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Identifying Markets and Forecasting Export Prospects for India's Marine Products

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Abstract

The marine sector in India holds tremendous potential for growth, export expansion and employment generation primarily due to India's competitive advantage in the production of marine products. In the present paper, an attempt has been made to identify the key destinations for India's marine export using trade analytical tools like Revealed Comparative Advantage and Import Intensity Index. ARIMA forecasting is applied to map the export potential of selected marine products to specific destinations. The paper also provides suggestions to exporters and the policymakers on tapping the future export potential of marine products in selected countries.

Key words: Marine Sector, India, Export Forecasting, Revealed Comparative Advantage, Import Intensity, ARIMA

JEL classification: F14, F17, O13, O53

1. Introduction

In recent years, economic integration of India with global markets has been achieved due to a series of economic reforms aimed at promoting and facilitating foreign trade as well as investment thus resulting in productivity in domestic sector (Kapila *et al*. 2002). An increase in exports ensures an increase in foreign exchange earnings, economic activity, employment opportunities and improved standards of living (World Trade Report 2017). India has signed several Preferential and Free Trade Agreement aimed at trade expansion, diversification and economic integration (Panagarhia, 2004). India has successfully diversified its export basket thus achieving both economic and social objectives of the nation's development (Anand et. al. 2015).

In recent years, many products from India have gained demand globally including food products and specifically marine products. The marine sector has emerged as a dynamic sector for generation of foreign exchange and employment opportunities (Swaminathan *et al* 2018; Parappurathu 2009; & Singh 2017). Shift in pattern of food consumption, growing urbanization, globalization and liberalization of trade policies, rapidly changing lifestyles and the emergence of new markets have resulted in rising of demand for marine products globally (Regmi 2001). Developing nations account

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for nearly 40 percent of total marine exports (Dommen and Deere, 1999). Though there exist a large number of studies for assessing the potential of total exports from India, there is a dearth of literature in terms of sector-specific studies mapping exportable products to attractive markets. It has been seen that marine exports have led to growth of the Indian economy as well as of certain states in the country (Radhakrishnan *et al* 2018, Faria *et al* 2016). In this context the present study is an attempt to narrow this gap in the literature to effectively link and contribute to exploring the possibility of entering new markets by identifying specific marine products in India which may have a competitive advantage in various countries. Additionally, the export potential of India in the newly identified markets is compared with the world using forecasting techniques and suggestions are provided to develop these markets further.

2. Overview of Marine Sector in India

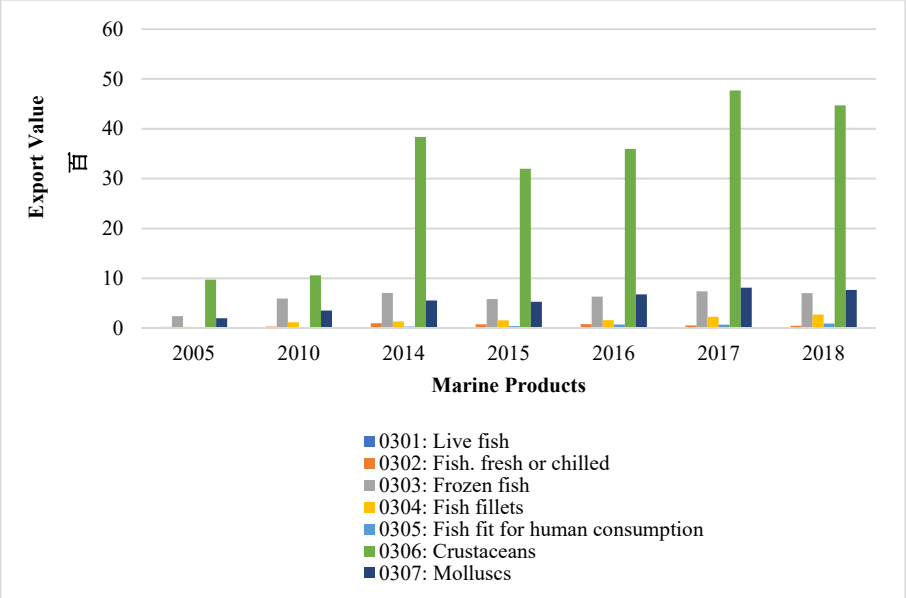
China produces about 60 million metric tons of fish per year and is the largest producer of fish in the world (FAO 2018) accounting for 32% of total fish produced in the world. India produces about 11.6 million metric tons of fish annually which is around 6% of total fish produced in the world (Marine Products Export Development Authority 2018). India has also emerged as the third-largest exporter of fish products to various parts of the world (Jelte 2017). India exports a variety of marine products to more than 70 countries of the world, with the top ten export destinations for India's marine products exports being USA, Viet Nam, China, Japan, Thailand, UAE, Spain, Italy, UK and Belgium (Appendix-I, Table-1). The key importers of marine products in world markets are USA, Japan, China, Spain, France and Italy (Appendix-I, Table-2). The United States is the largest market for marine products with annual import of 18.52 Billion USD which has approximately doubled from the year 2005. In case of Japan, imports of marine products are 11.86 Billion USD, followed by China which has emerged as the third-largest importer of marine products. South Korea and Vietnam are other notable markets for India's marine exports.

India, even after addressing the huge domestic demand for marine products, is the third-largest exporter of marine products in the world with a share of 5.1% Amongst the marine products, classified as HSN 03, the most exported marine product from India is Crustaceans (HSN-0306), followed by Molluscs (HSN-0307) and Frozen fish (HSN-0303). Figure-1 indicates the export values of various types of marine products exported from India to world market. Measuring on the competitiveness of Indian marine products by using Herfindahl Index[1] (concentration in the country of import), India has a diversified export basket with composite concentration index for all importing countries at 0.05 wherein the most competitive marine products are fresh fish (HSN-0302), fish fillet (HSN-0304) and followed by Molluscs (0307). Frozen fish (0303) has concentration index of 0.22 and most

[1] It is a measure of market concentration and is calculated by squaring the market share of each firm competing in a market and summing the resulting numbers.
$HHI = s1^2 + s2^2 + s3^2 + \ldots sn^2$, where sn = market share percentage of firm n

exportable product Crustaceans (HSN-0306) has the concentration index of 0.24. The only uncompetitive marine product for exports from India is Aquatic invertebrates (HSN 0308), for which India started export off-late and world demand is also very low. In absolute terms also, India is registering growth trends in exports for all types of marine products. On analyzing the import patterns in the world of marine products, it is seen that Crustaceans (HSN-0306) is the largest imported marine products in 2018.

Figure 1. India's Product Basket of Marine Products Exports from 2005-2018 (USD Millions)

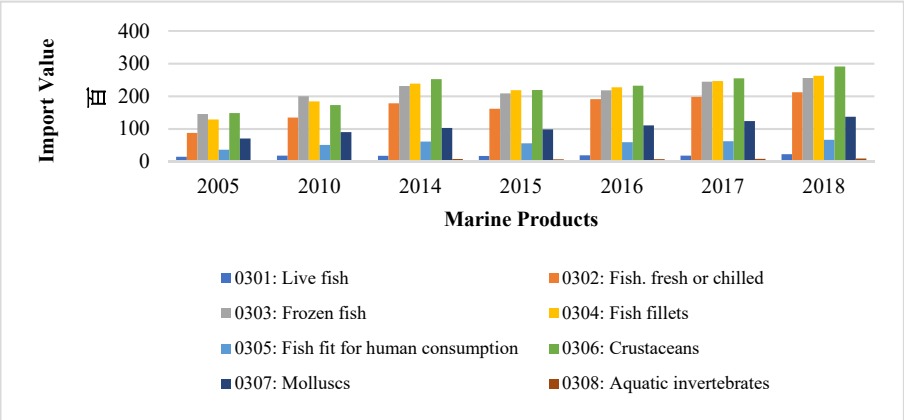


Source: UN Comtrade. 2019

The second-largest imported marine products are frozen fish (HSN-0303). The trade in aquatic invertebrates (HSN-0308) has started off recently but is growing steadily.

Thus, India's exports are in sync with the world import basket as the largest marine product is crustaceans (HSN-0306) where India has significant production and export advantages. India has also emerged as a key center for value addition for the seedling of crustaceans imported from Vietnam, cultured in aqua zones of India and further exported. Figure-2 provides details about the world import demand for the marine products.

Figure 2. World Import Demand of Marine Products from 2005-2018



Source: UN Comtrade. 2019

On analyzing Figure-1 and Figure-2, Table-3 indicates the growth of exports of marine products from India is in tandem with the growth in the demand for marine products across the world.

Table 3. Share of India's Exports as Compared to World Exports for Marine Products (%)

	0301: Live fish	0302: Fish. fresh or chilled	0303: Frozen fish	0304: Fish fillets	0305: Fish fit for consumption	0306: Crustaceans	0307: Molluscs	0308: Aquatic invertebrates
2005	0.08	0.26	1.65	0.19	0.30	6.54	2.81	
2010	0.06	0.22	2.95	0.63	0.29	6.13	3.90	
2014	0.15	0.54	3.05	0.56	0.48	15.19	5.40	0.51
2015	0.07	0.47	2.79	0.71	0.72	14.59	5.38	0.14
2016	0.07	0.41	2.89	0.70	1.19	15.49	6.09	0.06
2017	0.11	0.26	3.01	0.92	1.12	18.70	6.55	0.14
2018	0.07	0.22	2.74	1.03	1.39	15.36	5.60	0.25

Source: Author's calculations based on data from UN Comtrade. 2019

Figure- 2 indicates that the major marine products which are imported globally are Crustacean, Fish Fillet, frozen and fresh fish. On examining the share of India'a imports in world imports, it is seen that India is a major player in the field of exports of Frozen fish, Crustacean and Molluscs. The rate of increase of India's share in world imports has also been rising constantly for these three products. Thus, these are the three products which India has an adavntage in exporting to the world. In the present study, an attempt is being made to identify the top destinations of export for these marine products using various indices and forecasting techniques.

3. Data and Methodology

For identifying major export destinations for key marine products, Revealed Comparative Advantage is usually applied in a number of studies across sectors and also in case of marine products (Kaimakoudia *et al* 2014). To forecast the export potential of marine products at various destinations, a number of techniques can be applied. In most of the export potential studies, ARIMA technique of forecasting as give given by Box Jenkins (1976) has been applied. Export of fish from Tamil Nadu (Sankar 2011) and India (Das *et al* 2016), applies ARIMA model to analyze their export potential. Similarly, for a large number of varied products, ARIMA model has been applied to forecast exports like textile exports from USA (Lu 2015), readymade garments from India (Chawla and Behl 2002), meat products from India (Paul and Pawar 2013), dates from Pakistan (Naz 2012), oranges (Mustafa and Ahmad 2006) and mangoes from Pakistan (Ahmad, Mustafa and Mehdi 2006). The objective of the paper is to identify the potential markets for India's Marine Products by leveraging statistical tools such as Revealed Comparative Advantages (RCA), Import Intensity Index (III) and forecasting the exports prospects in prospective markets through econometric forecasting technique of ARIMA Model to strategize for export promotion by appraising various market access challenges.

To investigate the stated objective, the methodology applied has two stages. The first stage aims at understanding the potential markets where India has a comparative advantage by mapping the supply-side capabilities by applying Revealed Comparative Advantage index (RCA) with the demand side capacities through Import Intensity Index (III). Revealed Comparative Advantage is an index used in international economics for calculating the relative advantage or disadvantage of a certain country in a certain class of goods or services as evidenced by trade flows as per equation (1).

$$\text{India's Marine Products Revealed Comparative Advantage} = \frac{\text{India's Exports of each Marine Products at HSN Heading} / \text{India's Total Export of Marine Products}}{\text{World Export of Meach Marine Products at HSN Heading} / \text{World Total Exports of Marine Products}} \quad (1)$$

To map demand side capacities, Import Intensity Index is used to understand the intensity of world imports of marine products which is calculated by determining whether the value of trade between the two countries is greater or smaller than would be expected on the basis of their importance in world trade. For the marine sector, import intensity is calculated as per equation (2).

$$\text{Import Intensity Index for India's Marine Products (HSN at 4 digit level)} = \frac{\text{India's export of Marine Products to selectedcountry}}{\text{Total Imports of Marine Products by selected country}} \Big/ \frac{\text{India's total Exports}}{(\text{World's total exports} - \text{India's total Exports})} \quad (2)$$

The second stage of analysis involves the application of ARIMA Model which is a forecasting technique leveraged after the top markets and marine products are identified in stage one. The Autoregressive Integrated Moving Average (ARIMA) by Box Jenkins is a tool used to analyse time series data. In ARIMA approach, fluctuations in linear functions are observed based on which forecasts are carried out.

Time series analysis have in recent years gained immense importance in the area of research for explaining the patterns of variation and forecasting based on that. one such technique is ARIMA model which stands for the autoregressive integrated moving average model. In order to make forecasts, exponential smoothing methods are used with no assumptions about correlation between successive values in the series. As most of the time series are non-stationary, it is important to convert them into stationary series through transformations and building integrated models. For the present study, the problem of auto correlation is checked as in equation (3) and Box and Jenkins (1976) for univariate time series ARIMA model is applied as given in equation (4).

$$r_k = \frac{\sum_{t=1}^{N-k}(Y_t - \bar{Y})(Y_{t+k} - \bar{Y})}{\sum_{t=1}^{N}(Y_t - \bar{Y})^2} \tag{3}$$

where r_k is the auto-correlation coefficient at lag k and Y is the time series with t indexes of time.

$$W_t = \mu + \frac{\theta(B)}{\varphi(B)} a_t \tag{4}$$

Wt is the response to Yt and μ is the mean. $\varphi(B)$ is the autoregressive operator and $\theta(B)$ is the moving average operator while a_t is the random error term. The first step in ARIMA modelling is to identify whether the series is stationary or non-stationary. If the series is stationary ARMA model is applied. Based on the forecast the graph obtained from ARIMA modelling technique, an analysis was done using E-views software.

4. Estimation Results

Revealed Comparative Advantage of all marine products exported from India to assess the supply-side capabilities of India's marine products exports are illustrated in Table-4. India has very strong RCA in Crustaceans (HSN-0306) which mainly consists of shrimp and prawn products which are also the largest exportable marine product from India. India also has strong supply-side capabilities in exports of Molluscs (HSN-0307) where its Revealed Comparative Advantages index is rising. Two other marine products namely Fish Fillets (HSN-0304) and Fish fit for human consumption (HSN-0305) where India does not enjoy the comparative advantages but analysis as in table-4 indicates that India is constantly improving its supply-side capabilities with rising RCA for these two products.

Table 4. Revealed Comparative Advantage of Marine Products Exported from India

Code	Product label	RCA 2017	RCA 2018	RCA 2019
0301	Live fish	0.019	0.0147	0.016
0302	Fish, fresh or chilled (excluding fish fillets and other fish meat of heading 0304)	0.046	0.0420	0.062
0303	Frozen fish (excluding fish fillets and other fish meat of heading 0304)	0.548	0.557	0.403
0304	Fish fillets and other fish meat, whether or not minced, fresh, chilled or frozen	0.172	0.208	0.193
0305	Fish, fit for human consumption, dried, salted or in brine; smoked fish, fit for human consumption	0.200	0.273	0.220
0306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine	2.894	3.032	3.105
0307	Molluscs, fit for human consumption, even smoked, whether in shell or not, live, fresh, chilled	1.079	1.077	1.059
0308	Aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried	0.031	0.062	0.006

On applying the Import Intensity Index, the results obtained are as depicted in Table-5. Based on these analysis of marine products where India has proven supply-side capabilities, in terms of Import Intensity Index greater than 1, there a large number of countries. The countries where import intensity index has been fairly high are being considered for the next stage of analysis of forecasting. Along with the Import Intensity Index, further the countries are selected based on the total value of imports of the nations from India as well as shares of India's exports in total world exports for the selected nations. Therefore, the top 12 countries of Table-5 have been selected for applying ARIMA model.

Table 5. Final Selected Export Destinations

Crustaceans (0306)				Molluscs (0307)			
Country selected	**Import from India (in Thousand USD)**	**Share of imports from India (%)**	**Import Intensity Index**	**Country selected**	**Import from India (in Thousand USD)**	**Share of imports from India (%)**	**Import Intensity Index**
United States of America	1944488	26.5	82.983	**Viet Nam**	179849	113.4	21.204
Viet Nam	831539	176.5	552.62	**United Arab Emirates**	7717	22.31	4.171
United Arab Emirates	173237	57.9	181.44	**Turkey**	4337	25.69	4.8015
Russian Federation	60678	23.3	72.837				
Qatar	16006	55.9	174.93				

Source: UN Comtrade/ Author's Calculations

Thus, based on the Import Intensity Index, the share of India's imports out of total imports and the value of imports, the countries shortlisted are Qatar, UAE, USA, Russia and Viet Nam for Crustaceans(306) and Turkey, UAE and Viet Nam for Molluscs (0307).

5. Empirical Analysis Using Arima Modelling

To empirically assess the export potential of marine products from India, for each of the HS Codes selected, ARIMA modelling was applied by taking a sample of the monthly export data for each of the three HS codes for each nation for the time-period between January 2008 and December 2015 and forecasting the exports for the period of January 2016 to December 2022. The results of actual and forecasted value for each of the HS Codes were compared for India's exports to the world and also to the identified markets for export (Siddiqui and Singh, 2020). Stationarity of the series is checked before applying ARIMA by applying Augmented Dicky fuller Test of stationarity. The stationarity results are depicted in Table-6.

Table 6. Unit Root Results Using ADF

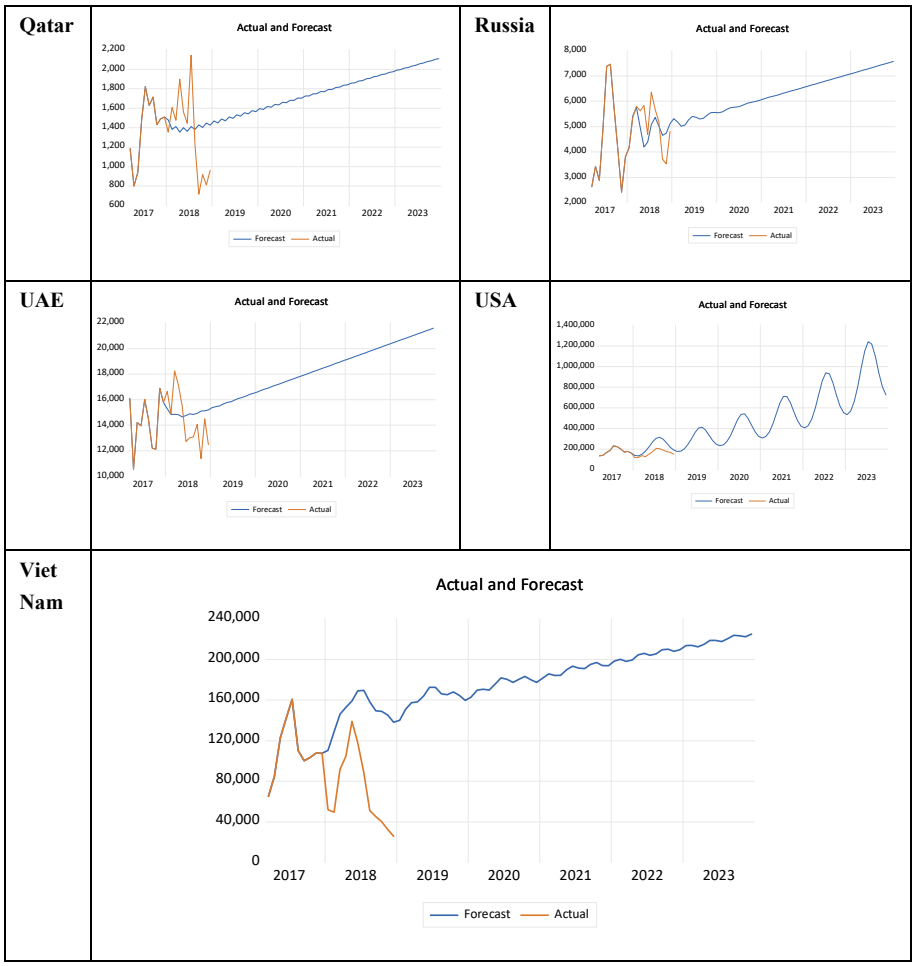
HS Code	Series	ADF p values at level	ADF p values at first difference
0306	Exports from India to Qatar	0.06	0.00*
	Exports from India to USA	0.91	0.00*
	Exports from India to Russia	0.05	0.00*
	Exports from India to UAE	0.39	0.00*
	Exports from India to Viet Nam	0.08	0.00*
0307	Exports from India to Turkey	0.00*	--
	Exports from India to UAE	0.00*	--
	Exports from India to Vie Nam	0.34	0.00*

* Significant at 1% Level of significance

The results of ADF indicate that the time series of 0306 is stationary at first difference level for all countries while in 0307, time series are stationary at level for Turkey and UAE while stationary at first difference for Viet Nam.

ARIMA forecasting is applied to exports of the chosen HS codes and each identified market and conclusions were drawn as enumerated. The export trends and forecasts for Crustaceans (0306) based on ARMA are depicted in Figure – 3 for each of the selected countries.

Figure 3. Export Trends and Forecasts for Crustaceans (0306) for Each of the Selected Countries



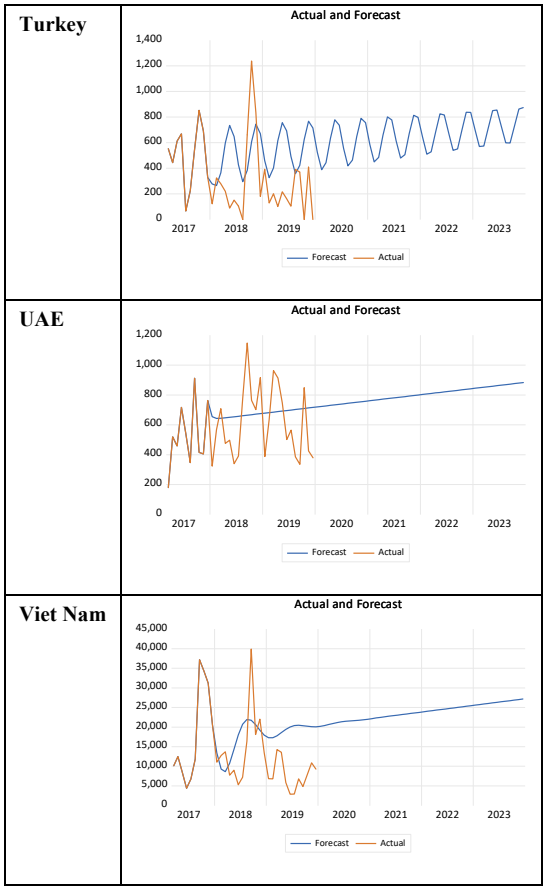
As per the forecasts, the exports of crustaceans to USA, Russia and Viet Nam are following the past trends and indicate the rise in demand though in a cyclical manner from 2019-2022. These are well established markets for India, and it is predicted that in future too exports will rise in a similar pattern. While for Qatar and UAE the forecast is a quite high indicating rise in demand and thus highly prospective markets for India. Thus, emphasis should be laid on increasing the reach in these countries of crustaceans. The model is a good fit for the selected countries as it explains the current trends and the r squared value is moderate. Hence, emphasis should be laid on enhancing exports to these countries from India by adapting adequate policy measures. Table 7 shows that all parameters of the selected model are significant and this model fulfils the criteria of best model selection as compared to other models.

Table 7. Optimal Model for Forecasting Exports of (0306) from India to the Selected Countries

Country	Selected Model	AIC	R-squared	Adjusted R-squared	Prob (F-statistic)	Durbin Watson
Qatar	ARMA(2,2)	12.66	0.28	0.25	0.00	1.94
Russia	ARMA(3,3)	11.76	0.23	0.18	0.00	2.04
UAE	ARMA(3,3)	12.65	0.25	0.20	0.00	2.06
USA	ARMA(4,3)	13.87	0.40	0.35	0.00	2.03
Viet Nam	ARMA(4,4)	12.65	0.31	0.25	0.00	1.98

The export trends and forecasts for Molluscs (0307) based on ARMA are depicted in Figure – 4 for each of the selected countries.

Figure 4. Export Trends and Forecasts for Molluscs (0307) for Each of the Selected Countries



As per the forecasts, the exports of molluscs to Turkey, UAE and Viet Nam are following past trends and indicate the rise in demand though in a cyclical manner from 2019-2022. These are highly prospective markets for India. Viet Nam and UAE are

markets with high demand. The model is a good fit for the selected countries as it explains the current trends and the R squared value is moderate. Hence, emphasis should be laid on enhancing exports to these countries from India by adapting adequate policy measures.

Table-8 shows that all parameters of the selected model are significant and this model fulfils the criteria of best model selection as compared to other models.

Table 8. Optimal Model for Forecasting Exports of (0307) from India to the Selected Countries

Country	Selected Model	AIC	R-squared	Adjusted R-squared	Prob (F-statistic)	Durbin Watson
Turkey	ARMA(2,4)	14.32	0.39	0.36	0.00	1.97
UAE	ARMA(1,1)	13.22	0.43	0.41	0.00	2.01
Viet Nam	ARMA(1,2)	13.76	0.36	0.33	0.00	1.91

The diagnostic checks also indicate that the models are a fit and selected as per Akaike information Criterion (AIC). There is no auto correlation as per Durbin-Watson test too and the R squared values indicate that the results explain the trends. As per the above forecasts, Crustaceans and Molluscs have a high potential for rise in exports to Qatar, Russia, UAE, USA and Viet Nam as well as Turkey, UAE and Viet Nam respectively.

6. Conclusions and Recommendations

The study offers unique insights to both policymakers as well as exporters. The identification of competitive marine products and markets is significant for policy planning as one can decide the quantum and nature of government assistance required for various marine products that can be competitively exported. The policy makers can design suitable assistance in the form of export incentives, benefits, and support & duty neutralization schemes. The nature of such assistance can be in the form of production-oriented support thus disseminating the benefits to marine traders, motivating them for enhanced production, marketing, foreign trade and value-added products. Producers and exporters can also rightly select the areas of core strengths and plan their international business forays with right business strategies. Identification of Crustaceans (0306) and Molluscs (0307) through trade indices like RCA as the most competitive marine products for India is vital as it will help policy makers to design the policy support. Identification of right and attractive markets through use of Import Intensity Index enhances prospective and existing exporter's capability to engage with markets like Qatar, Russia, USA, UAE and Viet Nam for Crustaceans (0306) and Turkey, UAE and Viet Nam for Molluscs (0307). The empirical analysis using ARIMA forecasting motivates Indian exporters to strategize and enhance trade opportunities in these selected markets for the identified products. Marine product's exports which are a potential source of employment generation and foreign exchange realization can be further promoted by mechanization of operations

through adopting modern fishing practices and diversify the production of aquaculture species.

Indian exporters need to gear-up their efforts for setting up new units aimed at value addition as per rising global demand. Further, India as a reliable supplier of marine products must take steps to produce and supply value-added marine products by adopting the latest technologies and by tapping the unexploited and under-exploited fishery resources. Even after having innate strengths in production and export supply of marine products, India's policy makers as well as exporters need to further work upon on export promotion measures as marine sector is backbone of economy of coastal states of India and boosting economic growth of the country.

References

Ahmad, B., K. Mustafa, and M. Mehdi, (2006), "Forecasting Mango Export from Pakistan: An Application of Time Series Data," *Science International*, 18, 268-270.

Anand R., K. Kochhar, and S. Mishra, (2015), "Make in India: Which Exports Can Drive the Next Wave of Growth?" *IMF*, Working Paper.

Swaminathan, B., V. Tarpara, and M. G. Dhandhalya, (2018), "Export Performance of Marine Products from India." *Departmental Research Project, GRIN Verlag.*

Box, G. E. P., and G. M. Jenkins, (1976), "Times Series Analysis Forecasting and Control," *Holden-Day San Francisco*.

Chawla, D., and R. Behl, (2002), "Forecast of Indian Readymade Garments Exports Using the ARIMA Model." *Global Business Review*, 3, 63-76.

Das, A., N. R. Kumar, and P. Rani, (2016), "Growth, Instability and Forecast of Marine Products Export from India," *Indian Journal of Fisheries*, 63, 112-117.

Dommen, C., and C. Deere, (1999), "Fish for Thought: Fisheries, International Trade and Sustainable Development," *International Trade and Sustainable Development Series*, No. 1, Geneva: ICTSD and IUCN.

Faria, S., and M. Kamat, (2016), "An Analysis of Marine Production and Exports Of Goa's Fisheries Sector," *Intercontinental Journal Of Marketing Management*, 3.

Jelte, De Jong. (2017), "Aquaculture in India," Report Rijksdienst voor Ondernemend Nederland.

Polymerosb, E. K., and K. Batziosc, (2014), "Investigating Export Performance and Competitiveness of Balkan and Eastern European Fisheries Sector," *Procedia Economics and Finance*, 9, 219 – 230.

Kapila R., and U. Kapila, (2002), "Structural Transformation of the Indian Economy in the Last Decade of the 20th Century and Future Prospects," *Academic foundation*.

Lu, J. (2015), "Forecasting of US Total Textiles and Apparel Export to the World in Next 10 Years (2015-2025)," *Journal of Textile and Apparel*, 9.

Manjunath, N., H. Lokesha, and B. J. Deshmanya, (2017), "Direction of Trade and Changing Pattern of Indian Marine Products Exports." *Indian Journal of Agricultural Research*, 51, 463-467

Mustafa, K. and B. Ahmad, (2006), "An Econometric Model for Forecasting Export of Kinnow from Pakistan," I*nternational Journal of Agriculture & Biology*, 8, 459-462.

Naz, F. (2012), "A Univariate Time Series Modelling of Dates Exports in Pakistan." *Journal of Contemporary Issues in Business Research*, 1, 37-48.

Panagariya, A. (2004), "*India's Trade Reforms, The India Policy Forum*," Brookings Institution Press & NCAER, 1-43.

Parappurathu, S., G. K. Balasubramanian, P. K. Joshi, and K. K. Datta, (2009), "Export of India's Fish and Fishery Products: Analysing the Changing

Pattern/Composition and Underlying Causes," *Indian Journal of Agricultural Economics*, 64.

Paul, R. K., S. Panwar, S. K. Sarkar, A. Kumar, K. N. Singh, S. Farooqi, and V. K. Choudhary, (2013), "Modelling and forecasting of meat exports from India," *Agricultural Economics Research Review*, 26, 249-256.

Radhakrishnan, K., M. A. Tesfom, M. Krishnan, J. Infantina, and I. Sivaraman, (2018), "Growth and Performance of Indian Fish and Fishery Products Exports," *Fishery Technology*, 55, 143-148.

Regmi, A. (2001), "Changing Structure of Global Food Consumption and Trade," *Economic Research Service*, 4.

Sankar, T. J. (2011), "Forecasting Fish Product Export in Tamil Nadu –A Stochastic Model Approach," *Recent Research in Science and Technology*, 3, 104-108.

Siddiqui, A. A., and Singh, P. (2020), "Identifying export markets for Indian medical devices," *International Journal of Pharmaceutical and Healthcare Marketing*, 14, 587-605.

Singh, N. D., M. Krishnan, S. Prakash, V. R. Kiresur, N. Sivaramane, and S. K. Pandey, (2017), "Geographical penetration, composition, unit value realisation, exports competitiveness and market diversification of shrimp exports from India," *Economic Affairs*, 62, 663-670.

FAO. (2018), "The State of World Fisheries and Aquaculture 2018 - Meeting the sustainable development goals," Rome.

UN, "Commodity Trade Statistics, Trade Statistics 2008-2018," Available at: www.comtrade.un.org.

UNCTAD, "The Global Database on Non-Tariff Measures," Available at: https://trains.unctad.org

World Trade Organization, (2017), "Trade. Technology and Jobs," *World Trade Report.*

Appendix-I

Table 1 India's Export of Marine Products (Million USD)

from 2005-2018 to Key Markets and World

Countries	2005	2010	2014	2015	2016	2017	2018
USA	361.5	349.5	1404.9	1229.4	1457.3	2056.5	2003.4
Viet Nam	18.7	108.3	1099.1	933.6	1264.6	1809.6	1173.8
China	129.4	245.9	124.8	148.1	129.0	141.6	565.8
Japan	256.8	300.0	431.5	387.4	381.3	435.8	410.0
Thailand	22.6	93.3	106.1	129.2	193.2	250.0	319.5
UAE	45.9	50.9	185.0	141.5	161.8	185.4	188.9
Spain	110.1	150.2	205.5	177.2	219.9	255.0	166.1
Italy	34.1	85.4	138.5	129.1	143.1	156.6	150.3
UK	78.6	67.7	159.8	118.6	145.1	172.5	128.6
Belgium	86.0	73.6	225.4	156.9	105.2	141.4	115.4
Total Exports	1466.7	2163.7	5358.6	4580.0	5209.1	6665.1	6349.8

Source: UN Comtrade. 2019

Table 2 Key Importers (Millions USD) of Marine Products in the World Market

from 2005-2018

Importers	2005	2010	2014	2015	2016	2017	2018
USA	9922.90	11827.21	16689.41	15498.43	16367.72	17900.67	18524.55
Japan	11537.94	11660.63	11450.35	10243.44	10795.76	11725.23	11864.09
China	2879.07	4365.46	6583.35	6328.01	6917.64	8070.78	11605.74
Spain	5242.58	5679.84	6043.75	5625.64	6351.79	6987.42	7422.21
France	3580.59	4684.24	5080.26	4544.85	4986.41	5403.58	5555.79
Italy	3395.26	4247.28	4632.06	4273.55	4886.51	5167.64	5477.07
Sweden	1349.03	2926.87	4380.91	4069.20	4838.26	4580.85	5200.68
South Korea	2030.07	2775.16	3635.88	3719.58	3942.70	4334.10	5045.60
Germany	2453.00	3757.60	4816.35	4179.82	4546.32	4775.54	4626.64
Viet Nam	193.67	328.85	1049.76	1042.92	1088.05	1259.51	4348.99

Source: UN Comtrade 2019