Navigating Determinants of India's Business Relations with GCC Countries : Evidence from the Gravity Model Theory

Raj Kumar Singh [1]
Ajay Kumar [2]
Jyoti Kumari [3]
Yashvardhan Singh [4]

Abstract

This research paper examined the determinants of India's business relations with Gulf Cooperation Council countries from 1995 – 2019 using the gravity model theory based on the theoretical underpinning of Nobel Laureate Jan Tinbergen. The study focused on identifying variables that influenced India's trade with GCC countries along with predicting the trade potential. The empirical findings were obtained through the random-effects model and fixed effects model. The Hausman test suggested that the random-effects model was more appropriate than the fixed effect model. The findings of the study stated that the GDP of India, GDP of Gulf countries, the population of Gulf countries, India's economic integration with the world, India's economic integration with GCC, trading affinity, and diaspora had a positive and significant impact on India's bilateral trade relations with GCC, while foreign direct investment had a positive and insignificant impact. The analysis further revealed that distance, terms of trade, exchange rate, and language had a negative and significant effect on bilateral trade relations. The market size of the host country had a negative but insignificant impact on India's trade with GCC. India has trade potential with Bahrain and Kuwait, while India has overtraded other GCC countries. The negative value of the coefficient of convergence of actual trade and potential trade indicated a lack of equilibrium in India's estimated trade flows with GCC countries, but the insignificant *p*-value did not support the argument. A strong economic tie with GCC will boost the Indian industry and offer a strategic edge internationally.

Keywords : **GCC countries, business relations, trade potential, trade equilibrium, gravity model**

JEL Classification Code : C1, F10, F13, F14, F15, F17

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The Gulf has been an integral part of India's 'extended neighborhood.' The social and economic relations were over four millennia old and were banked upon mostly on the exchange of goods and ideas (Pethiyagoda, 2017). India's interaction with Arabian civilization resulted in the development of Arabian

[1] *Professor,* Department of Commerce, Himachal Pradesh University, Summer Hill, Shimla - 171 005, Himachal Pradesh. (Email : profrksingh7@gmail.com)
[2] *PhD Scholar,* Department of Commerce, Himachal Pradesh University, Summer Hill, Shimla - 171 005, Himachal Pradesh. (Email : Katwalajay71@gmail.com)
[3] *PhD Scholar,* Department of Commerce, Himachal Pradesh University, Summer Hill, Shimla - 171 005, Himachal Pradesh. (Email : Kumarijyoti1234@gmail.com)
[4] *Student of MBA,* Department of Management Studies, 2nd Sem, IIT (ISM) Dhanbad, Dhanbad - 826 004, Jharkhand. (Email : yash9418@gmail.com)

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culture, more specifically in the domain of science, mathematics, and astronomy (Azmi, 2006). An essential element of these relations has been economic linkage, where Arab traders acted as middlemen between Indian and other traders, especially Europeans (Mehta, 1989). The historical legacies of business relations between India and GCC concentrated on the trade of textiles and spices in place of dates, pearls, and semi-precious stones (RigiLadez & Khan, 2014). Indo-GCC relations remained dormant during the cold-war period due to India's alignment with the erstwhile Union of Soviet Socialist Republics, but business relations attained new meaning since 1970 – 1990 because of the increasing demand for energy resources and economic reforms. The GCC was established on May 25, 1981, with the alliance of six Gulf countries, namely the United Arab Emirates (UAE), Saudi Arabia, Qatar, Oman, Kuwait, and Bahrain, to promote socio-economic-cultural and security cooperation (Alam & Ahmed, 2018). India signed an agreement with GCC countries on August 25, 2004 and adopted the 'Look West Policy' in 2005 to strengthen economic ties (Pradhan, 2010). Acknowledging the relevance of East Asian economies, the GCC countries also adopted the 'Look East Policy' to strengthen their business relations with these countries (Alam & Ahmed, 2018).

India and GCC countries have registered a high growth trajectory which has promoted mutual interdependence (Kumar & Ranjan, 2012). The spectacular economic growth can be corroborated by the fact that the GDP of India and GCC countries was 1.17% (US$ 360281.95 million) and 0.85% (US$264068.04 million) of global GDP in 1995, which increased to 3.28% (US$ 2875142.31 million) and 1.88% (US$ 1647893.68 million) of global GDP in 2019 (The World Bank). The economic reforms program that started in July 1991 has undoubtedly contributed to the performance of the external sector (De, 2010) and the domestic economy as well. India's share in global exports, imports, and trade grew from 0.63%, 0.71%, and 0.67%, respectively in 1995 to about 1.72%, 2.51%, and 2.12%, respectively in 2019. Similarly, GCC countries' share in global exports, imports, and trade increased from 1.99%, 1.29%, and 1.64%, respectively, in 1995 to about 3.33%, 2.88%, and 3.10% in 2019 (IMF). India's US$ 120.487 billion of trade with GCC countries in 2019 indicates that GCC is emerging as India's largest trading partner. The GCC countries' share in India's exports, imports, and trade was 12.63%, 16.63%, and 15.02%, respectively in 2019; whereas, India's share in GCC countries' exports, imports, and trade was 12.74%, 7.44%, and 10.26%, respectively in 2019 (IMF). This analysis reveals that both regions are dependent on each other for their economic prosperity. Manpower migration of 9.3 million people, constituting 16.17% of GCC's population (UN Migration Data) works as a fulcrum to maintain strong and stable economic relations. India is one of the leading remittances receiving countries in the world, with US$ 68968.10 million in remittances flows during 2017, out of which US$ 38378.50 million was from GCC countries that stood at 55.65% of total remittance received (The World Bank, Migration and Remittances Data). GCC possesses huge resources of global crude oil reserves (40%) and global natural gas reserves (23%) (Abbas, 2019), and these resources are essential for India to pursue its economic reform agenda and attain the objectives of a 5 trillion economy by 2025 (Arun, 2017).

The study has been carried out to address the two research questions: one, how the relationship with GCC countries which are rich in wealth with natural resources and sovereign wealth funds, can be helpful in the promotion of trade, industry, and investment in the present scenario; second, to identify determinants of business relations that will facilitate in shaping the trade and overall economic policy of India. The study also contributes to the existing theory of gravity model in five vital ways. First, this is the first study that analyzes determinants of trade flow with a gravity model for 24 years from 1995 – 2019. Second, the econometric model used in the study tests the impact of four new independent variables on bilateral trade such as FDI, terms of trade, exchange rate, and trade openness. Third, the random-effects model and fixed effects model were applied, and the Hausman test was applied to choose the appropriate model. Fourth, India's trade performance and the trend have been studied. Fifth, year-wise trade potential has been computed by applying the absolute difference method and speed of convergence method.

Review of Literature

The gravity model theory has been successfully applied as an important tool to analyze the determinants of bilateral trade flows and shaping a nation's trade policy. Many studies have been conducted on the various aspects of Indo-GCC business relations, but very few studies have applied the gravity model to explain the impact of determinants on bilateral trade flows. Batra (2006) attempted to predict trade flows and potential for India using the gravity model for the year 2000. The study results suggested that GNP of host and destination country, common border, language, colonies, and regional trading agreement had a positive and significant impact on trade flows, while coefficients on distance and landlockedness revealed a negative and significant impact on bilateral trade flows. Karayil (2007) conducted the study with the hypothesis of migration – trade nexuses utilizing the gravity model approach, based on the study conducted by Dunlevy and Hutchinson (1999). The results illustrated that migration had a positive and significant impact on India – GCC export relations. De (2010) estimated India's trade potential using an augmented gravity model analysis. The findings indicated that GDP, adjacency, language, and RTA had a positive and significant impact on trade, while distance had a negative impact. Binh et al. (2011) analyzed Vietnam's trade flows, and the estimated results reported that the economy size of Vietnam and its partner country, the market size of the partner country, exchange rate, and cultural gap had positive impacts on trade flows between Vietnam and partner countries, while distance had a negative effect. GDP of Vietnam and religion had a positive and insignificant impact on trade.

Yean and Yi (2014) examined the contribution of the ASEAN – India free trade agreement by using the augmented gravity model. The empirical outcome of the gravity model indicated that the GDP of ASEAN countries, GDP of India, and colonial legacy had a positive and significant effect on trade flows, and the exchange rate exhibited a negative and insignificant impact in both models. The coefficients on distance, tariff, and real exchange had negative and significant effects on trade in Model-1, while distance and tariff in Model-2 exhibited negative and insignificant impacts. The FDI indicator insignificantly affected the trade flows in both models. Kumar and Ahmed (2015) pointed out the determinants of exports and import flows among the countries of South Asia by employing a gravity model for the period from 1985 – 2011. The outcomes of the augmented gravity model analysis suggested that GDP and population, among other factors, had a positive effect on export and import flows; whereas, distance and tariff had a negative impact on trade flows. Sahu and Heng (2017) revealed that the host country's GDP and the partner's market size had a positive and significant impact; whereas, distance and real exchange had a negative impact on India's export to partner countries. The coefficients of the market size of the host country and trade agreement were positive, but insignificant results did not support the argument. Alam and Ahmed (2018) revealed that the GDP of India, GDP of GCC countries, economic integration of India, economic integration of GCC countries, and diaspora had a positive and significant impact on India's trade flow with GCC countries, while distance had a negative and significant impact. The other determinants, such as the population of GCC countries, common language, common colony, and trade affinity, had a positive but insignificant impact on India's trade with GCC countries; whereas the population of India had a negative and insignificant impact. Khayat's (2019) study findings depicted that the coefficients of GDP of GCC countries and GDP of eight developed countries and coefficients of the population of GCC countries and population of developed countries were positive and significant, and distance had a negative impact on bilateral trade flows.

The literature review specifies that to date, no comprehensive study has been conducted on India's business relations with GCC countries. Therefore, an endeavor has been made to fill this gap by conducting the present study.

Objectives and Hypothesis of the Study

The objectives of the study are as follows :

(1) To analyze India's trade performance and growth pattern with GCC countries.

(2) To identify the determinants which influence India's trade relations with GCC countries using the gravity model theory.

(3) To estimate India's trade potential and equilibrium in the bilateral trade flows with GCC countries.

Corresponding to the objectives of the present research work, the following hypothesis is formulated:

- **H01 :** Explanatory variables have no significant impact on India's trade with GCC countries.

Research Methodology

The methodological framework of the present research work is elaborated as under:

Scope of the Study

The scope of the present research is confined to examining India's business relations with six GCC countries, namely Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates, for a period of 25 years by utilizing the panel data from 1995 – 2019. There are various facets of business relations, such as trade, investment, tourism, etc., but the present research only analyzes India's trade relations. The statistical software used includes STATA, E-Views, and SPSS.

Sources of Data

The research work is purely based on secondary data. To carry out the objectives of the study, the data relating to trade were obtained from UN COMTRADE Database, IMF. Information for variables such as GDP and population were collected from World Bank; data for exchange rate were collected from UNCTAD Statistics; data for distance and dummy variable language were collected from the Centre for Prospective Studies and International Information CEPII- www.cepii.rf. Information on diaspora was gathered from the Department of Economics and Social Affairs, Population Division, United Nations. Various journals, newspapers, business magazines, books, and online sources were used to enrich and justify the research work.

Statistical Technique

The research is causal research and empirical, which investigates the causal relationship between dependent and independent variables. The collected data were edited, classified, tabulated, coded, and analyzed, and inferences were derived using various statistical software. The statistical techniques applied in the analysis include mean, standard deviation, coefficient of variance, compound annual growth rate, trend analysis, correlation, fixed-effects model, random-effects model, and Hausman test. India's year-wise trade potential has been computed by the absolute difference method. The concept of speed of convergence has also been used to determine the trade potential (Jakob et al., 2001).

$$Speed\ of\ convergence = \frac{Average\ growth\ rate\ of\ potential\ trade}{Average\ growth\ rate\ of\ actual\ trade} * 100 - 100$$

Theoretical Framework

James Stewart first used the gravity model analysis in the 1940s in the research relating to social sciences, which is based on Newton's law of universal gravitation relating the force of attraction between two objects to their combined mass and the distance between them. The model was first applied by Nobel Laureate Jan Tinbergen (1962) to predict bilateral trade flows between any two countries as a function of their size of the economy and the distance between them (Fitzsimons et al., 1999). Linnemann (1966) and Poyhonen (1963) were the next two who attempted to explain trade flows by the augmented gravity model. Anderson (1979) was the first to provide a theoretical foundation for the gravity model. GDP is a proxy for the size of the economy, which is directly proportional to bilateral flow, and distance represents trade cost or transportation cost which is inversely proportion to bilateral trade (Binh et al., 2011). Thus, the mathematical formula of the gravity model can be illustrated asun der :

$$F = G\frac{m_1 \times m_2}{D^2}, \rightarrow Trade_{ijt} = \propto \frac{GDP_{it} \times GDP_{jt}}{Distance_{ij}} \qquad (1)$$

where, F represents the force between the masses, G is a gravitational constant, M_1 is first mass, M_2 is second mass, and D is the distance from the centers of the masses. The basic gravity model is transformed into a linear equation so that it conforms to the regression analysis:

$$\text{Log}\,(Trade_{ijt}) = \alpha + \beta_1 \log\,(GDP_{it}) + \beta_2 \log\,(GDP_{jt}) - \beta_3 \log\,(DIST_j) + u_{ijt} \qquad (2)$$

where, α is constant; β_1, β_2, and β_3 are coefficients to be estimated, and u_{ij} is the error term; $Trade_{ijt}$ is bilateral trade between host and destination country in t year; GDP_{it} is gross domestic product of host country ; GDP_{jt} is gross domestic product of the destination country; $Distance_{ij}$ is the distance between host and destination country.

Equation (2) is termed as basic gravity model equation where bilateral trade flow is predicted between two sides. The augmented gravity model for the current study is specified as under :

$$\text{Ln}T_{ijt} = \alpha + \beta_1 \text{Ln}\,(GDP_{it}) + \beta_2 \text{Ln}\,(GDP_{jt}) + \beta_3\,\text{Ln}\,(POP_{it}) + \beta_4\,\text{Ln}\,(POP_{jt}) + \beta_5\,\text{Ln}\,(Dis_{ij}) + \beta_6\,\text{Ln}\,(FDI_{it}) + \beta_7 \text{Ln}\,(TOP_{it}) + \beta_8\,\text{Ln}\,(TOP_{jt}) + \beta_9 \text{Ln}\,(TOT_{jt}) + \beta_{10}\,\text{Ln}\,(EX_{it}) + \beta_{11}\,\text{Ln}\,(LANG_{ij}) + \beta_{12}\,\text{Ln}\,(TA_{ij}) + \beta_{13}\,\text{Ln}\,(DIAS_{ij}) + u_{ijt} \qquad (3)$$

Where, subscripts i refer to the host country, j refers to the destination country, t is time in years, Ln is the natural log.

- Ln $Trade_{ijt}$ = Bilateral trade flow between host country i and destination country j in t year.
- Ln GDP_{it} and Ln GDP_{jt} = Gross domestic product of host country and destination country represent the size of the economy of the host country and the expected signs of GDP of host country and destination country are positive.
- Ln POP_{it} and Ln POP_{it} = Population represents a proxy of the market size of the host country. The expected sign of population is either positive where the country enjoys the benefit of scales of economies or negative in case of the absorption effect.
- Ln $Dist_{ij}$ = Large distance between the host country and destination country means high trade or transportation cost, longer time, high risk, and ignorance of foreign legal, administrative, customs, and business practices. The hypothesis of the gravity model states that the expected sign of distance is negative.

↳ Ln FDI_{it} = Inward FDI facilitates the improvement of production capacity, which will lead to higher trade flows. Therefore, the expected sign of FDI is positive.

↳ Ln TOP_{iwt} and Ln TOP_{ijt} = Trade openness refers to removing trade restrictions by country *i* for country *j* and vice-versa, which tend to have more bilateral trade. So, the expected sign is positive.

↳ Ln TOT_{ij} = Terms of trade refers to the relation between export and import prices. The expected sign will be either positive or negative.

↳ Ln EX_{it} = Determination of the price of one national currency in terms of other country is termed as the exchange rate. For the host country, the coefficient of this variable is expected to have a positive or negative sign.

↳ Ln $LANG_{ij}$ = Sharing common language, i.e., commercial or official, between the host country and destination country tends to improve the trade. Thus, the expected sign of common language is positive.

↳ Ln TA_{ij} = Trading affinity between country *i* and *j* will have greater trade potential with each other. The expected sign of trading affinity is positive.

↳ Ln $DIAS_{ij}$ = Large migration of manpower from the host country and destination country will have a positive impact on bilateral trade flows. Thus, the expected sign of diaspora is positive.

The variables like language, trading affinity, and diaspora are used as dummy variables, which take the value of one when certain conditions are satisfied and zero otherwise.

Diagnostic Tests

Diagnostic tests like Augmented Dickey – Fuller and Philips – Perron tests were applied to examine the stationarity of the panel data. For this purpose, the following null hypothesis is formulated:

↳ **H02 :** Unit root is present or time series is non-stationary.

The analysis of Table 1 and Table 2 states that India's population, India's GDP, and India's trade openness with

Table 1. ***Diagnostic Test (Augmented Dickey – Fuller)***

Variables	Level		First Difference		Stationary
	t - value	*p* - value	*t* - value	*p* - value	
Total Trade	–2.262010	0.1858	–11.14152	0.000*	Stationary at first difference
FDI	–3.802869	0.0036	–12.54021	0.000*	Stationary at level
GDP (India)	–3.579113	0.0073	–12.29684	0.000*	Stationary at level
GDP (GCC)	–2.102011	0.2443	–11.77130	0.000*	Stationary at first difference
Population (India)	–4.072374	0.0014	–12.49450	0.000*	Stationary at level
Population (GCC)	–1.982659	0.2943	–11.95799	0.000*	Stationary at first difference
Trade Openness (World)	–10.70418	0.0000	–11.06968	0.000*	Stationary at level
Trade Openness (GCC)	–1.737810	0.4102	–9.981755	0.000*	Stationary at first difference
TOT	–3.777441	0.0039	–12.26223	0.000*	Stationary at level
Distance	–1.945960	0.3106	–12.08714	0.000*	Stationary at first difference
Exchange Rate	–2.040662	0.2693	–13.20732	0.000*	Stationary at first difference

Table 2. ***Diagnostic Test (Phillips – Perron)***

Variables	Level		First Difference		Stationary
	t - value	*p* - value	*t* - value	*p* - value	
Total Trade	–2.445357	0.1312	–11.13877	0.000*	Stationary at first difference
FDI	–4.096734	0.0013	–12.54120	0.000*	Stationary at level
GDP (India)	–3.815890	0.0034	–12.29708	0.000*	Stationary at level
GDP (GCC)	–2.151960	0.2250	–11.76633	0.000*	Stationary at first difference
Population (India)	–4.220541	0.0009	–12.54565	0.000*	Stationary at level
Population (GCC)	–2.024946	0.2760	–11.95799	0.000*	Stationary at first difference
Trade Openness (World)	–3.630507	0.0062	–11.45809	0.000*	Stationary at level
Trade Openness (GCC)	–1.616506	0.4716	–9.910440	0.000*	Stationary at first difference
TOT	–3.887202	0.0027	–13.00726	0.000*	Stationary at level
Distance	–2.015330	0.2801	–12.08714	0.000*	Stationary at first difference
Exchange Rate	–1.866368	0.3474	–13.89326	0.000*	Stationary at first difference

the world are stationary at the level ; whereas, total trade, the population of GCC, GDP of GCC, distance, trade openness with GCC, and exchange rate are stationary at first difference.

Analysis of India's Trade Performance with GCC Countries

The results of Table 3 depict that GCC's share in India's global trade improved from 8.57% in 1995 to 15.02% in 2019, indicating that GCC countries are emerging as significant business partners of India. Among the GCC countries, India's average trade is highest with UAE followed by Saudi Arabia, Kuwait, Qatar, Oman, and Bahrain, respectively ; whereas, trade is most consistent with Bahrain and least consistent with Qatar. India's trade with Qatar is rising at a higher rate, followed by Oman, UAE, Saudi Arabia, Kuwait, and Bahrain, respectively. The balance of trade remains mainly in favor of GCC countries, which happens due to two reasons — one, the increase in demand for oil and natural gas, and the second is due to the increase in the prices of oil in the international market (Alam & Ahmed, 2018).

Table 3. ***Analysis of India's Trade Performance with GCC Countries (in US$ million)***

Years	Bahrain	Kuwait	Oman	Qatar	Saudi Arabia	UAE	Total Trade with GCC	Balance of Trade with GCC	% Share in India's Global Trade
1995	119.59	948.36	125.35	142.56	1848.03	2671.11	5855.00	–1368.52	8.57
1996	195.43	1103.29	128.98	154.69	2395.87	2802.95	6781.21	–1942.53	9.34
1997	193.95	1067.01	141.71	145.52	2407.93	3103.01	7059.13	–1633.19	9.26
1998	527.67	1667.06	141.17	110.34	2607.14	3589.72	8643.10	–2601.18	11.43
1999	438.35	2077.95	196.14	246.69	3780.07	4434.88	11174.08	–4734.66	12.85
2000	240.58	842.69	187.66	249.80	2406.31	3497.79	7424.83	–66.41	7.79
2001	221.81	288.68	159.23	148.38	1300.70	3488.45	5607.25	2115.55	5.93

2002	230.07	328.63	215.12	184.53	1377.98	3977.44	6313.77	2913.03	5.87
2003	180.47	492.88	251.94	279.51	1714.77	5755.54	8675.11	3295.77	6.58
2004	245.58	641.96	300.21	655.67	2530.10	10460.96	14834.48	3092.08	8.48
2005	368.97	920.72	557.44	1157.88	3239.99	13455.25	19700.25	3306.89	8.17
2006	555.42	5177.27	1021.06	2272.19	13113.01	18958.93	41097.88	–10218.76	13.73
2007	820.52	7106.70	1513.63	2538.04	19816.26	26149.85	57945.00	–18195.38	15.90
2008	1940.88	11571.69	2314.29	4084.85	28358.21	38515.82	86785.74	–32573.62	17.44
2009	793.37	8353.06	3460.77	4723.39	18362.22	45151.36	80844.17	–17143.43	18.24
2010	1272.76	10675.99	4524.09	6515.76	24857.78	58319.72	106166.10	–35297.04	18.61
2011	1071.03	16047.46	5697.09	11999.52	33557.15	72840.95	141213.20	–48838.52	18.49
2012	1523.00	18830.22	4289.83	17081.40	41373.29	73580.50	156678.24	–58568.14	20.12
2013	1282.53	18750.65	6292.72	15365.63	48953.79	66945.01	157590.33	–53229.85	19.63
2014	920.39	16222.71	4245.53	17853.38	45767.02	60207.47	145216.50	–42533.90	18.69
2015	904.94	7137.91	3619.25	10606.12	28323.82	50272.80	100864.84	–17374.22	15.40
2016	798.37	5446.36	3877.88	8248.84	23506.02	49282.67	91160.14	–10518.42	14.77
2017	853.15	7488.72	5956.28	9281.39	26304.38	51751.72	101635.64	–22077.46	13.76
2018	1399.34	9134.88	5786.35	12267.87	33920.52	55470.61	117979.57	–37880.33	14.21
2019	994.08	10477.21	5361.63	10832.40	32974.16	59848.24	120487.72	–38817.82	15.02
Average	723.69	6512.00	2414.61	5485.85	1791.86	31381.31	64309.33	–17635.60	13.13
CV	68.77	94.26	96.53	109.62	89.52	84.53	87.39	–113.66	35.51
CAGR	9.22	10.53	16.94	19.77	12.76	13.83	13.43		

Source : Data retrieved from UNCOMTRADE Database and SPSS Output.

Figure 1. ***India's Trade with GCC Countries***

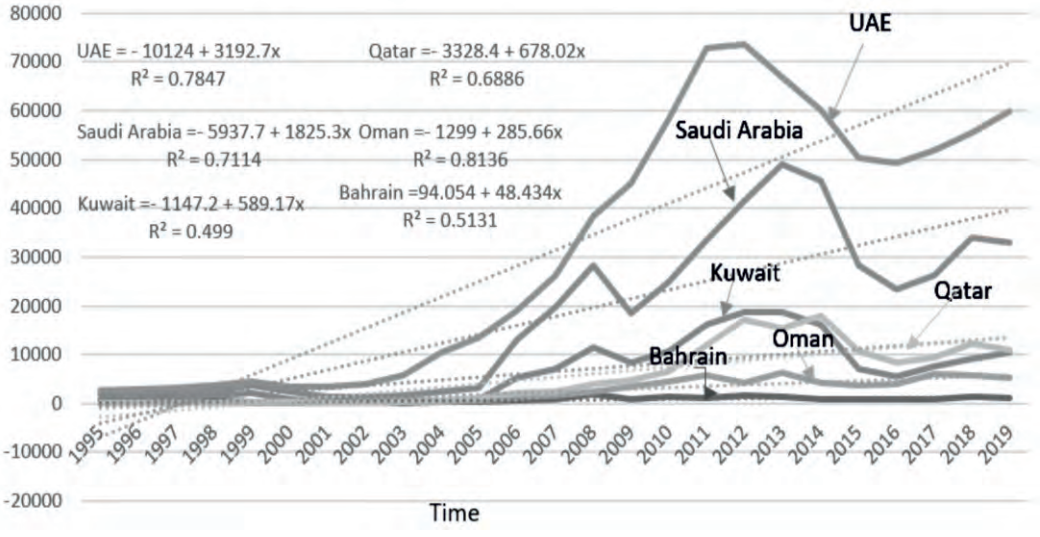

Figure 1 presents the trends of India's trade with individual GCC countries. India's trade with GCC countries can be projected for the next 10 years based on trend analysis. Thus, by the year 2029, India's projected trade with UAE, Saudi Arabia, Qatar, Kuwait, Oman, and Bahrain will increase to US$ 101620.50 million, US$ 57947.80 million, US$ 20402.30 million, US$ 19473.75 million, US$ 8699.10 million, and US$ 1789.24 million, respectively if all other factors remain constant. In 2019, India's total trade with GCC was US$ 120.487 billion and projected trade will be US$ 209.933 billion by 2029, thus trade will increase by 74.24%.

Gravity Model Analysis of India's Business Relations with GCC Countries

This sub-section summarizes the determinants which influence India's business relations with GCC countries. The summary of variables has been tabulated in Table 4(a). The mean and standard deviation values for the dependent variable and independent variables are given for the entire sample.

Table 4(b) exhibits the correlation matrix, displaying all possible correlations between any pairs of two variables. In most cases, correlation between independent variables is less than 0.75 (Gujarati et al., 2017; Singh et al., 2018), implying that multicollinearity will not be a significant problem in the regression analysis.

Table 4(a). ***Analysis of Descriptive Statistics***

Variable	Obs	Mean	Std. Dev.	Min	Max
$Trade_{ij}$	150	7.941	1.843	4.704	11.206
GDP_i	150	13.840	0.704	12.795	14.872
GDP_{GCC}	150	11.233	1.277	8.674	13.584
POP_i	150	7.065	0.106	6.871	7.220
POP_{GCC}	150	1.190	1.158	–0.667	3.534
FDI_i	150	9.478	1.152	7.674	10.831
TOP_w	150	3.304	0.292	2.888	3.767
TOP_{GCC}	150	0.942	0.274	0.706	1.796
TOT	150	4.007	1.232	1.446	7.577
ER_i	150	0.714	0.018	0.695	0.749
$Dist_{ij}$	150	7.836	0.148	7.568	8.024
$LANG_{ij}$	150	0.167	0.374	0	1
TA_{ij}	150	0.500	0.502	0	1
$DIAS_{ij}$	150	0.833	0.374	0	1

Table 4(b). ***Analysis of Correlation Matrix***

	Trade	*FDI*	GDP_I	GDP_{GCC}	P_I	P_{GCC}	TOP_W	TOP_{GCC}	*TOT*	*Dist.*	*ER*	*Lang.*	*TA*	*Dias.*
$Trade_{ij}$	1.000													
FDI_i	0.677	1.000												
GDP_i	0.685	0.952	1.000											
GDP_{GCC}	0.918	0.559	0.564	1.000										
POP_i	0.659	0.943	0.986	0.560	1.000									
POP_{GCC}	0.699	0.310	0.326	0.870	0.323	1.000								

TOP_w	0.646	0.846	0.794	0.518	0.779	0.257	1.000							
TOP_{GCC}	0.837	0.363	0.347	0.776	0.325	0.645	0.427	1.000						
TOT	–0.358	–0.288	–0.280	–0.239	–0.226	–0.005	–0.321	–0.098	1.000					
ER_i	0.300	–0.172	–0.193	0.438	–0.207	0.364	–0.120	0.462	–0.097	1.000				
$Dist_{ij}$	0.170	0.000	0.000	0.298	0.000	0.269	0.000	0.116	–0.548	0.242	1.000			
$LANG_{ij}$	0.039	0.000	0.000	0.002	0.000	–0.087	0.000	–0.097	–0.333	–0.442	0.348	1.000		
TA_{ij}	0.572	0.000	0.000	0.664	0.000	0.672	0.000	0.634	–0.099	0.316	0.480	0.447	1.000	
$DIAS_{ij}$	–0.289	0.000	0.000	–0.552	0.000	–0.791	0.000	–0.286	0.128	–0.442	–0.570	0.200	–0.447	1.000

Table 4(c). ***Estimated Results of Gravity Model for Trade (Fixed Effects Model)***

Fixed-effects (within) regression					Number of Obs. = 150	
Group variable: Country					Number of Groups = 6	
R-sq:					Obs. per group:	
Within = 0.9828					Min = 25	
Between = 0.8208					Avg = 25	
Overall = 0.9052					Max = 25	
					F(8,136) = 856.56	
Corr (*u_i, Xb*) = – 0.2889					Prob > *F* = 0.0000	
Trade	**Coef.**	**Std. Err.**	***t***	***P > t***	**[95% Conf.**	**Interval]**
GDP_i	0.453	0.183	2.470	0.015	0.090	0.815
GDP_{GCC}	0.841	0.119	7.040	0.000	0.605	1.077
POP_i	0.166	1.231	0.130	0.893	–2.269	2.600
POP_{GCC}	0.147	0.143	1.030	0.304	–0.135	0.430
FD_{li}	–0.023	0.053	–0.430	0.665	–0.127	0.081
TOP_w	0.062	0.176	0.350	0.726	–0.286	0.409
TOP_{GCC}	1.214	0.186	6.540	0.000	0.847	1.581
TOT	–0.477	0.025	–19.140	0.000	–0.527	–0.428
ER_i	0.967	5.364	0.180	0.857	–9.642	11.575
$Dist_{ij}$	0			(omitted)		
$LANG_{ij}$	0			(omitted)		
TA_{ij}	0			(omitted)		
$DIAS_{ij}$	0			(omitted)		
_cons	–9.021	9.110	–0.990	0.324	–27.038	8.996
sigma_u	0.613			(fraction of variance due to u_i)		
sigma_e	0.192					
Rho	0.910					

F test that all *u_i* = 0 : *F*(5, 135) = 64.43 ; Prob > *F* = 0.0000.

Table 4 (c) and Table 4(d) depict the estimated results of the gravity model for the fixed-effect model and random effect model, respectively.

The Hausman specification test was conducted to select the most appropriate model between the fixed effects model and the random-effects model. Table 4(e) shows that the chi-square value is 6.74 with the corresponding *p*-value of 0.6638, which accepts the null hypothesis that the random-effects model is more appropriate than the fixed-effects model.

Table 4(d) shows that the *p*-value is 0.000, which rejects the null hypothesis H01 at a 5% level of significance and states that independent variables significantly impact India's trade with GCC countries. The value of the coefficient of R^2 is 0.9820, which reveals that 98% variation in India's trade with GCC countries is explained by all the independent variables, and for the remaining 2% variations, other variables may be held responsible, which are not included in the study.

The estimation results of the gravity model for trade are reported in Table 4(b). The gross domestic product of India and GCC countries is used as a proxy of economy size. The estimated coefficients on GDP_i and GDP_j have positive signs, as expected, and are significant at the 1% level of significance. The coefficient of GDP_i is 0.620,

Table 4(d). ***Estimated Results of Gravity Model for Trade (Random Effects Model)***

Random-effects GLS regression					Number of Obs. = 150	
Group variable : Country					Number of Groups = 6	
R-sq:					Obs. per group:	
Within = 0.9820					Min = 25	
Between = 1.0000					Avg = 25	
Overall = 0.9896					Max = 25	
					Wald chi^2(12) = 12998.32	
Corr (*u_i, X*) = 0 (assumed)					Prob > chi^2 = 0.0000	
Trade	**Coef.**	**Std. Err.**	***z***	***P > z***	**[95% Conf.**	**Interval]**
GDP_i	0.620	0.175	3.540	0.000	0.277	0.963
GDP_{GCC}	0.635	0.091	6.970	0.000	0.456	0.813
POP_i	–1.138	1.147	–0.990	0.321	–3.386	1.110
POP_{GCC}	0.268	0.138	1.940	0.053	–0.003	0.538
FDI_i	0.006	0.053	0.120	0.903	–0.097	0.109
TOP_w	0.365	0.134	2.720	0.007	0.102	0.627
TOP_{GCC}	0.954	0.159	5.980	0.000	0.641	1.266
TOT	–0.481	0.025	–18.910	0.000	–0.531	–0.431
ER_i	–11.220	2.644	–4.240	0.000	–16.402	–6.039
$Dist_{ij}$	–1.002	0.406	–2.470	0.014	–1.797	–0.206
$LANG_{ij}$	–1.463	0.133	–11.000	0.000	–1.724	–1.202
TA_{ij}	1.427	0.144	9.900	0.000	1.145	1.710
DIS_{ij}	1.512	0.304	4.980	0.000	0.917	2.108
_cons	13.844	7.014	1.970	0.048	0.097	27.592
sigma_u	0		(fraction of variance due to *u_i*)			
sigma_e	0.192					
Rho	0					

Table 4(e). *Hausman Test*

	---- Coefficients ----			
	(b)	(B)	(b – B)	Sqrt (diag (*V_b V_B*))
	Fixed Effect	Random Effect	Difference	S.E.
GDP_i	0.453	0.620	–0.167	0.054
GDP_{GCC}	0.841	0.635	0.206	0.077
POP_i	0.166	–1.138	1.304	0.446
POP_{GCC}	0.147	0.268	–0.120	0.037
FDI_i	–0.023	0.006	–0.029	0.004
TOP_W	0.062	0.365	–0.303	0.114
TOP_{GCC}	1.214	0.954	0.260	0.095
TOT	–0.477	–0.481	0.003	.
Er_i	0.967	–11.220	12.187	4.667

Test : Ho : Difference in coefficients not systematic.

chi^2 (8) = (*b* – *B*)' [(*V_b* – *V_B*)^(–1)](*b* – *B*) = 6.74

Prob > chi^2 = 0.6638

suggesting that an increase of 1% in the GDP of India will increase India's trade with GCC countries by 0.626%, which is proportionately less, which means that the trade will increase, but at a decreasing rate. Similarly, the coefficient on GDP_{GCC} is 0.635, indicating that with an increase of 1% in GDP of GCC countries, trade will increase by 0.635%, which is less than the proportionately, which means the trade will increase but at decreasing rate. The coefficients of GDP country *i* is more than country *j*, which depicts that wealthy trading partners will tend to trade more. The estimated results obtained from the gravity model in this study have consistency with the empirical findings of earlier studies (Alam & Ahmed, 2018; Batra, 2006; Binh et al., 2011; De, 2010; Kaur & Nanda, 2011; Khayat, 2019; Kimura & Lee, 2006; Kumar & Ahmed, 2015; Yean & Yi, 2014) and many others.

The variable population is used as a proxy of the market size, which states that a large population creates more trade opportunities. The estimated coefficient of POP_i is – 1.138, negative and insignificant, which indicates that due to the absorption effect, the growth in India's market size reduces India's trade with GCC countries, but the insignificant results do not support this argument. The coefficient on POP_{GCC} is positive and significant at a 10% level of significance, which reveals that an increase of 1% in GCC countries' population will increase trade with India by 0.268%, which is less than the proportionately, that is, the trade will increase at a decreasing rate, keeping other factors constant. The results of the present study are in the line with previous studies (Alam & Ahmed, 2018; Batra, 2006; Binhet al., 2010; De, 2010; Kaur & Nanda, 2011; Khayat, 2019; Kimura & Lee, 2006; Kumar & Ahmed, 2015; Yean & Yi, 2014) and many others.

The estimated coefficient on distance is negative and significant, as expected. The result states that with a 1% increase in distance, India's bilateral trade will fall by 1.002%, which is more than proportionately, that is, the trade will decrease at an increasing rate, keeping other factors constant. The results suggest that India will prefer to trade more with a nearby trading partner than with a more distant trading partner. The estimated results obtained from the gravity model are consistent with earlier studies (Alam & Ahmed, 2018; Batra, 2006 ; Binh et al., 2011 ; De, 2010 ; Kaur & Nanda, 2011; Khayat, 2019 ; Kimura & Lee, 2006 ; Kumar & Ahmed, 2015 ; Yean & Yi, 2014) and many others.

FDI facilitates as an alternative source of capital to promote sustainable development in the developing countries where the level of savings is quite low (Dhamija & Singh, 2018) and export surplus is either negative or

very low. The estimated coefficient on FDI_i is 0.006, which is positive and insignificant, implying that an increase in foreign direct investment inflows to India has a positive impact on India's trade with GCC countries, but insignificant results do not support the argument. The finding indicates that the FDI inflows might be for exploiting the domestic markets instead of producing for the external market. The estimated results obtained from the gravity model are similar to the results obtained by Yean and Yi (2014). The finding is not consistent with the studies which stated that trade is positively impacted by inward FDI (Anwar & Nguyen, 2011; Gunawardana & Sharma, 2010).

The values of coefficients TOP_w and TOP_{GCC} are positive and significant at the 1% level of significance. Coefficients on TOP_w is 0.365, which suggests that with an 1% increase in India's trade openness with the world, bilateral trade flow with GCC countries will increase by 0.365%, less than proportionately, that is, the trade will increase at decreasing rate, keeping other factors constant. The coefficient on TOP_{GCC} is 0.954, suggesting that with a 1% increase in India's trade openness with GCC countries, bilateral trade flow will increase by 0.954%, which is less than proportionately if all other factors are constant. While comparing the estimated coefficients of TOP_w and TOP_{GCC} , it is stated that India's economic integration with GCC countries is better than economic integration with the world, and further trade openness measures will tend to increase bilateral trade. The outcomes align with an existing study conducted by Alam and Ahmed (2018).

The coefficient in terms of trade is found to be negative and significant. The coefficient of TOT_i indicates that a 1% increase in terms of trade will tend to decrease bilateral trade flows by 0.481%, holding other independent variables constant, which is less than proportionately. Value of coefficients TOT_i is less than one, suggesting that trade will decrease at a decreasing rate.

The exchange rate is the fundamental determinant of bilateral trade flows. The coefficient on the EX_i is –11.220, which is negative and significant at a 1% level of significance. The coefficient on the exchange rate is more than one, which implies that a 1% devaluation in India's currency will boost India's trade by 11.220% and vice-versa, if all other factors are constant. Chen et al. (2011) and Aljebrin (2012) also showed the positive impact of national currency depreciation on its trade. The finding of the exchange rate is consistent with the findings of Bahmani-Oskooee and Hegerty (2007), Eichgreen and Irwin (1995), Jan and Shah (2019), Kandilov (2008), Kaur and Nanda (2011), Narayan and Nguyen (2016), Sahu and Heng (2017), Vieira and MacDonald (2016), Yean and Yi (2014), and many others. However, the result obtained from the model contradicts earlier work done by Binh et al. (2011) and Sarin (2018).

The binary variable common language between country *i* country *j* tends to increase trade as communication in common language facilitates fruitful trade outcomes (Meltiz, 2008). The language barrier between the nations is expected to generate impediments in business negotiations and consequently reduce the prospects of bilateral trade flows. The value coefficient is –1.463, which is significant at a 1% significance level. The study depicts that India's trade with GCC countries tends to reduce by 0.0232 times [exp (–1.463)] or by 2.3241%, if all other factors are constant. However, the value of the coefficient is less than one, which suggests that with an increase in language problems between two nations, total bilateral trade will decrease but at decreasing rate, keeping other factors constant. This empirical result supports the outcome of previous work (Batra, 2006; De, 2010; Kaur & Nanda, 2011; Kumar & Ahmed, 2015; Singh et al., 2018). However, the result obtained from the model contradicts the earlier work by Alam and Ahmed (2018).

The estimated value of coefficient trading affinity is 1.427, which is positive and significant at a 1% level of significance. This indicates that India's trade with GCC countries tends to increase by 4.153 times [exp (1.427)] or by 415.3% just because of trade affinity. However, the value of the coefficient is more than one, reporting that with an increase in trading affinity between the two nations, bilateral trade flow will increase at an increasing rate, keeping other factors constant. The result obtained from the model is consistent with previous studies (Alam & Ahmed, 2018; Noland, 2005 ; Pradhan, 2006).

The estimated coefficient on Diaspora is 1.512, which is positive and significant at a 1% level of significance. The results confirm that India's trade with GCC tends to increase by 4.520 times [exp (1.512)] or by 452% just because of Indian immigrants in GCC countries. The calculated value of the coefficient is more than one, which suggests that with the increase in the Indian diaspora in GCC countries, trade will increase at an increasing rate if all other factors are constant. The result is in line with previous studies (Alam &Ahmed, 2018; Karayil, 2007)**.**

Analysis of India's Trade Potential with GCC

Table 5 illustrates India's trade potential with GCC countries using the difference between the potential trade (P) as predicted by the gravity model and the actual trade method, that is, the value of $P - A$. The positive values depict

Table 5. ***Analysis of India's Trade Potential with GCC Countries Using (P – A) Approach***

(Figure in US$ million)

Year	Bahrain	Kuwait	Oman	Qatar	SA	UAE
1995	–11.11	–51.16	19.56	–11.15	50.36	–163.73
1996	–30.31	–70.21	5.03	15.22	–3.25	147.24
1997	–18.94	–138.00	90.12	12.02	–163.83	151.63
1998	–190.26	–474.62	30.54	25.53	–447.58	–77.85
1999	–115.49	–412.90	103.58	54.83	–326.95	244.57
2000	16.99	122.38	129.99	112.38	127.58	–157.23
2001	–3.11	33.82	–38.92	44.82	28.35	–430.53
2002	–7.40	52.84	–71.04	26.79	–70.97	–892.53
2003	17.14	59.24	57.93	–2.72	47.14	–1362.14
2004	–6.19	74.67	–85.97	39.05	39.44	–2208.22
2005	–27.96	239.61	241.24	–310.59	329.47	–1756.44
2006	223.54	52.74	113.11	–403.70	438.74	–1110.02
2007	63.56	573.05	–19.66	–468.58	–2237.86	–866.28
2008	–89.68	1218.18	800.56	–589.15	–3141.30	8128.67
2009	207.28	–315.20	–183.36	–764.39	–1610.27	–6823.59
2010	–367.45	–3345.45	768.68	1516.51	–568.51	–408.29
2011	306.03	–844.26	965.20	–26.02	5412.17	2274.38
2012	–183.33	2825.68	–915.10	1479.29	–958.95	13581.17
2013	–211.52	1989.17	–2317.47	2432.27	–8193.65	16224.82
2014	204.83	975.90	–747.35	–2049.70	–10164.56	10768.74
2015	–53.16	–192.11	–647.58	–584.73	–978.25	447.93
2016	89.99	–457.92	–1507.17	844.69	3520.39	–2333.54
2017	226.23	–111.12	–1920.94	–403.42	5551.91	5446.04
2018	–49.49	769.17	–400.19	–2016.93	10810.39	15141.01
2019	133.94	–33.43	–23.26	–386.02	8069.02	13353.90
Average	**4.97**	**101.60**	**–222.10**	**–56.55**	**222.36**	**2692.79**

Note. **P* = Potential of trade, predicted by gravity model, *A* = Actual values of trade.

Table 6. ***Speed of Convergence***

Countries	Potential Growth of Trade	Actual Growth of Trade	Speed of Convergence
Bahrain	16.91	20.01	–15.49
Kuwait	27.74	29.87	–7.14
Oman	30.56	21.03	45.34
Qatar	28.80	28.12	2.41
Saudi Arabia	23.42	23.30	0.49
UAE	19.02	15.98	19.00

Table 7. ***The Convergence of India's Actual Trade towards Potential Trade***

Variables	Coefficients	*T*	Sig.
(Constant)	811.	2.483	0.014
Difference between actual and potential trade	–0.047	–0.447	0.655

Note. D.W = 1.113, *R* square = 0.001.

trade potential; whereas the negative values show that India has overtraded with the particular GCC country (Kaur & Nanda, 2011). During the year 2019, India's maximum trade potential lay with the UAE, amounting to US$ 13353.90 million followed by Saudi Arabia and Bahrain, respectively ; whereas, the negative sign in the case of Qatar, Kuwait, and Oman describe that India had overtraded with these countries.

Table 6 presents the analysis of the speed of convergence, which symbolizes the two situations — one characterized by the overtraded group with a positive sign and the second, a trade potential group with a negative sign. The outcomes of the speed of convergence show that India has trade potential with Bahrain and Kuwait, while India has overtraded with Oman, Qatar, Saudi Arabia, and UAE. Therefore, to increase the demand for Indian products in GCC countries, India should take advantage of differences in trade structures and diversify its export basket.

Equilibrium in the Trade Flows

Table 7 reports India's actual trade convergence towards potential trade or empirical equilibrium in trade flow. For the convergence, the estimated coefficient should be negative and significant, and vice versa for the divergence of trade (Kaur & Nanda, 2011). The results of this model state that the coefficient of the independent variable is 0.047 but insignificant. Therefore, the analysis reveals a presence of convergence or equilibrium in estimating India's trade flows with GCC countries, but the insignificant *p*-value does not support the proposition.

Conclusion and Policy Implications

The rationale of the current study is to evaluate India's trade performance, factors influencing trade, and estimate trade potential with GCC countries using the augmented gravity model theory. The findings reveal that India's trade was US$ 5.855 billion in 1995, which increased to US$ 120.487 billion in 2019, and projected trade will be US$ 209.933 billion by 2029. India's average trade is highest and consistent with UAE and Saudi Arabia, while the growth rate of trade is maximum for Qatar. This analysis shows that GCC is emerging as India's largest regional-bloc trading partner.

The results of gravity model analysis report that explanatory variables have a significant impact on determining India's bilateral trade flows with GCC countries. The value of coefficient R^2 is 0.9820, which indicates that 98% of the variations in India's trade with GCC countries are explained by independent variables, while the remaining 2% discrepancy is caused by other factors which are not included in the model. The economy size of India, the economy size of GCC countries, the market size of GCC countries, India's trade openness with the world, India's trade openness with GCC countries, trading affinity, and diaspora have a positive and significant impact on India's bilateral trade flows with GCC countries, while distance, terms of trade, exchange rate, and language have a negative and significant impact on trade flows. The market size of India has a negative but insignificant impact on trade flows, which confirms the theory of the absorption effect of a rising population on trade. Foreign direct investment inflows have a positive but insignificant impact on bilateral trade, implying that FDI inflows in India are for exploiting the domestic market rather than producing for exports.

The outcomes of the study state that India has trade potential with Bahrain and Kuwait ; whereas, India has overtraded with Oman, Qatar, Saudi Arabia, and UAE. There is a lack of equilibrium in India's estimated trade flows with GCC countries. To increase the demand for Indian products in GCC countries, India should take advantage of differences in trade structures and diversify its export basket. The study suggests that India should review its population policy, exchange rate policy, and FDI policy to promote external sector growth. Policymakers should refrain from making decisions that adversely affect the GDP growth rate. Growing income and expanding market in the GCC region will have more demand for Indian products, which in turn will provide impetus to the business sector and agricultural sector. Therefore, strong relationships with GCC have economic benefits and have a strategic edge in foreign policy affairs and many other international fora. This study also validates the gravity model theory for assessing the bilateral trade flows between the countries.

Limitations of the Study and Scope for Future Research

Like other studies, the present study also has some limitations, such as constraints of secondary data applied to this research, which covers the period from 1995 – 2019; analyzes only India's trade with GCC countries based on 10 independent and three dummy variables; and the study generates a large amount of data, managing which was a challenge and in analyzing the data, researcher's bias and overlook may affect the outcomes of the study. The results of the gravity model cannot be generalized. In future studies, gravity model analysis can be conducted with more countries and more explanatory and binary variables like tariff rate, research, development accumulation and similarity, relative factor endowment, regional trading agreements, common colony, religion, etc. The study should be conducted with large data, wider coverage of time, and more variables to obtain clear insights for policy formulation in the areas of foreign trade policy and foreign policy. Finally, the study strongly recommends that both India and GCC countries should build strong economic relations to reap the benefits of potential business integration.

Authors' Contribution

Dr. Raj Kumar Singh conceived the idea to pursue the study on Indo-GCC business relations and developed the theoretical framework, objectives, scope, and hypotheses. Jyoti Kumari extracted the research papers on the gravity model and drafted the literature review relevant to the study. Ajay Kumar and Yashvardhan Singh collected, edited, and coded the data. Dr. Raj Kumar Singh and Ajay Kumar analyzed the data through SPSS, E-views, and STATA software and prepared the tables and figures. The rough draft of the research paper was written by Jyoti Kumari, Ajay Kumar, and Yashvardhan Singh. The draft so prepared by these contributors was finally reviewed and edited by Dr. Raj Kumar Singh.

Conflict of Interest

The authors certify that they have no affiliation with or involvement in any organization or entity with any financial and non-financial interest in the subject matter or material discussed in this manuscript.

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About the Authors

Dr. Raj Kumar Singh is a Professor in the Department of Commerce, Himachal Pradesh University, Shimla, having 28 years of teaching experience. His research areas are accounting and finance, international financial management, corporate governance, corporate social responsibility, and business ethics. He has 18 books to his credit and has published 65 research papers in various national and international journals. He is also an Associate Scholar at the Indian Institute of Advanced Studies, Shimla, H.P. He has been honored with the Best Research Award and Best Teacher Award.

Ajay Kumar is a Research Scholar in the Department of Commerce, Himachal Pradesh University, Shimla, and is pursuing a PhD on the topic: "India's Business Relations with BIMSTEC Countries: Prospects and Challenges."

Jyoti Kumari is a Research Scholar in the Department of Commerce, Himachal Pradesh University, Shimla, and is pursuing a PhD in "India's Business Relations with ASEAN Countries: Prospects and Challenges."

Yashvardhan Singh is a Student of MBA at the Department of Management Studies, IIT (ISM), Dhanbad, Jharkhand.