Trade Mapping of India's Cotton Export

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Abstract: *The present research empirically investigated the export comparative advantage of India's cotton products and determined the potential target importing cotton markets using annual dated data sourced from FAO database, spanning from 2000 to 2013.The collected data were analyzed using the static revealed comparative indexes, neoclassical comparative index (Trade mapping analysis), market structure index (Herfindahl-Hirschman Index) and prioritization index models. The results of the findings showed that India has poor comparative advantages with the exception of cotton lint in the exportation of its cotton products due to specialization in the production of lint. However, from the sector point of view the country had revealed comparative advantage in the exportation of cotton. Furthermore, empirical evidence showed that the cotton lint been the major export earning India emerged in the export market over the study period despite commanding small share in the market, and is among the winner groups. Though, for the overall sector, the country is at a threshold in the export market and among the winner groups. Therefore, study recommends the need for increase productivity and production cut-costs in order to improve the position of its products export amongst the commercial competitors. In addition, the commercial production status and behavior of the major competing exporting countries (China and USA) need to be fully tracked or monitored by the major participants in the cotton value chain in other to deal with the effects of externalities. The research will help to breach the gap of India's cotton share in the global market by exploring potential target markets for its product, thus enhancing its cotton foreign exchange earnings.*

Keywords: Cotton export, comparative advantage; India, target market, trade mapping

1. Introduction

Cotton is one of the most important textile fibers in the world, accounting for 35% of the world fiber use. Cotton was first cultivated in the old world about 7,000 years ago, by the inhabitants of the Indus Valley Civilization. This civilization covered a huge swath of the north-western part of the India subcontinent, comprising today parts of eastern Pakistan and north-western India (Samuel *et al*., 2015).

Among the countries in which cotton is an important contributor to rural livelihoods are China, India and Pakistan where millions of rural households are engaged in cotton production and more than two- thirds of the world's cotton is produced in the developing countries (Baffes, 2005). Despite that India is the second largest producer of cotton in the world after China with world share contribution of 22% (International Trade Centre, 2013); the country has been more or less non-existent in the world cotton market.

Recognizing potential target markets and prioritizing them for a particular product can eventually be useful in developing efficient marketing strategies related to policy makers. Due to the manifold and profitability of global transactions, benefits of joining the globalization process cannot be over-emphasized. To enter this stream, evaluation of competitiveness levels is necessary. Batra and Khan (2009) reported that there is an emerging concern and ongoing discussion among the less developed countries about the threats of increasing exports share of some robust economies and the consequent intensification of competition among manufactures. Therefore, taking steps to keep and even increase

the market performance by identifying and prioritizing the potential target markets is an important matter. Literature review of similar studies (Sharma and Bugalya, 2014; Kumar and Singh, 2015; Samuel *et al.*, 2015; Dhima and Sharma, 2017; Gupta and Khan, 2017) showed no comprehensive study on the current status of importing potential target markets for India's cotton. Hence, identifying potential target markets and prioritizing them for export direction of India's cotton export can help to find the best strategies for companies that export India's cotton. Furthermore, policymakers can make use of the business information strategies, especially in bilateral trade negotiations. Therefore, the objectives of this research are to determine India's cotton export growth and competitiveness in the global cotton markets; compare India's cotton export growth to global demand; and, to identify and prioritize the potential target importing cotton markets for India's cotton export.

2. Research Methodology

The study used annual dated time series data sourced from the FAO database, spanning from 2000 to 2013. The data covered export value of all the cotton products sub-sectors *viz.* cotton lint, cotton linter, cotton waste, cotton carded/combed and cotton seeds. The first objective was achieved using revealed comparative advantage (RCA) index, revealed symmetric comparative advantage (RSCA), export competitiveness index (XCI) and revealed trade advantage (RTA). The second objective was achieved using Trade mapping analysis (TMA); the third objective was achieved using prioritization index; and, the last objective was achieved using Herfindahl-Hirschman Index (HHI). The empirical models are given below.

2.1. Indexes of export's revealed comparative advantage

Following Balassa (1965) as cited by Astaneh *et al*. (2014); Gupta and Khan (2017); Navghan *et al.* (2017) the revealed comparative advantage (RCA) was calculated following the equation below.

$$RCA_{ij} = \frac{X_{ij}/\sum X_{ij}}{X_{iw}/\sum X_{iw}} \qquad [1]$$

Where,

RCA_{ij} = revealed comparative advantage of ith commodity by country j

X_{ij} = Export of ith commodity by country j

$\sum X_{ij}$ = Total export of ith commodity class by country j

X_{iw} = Export of ith commodity by the world

$\sum X_{iw}$ = Total export of ith commodity class by the world

The numerator represents the commodity structure of the exports from jth country and the denominator represents the product structure of the global market. The range of *RCA* is between 0 to∞. *RCA*> 1 shows sectors in which a country is relatively more specialized and *vice versa* (the more the value of the index, the greater reliability and the better the given position). In other words, if RCA >1, then the state has a revealed comparative advantage in the commodity; if RCA <1, then the state has a revealed comparative disadvantage in the commodity; and, RCA=1, implies comparative neutrality.

The benefit of comparative advantage index is that it takes into consideration the intrinsic advantage of a particular export commodity as well as the consistency with changes (Batra and Khan, 2009). However, one of the main disadvantages of *RCA* index is its wide range such that it is too wide to determine the degree of comparative advantage properly (Astaneh *et al.*, 2014). To solve the above problem, Laursen (1998) introduced another form of *RCA* index using a symmetric or normalized index by a homogeneous transformation called revealed symmetric comparative advantage (RSCA) as indicated below.

$$\boldsymbol{RSCA_{ij} = (RCA_{ij} - 1)/(RCA_{ij} + 1)} \qquad [2]$$

These changes range between -1 and +1 so that negative values indicate no advantage and positive values indicate that there is an advantage.

The mentioned indexes are static. New indexes are expanded which have more consistency with new conception of competitive advantages. One of them is Trade Map (TM) introduced by International Trade Centre (ITC) and United Nations Conference on Trade and Development (UNCAD) and compares export growth to global demand growth. The groups of export commodities are classified into winners and losers based on *TM* and defined in Table 1. Based on the information in Table 1, if the global growth rate of import of commodity *i*(r_i) is bigger (less)than the growth rate of aggregated

imports, the market of this commodity is identified as emerging (declining) market. If the export growth rate of country *j* for commodity i^{th}(d_{ij})is bigger (less) that the import growth rate of this commodity (r_i), the country is winner (looser) on that commodity.

Table 1: Trade mapping coordinates

Coordinate	Property	Decision rule
First quarter	$d_{ij}>r_i> r$	Winners in emerging markets
Second quarter	$d_{ij}<r_i> r$	Losers in emerging markets
Third quarter	$d_{ij}>r_i< r$	Winners in declining markets
Fourth quarter	$d_{ij}<r_i< r$	Losers in declining markets

Source: International Trade Centre (2013)

2.2. Export Competitiveness Index (XCI)

The export competitiveness pertains to the ability and performance of any product, firm, industry, or country to export in given market comparative to ability and performance of other product, firm, industry, or country. Export competitiveness of cotton products in India was used to determine its changes in the world cotton market share. Changes in Indian's cotton export share in the world cotton market over time can indicate the long-term comparative advantage of the product. It neutralizes cyclic fluctuations to large extent which showed sustained trends in the shifting of market forces toward the new center of gravity. Following Navghan *et al*. (2017) the XCI developed by Fertö and Hubbard (2002) is used to calculate export competitiveness index.

$$XCI_{ij} = \frac{X_{ijt}/X_{wt}}{X_{ijt-1}/X_{wt-1}} \quad [3]$$

Where,

XCI_{ij} = *Export competitive index of ith product by country j at time 't'*

X_{ijt} = *Export of ith product by country j at time 't'*

X_{iwt} = *Export of ith product by the world at time 't'*

X_{ijt-1} = *Export of ith product by country j at time 't-1'*

X_{iwt-1} = Export of i^{th} product by the world by at time '*t-1*'

If the XCI is >1 then it can be said that the country has competitiveness in the export of i^{th} product.

2.3. Relative Trade Advantage (RTA)

Besides using the exports as a factor, as in Balassa index, RTA has also been taken into consideration. Following Navghan *et al.* (2017) the RTA index was calculated using the formula below.

$$RTA = RXA - RMA \quad [4]$$

$$RTA = \frac{X_{ij}/\sum X_{ij}}{X_{iw}/\sum X_{iw}} - \frac{M_{ij}/\sum M_{ij}}{M_{iw}/\sum M_{iw}} \quad [5]$$

Where,

RTA = relative trade advantage

RXA = RCA or Balassa index

RMA = Relative import advantage

M_{ij} *= Import of ith commodity by country j*

$\sum M_{ij}$ *= Total Import of ith commodity class by country j*

M_{iw} *= Import of ith commodity by the world*

$\sum M_{iw}$ *= Total Import of ith commodity class by the world*

2.4. Prioritization of target export markets

Following Brewer (2001), the importing countries were prioritized according to potential indices of imports using six indices.

The average imports i^{th} commodity by country *j*

$$m_1 = \overline{M_{ij}} \quad [6]$$

The ratio of imports of the i^{th} commodity by country *j* to total world imports of the commodity

$$m_2 = \frac{M_{ij}}{M_{iw}} \quad [7]$$

The ratio of imports of i^{th} commodity by country *j* to total imports of country *j*

$$m_3 = \frac{M_{ij}}{M_j} \quad [8]$$

The index of disadvantage of country *j* for i^{th} commodity

$$m_4 = \frac{M_{ij}/M_j}{M_{iw}/M_w} \quad [9]$$

The average growth of imports of i^{th} commodity by country *j*

$$m_5 = r.M_{ij} \quad [10]$$

$$H_j = \sum_{k=1}^{n} \left|\frac{m_{kj}-m_j}{\delta_i}\right| /n \quad [11]$$

Where,

m_{kj}= Index k^{th} for country *j*,

δ_i= Standard deviation of indices for country j

H_j = Simple average of the standardized indices of the above

Using this method, specified and limited number of countries, whose H_j index is relatively the highest were selected in the final prioritization.

2.5. Herfindahl–Hirschman Index (HHI)

Herfindahl-Hirschman index is calculated by the summation of the squares of market shares of all active firms in the industry. This index is very similar to Hirschman index except for the square root (Hirschman, 1964).

$$HHI = \sum_{i=1}^{n} S_i^2 \quad [12]$$

Where,

Si = market share of i^{th} sub-sector in the sector;
n = number of sub-sectors.

Types of market structure and characteristics as reported by Williams and Rosen (1999) are presented in Table 2.

2.6. Diversification Index

However, literature has shown various methods used to measure level and degree of diversification but for the present empirical examination, Berry's index and Theil's Entropy index were used.

Berry's Index of Diversification (BID) $= 1 - \sum_{i=1}^{n} P_{it}^2$ [13]

$$P_{it} = \frac{A_{it}}{\sum_{i=1}^{n} A_{it}} \quad [14]$$

Where,

P_{it} = Share contribution of i^{th} sub-sector to the main sector at time 't'

A_{it} = i^{th} Export value of ith sub-sector at time 't'

$\sum_{i=1}^{n} A_{it}$ = Export value of cotton sector at time 't'

The value of Berry's index varies between zero and one. It is one (1) in case of perfect diversification and zero in case of perfect specialization.

$$Entropy\ Index\ of\ Diversification\ (EID) = \sum_{i=1}^{n} P_{it}\ log\left(\frac{1}{P_{it}}\right) \quad [15]$$

The value of Entropy index (E) varies from zero to *log n*. *'EID'* takes the value of zero in case of perfect specialization and *log n* when there is perfect diversification.

The actual degree of diversification to maximum diversification for a given sector was measured through Berry's index below.

$$Degree\ of\ diversification\ by\ Berry's\ Index = Berry's\ Index\ /\left(1 - \frac{1}{n}\right) \quad [16]$$

Where,

n = number of sub-sectors in the agriculture sector

$$Degree\ of\ diversification\ by\ Entropy\ Measure = Entropy\ Index/logn \quad [17]$$

Rule of Thumb:

0 = specialization
0.01-0.19 = Very low diversification
0.20- 0.39 = Low diversification
0.40-0.59 = Moderate diversification
0.60-0.79 = High diversification
0.80-0.99 = Very high diversification
1.00 = Perfect diversification

Table 2: Market structure

Market type	HHI	Feature
Perfect competition	HHI → 0	None of the subsectors have considerable share in the sector
Monopolistic competition	(1/HHI → 10)	None of the sub-sectors had more than 10% share in the sector
Opened oligopoly	$6 < (1/HHI) \leq 10$	Few subsectors account for maximally 40% share in the sector
Closed oligopoly	$1 < (1/HHI) \leq 6$	Few subsectors account for maximally 60% share in the sector
Monopoly	HHI → 10	One subsector account for whole share of a sector

Source: Williams and Rosen (1999)

3. Results and Discussion

3.1. India's cotton export status

Presented in Table 3 are the export values of India's cotton sub-sectors along with their respective growth rates for the period 2000 to 2013. A perusal of the Table showed that cotton lint accounted for the highest contribution of the total export value of Indian cotton sector with a share contribution of 96.58%; an equivalent approximately export value of $21.5 billon. The

contributions of the other cotton products were very marginal with the sum share contribution been 4.42%, thus negligible. Therefore, it can be inferred that cotton lint is the main export earning of India's cotton sector which is driven by wide mismatch between demand and supply in the global fabric trade market. Furthermore, it was observed that the export growth rate of the main sector and the sub-sectors were plagued or accompanied by fluctuation with the fluctuations been more pronounced in the cotton carded/combed, cotton seeds and cotton linter in descending order. However, empirical evidence showed mild fluctuation rate in the lint and waste sub-sectors and the main sector during the period under study.

The average annual growth rate of cotton carded/combed was found highest despite been poor in the share contribution of India's cotton export value and accompanied high level of fluctuation. However, evidence showed that export value recorded for the sub-sector during the year 2003 was responsible for the heightened annual average growth rate. The average share of India's cotton in the total world cotton to the tune of 10.03% is low and this may be attributed to high domestic consumption as well as subsidies devised by the competitive major exporters (China and USA) which dampen the price of India's cotton products.

3.2. RCA and RSCA indices of India's cotton export

The year-wise results of export's revealed comparative advantage of India's cotton sector calculated by RCA and RSCA indices over time indicated that India had good and fair export revealed comparative advantage in the exportation of cotton lint and cotton linter respectively over the study periods (Table 4). However, it was observed that the country had no revealed comparative advantage in the exportation of cotton waste, cotton carded and cotton seeds. The results showed positive and negative systematic pattern of changes for the RCA and RSCA respectively, across the years under consideration. However, when the average export's relative comparative advantage was considered for the overall period for each of the products, it was observed that the country only had revealed comparative advantage in the exportation of cotton linter while the remaining sub-sectors indicate negative advantage in the exportation of these products. Furthermore, the year-wise results for the cotton sector indicated that India had revealed comparative export advantage owing to growth trend in the export performance of the country in the global cotton trade markets.

India's share of global exports of cotton products indicate that RCA and RSCA changes are related to the changes of exports values. Consequently, India's share of global exports is such that whenever its' share of global exports inclines (or declines), the mentioned indices inclines (declines) as well. Thus, India can increase its revealed comparative advantage by subsidizing the prices of its products at international cotton market, thus enhancing its' world share export. But cautious need to be applied at the production level in order not to put the producers, value chain actors and the economy at disadvantage or peril.

The reason for India's revealed non-comparative advantage in the exportation of carded, cotton waste and seeds may be due to specialization in the production of lint and linter thereby affecting the supply quantities of cotton waste, carded and seeds whose share contribution to the cotton sector are minimal. Therefore, India needs to strengthen the sector to maximize sector benefit by devising a cost-cut mechanism in the production of their cotton products in order to enable them have a major breakthrough in the market and compete favorable with the cartel cotton giants whose production and quality stands are not better than that of India.

3.3. Export competitiveness (XCI) of India's cotton

Furthermore, year-wise empirical evidence showed that the country had export competitiveness in almost all the cotton products except cotton carded/combed which indicated relatively poor export competitive position in the global cotton market over the study period (Table 4). Investigating export competitiveness of India's cotton products illustrates the fact that India has the potential to achieve the comparative advantage in cotton exportation as evidenced by its advantages in the exportation of cotton lint and linter during the years under study. Furthermore, the year-wise results of the cotton sector indicated that the country had positive competitive export status over the study periods except for the years 2001, 2004, 2005, 2007 and 2008.

3.4. Relative trade advantage of India's cotton export

The results of the relative trade advantage (RTA) which reflects the real competitiveness and efficiency of trade of a country as it incorporates both exports and imports showed that India has positive trade advantage in the exportation of cotton linter and seeds throughout the study years. For cotton linter, the highest and lowest positive trade advantage years were 2001 and 2006 respectively, while for the cotton seeds, the highest and lowest positive trade advantage years were 2002 and year 2007 respectively. In addition, the country recorded positive RTA in the exportation of cotton as a whole across the study periods except from the year 2000 to 2005. However, the country recorded mostly negative RTA in the exportation of cotton lint, cotton waste and cotton carded/combed over the study period (Table 4). Therefore, it can be inferred that the country had a very negligible import advantage in cotton linter and cotton seeds indicating that it has been gaining competitiveness and the pace of growth was fast. However, the country had a very negligible export advantage in cotton lint, cotton waste and cotton carded, revealing poor competitiveness and pace of growth during the study period. The poor competitiveness and pace of growth in the India's cotton lint is associated to the price subsidies on lint offered by China and USA who are the major cotton exporting economies.

Table 3: Growth and export value ('000 dollars) of India's cotton export

Years	Lint		Linter		Waste		Carded		Seeds		Cotton		World share %
	Value	Growth	Value	Growth	Value	Growth	Value	Growth	Value	Growth	Value	Growth	
2000	13725	-	3394	-	6074	-	30111	-	238	-	53542	-	0.74
2001	5942	-56.70	1743	-48.64	949	-84.37	2616	-91.31	117	-50.84	11367	-78.76	0.15
2002	9851	65.78	343	-80.32	363	-61.74	171	-93.46	139	18.80	10867	-4.39	0.16
2003	163047	1555.13	3573	941.69	2980	720.93	36394	21183.04	938	574.82	206932	1804.22	2.22
2004	69558	-57.33	1641	-54.07	6989	134.53	6430	-82.33	213	-77.29	84831	-59.00	0.73
2005	639704	819.66	5294	222.60	8384	19.95	10700	66.40	192	-9.85	664274	683.05	6.09
2006	1332636	108.32	4155	-21.51	13702	63.43	2267	-78.81	197	2.60	1352957	103.67	11.11
2007	2118257	58.952	10365	149.45	27372	99.76	2456	8.33	368	86.80	2158818	59.56	17.39
2008	642073	-69.68	5294	-48.92	19448	-28.94	1352	-44.95	4137	1024.18	672304	-68.85	6.18
2009	1940656	202.24	27718	423.57	29601	52.20	1059	-21.67	328	-92.07	1999362	197.38	20.07
2010	2972199	53.15	46449	67.57	45373	53.28	953	-10.00	1661	406.40	3066635	53.38	19.67
2011	3395689	14.24	36544	-21.32	66736	47.08	679	-28.75	2471	48.76	3502119	14.20	15.53
2012	3647834	7.42	35872	-1.83	83276	24.78	602	-11.34	826	-66.57	3768410	7.60	17.33
2013	4533183	24.27	37041	3.25	121440	45.82	827	37.37	604	-26.87	4693095	24.53	22.94
Mean		194.67		109.39		77.62		1488.03		131.34		195.47	10.02

Table 4: Comparative advantage indices of India's cotton export during 2000-2013

Product	Index	2000	2001	2002	2003	2004	2005	2006	2007
Lint	RCA	0.286312	0.579406	1.006738	0.860318	0.8929	1.044638	1.063299	1.065701
	RSCA	-0.55483	-0.2663	0.003358	-0.07509	-0.05658	0.021832	0.030679	0.031806
	XCI	1.125647	0.418273	1.832777	11.69038	0.344636	9.66468	1.857434	1.568095
	RTA	-0.80559	-0.51303	-0.09686	-0.22362	-0.17123	-0.00881	0.021866	0.011902
Linter	RCA	4.656025	10.39741	3.079759	1.989111	2.230456	1.024165	0.538999	0.668993
	RSCA	0.646395	0.824522	0.509775	0.330905	0.380892	0.011938	-0.29955	-0.19833
	XCI	5.372596	0.461557	0.312441	8.835444	0.37235	3.793158	0.960378	1.941895
	RTA	4.656025	10.39741	3.079759	1.989111	2.230456	1.024165	0.538999	0.668993
Waste	RCA	3.237256	2.478601	0.928644	0.449394	2.554307	0.440027	0.351818	0.405793
	RSCA	0.527996	0.425056	-0.037	-0.37989	0.437302	-0.38886	-0.47949	-0.42268
	XCI	0.994808	0.15825	0.395202	6.620094	1.887395	1.423085	1.459025	1.804591
	RTA	3.081927	2.32689	0.792005	0.134945	2.075608	-0.35725	-0.66977	-0.17551
Product	Index	2008	2009	2010	2011	2012	2013	Mean	
Lint	RCA	1.058887	1.074739	1.059059	1.04866	1.06441	1.067069	0.940867	
	RSCA	0.028601	0.036023	0.028683	0.023752	0.0312	0.032446	-0.04889	
	XCI	0.353298	3.293639	0.965836	0.781955	1.132802	1.326607	2.596861	
	RTA	-0.009	-0.00865	0.022205	-0.00748	-0.00324	-0.00428		
Linter	RCA	0.828692	0.83725	0.644613	0.836847	1.28873	1.153351	2.155315	
	RSCA	-0.09368	-0.08858	-0.21609	-0.08882	0.126153	0.071215	0.13691	
	XCI	0.440452	3.278571	0.754623	1.025213	1.718682	1.184291	2.175118	
	RTA	0.828692	0.83725	0.644613	0.836847	1.287341	1.148093		
Waste	RCA	0.790301	0.439459	0.523573	0.615822	0.798045	0.797686	1.057909	
	RSCA	-0.11713	-0.38941	-0.3127	-0.23776	-0.11232	-0.11254	-0.11425	
	XCI	0.692492	1.804467	1.167736	0.928849	1.446279	1.322706	1.578927	
	RTA	0.428956	-0.06	-0.67443	0.078358	0.690235	0.662034		

Table 4: Continued

Product	Index	2000	2001	2002	2003	2004	2005	2006	2007
Carded	RCA	21.54274	11.14746	0.802643	7.918625	4.628862	0.81183	0.090952	0.055796
	RSCA	0.91128	0.835356	-0.10948	0.77575	0.644688	-0.10386	-0.83326	-0.89431
	XCI	129.01	0.106952	0.075949	134.9626	0.194107	1.448823	0.204442	0.959806
	RTA	21.45193	11.07546	0.742581	7.848239	4.46644	0.649618	-0.04335	-0.45362
Seeds	RCA	0.148582	0.358358	0.379136	0.213712	0.10296	0.013239	0.007017	0.008328
	RSCA	-0.74128	-0.47237	-0.45018	-0.64784	-0.8133	-0.97387	-0.98606	-0.98348
	XCI	1.933842	0.498501	1.115975	7.711152	0.159977	1.062241	0.967218	1.856754
	RTA	0.148582	0.358358	0.379136	0.211537	0.10296	0.013239	0.007017	0.004934
Cotton	RCA	1.105307	0.211584	0.202677	2.719784	0.857792	6.175849	10.76262	15.67456
	RSCA	0.05002	-0.65073	-0.66296	0.462334	-0.07655	0.721287	0.82997	0.880057
	XCI	2.502323	0.23432	1.062162	11.66365	0.336646	8.094558	1.822042	1.563696
	RTA	-3.67823	-7.50196	-4.57892	-2.11431	-1.57982	4.719151	9.669713	14.10847

Product	Index	2008	2009	2010	2011	2012	2013	Mean
Carded	RCA	0.081872	0.02181	0.018831	0.013438	0.004564	0.00516	3.36747
	RSCA	-0.84865	-0.95731	-0.96304	-0.97348	-0.99091	-0.98973	-0.32121
	XCI	0.521748	0.864457	0.846234	0.563572	0.379078	1.495942	19.40241
	RTA	-0.30005	-0.10058	-0.29029	-0.18481	-0.08804	-0.11266	
Seeds	RCA	0.224501	0.007347	0.032661	0.040223	0.010694	0.006027	0.110913
	RSCA	-0.63332	-0.98541	-0.93674	-0.92266	-0.97884	-0.98802	-0.82238
	XCI	9.585497	0.1062	4.35704	0.972572	0.296705	0.74586	2.240681
	RTA	0.224501	0.007347	0.032661	0.038674	0.010694	0.005227	
Cotton	RCA	4.961365	14.75401	12.83616	9.127244	10.60585	13.64697	7.402984
	RSCA	0.664506	0.873048	0.855451	0.802513	0.827673	0.863453	0.460006
	XCI	0.356302	3.238645	0.979794	0.789645	1.115995	1.323163	2.505925
	RTA	2.606327	12.79791	12.49079	8.69917	9.403886	12.52107	

3.5. Trade mapping index

A perusal of Table 5 showed the Trade Mapping and competition situation of India's cotton sector in the global markets. The exogenous factor that may cause reduction or loss of the comparative advantage of exports includes price subsidies offered by other major exporting countries and increase in the production of other countries. In addition, trade agreements of other countries with the recipient countries for reducing trade barriers thereby increasing the export share, and the problems due to the entry of these goods in the importing countries.

Trade mapping analysis for export markets of India's cotton sector indicates a threshold in the export market of cotton products during the studied period, having low market share and the country is among the winner groups. Furthermore, the decomposition analysis of the Trade mapping analysis for the cotton products showed that the export markets for cotton linter and carded declined during the studied period with the market shares been poor. The export market of India's cotton seeds was at a threshold between decline and increase; and has low market share. However, the export markets of cotton lint and waste declined during the studied period with low market shares. Furthermore, it was observed that India is among the winner groups for cotton lint, cotton waste and cotton linter; and among the loser groups for cotton carded and seeds.

Table 5: Trade mapping index (TMI) for India's cotton export

Product	Growth %	2000	2001	2002	2003	2004	2005	2006	2007
Lint	WIG	-	2.71546	-9.36676	39.19762	23.45542	-5.20877	11.61254	1.985812
	WCIG	-	3.504915	-9.54385	41.58064	23.78664	-4.84218	12.1551	1.366558
	ICEG	-	-56.7067	65.78593	1555.131	-57.3387	819.6699	108.3207	58.95241
	Assessment	-	LEM	WDM	WEM	LEM	WEM	WEM	WDM
Linter	WIG		2.71546	-9.36676	39.19762	23.45542	-5.20877	11.61254	1.985812
	WCIG		11.26539	-37.0162	17.89911	23.34574	-14.95	-18.2769	28.46139
	ICEG		-48.6447	-80.3213	941.691	-54.0722	222.6082	-21.5149	149.4585
	Assessment		LEM	LDM	WDM	LDM	WDM	LDM	WEM
Waste	WIG	-	2.71546	-9.36676	39.19762	23.45542	-5.20877	11.61254	1.985812
	WCIG	-	-1.27061	-3.21198	24.0068	24.26129	-15.7043	12.01343	10.69901
	ICEG	-	-84.376	-61.7492	720.9366	134.5302	19.95994	63.43034	99.76646
	Assessment	-	LDM	LEM	WDM	WEM	WDM	WEM	WEM
Product	Growth %	2008	2009	2010	2011	2012	2013	Mean	
Lint	WIG	-12.4165	-8.35615	56.48923	44.61105	-3.58437	-5.88856	9.660432	
	WCIG	-14.2045	-8.23266	58.57177	46.10608	-5.1684	-6.32455	9.911114	
	ICEG	-69.6886	202.2485	53.15435	14.24837	7.425444	24.27054	194.6767	
	Assessment	LDM	WEM	LEM	LEM	WDM	WDM		
Linter	WIG	-12.4165	-8.35615	56.48923	44.61105	-3.58437	-5.88856	9.660432	
	WCIG	15.96209	59.69577	122.0671	-23.2593	-42.8858	-12.8096	9.249914	
	ICEG	-48.9243	423.5739	67.57703	-21.3245	-1.83888	3.258809	109.3948	
	Assessment	LEM	WEM	LEM	WDM	WDM	WDM		
Waste	WIG	-12.4165	-8.35615	56.48923	44.61105	-3.58437	-5.88856	9.660432	
	WCIG	2.601479	-15.6505	31.26419	58.34979	-13.7205	10.24999	8.849151	
	ICEG	-28.9493	52.20588	53.28198	47.08307	24.78422	45.82833	77.62375	
	Assessment	LEM	WDM	WDM	LEM	WDM	WEM		

Table 5: Continued

Product	Growth %	2000	2001	2002	2003	2004	2005	2006	2007
Carded	WIG	-	2.71546	-9.36676	39.19762	23.45542	-5.20877	11.61254	1.985812
	WCIG	-	-18.7689	-13.9333	57.69585	-8.97935	14.85698	3.632766	12.87388
	ICEG	-	-91.3121	-93.4633	21183.04	-82.3323	66.40747	-78.8131	8.337009
	Assessment	-	LDM	LDM	WEM	LDM	WEM	LDM	LEM
Seeds	WIG	-	2.71546	-9.36676	39.19762	23.45542	-5.20877	11.61254	1.985812
	WCIG	-	-1.38511	6.457043	-12.4878	41.94481	-15.1409	6.081754	0.606776
	ICEG	-	-50.8403	18.80342	574.8201	-77.2921	-9.85915	2.604167	86.80203
	Assessment	-	LDM	WEM	WDM	LEM	WDM	LDM	WDM
Cotton	WIG	-	-3.86021	3.073955	16.36188	22.06839	14.09384	14.99651	15.28594
	WCIG	-	2.71546	-9.36676	39.19762	23.45542	-5.20877	11.61254	1.985812
	ICEG	-	-78.7699	-4.3987	1804.224	-59.0054	683.0557	103.6745	59.56294
	Assessment	-	LEM	WDM	WEM	LEM	WDM	WDM	WDM
Product	Growth %	2008	2009	2010	2011	2012	2013	Mean	
Carded	WIG	-12.4165	-8.35615	56.48923	44.61105	-3.58437	-5.88856	9.660432	
	WCIG	5.508525	-9.39003	6.342395	26.42339	133.8828	-8.16794	14.42694	
	ICEG	-44.9511	-21.6716	-10.0094	-28.7513	-11.3402	37.37542	1488.037	
	Assessment	LEM	LDM	LDM	LDM	LEM	WDM		
Seeds	WIG	-12.4165	-8.35615	56.48923	44.61105	-3.58437	-5.88856	9.660432	
	WCIG	17.27976	-25.3442	16.22625	52.9612	12.66332	-1.96088	6.993011	
	ICEG	1024.185	-92.0715	406.4024	48.7658	-66.5722	-26.8765	131.3479	
	Assessment	WEM	LDM	WDM	LEM	LEM	LEM		
Cotton	WIG	15.47251	-22.9719	21.66803	19.85707	0.694165	1.662099	8.457306	
	WCIG	-12.4165	-8.35615	56.48923	44.61105	-3.58437	-5.88856	9.660432	
	ICEG	-68.8578	197.3896	53.38068	14.20071	7.603711	24.5378	195.4713	
	Assessment	LDM	WEM	LEM	LEM	WDM	WDM		

Note: WIG (World import growth %); WCIG (World cotton import growth %); ICEG (India's cotton export growth %)

3.6. Prioritization of export target's market for India's cotton

To introduce the best potential target markets the major India's cotton importing economies were identified and based on the market potential indicator the countries were prioritized. The results of the market attractiveness indicators placed only two countries namely China and Malaysia out of the seven importing countries as the potential export markets for India's cotton (Table 6). Thus, with regard to prioritization in the exportation of cotton, India should endeavor to adopt some important policies.

Table 6: Prioritization of potential target export markets for India's cotton

Country	PC
China	0.605123
Bangladesh	-0.04965
Indonesia	-0.06383
Malaysia	0.013209
Thailand	-0.18588
Turkey	-0.06112
Korea Rep.	-0.12763

Note: PC- Prioritization coefficient

3.7. Market structure of India's cotton export

The year-wise cursory review of the results showed that the market structure of India's cotton export in the year 2000 and 2001 was characterized by closed oligopoly, and beyond these periods the exportation market was characterized by monopoly structure (Table 7). This indicates that government of India was the only channel of exportation of cotton to the global market. This outcome is not surprise as government intervention is very essential to protect India's cotton producers from the imperfect market situation that prevails in the cotton global market due to bear raid in the market by China and USA. However, government of India should devise a marketing means of being efficient in the global trade market as this intervention is likely not to be sustainable in the long-run. Furthermore, it was observed that the sector was highly diversified in the first two years, suddenly plummeted to very low diversification in the year 2002and the slightly rise to low diversification across the year 2003 to 2004. Thereafter, it plummeted to very low diversification receding towards specialization across the remaining periods.

Table 7: Export trade structure of India's cotton

Year	Market structure	1/HHI	BID	EID	DBID	DEID
2000	Monopolistic competition	2.506954	0.60111	0.159216	75.1387	22.77861
2001	Monopolistic competition	2.802599	0.643188	0.159695	80.39855	22.84718
2002	Monopolistic competition	1.213185	0.175724	0.069179	21.96546	9.897304
2003	Monopolistic competition	1.533074	0.347716	0.12104	43.46445	17.31689
2004	Monopolistic competition	1.459327	0.314753	0.112485	39.34408	16.09299
2005	Monopolistic competition	1.077731	0.072125	0.030166	9.015631	4.315739
2006	Monopolistic competition	1.030608	0.029699	0.012705	3.712371	1.817624
2007	Monopolistic competition	1.038464	0.037039	0.015784	4.629862	2.2582
2008	Monopolistic competition	1.095254	0.08697	0.036078	10.87123	5.161635
2009	Monopolistic competition	1.060953	0.057451	0.02422	7.181361	3.465063
2010	Monopolistic competition	1.064047	0.060192	0.025338	7.524037	3.625071
2011	Monopolistic competition	1.063133	0.059384	0.025009	7.423029	3.577958
2012	Monopolistic competition	1.066542	0.06239	0.026232	7.798779	3.752998
2013	Monopolistic competition	1.070956	0.066255	0.027799	8.281853	3.977154

Source: Authors' computation, 2018

4. Conclusion and Recommendation

The present research empirically examined the export competitiveness of India's cotton products in the global cotton trade markets. The empirical evidence revealed that India's cotton products with the exception of cotton lint did not have revealed export comparative advantage in the international cotton markets during the study period. However, based on the trade mapping analysis the export of cotton lint, the major export earning of India emerged in the global trade market during the study period despite having small share and the country is found to be among the winner group. Furthermore, for the cotton sector as a whole, the export market

has been at a threshold with the country share been small, and it is among the winner groups.

Hence, in order for India to have a comparative advantage for cotton in the export market and its continuing presence in the world markets, the following recommendations are suggested:

- Special attention towards increasing productivity and minimizing costs *via* improved varieties, proper mechanization, enhanced quality and production methods should be considered as appropriate actions or solutions to improve the position of exporting products amongst commercial competitors.
- The commercial production status and behavior of the competing countries especially China and USA need to be fully monitored by manufacturers, exporters, and domestic decision makers to deal with the effects of externalities. Furthermore, timely and appropriate responses should be done to improve the competitive position of these products in the target importing markets.
- Since not all the countries qualify as target importing market, effort should be made to penetrate these markets by accurate systematic plan coupled with increasing competition and competitiveness. For this purpose, the exporter of various cotton products should select the proper number of the priority markets and infiltrate them by awareness of the competitors, rules and regulations of marketing, and by having a coherent marketing plan.

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