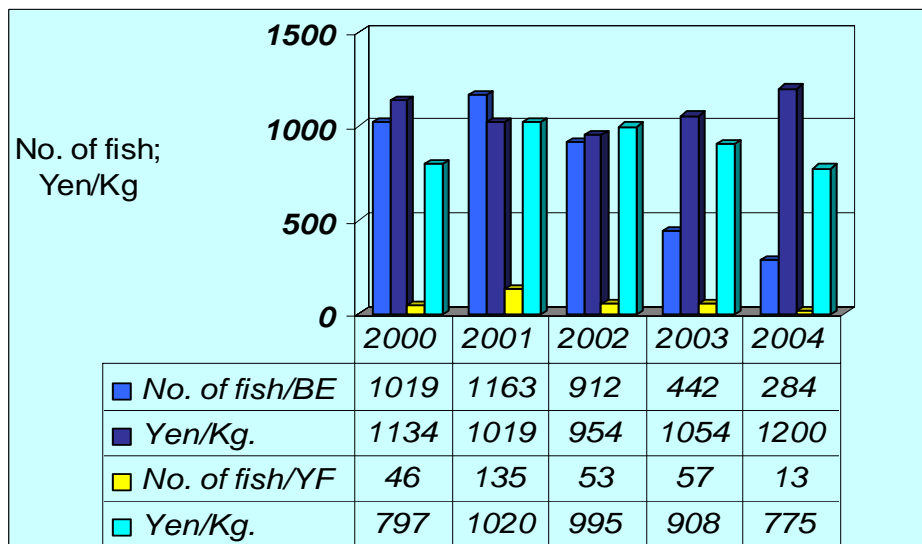


Figure 3. Trends of Sri Lankan tuna exports to Japanese market

(BE – Big Eye tuna; YF – Yellow Fin tuna) Source: Department of Customs, Sri Lanka; 2000-2004

Sri Lankan fresh tuna exports to Japanese market consisting with big eye (*Thunnus obesus*) tuna (90%) and yellow fin (*Thunnus albacares*) tuna (10%) (see figure 3). Historically, the bluefin tuna and high quality bluefin were, and is still to some extent very expensive to the average Japanese consumer. The collapse of Japan's economic bubble during the 1990s, forced a very harsh review of corporate spending. Meantime, increased fishing worldwide, through penning and farming produced a generally a more constant supply of bluefin, bigeye and yellowfin tunas from many places around the world. In combination with downturn in economy resulted in tuna prices went down, availability to public went up, now every supermarket sells a nice mix of fresh and frozen tuna from all over the world, every day of the year. Unfortunately, tuna market had trouble with Carbon monoxide and this lead to food poisoning problems. Low profit margins made Sri Lankan suppliers away from the Japanese market and entered into new markets with processed products. Japanese market is cyclical and there is a greater demand around some holidays. Especially, during New Year, which falls in January and during O-bon festival (festival for death and during this period people rush to their home towns) the demand for tuna and other fish is very high and suppliers can enjoy better returns. Sri Lanka ranked 5<sup>th</sup> place in fresh tuna exports to Japanese market (Japan Fish Traders Association, 2003). But Sri Lankan share is quite small comparing with other Asian exporters. Taiwan (26%), South Korea (16%), Thailand (11%), Indonesia (7%) and China (6%) are the main tuna suppliers to the Japanese market (JETRO, 2003).

### European Union Market

The main buyers in EU market are UK, France, Germany, Switzerland and Netherlands. The EU, mainly UK, France and Germany represents an affluent market for processed and semi-processed tuna products of Sri Lanka. Majority of Sri Lankan tuna loining companies have direct supply contracts of their products to leading retail chains in UK and France. For an example, most of the companies export directly to Tesco retail chain which represents 23% of UK grocery sales (Richardson, 2002). European customers are more and more looking to buy good quality portion-sized fish; bone less, skinless and if possible odorless filets, steaks which are quick and easy to prepare (Richardson, 2002). Sri Lankan producers have to follow new strategies towards more value addition rather than fresh or frozen basis.

### Empirical Approach

The information utilized in this paper was provided by a survey of tuna exporters which was carried out between March and April 2004. The study locations were coastal belt of south-west, west and north-west coastal provinces of Sri Lanka. Survey sample was consisted of both tuna processing firms inside and outside export processing zones. Primary data was collected from ten permanent tuna exporters and ten sporadic tuna exporters. The principle data collection tools were structured questionnaire, in-depth interviews with key informants (managers, directors) of selected tuna processing plants. Characteristics of the companies were considered during the period of 1999-2003. Companies that export through out this period were considered as permanent exporters while companies not export regularly were considered as sporadic exporters.

### Export Performance

The differences of export performance of the permanent and sporadic tuna exporters were discuss in this section. The impact of four aspects on export performance that had previously been observed by Alvarez (2004), guided for this study. The four aspects are; technological innovation, international business management, manager's perceptions about obstacles to exporter performance and utilization of public instruments.

The following model was used to test for the existence of significant differences among types of tuna exporter firms.

$$\text{Int}_i = \alpha + \beta \text{exp}_i + \varepsilon_i \quad (1)$$

Where Int measures the intensity of some action carried out by a company and this variable corresponds to answers given by the company's owner. The scale of intensity was measured as follows; 0 – null intensity; 1 – low intensity; 2 – slightly low intensity; 3 – slightly high intensity and 4 – high intensity (Alvarez, 2004). Exp is a categorical variable that defines the exporting status of the company (1- if the firm is a permanent exporter, 0 – sporadic exporter).

## Technological Innovation

Technological innovation plays a significant role in the success of tuna processing company. This study was used to examine the differences of permanent and sporadic tuna exporters, in three types of innovative activities; product, process and innovation in management. Technological improvements, such as new products, changes in design and packaging were the categories that measured to evaluate product innovation. Process innovation was evaluated by using investment on specialized machinery, introduction of quality control (HACCP – Hazard Analysis Critical Control Point), utilization of information technology and out-sourcing. Finally, innovation in management was evaluated through the introduction of strategic planning, company re-engineering and total quality management processes.

**Table I: Differences among Permanent and Sporadic Exporters in Technological Innovation**

Particulars of scores	Permanent exporters	Sporadic exporters	Mean	Standard deviation (SD)
Product inn. (0-16)	16 – 8	7 - 1	7.7	5.37
Process inn (0-16)	15 – 10	8 – 2	8.6	5.18
Inn. In Mgt. (0-16)	13 - 9	4 - 1	6.9	4.67

Source: Field survey, March –April 2004.

Findings suggested that permanent tuna exporters engage in development of new products, changes in design and packaging much more than sporadic exporters (see table I). Out- sourcing of company's activities and frequent utilization of information technology were more prominent among permanent exporters. Their quality assurance systems were already reached up to international standards. Permanent exporters made more effort on strategic planning towards to company re-engineering process than the sporadic exporters.

## Effort in International Business

The level of effort in international business also affects the export performance of tuna processing companies. Findings suggest that permanent tuna exporters were more active on strategic alliances with foreign firms, training of workers in export operations, export promotion on goods in abroad and obtaining loans for financing working capital (see table II). Sporadic firms were more active in strategic alliances with domestic firms and hiring of staff qualified for international business.

**Table II: Effort in International Business**

Particulars of scores	Permanent exporters	Sporadic exporters	Mean	Standard deviation
Effort in International business (0 – 48)	36 - 23	14 - 9	21.45	11.07

Source: Field survey, March –April 2004.

## Manager Perception in International Business

Information on manager perception in international business was collected from the managers of tuna processing companies. The main emphasis was focus on obstacles to tuna export business. These obstacles were categorized into 3 groups, such as internal to the firms, internal to the country and external to the country. Table III describes the findings of manager perception in international business.

**Table III: Summary of Manager Perception in International Business**

Particulars of scores	Permanent exporters	Sporadic exporters	Mean	Standard deviation
Internal to firm (0 – 36)	18 – 13	26 – 23	20.2	5.13
Internal to country (0 – 36)	29 – 20	35 – 24	26.4	3.53
External to country (0 – 52)	49 - 30	48 - 36	45.5	5.79

Source: Field survey, March –April 2004.

Managers of sporadic firms highlighted that they were facing greater difficulties in international operation. Especially, obstacles external to the country, such as high tariff, export quotas, licenses, safe guards, environmental barriers, strict legislations and unfair competition, made severe burden on exporters. Fluctuating exchange rates, scarce market information and lack of export promotion were also hindering their export performance. Comparing with sporadic exporters, permanent exporter’s position in international market is better. But they were also suffering from safeguards, environmental barriers and strict quality regulations, changing legislations, unstable real exchange rates, lack of export promotion and low production volumes. With regards to credit access, the findings state that liquidity constraints were more relevant for sporadic exporters.

**Utilization of Public Instruments**

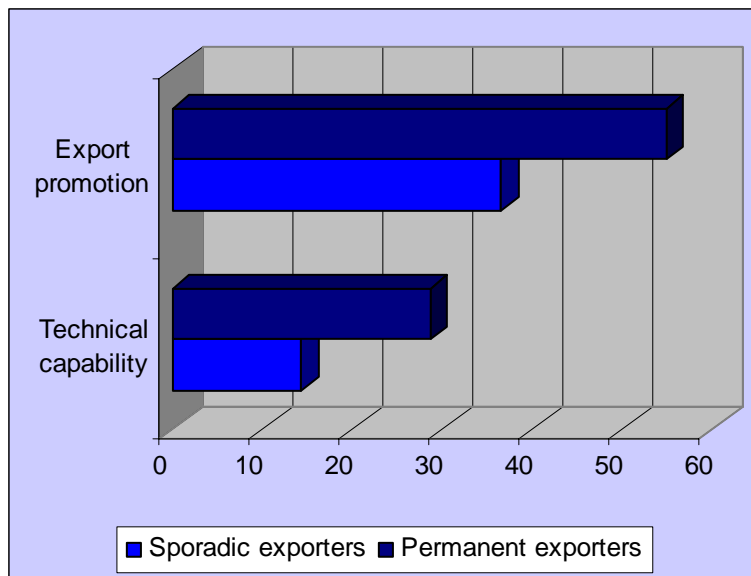
In a view point of managers, utilization of public instruments was not playing a significant role behind the export performance. Public instruments are handled by the governmental and non-governmental organizations, aiming to enhance the technological capability in quality management and export promotion. Financial instruments available for small scale exporters were limited in number and they have difficulties to access. Table IV and figure 3 present the utilization of public instruments among permanent and sporadic exporters.

**Table IV: Utilization of Public Instruments by Permanent and Sporadic Exporters**

Particulars of scores	Permanent exporters	Sporadic exporters	Mean	SD
Public instruments (0 – 12)	11 - 5	3 - 1	5.75	3.89

Source: Field survey, March –April 2004.

Permanent exporters have using public instruments, mainly export promotion and technological capability enhancing in quality management than the sporadic exporters. The most used public instruments have been the export promotion instruments such as brand development, trade fairs and exhibitions, credit grantees and public supported research and development and international market information guide. These public instruments are handling by the Export Development Board of Sri Lanka (EDB).



**Figure 3. Pattern of the Utilization of widely used Public Instruments**

**Factors Affecting the Export Performance**

The analysis of four aspects and their intensity show that there are significant differences between permanent and sporadic exporters. The impact of above aspects on export performance of permanent and sporadic exporters is explained in this part followed by Alvarez (2004). Dependent variable varies 0 (sporadic exporter) to 1 (permanent exporter). For the econometric estimation, the following probit model is used;

$$P_r(Y_i = 1) = \Phi(\beta' X_i) + \varepsilon_i$$

Where  $\Phi$  is a normal c.d.f. and  $X$  is a vector of covariates. The explanatory variables used in this estimation were technological innovation, efforts related to international business and utilization of public instruments. Previous studies of Bernard and Jensen (1999) and Roberts and Tybout (1997) found that the probability of exporting is positively affected by age of the firm, productivity, worker skill levels, and technological innovation foreign capital participation. Product innovation contributes positively to superior market and financial performance of the firm (Sandvik and Sandvik, 2003). A firm's ability to employ new and successful product innovations is an important competitive weapon (Jaworshi and Kohli, 1996; Varadarajan and Jayachadran, 1999). Export promotion instrument act as a vehicle, which carry the brand name to the overseas markets. It helps to improve export performance of a firm. Spence (2003) states that impact of overseas trade missions in the UK had contributed positively to generation of incremental increase of sales in foreign markets. The positive effects of specific export promotion instruments were provided by Wilkinson and Brouthers (2000); Cavusgil and Naor (1987) and Coughlin and Cartwright (1987). The empirical approach in this paper follows Alvarez (2004) and this explains the differences between permanent tuna exporters and sporadic exporters. This study emphasis the role of 4 potential explanations on export success; technological innovation, effort in international business, manager perception in international business and utilization of public instruments.

**Table V. Descriptive Statistics**

Variable	Mean (Permanent)	Mean (Sporadic)	SD (Permanent)	SD (Sporadic)
Product inn.	12.5	2.9	2.51	1.85
Process inn.	13.4	3.8	1.71	1.62
Mgt. in inn.	11.3	2.5	1.25	1.35
Effort in IB	31.8	11.1	4.34	1.37
Internal to firm	15.5	24.9	1.96	1.66
Internal to country	24.6	28.2	2.99	3.19
External to country	38.8	44.3	6.49	3.43
Public instruments	9.3	2.2	1.83	0.79

The descriptive statistics (see table V) show that the permanent exporters were engaged in technical innovation in greater intensity than sporadic exporters. Especially, permanent exporters put more effort on international business than the technical innovation. Considering manager perceptions, external to the country became a main obstacle on export performance. It has heavy impact on sporadic exporters than the permanent ones. Both permanent and sporadic exporters were not frequent users of public instruments in Sri Lanka. Government bureaucracy and heavy documentation barriers were make exporters away from utilization of public instruments. But, permanent exporters utilize little more than the sporadic. Chi-square test was used to find out the significance of tested variables and following are the findings (see table VI).

**Table VI: Summary of Chi-square Test**

Variable	Chi-square	Asymp. Significance
Product inn.	6.400	0.781
Process inn.	7.000	0.537
Inn. in Mgt.	4.000	0.780
Effort in IB	6.400	0.781
Internal to firm	3.100	0.979
Internal to country	7.900	0.443
External to country	5.200	0.971
Public instruments	4.000	0.780

**Table VII: Model Summary**

Model	R	R square	Adjusted R <sup>2</sup>	Standard error of the estimate
1	0.988 <sup>a</sup>	0.977	0.960	0.10319

- a. Predictors: (constant), product and process innovation, innovation in management, effort in international business, manager perception on obstacles to export and utilization of public instruments.

Ninety six percent of the export performance of small and medium scale tuna exporters was explained by the above mentioned variables (see table VII).

**Table VIII: Summary of Coefficients**

Model	Standardized coefficients ( $\beta$ )	t	Significance
(Constant)	0.527	1.122	0.286
Product inn.	-0.085	-0.477	0.643
Process inn.	0.032	0.130	0.899
Inn. in Mgt.	0.539 <sup>*</sup>	2.166	0.053
Effort in IB	-0.069	-0.276	0.787
Internal to firm	-0.081	-0.533	0.605
Internal to country	-0.011	-0.129	0.900
External to country	-0.127	-1.958	0.076
Public instruments	0.457	2.257	0.456

Results of the regression shows that product and process innovation, effort in international business, obstacles internal to the firm and internal to the country have significant impact on export performance. Analysis suggests that exports were negatively associated with product innovation, effort in international business, obstacles internal to the firm and internal to the country, and obstacles external to the country (see table VIII). Prominent effort in innovation of products and introducing convenient and attractive packaging methods was common among permanent exporters. Positive significant impact of process innovation on export performance is mainly based on improvement of quality assurance systems. Survey findings prove that adoption of Hazard Analysis Critical Control Point (HACCP) based quality management system requires to up grade the present system of establishments. This includes the purchase of specialized machinery, out-sourcing and introduction of information technology. Permanent tuna processors with European Union certification were enjoying better returns from international market with high export performance. Permanent tuna exporters are engaged more in innovative procedures to its management. Results suggest that introduction of strategic planning towards to company re-engineering has significant impact on export performance. Manager perceptions on obstacles to export were negatively affected to the export performance. Especially, external to the country obstacles, such as high tariff, export quotas, import licensees, environmental concerns (Eco-labeling), safe guards, unfair competition, competitors with preferential access and changes in legislation in foreign markets have heavy impact on export performance. Those barriers hindered the progress of sporadic exporters. Utilization of public instruments is not significantly affected on export performance. This is similar to the previous findings of Alvarez (2004). According to the managers' point of view, participating to overseas trade shows, exhibitions, etc. was brought little improvement to their export success and brand popularization. Frequently used public instruments were productivity enhancing instruments (public supported research and technology), technological capability enhancing instruments and financial instruments. Permanent exporters have better access to financial instruments such as bonds, bills, certificate of deposits, commercial papers, securities, etc. that were established to improve credit access. Sri Lankan exporters were more relayed on promotional activities based on their personal contacts.

## CONCLUSION

This paper has explored the present status of tuna export industry in Sri Lanka, considering the impact of technical innovation, effort on international business, manager's perception on obstacles to export and utilization of public instruments on export performance. Past performances and present situation of the industry highlighted that the permanent tuna exporters were performed well in international market than the sporadic exporters. Process innovation (introduction of HACCP system, upgrading the plant environment, invest on new machinery, introduction of information technology and innovation in management system) played important role in improve export performance and common among permanent exporters. Generally, utilization of public instruments including trade promotion and financial instruments was not helpful to improve the export status. Bureaucratic barriers were leading to away the exporters from these promotion tools. Both, permanent and sporadic exporters suffer from the obstacles outside the country. These obstacles were most pronounced in export oriented tuna industry that is highly dependent on particular developed country markets. As a result, the potential for trade diversion is limited. Traditional barriers to trade, including tariff and non tariff barriers, preferential trade agreements, quality restrictions and food safety measures can equally act as important obstacles. This reflects the resource constrains that hinder



their ability to comply. Export oriented tuna supply chains with limited alternative markets is a particularly salient issue.

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