



Research Article

Export performance of Indian marine products to major export market regions

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SUMMARY : The countries importing marine products from India are grouped into 12 major export market regions from 1998. The export performance of marine products from India to the major export market regions for the period 1998-2008 was analysed by studying the graphical trend, percentage contribution, compound growth rate, and instability index in export quantity and value. Direction of trade for export quantity was analysed for the period 2004-2008. It was found that the growth rates were low for U.S.A. and China (incl Hong Kong), and negative for Japan. The E.U. and South East Asia regions also had low rates. However, the rates were not significant for Japan, U.S.A., China, and Other West European countries. The index of instability in export quantity was low for E.U., Japan and moderate for U.S.A. Growth rate for total exports was low for export quantity and value and was not significant for the latter. The associated instability in export quantity was also low. Direction of trade analysis revealed that the largest market of China (including Hong Kong) returned only a moderate probability of retention of market share, as did the second largest region, the E.U. The highest probability of market share retention was shown by other Asian Countries.

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KEY WORDS :

Export performance, Markets, Regions, Trend, Growth rate, Instability index, Direction of trade

BACKGROUND AND OBJECTIVES

In 1998, India's marine products exports were 313,503 tons with a nominal value of Rs. 47,095.5 millions (US \$ 1,168.62 millions) which increased to 595,821 tons and nominal value Rs.83,982.6 millions (US \$ 1945.84) in 2008. India exports marine products to over 90 countries, which are grouped into regional and economic entities. Three classifications of major export market regions were followed during the periods 1972-1981, 1977-2001, and 1998-2008. For the period 1972-1981, countries taking marine products from India were grouped into ten major export market regions, namely, Africa, North America, Latin America, other American countries, ESCAP countries, other Asian and Oceanic countries, East European countries, European common market (E.C.M.), European free trade (E.F.T.A.) countries, and other European countries. In the overlapping period 1977-2001, countries were grouped into 7 major export market regions, namely, WANA (West Asia and North

Africa) Region, North America, Latin America, ESCAP countries, East European countries, European economic community (EEC), and 'other countries'. Starting from 1998, the various countries for marine products exports from India are grouped into 12 major export market regions including 'others'. These major regions are Japan, U.S.A, the E.U., China (including Hong Kong), South-East Asia, Middle East, East Europe, African countries, Latin American countries, other Asian countries, other West European countries, and 'others'.

The major export market regions presently followed 1998-2008 gives a geographical indication of the markets to which exports are being made. The earlier classification followed during 1972-1981 and 1977-2001 included large economic groupings like ESCAP region, European common market, and the European free trade countries in the period 1972-1981, and ESCAP region and European economic community in the period 1977-2001 which regions combined took away more than

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50 per cent of the export picture. Presently, Europe is grouped into three regions, the E.U., East Europe, and other West European countries. The export performance of India's marine products to these major market regions was analyzed.

RESOURCES AND METHODS

The data on destination-wise export quantity and value of major export market regions was compiled from the publication "Statistics of marine products exports" for several years, published by the Marine Products Export Development Authority (MPEDA), (Ministry of Commerce and Industry, Government of India,) Kochi. The nominal export values were deflated using the wholesale price index. Data were available for the period 1998-2008 and analysis was conducted for the following:

Trend:

A graphical plot of the export quantity and export value against time (years) for the leading countries was used to ascertain the general trend in export to major export market regions.

Percentage contribution:

The simple average of the export quantity and value for the various time periods for the 12 major export market regions was used to get the share percentage of the leading countries exported to. The period 1998-2008 was considered as total period and the period 2004-2008 as recent period

Compound growth rate analysis:

The growth of exports to the 12 major export market regions was analyzed using the exponential growth function of the form,

$$Y = ab^t e \tag{1}$$

where y = dependent variable for which growth rate is to be estimated (quantity exported and value realized)

- a = intercept
- b = regression coefficient
- t = time variable
- e = error term

The compound growth rate was obtained from the logarithmic form of the equation (1) as follows:

$$\text{Log } y = \text{Log } a + t \text{ Log } b \tag{2}$$

Thus, the per cent compound growth rate (g) was computed using the relationship:

$$g = (\text{Antilog of } b - 1) \times 100 \tag{3}$$

Instability index:

In order to study the variability in the export quantity

and export value to the 12 major export market regions exported over the years, the instability index (Cuddy and Della Valle) was used to compute the degree of variation around the trend, i.e., the co-efficient of variation was multiplied by the square root of the difference between the unity and coefficient of multiple determinations (R^2) to obtain the instability index.

$$\text{Index instability} = \frac{\text{Standard deviation } (\sigma)}{\text{Mean } (X)} \times 100 \times \sqrt{1 - R^2}$$

where R^2 = Co-efficient of determination

A high degree of instability index signifies large variations in the exports to the major export market regions.

Direction of trade:

In the present study, the changes in the exports of marine products to the 12 major export market regions were analyzed by employing a first order finite Markov chain model which captures the net effect in changes in the exports of the marine product over a period of time. Markov chain analysis involves developing a transitional probability matrix 'P' which is central to the method. The matrix has elements, P_{ij} , which indicate the probability of exports switching from market region 'i' to market region 'j' over time. The diagonal element P_{ii} , where, $i=j$, measures the probability of a market region retaining its market share or in other words the loyalty of an importing market region to a particular country's exports.

The assumption was that the average export of marine products from India among importing major export market regions in any period depends only on the export in the previous period and this dependence is same among all the periods. This is algebraically expressed as:

$$E_{jt} = \sum_{i=1}^n j_t = [E_{it-1}] P_{ij} + e_{jt} \tag{4}$$

where,

E_{jt} = exports from India to the jth market region during the year t.

E_{it-1} = exports to ith market region during the period t-1.

P_{ij} = probability that the exports will shift from ith market region to jth market region.

e_{jt} = the error term which is statistically independent of E_{it-1}

t = number of years considered for the analysis

n = number of importing major market regions

The transitional probabilities P_{ij} can be arranged in a (columns x rows) matrix and have the following properties:

$$0 = P_{ij} = 1, \text{ and}$$

$$\sum_{i=1}^n j_t = 1 \text{ for all } i$$

Direction of trade was examined only for the variable export quantity using the annual data of major export market regions. Eleven major market regions and 'other countries' were analyzed for direction of trade (Table 2) for 5-year term in the period 2004-2008. Based on average annual export quantity, the major market regions for the stated period were arranged in descending order of tonnage purchased.

OBSERVATIONS AND ANALYSIS

Export quantities showed an increase towards 2008 for the leading market regions of E.U. (157,953 tons and Rs.8.11 billions real value) and China (141,605 tons and Rs.7.58 billions real value). Exports to U.S.A was about 35,591 tons and Rs.8.20 billions real value in 1998 and reached 62,921 tons in 2002 but declined to 36,240 tons and Rs.23.10 billions real value in 2008. Japan maintained its quantities around 60-65,000 tons (Fig. 1).

For the period 1998-2008, in terms of share in average export quantity, China (including Hong Kong) was the largest buyer (31%), followed by European Union (23%), Japan (13%), South East Asia (12%), U.S.A (10%), Middle East (4%), African countries (2%), other Asian countries (2%), East Europe (1%), Latin American countries (0.35%), other West European (0.11%), and 'others' (2%) (Fig. 2).

countries (0.11%), and 'others' (2%), when considering average quantities for the period (Fig. 2). China and the E.U. together took a little more than half (54%) of the total export quantity from India. In the recent period 2004-2008, the shares of average quantity are similar, except for the slight decrease in Japan (12%) and relative increase in South East Asia (13%).

For the period 1998-2008, in terms of average export real value however, Japan was the largest contributor (26%), closely followed by the European Union (24%), U.S.A. (20%), China (12%), South East Asia (8%), Middle East (4%), African countries (2%), other Asian countries (1%), East Europe (0.32%), Latin American countries (0.30%), other West European countries (0.11%), and 'others' (3%) (Fig. 3).

The growth rate in export quantity was low for leading market regions of U.S.A. (0.88%) and China (incl. Hong Kong) (2.55%), and was negative for Japan (-0.57%) (Table 1). The E.U. (12.81%) and South East Asia (10.53%) also had also low rates. However, the rates were not significant for Japan, U.S.A., China, and other West European countries. The index of instability in export quantity was low for E.U. (7.58%) and Japan (10.60%), and moderate for U.S.A. (20.40%).

The growth rate in real value was also negative for Japan (-12.36%) and U.S.A. (-0.49%) but was significant only for the

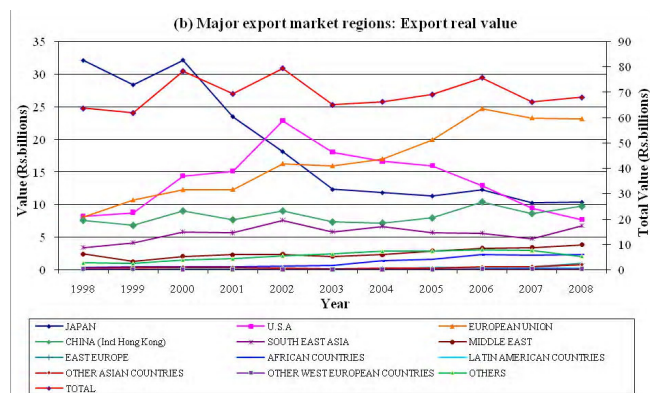
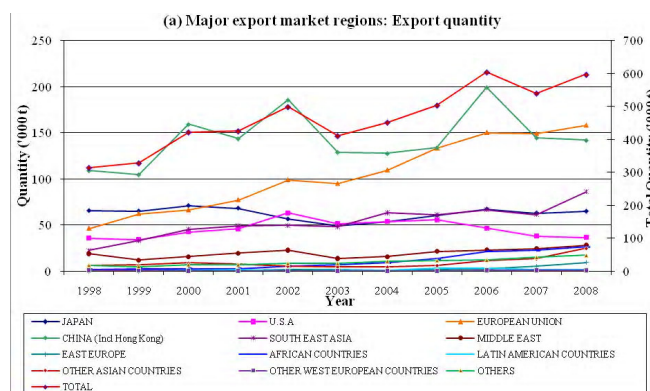


Fig. 1 : Major export market regions: (a) export quantity (tons) and (b) export real value (Rs .billions) for the total period 1998-2008

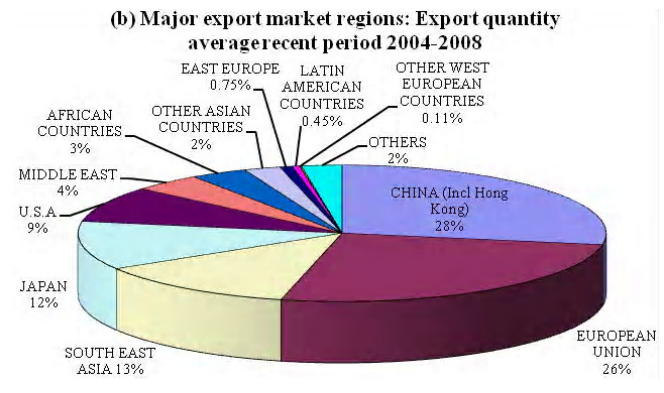
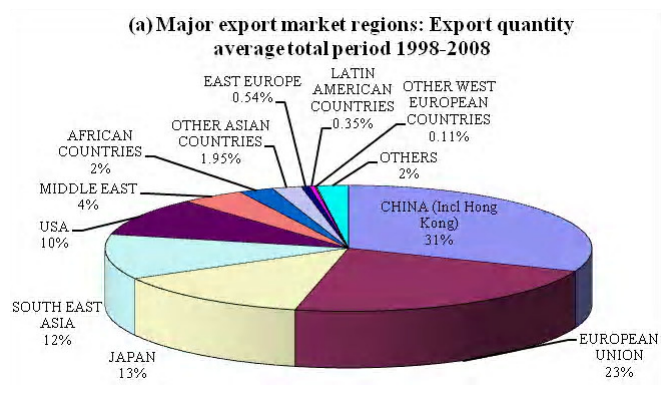


Fig. 2 : Major export market regions: Percentage share in average export quantity (tons) for the (a) total period 1998-2008 and (b) recent period 2004-2008

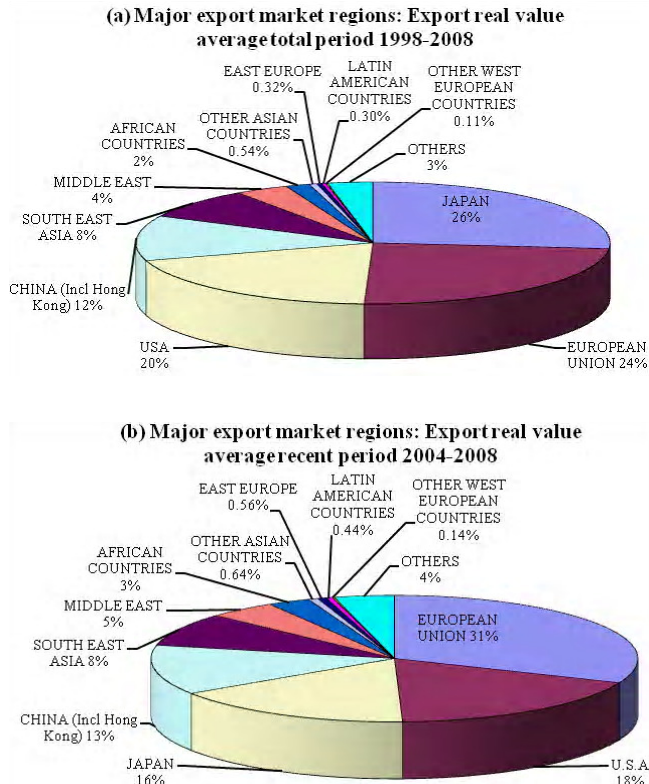


Fig. 3 : Major export market regions: Percentage share in average export real value (Rs.billions) for the (a) total period 1998-2008 and (b) recent period 2004-2008

former. The rate for China was low (2.25%), while it was better for the E.U. (10.98%). The instability index in real value was lowest for the E.U. (8.57%) and highest for East Europe (49.13%) (Table 1). The market regions of East Europe and

African countries showed higher growth rates in quantity and value, but stability in both was lowest for the latter region. Growth rate for total exports was low for export quantity (6.11%) and value (0.28%) and was not significant for the latter. The associated instability in total export quantity was also low (8.68%).

Eleven major market regions and ‘other countries’ were analyzed for direction of trade (Table 2). The largest market of China (including Hong Kong) returned only a moderate probability (0.3100) of retention of market share, as did the second largest region, the E.U. (0.4453). The highest probability of market share retention was shown by other Asian countries (0.8400), followed by U.S.A. (0.7334), and African countries (0.4678), while that for South East Asia was low (0.2118), and the probabilities for Japan (0.1419) and Middle East (0.0770) were poor. The rest of the market regions and ‘others’ were unstable. The average quantities taken by China were about 31 per cent (143,210 tons) of the period’s average annual total exports, while the same was 23 per cent for E.U., 10 per cent (45,581 tons) for U.S.A. and 2 per cent for other Asian countries. China showed several probabilities of gain of market share from E.U., Japan and U.S.A.

The low contribution of China to export real value despite taking the largest share in export quantity is because of high purchases of frozen fish quantities such as frozen Ribbon Fish, frozen Croaker, and other lower valued items. The low export value contribution from South East Asia in relation to the export quantity reflects the low value-added products taken. More than 60% of the exports to South East Asia is further processed and exported. Vietnam is a large purchaser from S.E. Asia. The major portion of India’s exports go in block frozen ‘whole’ style – unprocessed - and fetches low unit value of realization due to low value addition in India.

Table 1 : Major export regions: Growth rate and instability index for export quantity (kg) and export value (Rs.) for the total period 1998-2008

Major export market regions	Export quantity		Export real value		Export nominal value	
	Growth rate (%)	Instability index (%)	Growth rate (%)	Instability index (%)	Growth rate (%)	Instability index (%)
Japan	-0.57 ^{NS}	10.60	-12.36 ^{***}	17.19	-7.82 ^{***}	18.29
U.S.A.	0.88 ^{NS}	20.40	-0.49 ^{NS}	34.93	4.66 ^{NS}	31.48
European Union	12.81 ^{***}	7.58	10.98 ^{***}	8.57	16.72 ^{***}	7.95
China (and Hong Kong)	2.55 ^{NS}	18.24	2.25 [*]	11.42	7.54 ^{***}	12.11
South East Asia	10.53 ^{***}	13.51	3.45 ^{NS}	18.47	8.80 ^{***}	17.13
Middle East	5.41 ^{**}	18.85	7.69 ^{***}	17.16	13.27 ^{***}	18.62
East Europe	39.82 ^{***}	55.46	40.65 ^{***}	49.13	47.93 ^{***}	50.28
African Countries	32.38 ^{***}	14.18	26.55 ^{***}	17.39	33.10 ^{***}	16.96
Latin American Countries	16.22 ^{***}	39.70	20.12 ^{***}	31.43	26.33 ^{***}	31.02
Other Asian Countries	9.60 [*]	52.48	5.22 ^{NS}	37.71	10.67 ^{**}	43.18
Other West European Countries	4.88 ^{NS}	44.70	4.58 ^{NS}	42.52	10.00 [*]	47.89
Other Countries	12.05 ^{***}	9.41	10.73 ^{***}	19.38	16.47 ^{***}	17.90
Total	6.11 ^{***}	8.68	0.28 ^{NS}	8.51	5.47 ^{***}	7.99

Note: *, **, and *** indicate significance of values at P=0.01, 0.05 and 0.10, respectively

Table 2: Major export regions: Direction of trade - transitional probability matrix from the period 2004-2008

Major export market regions	China (incl Hong Kong)	European Union	South East Asia	Japan	U.S.A.	Middle East Asia	African Comorbices	Other Asian Comorbices	Europe	Latin American Comorbices	Other Western Comorbices	Other Comorbices
China (incl Hong Kong)	0.31000	0.39115	0.00000	0.17766	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
European Union	0.18883	0.44633	0.29441	0.09231	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
South East Asia	0.00000	0.39688	0.21118	0.34881	0.00000	0.00000	0.00000	0.00000	0.00000	0.01335	0.00000	0.00000
Japan	0.35881	0.00000	0.00000	0.14119	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
U.S.A.	0.23429	0.00000	0.00000	0.00000	0.76334	0.00000	0.00000	0.00000	0.00000	0.03294	0.00000	0.00000
Middle East Asia	0.00000	0.00000	0.38836	0.00000	0.00000	0.07740	0.26697	0.00000	0.00000	0.00000	0.01571	0.56330
African Comorbices	0.00000	0.00000	0.00000	0.00000	0.00000	0.01530	0.66788	0.15538	0.19271	0.00000	0.00000	0.11997
Other Asian Comorbices	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.89400	0.16599	0.00000	0.00000	0.00000
Europe	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	1.00000	0.00000	0.00000	0.00000	0.00000
Latin American Comorbices	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Other Western Comorbices	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Other Comorbices	0.00000	0.00000	1.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

In contrast, U.S.A and E.U. are large purchasers of high valued products such as frozen shrimp and lobster, and their value added products, which now go for direct sales to retail markets without further processing. U.S.A. took only 10% in export quantity but contributed double (20%) that in export real value. The E.U. overtook Japan in 2002-2003 and the U.S.A. in 2003-2004 as India's largest market. The European Union, collectively, is the largest market for India in terms of export nominal value. Within the Middle East, the U.A.E is the major market.

The accession of China to the WTO in 2001 saw its entry and growth in both imports and exports of seafood products in the world markets. Japan showed a 70% drop in export real value from the year 2000 to 2008. The economic recovery of Japan in the 2000's decade, from the recession of the 1990's, did not bring about an increase in export quantity from India. U.S.A. also showed a drop of 66% in export real value between 2002 and 2008. The fall in value of total exports was offset largely by the increase in exports to EU which showed a 2.8 fold rise over the period 1998 to 2008. Though total exports in quantity show increase, the real export value does not show commensurate increase and appears to have levelled off. Most remarkably, total exports show nearly a 90% rise in quantity in 2008 compared to 1998, but the rise in export real value was only marginal.

In 2008, as much as 78.8% of total seafood imports valued at US \$ 82.6 billion was estimated to be taken by the four large markets of Japan (US\$ 14.5 billion and 13.8%), U.S.A. (US \$ 14.1 billion and 13.5%), China including Hong Kong (US \$ 10.8 billion and 10.3%), and E.U. (US \$ 43.2 billion and 41.3%) from a global total of US \$ 104.7 billions (Globefish, 2012). Within South East Asia, Vietnam is expected to 'match' China in seafood imports for its reprocessing industry and for domestic consumption, and is projected to increase in the near future.

Shyam *et al.* (2004) studied growth rates in export quantity and value for major market regions. They found that compared to the pre lib period of 1979-1990, in the post lib period 1991-2002 the growth rates in export quantity and value increased for Japan (3.73% and 5.03%), U.S.A. (8.17% and 14.79%), South East Asia (13.86% and 12.54%), and Middle East (5.19% and 7.84%). In contrast the same decreased for the European Union (-0.66% and 0.97%). In the post lib period, the growth rate for exports in total quantity and value increased for total exports (8.29% and 8.23%) and 'Others' (18.18% and 24.39%). In their study, rates were not significant for Japan, U.S.A. and 'Others' for export quantity in the pre lib period. Rates were significant for E.U., only in the pre lib period. The growth rate for South East Asia was not significant for export value in the pre lib period while growth rate was significant for Middle East only for export quantity in pre lib period.

Comparing the pre lib period 1979-1990, Shyam *et al.*

(2004). found that in the post lib period 1991-2002, instability index in export quantity and value increased for Japan (18.04% and 24.02%), South East Asia (33.35% and 46.71%), and Middle East (36.93% and 98.61%), whereas they decreased for U.S.A. 17.96% and 29.73%, and European Union (21.09% and 22.22%). They concluded that in the post-liberalisation period the regional markets of Japan, South East Asia and Middle East exhibited higher degree of instability when compared with pre-liberalisation period.

Shyam and Aswathy (2011) opined that there existed very huge competition for gaining access to the target markets. Japan, USA, and European Union or Western Europe were the major fish importers from India, which accounted for about 60 to 65 per cent of the volume and about 70-75 per cent in value of Indian seafood export. They concluded that even though geographic diversification emerged with exports to China and to Middle East region expanding after the imposition of strict quality regulations in US or EU, the latter two markets still accounted for a major share (70-75 %) in the foreign exchange earned through Indian exports.

Developed countries as a whole are now responsible for 78 per cent of the total import value of fish and fishery products. In volume (live weight equivalent), their share is significantly less, 58 per cent, showing the higher unit value of commodities imported by developed countries. In 2008, about 50 per cent of the import value of developed countries originated from developing countries (FAO, 2010).

The major events in this period to impact trade with U.S.A., and Japan were the cultured shrimp 'muddy-mouldy' smell problem with Japan in 2002-2004, the anti-dumping dispute with the U.S. beginning 2004, the antibiotic tainted shipment rejections from EU and U.S.A (AAI, 2002), the 2005 Tsunami, the periodic EC directives on quality, US trade restrictions such as Bioterrorism Act 2002 and duty bond requirement in 2008, and the strengthening of the dollar (2000-

2007) were among the many to impact India's marine products exports.

The Govt of India offers a "Focus Market Scheme" from 2006 to increase exports to new markets in Africa, Latin America and Central Asia among others to offset the high cost of freight and protect against externalities. With the 'Look East' trade policy, a rise in trade with South East Asia is expected.

With several regional free trade agreements signed and others under discussion, exports to regions other than the traditional strongholds of Japan, U.S., and E.U are likely to increase. Marine products exported from India are high in food safety and quality and fully compliant with EU, U.S.A. and Japanese standards, and should face no barriers on these fronts from new markets.

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