

A Study of the Relationship between Logistics Performance and Human Development

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Abstract

Logistics is an important of Supply Chain Management. It ensures smooth flow of information and material across the supply chain. Countries have always tried to reduce the money and time spent on supply chain logistics. Logistics industry impacts a country's economy, both on macro level and micro level. Logistics sector is the key to globalization and internationalization. Logistics Performance Index (LPI) as defined by World Bank and Human Development Index (HDI) as defined by United Nations Development Program (UNDP) have been discussed in this paper. The relation between International LPI and HDI have been explored. The authors have attempted used a linear regression model using SPSS (Statistical Package for the Social Sciences) for studying this relationship. The data for 154 countries for the year 2018 has been used for this study. Each assumption relating to regression analysis is satisfied and the same is proven with the help of SPSS outputs. The regression equation obtained is used to predict the LPI value for the year 2019.

Keywords

Logistics Performance Index, Human Development Index, Humanitarian Supply Chain

1. Introduction

Supply chain logistics involves the coordination among supply chain members and detailed arrangements to ensure a smooth flow of information and material across the supply chain (Harrison and Van Hoek, 2008). Countries have always tried to reduce the money and time spent on supply chain logistics. Logistics industry impacts a country's economy, both at macro level and micro level. At the macro-level, it boosts the national economy by generating employment and encouraging foreign investments influx. Logistics sector is rightly considered to be the key to globalization and internationalization. At the micro level, logistics industry gives rise to increased competition that results in competitive pricing. The performance of the logistics sector of any country is measured by the Logistics Performance Index (LPI) of the country. Calculation of LPI is in accordance to what is defined by the World Bank. Human development of any country is measured by the Human Development Index (HDI) as defined by United Nations Development Program (UNDP). This paper studies a possible relationship between these two metrics.

The World Bank provides an interactive benchmarking tool called Logistics performance Index (LPI). With the help of this tool, countries can easily spot the unexploited opportunities and the underlying challenges involved in trade logistics performance. LPI was last released in 2018 comparing 160 countries. A survey of ground operators is conducted worldwide and their feedback on ease of working and friendliness of the countries they operate in is recorded. Apart from this feedback, quantitative data on logistics network in the country emphasizing on performance of key components is also assessed. Therefore, LPI is a combination of both qualitative and quantitative measures.

International LPI consists of evaluations done qualitatively by the trading partners operating abroad. The assessments are done in six areas that include 'customs', 'infrastructure', 'ease of arranging shipments', 'quality of logistics services', 'tracking and tracing' and 'timeliness'. On the other hand, Domestic LPI comprises both qualitative as well as quantitative evaluations of a country conducted by logistic professionals working within the country. Ranking is not a part of Domestic LPI, rather it gives details containing information about logistics processes, logistics environment and institutions within a country, constraints hindering smooth flow of logistics activities present at ports, borders or inside the country. It is measured in six areas that include 'infrastructure', 'services', 'border procedures and time' and 'supply chain reliability' (World Bank, 2020).

Despite the elaborated definition of LPI, several studies stated that there have been cases of controversy regarding the methodology of LPI. The subjective responses by various logistics operators may lead to skewed rankings. Also, social and economic factors are a major influencer to LPI scores.

Human Development Index is defined as the encapsulation of achievement of a country in major dimensions of human development. These dimensions as stated by UNDP are: a long and healthy life, being knowledgeable and a decent standard of living. For the given dimensions, geometric mean of normalized values is taken to define HDI. HDI fails to elaborate on inequalities prevailing in the society or poverty or human security issues. Since 1990, the human development Report is being published by the UNDP (UNDP, 2021). Figure 1 depicts the Human Development Index structure.

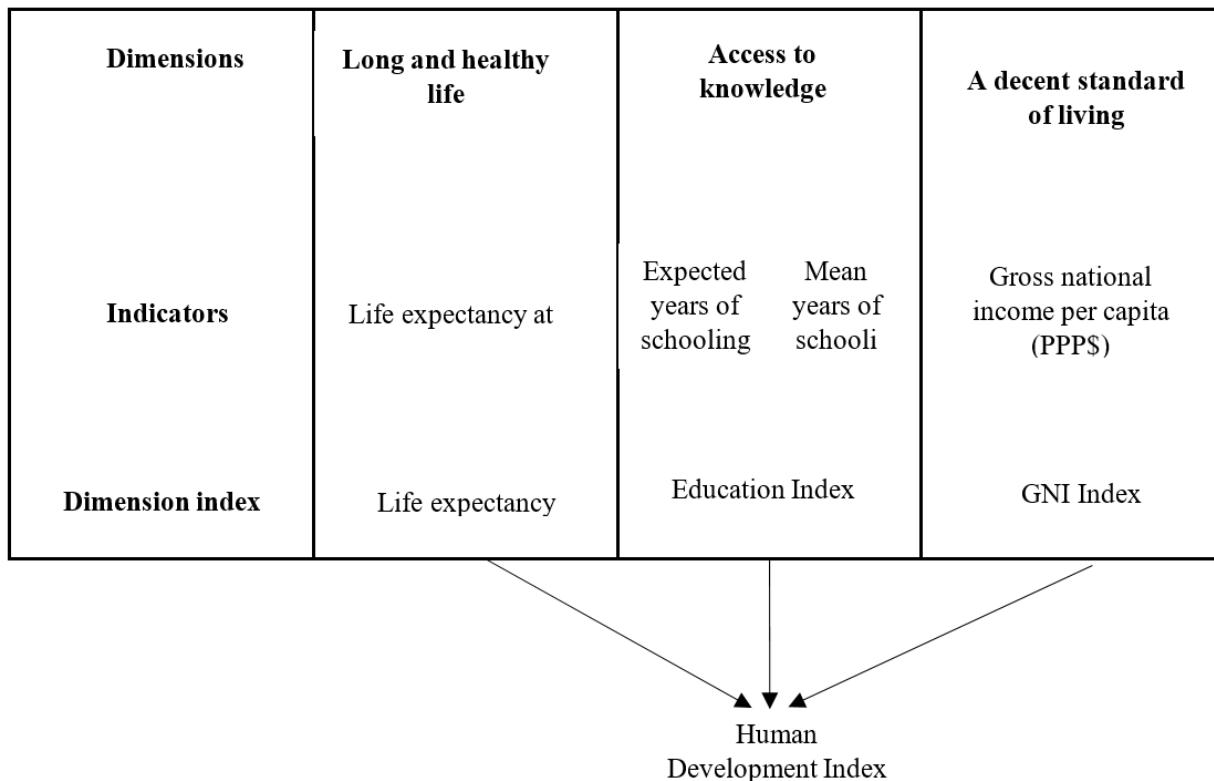


Figure 1. Human Development Index Structure

1.1 Objectives

The LPI rank of India has dropped from 35th in the year 2016 to 44th in the year 2018 (World Bank, 2021). This creates the need to study and analyze every factor affecting the logistics performance of a country. By exploring a relationship between two important indices, i.e., LDI and HDI, the authors intend to focus on HDI as a factor that is capable of resulting in an improvement in LPI. This will in turn lead to greater economic development of a nation.

To the best of our knowledge, no research till now has focused on the impact of HDI on LPI. This study focuses on establishing a relationship between LPI and HDI of a country. The specific objectives of this study are

1. Determine if any relationship exists between the LPI and HDI of any country.
2. Determine if the mathematical relationship between LPI and HDI if any relationship exists.
3. Based on the relationship determined predict the LPI for the year 2019 for India

This paper is organized in the following manner. The first section discusses the literature review stating the research done with respect to LDI and HDI. Method followed to reach the final result of the discussed research is elaborated in section 3 followed by the data collection techniques in section 4. Based on the research methods followed, authors

arrive at appropriate results in section 5, which is supported by suitable numerical and graphical proves in the following subsections. Finally, section 6 concludes the study.

2. Literature Review

As defined by Puertas et al. (2014), logistics comprises shared information, packaging, warehousing and transportation system that is able to meet the time deadlines, quality and quantity requirements and still manage to keep the cost low. Therefore, logistics is considered as a vital element in economy's competitiveness (Arvis et al., 2007). It is essential for international trade that trade flows are well organized and synchronized in order to ensure accurate and efficient circulation of goods at competitive prices and a favorable environment for the economy to flourish (Puertas et al., 2014). Underdevelopment of logistics can result in aggravated trade costs and hinder smooth flow of goods because of impoverished infrastructure, poor transportation facilities and uncontrolled bureaucracy of the state institutions. Such symptoms are often seen in developing countries (Marti et al., 2014). According to LPI report 2018, the high-income economies occupy the top positions and a huge disparity in scores and ranks is seen in case of BRICS economies. With the view of providing countries an opportunity to improve their performance and recognize the challenges pertaining to logistics of the country, World Bank provides a benchmarking tool called Logistics performance Index (LPI) that was first released in 2007. Six key dimensions are used in this international score for benchmarking the logistics performance of a country. These are described in figure 2 given below (The World Bank, 2021):

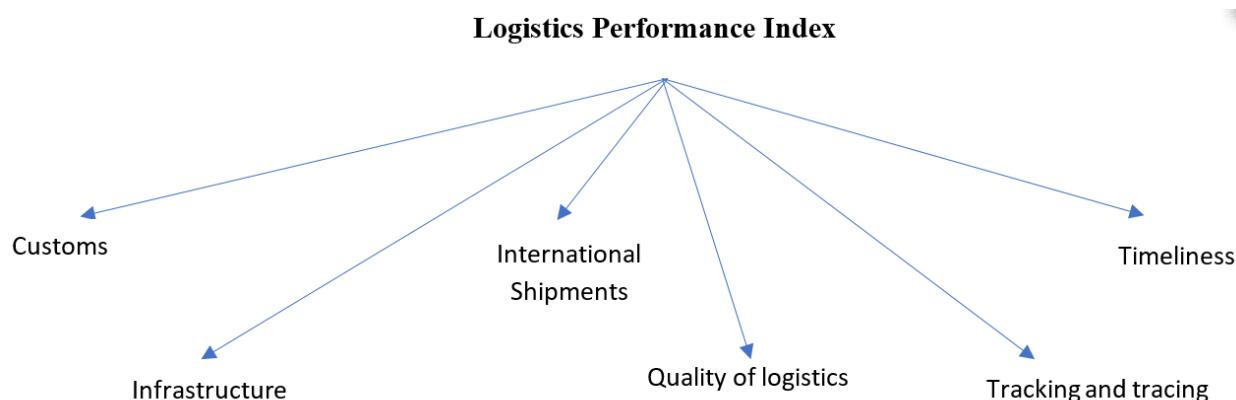


Figure 2. Structure of Logistics Performance Index

1. Customs
This includes clearance processes performed by border control organizations. These processes must be efficient so that it does not cause any delay in transportation of goods. Moreover, a complicated process and unnecessary formalities can be hindrance to the smooth flow of goods across borders. So, this clearance process must include simplicity, high speed and predictability of formalities.
2. Infrastructure
Poor quality of transport and trade infrastructure can lead to delayed shipments and unwillingness of traders to use those services. Unsatisfactory quality may encourage traders to use alternate routes to transport their goods. Hence, it is necessary to maintain trade related infrastructure of high quality at ports, railroads, for information technology etc
3. International shipments
The ease with which competitively priced shipments are arranged is of utter importance in term of Logistics Performance Index. Arduous to arrange international shipments would mean less trade which would finally result in financial losses.
4. Quality of logistics
The quality of logistics services provided by a country are a factor affecting the number of shipments. Competence of logistics service is a must in term of trucking, forwarding, custom brokerage etc.
5. Tracking and tracing

Amy logistic provider must have sound expertise and a strong information technology support to allow quick tracking and tracing of consignments.

6. Timeliness

Delayed shipments can incur huge losses, especially in case of perishable goods. Spoilage, pilferage, obsolescence can be some of the causes. To avoid such a situation, it should be made sure that expected shipments are delivered to the desired destination within the scheduled time.

Human development of any country is measured by Human Development Index (HDI). HDI is a standardized measure that can be defined on three dimensions, i.e., long and health life, access to education and decent standard of living. Apart from being a measure of human well-being, HDI can also measure the influence of economic policies on quality of life of countrymen. Both social and economic development can be analyzed using this framework of HDI (Kinnunen et al. 2019). Easy access to knowledge will pave the path towards Industry 4.0. As stated by Adeitan et al. (2021), technology has the capability to enhance logistics chain competitiveness with the help of smooth flow of information through the processes related to logistics. Networks in the logistics and throughout the supply chain have seen increase in complexity over time. This generates the need for an adequate information flow so that the logistics network get strengthened and functions in an efficient way (Dimitrov 2005). As per a study conducted by Loos and Allweyer (1998), the fact that information flow is necessary for smooth functioning of routes for feedback logistics is proven. Some of the literature related to LPI and HDI has been summarized in Table 1.

Table 1. Overview of the state of the research concerning Logistics Performance Index and Human Development Index

Author(s) (year)	Focus of study	Tool/technique used
Gocer et al. (2021)	Suggest framework for achieving improved LPI scores by implementing recommended policies.	Analysis of current policies and recommendation of strategic policies
Janno et al. (2021)	Aspects included in the current methodology that are subjective in nature	Correlation study using principal component analysis (PCA)
Kalpan & Bozyigit (2021)	Analyze impact of logistics performance of Turkey on foreign trade of the country	Regression Analysis
Kesavan and Deif (2021)	Study of social and national culture impact on a country's performance in logistics (LPI)	Hofstede national culture dimension
Park, Cho (2021)	Explore impact logistics efficiency on Korea's export market for agriculture	Gravity Model
Senir (2021)	Turkey's domestic logistic performance was compared with that of European Union countries.	Criteria Importance Through Inter-criteria Correlation (CRITIC) followed by ranking as per the domestic logistics performance score with the Complex Proportional Assessment (COPRAS).
Sergi et al. (2021)	Study influence of Global Competitiveness Index (GCI) on LPI	ANOVA
Beysenbaev and Dus (2020)	Proposal for improvement of current LPI that is published by World Bank	Modified qualitative and quantitative index proposed
BUGARČIĆ et al. (2020)	Logistics performance impact on trade volume in the Eastern and Central European countries (CEECs) and Western Balkans is assessed	Gravity model
Isik, et al. (2020)	Ranking and analyzing logistics performance of 11 selected Central and Eastern European countries (CEECs).	Statistical Variance (SV) and Multi-Attributive Border Approximation area Comparison (MABAC)
Mercangoz et al. (2020)	Scores with respect to logistics performance in provided for specific countries for a pre-defined time period.	Complex Proportional Assessment of Alternatives (COPRAS)
Ulutaş & Karaköy (2019)	Integrates two weighting methods, i.e., subjective (SWARA) and objective (CRITIC) used in calculation of LPI by World Bank.	Multi-Criteria Decision Making (MCDM)

Rezaei et al. (2018)	Weights are assigned to each of the six factors affecting LPI (as defined by World bank)	Best Worst Method (BWM)
Mariano et al. (2017)	Evaluating the relationship between low carbon emission and the transport sector as stated by LPI.	Data Envelopment Analysis (DEA)
MARTÍ et al. (2017)	Synthetic index is computed for overall logistics performance of countries having LPI scores.	Data Envelopment Analysis (DEA)
D'Aleo & Sergi. (2016)	Analyze logistics performance in Balkans	Critical analysis of LPI
Nunes et al (2015)	Logistics performance Index of Brazil is assessed with respect to its major trade competitors in international market.	Cluster analysis, multiple comparison tests
Martí et al. (2014)	Studying the impact on emerging economies caused by different components of LPI on trade	Gravity Model
Puertas et al. (2014)	Determinants of European Union exports are analyzed, identification of any logistic performance changes during the period of 2005 and 2010 are differently influenced in products as per ranking given by logistical complexity.	Gravity Model
Šimanskienė & Kutkaitis, (2009)	Sustainable development with respect to logistical performance including three levels namely social, economic and ecological	Universal model of sustainable development and logistical organizational relationships
Ravanos, P., & Karagiannis, G. (2021).	A new formulation proposed to ensure incorporation of external preferences and value judgements	Benefit of doubt model, Value Efficiency Analysis
Shi, Z., & Tang, X. (2020)	Explore sectoral imbalances of China and disparity prevalent in the province.	Partial differentiation, Coefficient of Variation (CV), variance decomposition
Hanifah, F. F., & Kiswanto. (2017).	Analyze impact of political competition on HDI.	Multiple regression analysis
SARKAR, A. K. (2016).	Study conducted to find out extent of impact of different human development indicators on HDI	Spearman's Correlation
Maria-Lenuța, C.-U. (2015).	Study of effect 3 indicators of HDI on 37 different European countries	In-depth analysis
Muttneja, P. (2015).	Human poverty Index and HDI, measures provided by UNDP are compared in Indian context	Comparative study
Türe, C., & Türe, Y. (2021).	A new model called HDI-EF (Ecological Footprint) is developed for assessment of sustainability	Mathematical Models

3. Methods

A good statistical model is expected to use least possible mathematical models and should be able to depict the real life situation as simply as possible (Aczel and Sounderpandian, 2008). Figure 3 explains how a good statistical model should look like. As illustrated in the Figure 3, the suggested model successfully captures systematically behaving data, separates the random errors that are the non-systematic part of the data. One such parsimonious model is a linear regression model and the same is used in this paper. Sir Francis Galton is the man behind the most commonly used statistical analysis method - regression. Simple linear regression technique models the relation between two variables, dependent variable (X) and independent variable (Y). As the name suggests, linear regression models a straight line relationship between the variables X and Y in the form of a linear equation. This statistical model comprising assumptions and mathematical equations can be used to depict real world situation. Though regression analysis attempts to explain the relationship underlying the given data, presence of uncertainty in the real world situations cannot be eliminated. These errors may be caused because of external factors that are not known which in turn affect the data collected. The general equation for a linear regression model can be stated as described in figure 3 as follows (Aczel and Sounderpandian, 2008)

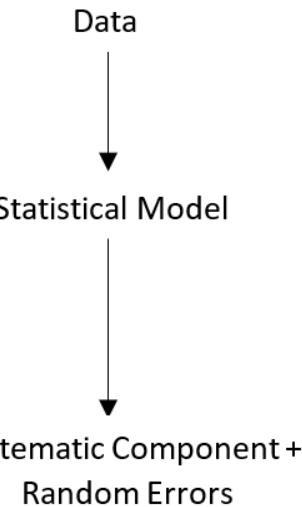


Figure 3. A statistical Model (Adopted from Aczel and Sounderpandian, 2008)

$$Y = B_0 + B_1 X + E$$

Y = dependent variable

B₀ = population intercept

B₁ = population slope

X = independent variable or predictor

E = random error

A regression model has the following assumptions:

1. Continuity of variables

It is necessary for a regression model to be valid that both the dependent and the independent variable is continuous. In other words, both the selected variables may belong to ratio or interval scale. Regression model cannot be applied to nominal or ordinal data.

2. Linearity

A straight line relationship must exist between variable X and variable Y. The two variables should be capable of being related with a linear equation $Y = mX + c$, where intercept is defined by c , Y stands for the dependent variable (here, LPI), m is the slope of the line, X depicts the independent variable or HDI in this case.

3. E, the only random variable

It is assumed that the value of X, i.e., the independent variable must not be random. The only random value that exists is the error term, E.

4. Normally distributed errors and homoscedasticity

E or the error terms are assumed to be normally distributed across the given data. These error terms are said to have mean = 0, and variance (σ^2) is assumed to be unknown and constant throughout the data.

5. No autocorrelation among errors

When value of a variables is correlated with values of exactly same variables that is lagged one or more periods back is called autocorrelation. This assumption states that successive error terms must not be correlated with each other.

The purpose for performing a regression analysis can be two-fold. Firstly, estimation of effect of independent variable on the dependent variable can easily be obtained, if any relationship exists between the two. Secondly, the value of dependent variable may be predicted on the basis of the relationship obtained after performing regression analysis; provided the dependent and independent variable have a relationship.

Data Collection

This study is based on secondary data. Regression technique is applied to the data collected for HDI from the website of UNDP while the LPI scores have been collected from the website of the World Bank. For the year 2018, LPI scores

were available for 160 countries and HDI scores included 189 countries. Countries for which data on both LPI and HDI were chosen. This was done using *merge* function present in the *Pandas* library of Python. This merged data consisting of 154 countries was exported to an excel file, which was further imported to Statistical Package for the Social Sciences (SPSS) for analysis. IBM SPSS is a statistical analysis tool that enables the user for interactive and complex analysis. It allows various parametric and non-parametric test to be performed on a given data.

The results obtained after regression analysis have been discussed in the next section. Since the results show that LPI is dependent on HDI, value for LPI 2020 has been predicted.

Results and Discussions

The results obtained after applying regression analysis to HDI and LPI data of 154 countries are discussed in this section. Apart from the final regression equation stating the dependence of LPI over HDI, all underlying assumptions for linear regression are also proven.

Table 2 and Table 3 prove the validity and statistical significance of the model. The extent of relatedness of HDI to LPI and its impact is shown by Table 4. Assumption 5 (no autocorrelation among residuals) is proven valid in table 4. Figure 5 states that assumption 4 (normality of residuals) is true and Figure 6 validates the assumption 4 (residuals are homoscedastic). Finally, a linear equation is formed which can be used in prediction of LPI for future years.

3.1 Numerical Results

Alpha or the significance level is defined as the probability of null hypothesis being rejected even if it is true. Here, the authors have assumed alpha = 5%, i.e., a confidence interval of 95%. In this case the following hypothesis exist:

Table 2. Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error				Lower Bound	Upper Bound
(Constant)	.941	.149		6.334	.000	.648	1.235
HDI	2.655	.201	.732	13.238	.000	2.258	3.051

a. Dependent Variable: LPI

H₀: Dependent variable, HDI is not significant

H₁: Dependent variable, HDI is significant

Here, alpha level = 0.05 which implies that there exists 5% risk of reaching a conclusion that H₁ is true.

According to the hypothesis testing rule, H₀ cannot be rejected if significance value is more than alpha.

Therefore, Table 3 shows the significance value for the independent variable HDI, i.e., 0.00. The given significance value is less than alpha which is 0.05 (alpha assumed as 5%), so, H₁ is true. This confirms the validity of the model.

Table 3. ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	26.416	1	26.416	175.234	.000 ^b
	Residual	22.913	152	.151		
	Total	49.329	153			
a. Dependent Variable: LPI						
b. Predictors: (Constant), HDI						

Statistical significance of the chosen model can also be validated from the above table. The significance value for regression clearly indicates that the independent variable HDI explains the dependent variable LPI well. Here, in table

3, significance value is 0.00 which is less than 0.05 (alpha = 5%). Hence, the selected regression model is a good fit for the data.

The independent variable is HDI and dependent variable is LPI. R value provided in the above table depicts the correlation value between HDI and LPI. As evident, a high degree of correlation exists between the two variables HDI and LPI, i.e., 73.2%. It is recommended to use adjusted R square value in case of multiple regression as this value is adjusted for the number of independent variables used in the model. Since, this is a linear regression model, so using R square or adjusted R square value will not make a difference.

Table 4 states that value of R square is 0.535 which is considered to be satisfactorily good fit line. Autocorrelation in the residuals after performing regression analysis can be detected by Durbin-Watson statistic. This statistic takes the value in the range from 0 to 4. A value of 2 stands for absence of autocorrelation. As we move left words from 2 on the number line, positive autocorrelation increases and a rightward movement from 2 aggravates negative autocorrelation. This is well illustrated in the figure 4 given below.

Table 4. Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.732 ^a	.535	.532	.388	2.086

a. Predictors: (Constant), HDI

b. Dependent Variable: LPI

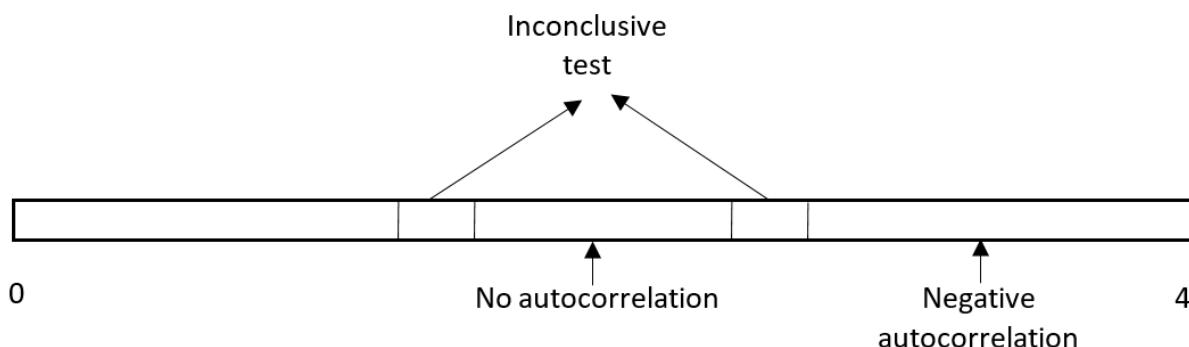


Figure 4. Critical regions depicted in Durbin-Watson test (Adopted from Aczel & Sounderpandian, 2008)

In Figure 4, it can be seen that Durbin-Watson static value is 2.086 which indicates no autocorrelation among the residuals post performance of regression analysis.

5.2 Graphical Results

The normality of residuals can be checked by a normal probability plot (P-P plot). In the plot given in figure 5, the horizontal axis is defined by residual values while z value corresponding to it are defined by the vertical axis. In case of residuals following a normal distribution, these are aligned well along the straight line appearing in the plot. The extent of deviation of points from this desired straight line describe the deviation of residuals from normal distribution. The given P-P plot shows residuals follow a normal distribution and fit well to the theoretical normal distribution curve.

Normal P-P Plot of Regression Standardized Residual

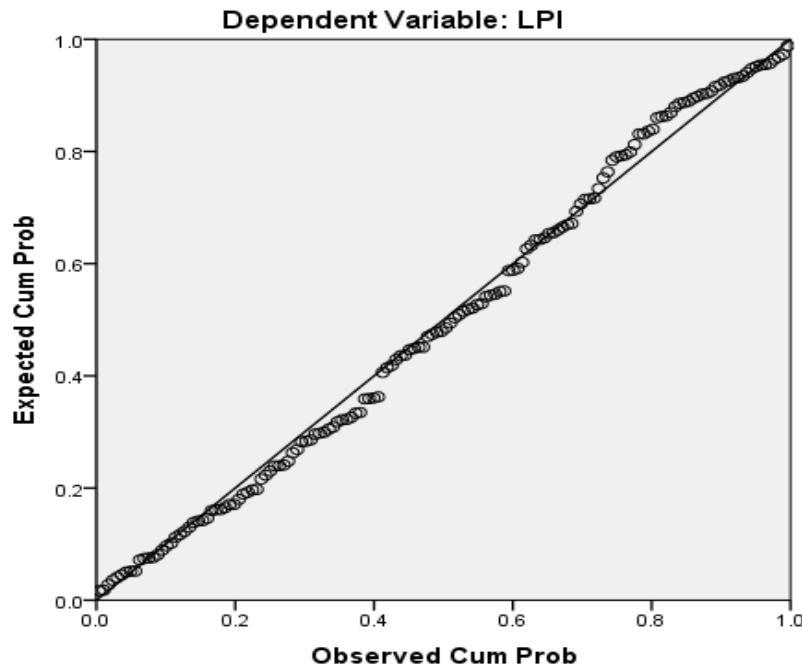


Figure 5. Normal Probability Plot

Scatterplot

Dependent Variable: LPI

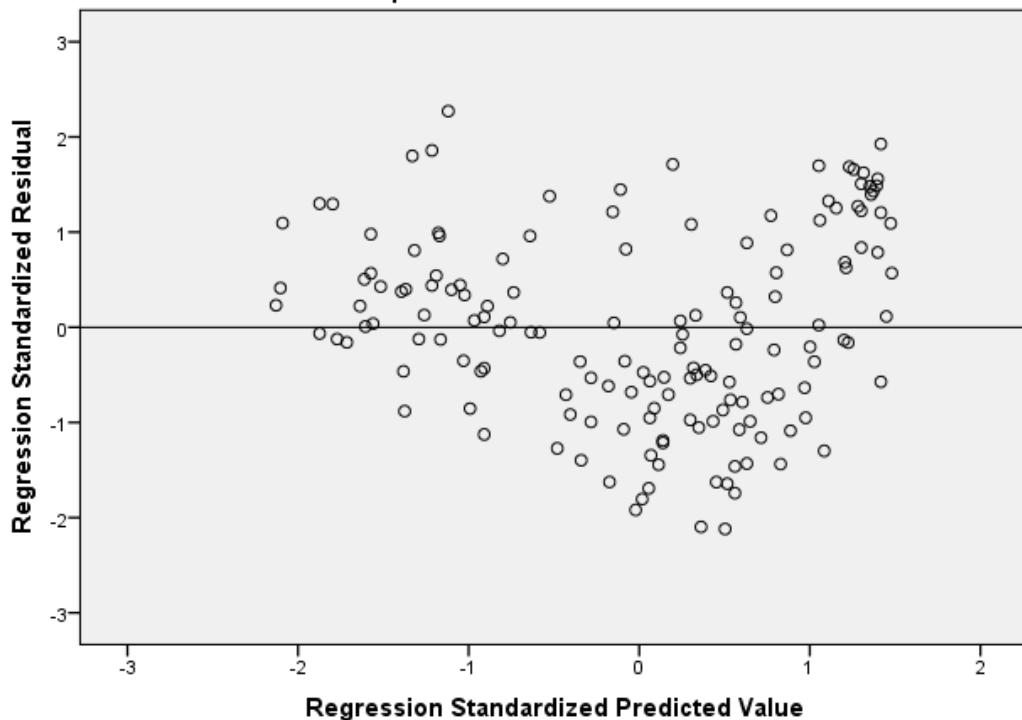


Figure 6. Scatterplot of residuals

As per the assumptions of linear regression, the variance of errors must be constant. Residual's variance can be well depicted using a scatter plot as shown in figure 6. The change in width of the scatter plot developed for residuals describes the variance. If change in width of scatter plot constantly aggravates or declines, residuals are said to be heteroscedastic. In case of existence of heteroscedasticity, simple linear regression may not be applicable. The above scatter plot shows homoscedasticity, i.e., the variance among errors is constant. This is accepted as per the assumptions of linear regression.

Since all assumptions of linear regression are true, the following regression equation can be formed.

$$\text{LPI} = 0.941 + 2.655\text{HDI}$$

This regression equation may further be used to predict the value of LPI. As per Human Development report, 2020 (UNDP, 2021), HDI score for India in 2019 was 0.645. According to the regression equation obtained above, LPI (2019) for India is 2.65.

5.3 Validation

The suggested regression model which has been developed has been validated by predicting the LPI value of various countries. The Table 5 gives a list of countries for which the error in predicted values was less than 5%.

Table 5. Countries with Predicted LPI < 5% error

Country	HDI 2018	Actual LPI 2018	Predicted LPI 2018 (LPI = 0.941 + 2.655HDI)	Percentage Error
Bangladesh	0.625	2.58	2.600	0.790
Brazil	0.762	2.99	2.964	0.866
Bulgaria	0.813	3.03	3.100	2.294
Burundi	0.431	2.06	2.085	1.228
Cambodia	0.585	2.58	2.494	3.327
Chile	0.849	3.32	3.195	3.762
Colombia	0.764	2.94	2.969	1.001
Congo Rep	0.573	2.49	2.462	1.112
Croatia	0.848	3.1	3.192	2.982
Cyprus	0.885	3.15	3.291	4.466
Ecuador	0.762	2.88	2.964	2.920
Egypt	0.701	2.82	2.802	0.633
Eritrea	0.456	2.09	2.152	2.951
Estonia	0.889	3.31	3.301	0.263
Ghana	0.606	2.57	2.550	0.781
Greece	0.881	3.2	3.280	2.502
Guinea	0.473	2.2	2.197	0.145
Honduras	0.633	2.6	2.622	0.831
Ireland	0.951	3.51	3.466	1.256
Israel	0.916	3.31	3.373	1.903
Lesotho	0.522	2.28	2.327	2.057
Liberia	0.48	2.23	2.215	0.655
Madagascar	0.527	2.39	2.340	2.084
Malaysia	0.805	3.22	3.078	4.401
Mauritania	0.542	2.33	2.380	2.146
Mexico	0.776	3.05	3.001	1.597

Nepal	0.596	2.51	2.523	0.533
Niger	0.391	2.07	1.979	4.391
Oman	0.813	3.2	3.100	3.140
Russian Federation	0.823	3.12	3.126	0.194
Sierra Leone	0.447	2.08	2.128	2.297
Slovenia	0.912	3.31	3.362	1.582
Turkey	0.817	3.15	3.110	1.266
Yemen	0.468	2.27	2.184	3.809
Zambia	0.582	2.53	2.486	1.731

Also, it was found that there were 78 countries for which predicted LPI was within 10% of the actual LPI value. As high as 112 out of 154 countries had depicted error within the range of 15% as compared to the actual LPI scores by World Bank. This validates the model and shows that results obtained by using the model give a fairly good prediction of the LPI values of various countries.

6. Conclusion and Future research directions

Due to cut throat competition among various countries, the need for improvement in the logistics front appears to be necessary. Every nation is in a race to achieve better logistics performance index but this fact seems to neglected that apart from the six key indices as defined by the World Bank, LPI depends on other factors too. HDI is one such factor that is responsible to the variation in LPI. Level of development of a nation and logistics costs are interrelated. Developing countries see a logistics cost of as high as 25% of delivered costs while for developing countries this cost is dipped to 8-9% (Roberts, 2003). A reduction in the logistics cost for any country can help in bringing down the final cost of the product which in turn can make things more affordable for the people of the country. This is how the LPI can affect the HDI of any country. Taking appropriate measures for increasing life expectancy of its citizens, providing access to education and offering a decent standard of living can be linked to a rise in HDI. The LPI can contribute to offering a decent standard of living by making prices competitive thus affecting HDI. It can also be seen that logistics costs have a direct relation with increase in international trade and hence increase foreign direct investment (Coto-Millán, 2016). Increase in foreign direct investment can enhance the foreign exchange reserves of any country. A country's external obligations can be met by its reserves and just the presence of these reserves can boost market's confidence level in its country's capabilities. Not only this, reserves provide external assets to a country which are in turn responsible for backing of domestic currency. Also, reserves provide assistance to government when it comes to meeting requirements involving foreign exchange and external debt obligations. Maintenance of reserves is also crucial in case of national disasters and natural calamities (Mathews & Singh, 2020). This will indirectly help the government in improving the HDI for the country.

This study is limited to 154 countries as only these countries had both the indices defined. The lack of LPI data by World Bank for the year 2020 limits the study to year 2018. Logistics Performance Index values are available only for 6 years as this index is released every alternate year. These values can be extrapolated to find values of this index for all years starting from 2008. The value of LPI predicted by the model is a fairly accurate. A more accurate model could be developed by including more variables in the model. Other factors like Gross Domestic Product, Ease of Doing Business scores could have been used to see if these indices have an impact on LPI and hence, predict a more accurate LPI score.

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