National Council of Applied Economic Research

LOGISTICS DIVISION
DEPARTMENT FOR PROMOTION OF INDUSTRY AND INTERNAL TRADE
MINISTRY OF COMMERCE & INDUSTRY,
GOVERNMENT OF INDIA

REPORT ON

LOGISTICS COST IN INDIA

Assessment and Long-term Framework

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December 2023

Ministry of Commerce & Industry
Government of India
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Executive Summary

Logistics generally refers to the distribution of products and services from the point of origin to the point of consumption for either further processing or final consumption. Specifically, logistics comprises the part of the supply chain process that deals with the transportation, warehousing, inventory-carrying, information flow, and administration and management of physical products and services between the point of production and the point of delivery.

Development of multimodal connectivity to economic/industrial clusters, promoting domestic manufacturing and becoming globally competitive, improving efficiency of hinterland and EXIM logistics, are among the critical factors that will contribute to achieving Hon'ble Prime Minister's vision to make India a developed Nation and become a **USD 32.8 trillion** economy by 2047.

India's **National Logistics Policy**, launched on 17th September 2022, aims to reduce logistics costs in India to be comparable to global benchmarks by 2030. Reduced logistics costs would also improve efficiency and competitiveness across various sectors of the economy and encourage greater value addition and innovation. In view of this, it is important to reliably measure cost associated with logistics and identify ways to reduce it.

Since there is **no official estimate** for logistics cost in the country, the first task at hand was to come up with a methodology for estimating it. Given the fragmented nature of the sector and various variables such as storage, terminal infra, O-D pair wise commodity flows, affecting the ecosystem, various questions such as what the various variables are affecting logistics cost, what are the essential data parameters to be considered, sources of data, etc. needed to be answered. Overall, logistics involve many different and complex processes, and obtaining information about every stage of the process from transportation to depreciation of capital is the challenge. Presently, **there is no scientific framework for estimating logistics cost** in the country.

In view of this the Logistics Division notified a **Task Force** on 28th March 2023, with members from academia, international experts, NITI Aayog, Asian Development Bank (ADB), line Ministries and industry associations, with the objective to develop a framework for estimating logistics cost, based on an assessment of ground realities.

Several meetings of the Task Force were held with series of discussions on global benchmarks and methodologies, whether and how these methodologies apply to the Indian context, the best possible measurement methods for India, the availability of updated or even real-time data, and the specific areas where there is scope for cost-cutting, between March and October 2023.

As an outcome of this extensive exercise, a **report on Logistics Cost in India: Assessment and a Long-Term Framework,** has been developed. Based on available secondary data from Ministry of Statistics & Programme Implementation's (MOSPI) Supply Use Tables and National Account Statistics, and the NCAER's 2019 study, "Analysis of India's Logistics Costs," this report provides trends on aggregated estimates of logistics cost as a percentage of GDP, along with recommendations for a long-term logistics cost calculation framework.

Findings of the Assessment

This assessment finds that the aggregated logistics **costs for India fall in the range of 7.8%–8.9%[1] of GDP for 2021-22**.

Our analysis also reveals that logistics costs as a share of GDP[2] declined from 2014-15 to 2016-17. This is due to a notable year-on-year decline in fuel prices of 10.6% and 32.0% in 2014-15 and 2015-16, respectively, plus a marginal decline of 0.8% in 2016-17.

To further reduce its logistics costs, India should gradually reduce the absolute cost of logistics as a percentage of sales of agriculture and manufactured goods. This can be achieved by logistics and infrastructure development, the removal of congestion points, a modal shift towards rail and waterways, digitalisation, a reduction in administration and management costs, among others.

The Way Forward—A Comprehensive Survey Based Study for Logistics Costs Assessment

Aggregated data available in public domain [MOSPI's Supply-Use Tables and National Account Statistics] is only for few components of the logistics cost [transportation cost and warehousing cost]. Not only is data on other components not available in public domain, but aggregated results also cannot be used for identifying strategic interventions for policy making. It does not provide any policy advice with regard to reducing freight transport costs by mode of transport for different sectors and commodities or by identifying (i) the most efficient (and inefficient) routes, (ii) which routes are experiencing the most rapid growth in freight traffic and therefore require investment, and (iii) congestion points along freight routes that need to be addressed. Therefore, this report recommends a **hybrid approach** using **primary and secondary survey data**, as well as **real-time Big Data** to provide an estimate of logistics cost.

Synchronising data from FASTag with E-way bills can provide a time cost of consignment movement by product and route to help identify congestion points, which will be useful in subsequent and more detailed analysis.

To ensure evidence-based decision making for improving logistics efficiency, **logistics costs should be estimated on a regular basis** (preferably annually).

The **primary survey** underlying the hybrid approach to logistics cost estimation should be conducted in conjunction with logistics providers and cover different trade routes. Survey **respondents** should comprise logistics firms [i.e., second-party (2-PL) and third-party logistics (3-PL)]; standalone warehouse operators; end-users managing their own logistics (first-party logistics); freight forwarders and clearing agents, transporters, end-users (e.g.,

[1] The **lower bound (LB) and upper bound (UB)** estimates result from variations in the cost of cargo movement on major trade routes for domestic and export–import cargo movement. LB estimates assume that the components of logistics costs other than transportation, storage and warehousing components, and some postal and courier services constitute 24% of total logistics costs, while UB estimates assume the same to be 33%.

[2] **Logistics cost as a percentage of GDP**: is calculating logistics cost and taking a ratio (nominal or real) of the GDP. This is not a measure of how much logistics sector contributes to GDP. To evaluate logistics relative to GDP is to determine how much of GDP is consumed by the logistics activities. Cross country comparisons are easiest when using Logistics Costs as Percent of GDP and it can therefore be used as a yardstick to measure the efforts of infrastructure and policy developments towards reduction in logistics cost.

manufacturing companies as well as standalone importers), port authorities, and logistics experts. The survey can identify the time (hours) and costs (rupees) required for transporting cargo across different modes of transport (e.g., roads, railways, air, and waterways), multimodal costs and transfer cost between modes, and the type of products and cargo moved (e.g., containerized versus non-containerized, perishable versus nonperishable). Further, the survey should assess cargo movement patterns across India; the cost of each logistics component within overall logistics costs; logistics cost per ton-kilometre on each of the logistics routes under consideration; and the variation in logistics costs across different routes, modes, products, types of cargo, and service operations.

Logistics Cost in India

1. Background

Logistics, in simple terms, is the distribution of products and services from the point of origin to the point of consumption. Over time and across industries, both at the micro and macro levels, logistics have always played a crucial role. Historically, logistics planning used to be strategically one of the most important factors for winning a war (Daniela and Ovidiu, 2014). Nowadays, in the era of globalization, logistics' strategic importance relates to trade and the competitiveness of countries' exports.

Hence, a unified and reliable way to measure logistics costs is crucial. Equally important is to identify the factors where there is scope to reduce costs. The Government of India has placed emphasis on reducing India's logistic cost through a variety of interventions by both the private and public sectors. India has also developed a National Logistics Policy (NLP)[3] and several States/UTs[4] has already notified their States Logistics Policies.

It is important for any country to reliably measure costs associated with logistics and identify the ways to reduce these costs. National Logistics Policy aims to address these through a variety of interventions

Given that the NLP sets a target to reduce the cost of logistics in India to be comparable to global benchmarks by 2030, it becomes important to develop a full understanding of the following aspects:

- global benchmarks available
- methodologies applied for developing these benchmarks
- feasibility in application of these methodologies to the Indian context
- best possible methods to measure logistics costs in India given current data limitations, and
- methodology to derive logistic costs if newer sources of data were available.

2. What Constitutes Logistics Costs

At the outset, it is important to understand the elements that determine logistics costs. Sopple (2007) defined the logistics processes as follows: order processing, inventory management, warehousing, transportation, material handling and storage, logistical packaging, and information. And while there is no standard worldwide nomenclature that defines logistics costs, according to the NLP released in 2022, "logistics" includes the transportation and handling of goods between points of production and consumption, storage, value addition, and allied services. Value-addition and allied services can cover a wide gamut of specific activities.

[3] The National Logistics Policy defines 'Logistics' to include transportation & handling of goods between points of production and consumption, storage, value addition and allied services. Value-addition and allied services can cover a wide gamut of specific activities.

[4] 23 States/UTs have notified State Logistics Policies as on December 2023.

The weights of different factors in the overall cost also vary significantly across countries and industries; thus, the efficient use of resources and reduction of logistic costs depends on logistics management.

No doubt, there are various complexities in assessing logistics cost. The primary reason is that logistics involve many different and complex processes and getting information about every stage of the process—from transportation to depreciation of capital—involves a great challenge (Farahani et al. 2009). Another very subtle issue in aggregating and accurately measuring logistics costs at the macro level comes from the fact that there is no common definition of supply chain management that companies adhere to; thus, when companies calculate logistics costs, their methods vary across firms and industries (Pohlen et al., 2009). Besides, the unavailability of sufficient data and the unreliability of available data are also important issues in macro-level estimations of logistics costs.

The literature on logistics cost considers the following five elements --transportation, warehousing (including inventory-carrying cost), postal and courier services, insurance, and administration- as the key determinants of logistics costs

Based on a literature review of relevant publications, including questionnaire-based surveys, statistics-based studies, and scientific articles, the five most common logistic cost components are transportation, warehousing (including inventory-carrying cost), postal and courier services, insurance, and administration.

Direct and Indirect Logistics Costs

As noted earlier, cost components directly related to the physical flow of goods are easily perceived as a part of total logistics costs, and are thus referred to in the literature as direct costs. Logistics processes also generate functional costs such as for administration, which is not confined to logistics activities. Identifying and measuring these costs is considerably more difficult than measuring direct costs.

Direct Logistics costs are those which are easily identified and include transportation and warehousing costs. Indirect costs are functional costs that are not directly linked to logistics function but rather to an activity, like administrative costs

Direct function-related costs are usually the kind of costs caused by tangible logistics functions that are easily identified and traced back to a certain activity. The costs belonging to this group include transportation and warehousing costs that are commonly perceived as logistics costs. However, it is important to draw the line between warehousing costs, which are direct and function-related costs, and inventory-carrying costs that occur when capital is tied to the inventory itself.

Indirect costs are overhead costs that arise when logistics activities are not working as planned. The costs in this group are only incurred in the case of a failure in logistics functions. In this case, the risk is fulfilled due to, for example, lost sales or nonmarketable goods. Even if the risk does not materialize, avoiding it still creates costs.

Finally, indirect function-related costs are expenditures that are not directly linked to a sole logistics function but rather to an activity. It is impossible, for example, to allocate the cost of

packaging material or a new forklift to a specific transported product. However, these supporting functions are essential for seamless logistics activities.

Logistics costs should attempt to estimate all of these components of costs from published official or private sources, primary surveys using structured questionnaires, or stakeholder interactions. In reality, most logistics cost estimate do not incorporate the value of time or other items listed under indirect overhead costs in Table 1.

Table 1: Cost Components by Functionality

Indirect function-related costs	***Indirect overhead costs***	
Packaging material Packaging Logistics equipment, premises, and capital Administration Indirect logistics-related hardware, software, and maintenance costs Other logistics-supporting functions	Lost sales Employing customer service agents Nonmarketable goods Other logistics related trade-offs	Indirect logistics costs
Direct function-related costs	***Direct overhead costs***	
Transportation Cargo handling Warehousing Custom clearance logistics Documentation Direct logistics related to IT hardware, software, and maintenance costs. Other direct activities	Value of time Inventory carrying Other operations related to logistics	Direct Logistics Costs
Function related costs	Alternative or overhead costs	

Source: Pohit et al. (2019) Survey of Literature on Measuring Logistics Cost: A Developing Country's Perspective. *Journal of Asian Economic Integration*, 1 (2): 260–82.

3. Metrics of Logistics Costs

It must be noted that the metrics of logistics costs in the literature differs across studies. By and large, there are three main metrics to access the logistics cost: (a) percentage of gross domestic product (GDP), (b) percentage of sales or turnover, and (c) absolute costs. However, most of the studies report logistic costs as a percentage of GDP in order to make the results for different countries more comparable.

Logistics cost as a percentage of GDP should not be interpreted as its contribution to GDP. It is an absolute and an aggregate cost, presented as percentage to GDP, only for the purpose of international comparison

It should be noted that when expressed as a percentage of GDP, logistics cost should not be interpreted its contribution to GDP in respect of income and job creation. It is an absolute and an aggregate cost measure, presented as percentage to GDP, only for the purpose of cross-country comparison. It may be presumed that services-driven economy is expected to

have lower logistics cost. Also, an economy dependent predominantly on road transport is expected to have, ceteris Paribus, higher logistics cost.

Ideally, if the countries strive to reduce their logistics cost, effort should be made towards gradually reducing the absolute cost as percentage of sales of goods, that is, agriculture and manufactured goods. This can most commonly be achieved, among other ways, through infrastructural development, removal of congestion points, modal shift towards rail and waterway, and reduction in administrative costs.

4. Methodologies for Estimation of Logistics Costs

We now review the different methodologies that have been used by previous studies to examine and estimate logistics costs at the macro level. The World Bank (2008) has developed its global LPI, which ranks countries qualitatively on various logistics indicators. However, this indicator does not provide any quantitative estimate of the logistics costs of any country.

The three most commonly adopted methodologies to estimate logistics cost are Survey-based, Statistical Studies, and Case Studies. In addition, there are models, like Artificial Neural Network model, which are more appropriate for developed countries

According to Rantasila (2013), most of the methods used to measure logistics costs at the micro level cannot be directly used to access logistics costs at the macro level. The previous published studies have adapted different methods based on the reliability and availability of the data. The three types of studies based on different methodologies that can be used for macro-level logistics costs studies are:

Survey-based studies. Such studies rely on information collated through structured or semi-structured questionnaires, which provide the estimates of logistic costs from the perspective of the key stakeholders of the relevant industries. Typically, questionnaires are canvassed to key persons (chief operating officers) in industries with a view to solicit the logistics costs of their respective industries. These responses are then aggregated by a suitable weighting scheme to arrive at the logistic costs of a country.

Statistical studies. These studies use statistical models and secondary data like national accounting statistics to derive the level of logistics costs.

Case studies. Case studies typically address the issue at a micro level or for a specific industry. The information in this method is obtained through in-depth interaction with the relevant and knowledgeable persons of that industry.

Bowersox (1998) introduced the Artificial Neural Network (ANN) model for logistics cost assessment. The model is based on a biological emulation of the nervous system and uses five input variables: geographic region variables, economic variables, income level variables, transportation variables, and country size variables. These input variables are entered into the ANN model to give output as the national level logistics cost. Even though the study does not provide individual cost components of logistics costs, it still made an important contribution to estimating global level logistic costs.

By and large, a variant of this model has been adopted by Armstrong and Associates Inc. (A&A) to provide estimates of the logistics costs of all the major and emerging economies of the world. While this is indeed a commendable effort, caveats need to be emphasized. In this model, for a specific country, the logistics cost as a percentage of its GDP is estimated by putting observed

data for the selected economy and infrastructure related variables into the model. Once the ANN model is estimated for the control countries, which are basically the developed economies, the input variables for any country are put into the model to estimate the logistics costs as a percentage of GDP for the corresponding country. But for developing economies like India where transaction costs are quite high, in terms of both expenditure and time, and the quality of physical infrastructure is inefficient, the application of the ANN model estimated from developed economy data to assess logistics costs in India may provide misleading results.

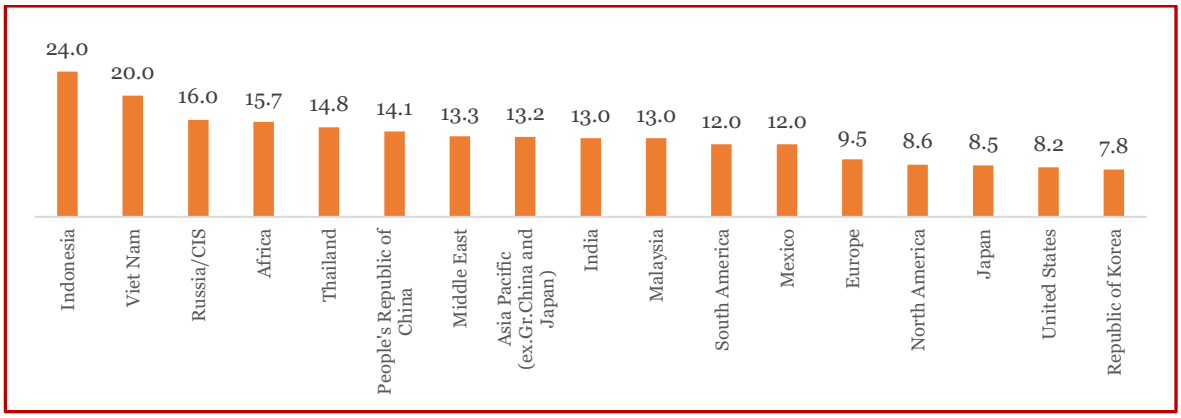
5. *Review of past studies on Logistics Costs*

There are not many studies on logistic costs that provide cross-country comparisons. However, the one conducted by Armstrong and Associates (2017) suggests that supply chain management capabilities differ from country to country due to two main reasons: (i) information flow and controls; and (ii) physical limitations such as infrastructure related to road, railways, waterways, and airways.

A&A provides cross-country comparisons based on ANN model. It finds that logistic costs as a percentage of GDP in 2016 lie in the range of 11%–15% for developing countries. However, there are significant variations across major Asian countries

As per this report, logistic costs as a percentage of GDP in 2016 lie in the range of 11%–15% for developing countries (**Figure 1**). However, there are significant variations across the major Asian countries. For instance, logistic costs in Indonesia are on the higher side (24%), whereas it is only 8% of GDP in South Korea.

Figure 1: Logistics Costs for Key Regions and Countries (as % to GDP, 2016)



Source: Armstrong and Associates report (2017)

In the context of India, there are no official estimates for logistics costs as a percentage of GDP. However, private sector institutions and academic institutions have computed logistics costs, which are widely quoted to stress the point that India is a country with high logistics costs. A summary of three studies conducted between 2015 and 2019 to estimate logistic costs in India is given in **Table 2**.

Table 2: Summary of Studies Estimating Logistics Costs in India

Study	*Estimate*	*Remarks*
Armstrong and Associates (2017)	13% of GDP in 2016	This estimate is based on the Artificial Neural Network Model, but the weaknesses of the same has already been pointed out earlier. Information on the comprehensiveness of the data and its sources is not available in the public domain.
Confederation of Indian Industries (2015)	10.9% of the GVA in 2015	Questionnaire-based approach to estimate logistic costs. Stakeholders in major industries are asked to report their assessment of logistic costs as a percentage of GVA. These are then weighed to arrive at an estimate of logistic costs for India considering the sectoral contributions to the economy.
National Council of Applied Economic Research (2019)	8.9% of GVA at basic price or 8.1% of GDP at market price for 2017/18.	This method captures the following components of logistics costs: ○ Transportation ○ Other components, including: ▪ Material Handling ▪ Warehousing ▪ Administration ▪ Logistics Equipment ▪ Documentation ▪ Insurance ▪ IT Hardware and Software ▪ Logistics System Management ▪ Marketing ▪ Packaging ▪ Speed Money ▪ Software and Maintenance This method uses the combination of statistical method using secondary data from MOSPI's Supply and Use Table and an all-India survey of 1,120 logistics players.

GDP = gross domestic product, GVA = gross value added.
Source: Authors' compilation.

6. Assessment of Logistics Costs for India

The logistic costs for a large country like India can best be estimated through a comprehensive study, comprising a primary survey and the compilation of relevant secondary data. A comprehensive study would not just provide a plausible estimate of total logistics cost for India but will also provide disaggregated information on logistic costs associated with various product groups and supply chains and different geographies within India. It would also

distinguish between the different constituent elements of logistics and the mode-wise differences and the role they play in driving overall logistics costs. Such disaggregated information is critical for enabling policymakers to identify priority areas for bringing down logistics costs.

DPIIT constituted a Task Force to arrive at an aggregate estimate of India's logistics costs based on readily available government data and also to propose a long-term comprehensive framework to track the progress of NLP interventions

However, pending such a study, this report presents an interim assessment that was conducted to arrive at a general (but reliable) aggregate estimate of India's logistics costs based on readily available government data. This assessment study is one of the key responsibilities of the Task Force, which was constituted by DPIIT and include representatives from the Ministry of Statistics and Programme Implementation, NITI Aayog, the National Council of Applied Economic Research, the Asian Development Bank, international academic experts, and other stakeholders. Another key responsibility of the Task Force, which is also its prime objective, is to update estimates of logistics costs following international best practice.

As mentioned before, not all components of logistics costs are available from secondary sources, but some of them like transport, storage, and warehousing costs can be readily obtained from the national Supply and Use Tables (SUTs). The SUTs are generally released by the Government of India with a lag of 2–3 years; therefore, the updated data on these components can be imputed using the latest available statements from the NAS. Both of these sources are discussed in more detail below.

6.1 Supply and Use Tables

For the initial assessment of logistics costs, an important source of data are the SUTs, which are prepared by the Ministry of Statistics and Programme Implementation (MoSPI) and published on a 2 to 3-year lag.

The SUT framework, which comprises two tables (Supply Table and Use Table), is a comprehensive representation of all economic transactions that take place between all sectors of an economy, resulting in income generation during a particular reference period. The Supply Table describes how goods and services become available in an economy during a certain period. These are either produced by domestic industry or imported. The Use Table shows how goods and services are consumed in the economy during a certain period. These are either domestically consumed or exported. These tables conform to the internationally standardized data compilation and collation framework.

The Supply table is presented in basic prices and Use table is presented in purchaser's price. The basic price is the amount receivable by the producer from the purchaser for a unit of a good or service, minus any tax payable plus any subsidy receivable, as a result of production or sale of the unit. The commonly levied product taxes are excise duties, stamp taxes, registration taxes, and Goods and Service Tax (GST). Product subsidies include subsidies for food, fuel, and fertiliser.

The purchaser's price is the amount paid by the purchaser. This includes any taxes payable (less any subsidies receivable) on production and imports, any transport charges paid

separately by the purchaser to take delivery, and the retailers' margin. The transport charges are also called transport margins and retailers' margins are trade margins.

Hence, the Supply table also has a column on imports showing values of imports of products and columns for valuation adjustments—that is, trade and transport margins (TTM) and indirect taxes less subsidies on products. It should be noted that:

Supply table has a column of Trade and Transport Margin (TTM), which is the combination of these margins for agriculture and manufactured goods; nil for services other than transport; and only transport margin for transport services. This transport margin for transport services represents total freight cost of the country

- TTM is the combination of both trade and transport margins, in the case of agriculture and manufactured goods,
- TTM is nil for services, other than transport services, as there is neither trade nor transport margin for services.
- For transport services, TTM depicts transport margins or the freight cost only as there is no trade margin for transport services. These TTM values can also be interpreted as the domestic output of logistics services.

The transport services for which these freight costs are available are:

a) railway transport,
b) road transport,
c) water transport,
d) air transport, and
e) supporting and auxiliary transport activities.

The values of TTM for the above items include the values of freight cost for each type of transport as well as the cost of support services for each of the transport services. The support services include services such as switching and shunting (in the case of railways), parking charges (in the case of land transport), fire-fighting services (in the case of air transport), cargo handling in all types of transport services, and the service charges of travel agents.

Transport services are both imported and exported, with the exception of railway transport services. Imported services include both passenger and freight transport services. In the absence of any data to disaggregate the imported transport service into passenger and freight, it is assumed that 10% of road transport imports, 50% of air transport imports, 100% of water transport imports, and 50% of supportive auxiliary transport activities imports are related to logistics services.[5]

The SUTs are available for the years 2011-12 to 2019-20 only. For more description on the concept of SUT, refer to Annexure II.

6.2 National Accounts Statistics

The NAS, published by MoSPI, presents the detailed statements on the sectoral values of output and gross value added. The latest NAS is for 2023, which presents the output and gross value added (GVA) data from 2011-12 through 2021-22. These data are provided for all major economic sectors, including those which are required to estimate the logistics cost—that is, transport, storage, and warehousing. Transport output is available by all modes of transport,

[5] The percentage shares were determined through discussions with Task Force member from MoSPI.

but not disaggregated into passenger and freight (except for railways). Using these data and past trends in the ratio of freight transport cost to total transport output, the values of freight transport cost (or TTM) have been derived for 2021-22. The pandemic period has not been included for consideration in this assessment, which includes 2019-20 (although it was only partially impacted by pandemic) and all of 2020-21.

NAS also provides the value of output for the storage and warehousing sector, which is the direct combined estimate of the logistics components, namely material handling and Warehousing. This covers all storage and warehousing output, comprising both public and private components. The cost of carrying inventories is also accounted for in this part.

7. Methodology for present assessment

The methodology adopted to arrive at the estimates of the logistics components for which data are available is presented in **Table 3**, along with the assumptions and explanatory. Also presented are the notes for components for which no direct estimate is possible for this interim assessment.

Table 3: Data Sources and Methodology Used for Components of Logistics Costs

S. No.	*Logistics Components*	*Data Source*	*Assumptions*	*Explanatory Notes*
1.	**Transportation Cost and Supportive and Auxiliary transport activities**	SUT for 2011-12 to 2018-19	No assumption; directly available	TTM for five transport services is the measure of freight transport cost. This is directly available by all modes of transport in the SUT.
		NAS'2023 for 2021-22	Transport Margin Ratios (TMR) or TTM-to-output ratios are assumed to be equal to the moving average of TMRs for the previous 5 years. Past years TMRs are directly available from the respective year's SUTs	The average TMR for each transport service is multiplied by the value of output of respective transport services for 2021-22. These values of output are available in the 2023 NAS.
2.	**Warehousing (includes material handling cost and cost of carrying inventories)**	2023 NAS for all years from 2011-12 to 2021-22	No assumption; directly available.	This component is included in the storage and warehousing sector's value of output.
3.	**Postal and Courier Services**	No direct data source, but it can be imputed using data	The gross value added for postal and courier services is the margins earned by them through the delivery of both business and	**A primary survey will be required to determine the actual share of business couriers in total**

S. No.	Logistics Components	Data Source	Assumptions	Explanatory Notes
		available in the 2023	personal couriers. It is assumed that business couriers account for 50% of total	**postal and courier service.** For now, in absence of any data, it is assumed that this share is 50%.
4.	**Insurance Cost**	No direct data source	No plausible assumption to derive indirectly too	A primary survey is required for this component.
5.	**Administration Cost associated with Logistics Activities**			
5.1.	*Repair and Maintenance of Logistics and Transport equipment*[6]			
5.2.	*Cost of Logistics Equipment*[7]			
5.3.	*IT Hardware and Software*			
5.4.	*Logistics System Management*			
5.5.	*Software and Maintenance*			

Source: Authors' compilation.

For this interim assessment, the data on available components (as discussed in the table above) can be used to estimate a part of logistics costs. For the remaining part, the approach followed is as follows:

- The previous NCAER study for the reference year 2018 presented the cost analysis of cargo movement on major trade routes for domestic and export–import cargo movement.
- Since these route-wise components lie in a specific range, their lower bound (LB) or upper bound (UB) estimates have been used.

While the data on transportation cost and storage/warehousing cost are taken from available government sources, for the remaining components, values are imputed using the previous NCAER study assuming that the share of remaining components in total logistics cost is the same as in 2018

[6] *Repair and maintenance of transport equipment is separately available in the SUTs, but it is difficult to differentiate between repair and maintenance of private vehicles and commercial vehicles. Also, it is difficult to differentiate between commercial vehicles being used for passengers and freight separately. Hence, a primary survey is required.*

[7] *The categories of transport equipment for which GFCF are available in SUTs include Ships and boats; Rail equipment; Motor vehicles; Motorcycles and scooters; Bicycles, cycle-rickshaw; Aircrafts and spacecrafts; Other transport equipment. However, the estimation of depreciation requires information on year of purchase. No direct or indirect estimation is possible for this. Hence, a primary survey is required.*

- The LB assumes that the remaining components constitute 24% of the total logistic costs, whereas UB assumes the same to be 33% (for justification of LB and UB, refer to Annexure III of this report).
- Accordingly, the logistic costs estimated for available components can be scaled up with these factors.

8. Assumptions and Limitations of the present assessment

The interim assessment of logistics costs presented in this report suffers from the following limitations:

- This assessment relies on secondary concomitant data, with primary data collated from an earlier NCAER study on logistics costs.
- The key data source, as mentioned in previous sections, is the SUT, prepared by MoSPI. However, these SUTs are available until 2019-20 only. For later years through 2021-22, data have been extrapolated using the NAS statements and assuming that the Transport Margin Ratios are equal to the moving average of these ratios for the previous 5 years.
- The business component of postal and courier services is assumed to be 50% of its total GVA.
- The components of logistics costs for which values could be estimated using the available secondary source are limited to transportation, storage and warehousing, and postal and courier services. The values of none of the other components could be estimated. Hence, it is assumed that the remaining components account for the same proportion of total cost as they did in the previous study done by NCAER in 2019.
- The values of imported transport services are also available in the SUTs. However, their disaggregation into passenger and freight is not available. For this, it is assumed that the freight component of imported transport services accounts for 10% in road transport, 50% in air transport, 100% in water transport, and 50% in supporting and auxiliary services.

9. Calculations and Findings

Table 4 presents the estimates of the components of logistics costs for which the data are available for the years 2011-12 to 2021-22. Also presented are the estimated total logistics costs in **Table 6** after applying the factors of 24% (LB) and 33% (UB), reflecting the share of the remaining components in total cost.

Further, **Figure 2** presents the structure of freight cost by different transport services. **Figure 3** presents the year-wise trend in logistics costs as a percentage of GDP, which is the standard international measure of logistics costs.

Table 4: Estimated Logistics Costs (Freight Transport, Warehousing, and Postal and Courier Costs only)

(INR '00 crore)

	Freight Cost (domestic + imported services)					Total Transport	Storage and warehousing	Postal and Courier Service Cost	Logistics Cost (available components)
	Railway Transport	Road Transport	Air Transport	Water Transport	Supportive and Auxiliary Transport				
2011-12	674	3128	116	475	1176	5569	138	83	5789
2012-13	863	3607	134	541	1319	6464	129	93	6685
2013-14	918	4064	150	557	1445	7133	148	100	7381
2014-15	913	4320	161	591	1615	7600	149	111	7860
2015-16	918	4704	170	646	1710	8147	159	121	8428
2016-17	967	5113	212	394	2079	8765	160	149	9074
2017-18	1142	6002	253	464	1966	9827	327	166	10320
2018-19	1259	6728	288	564	2289	11127	360	182	11670
2021-22	1317	8168	195	970	2633	13282	476	246	14003

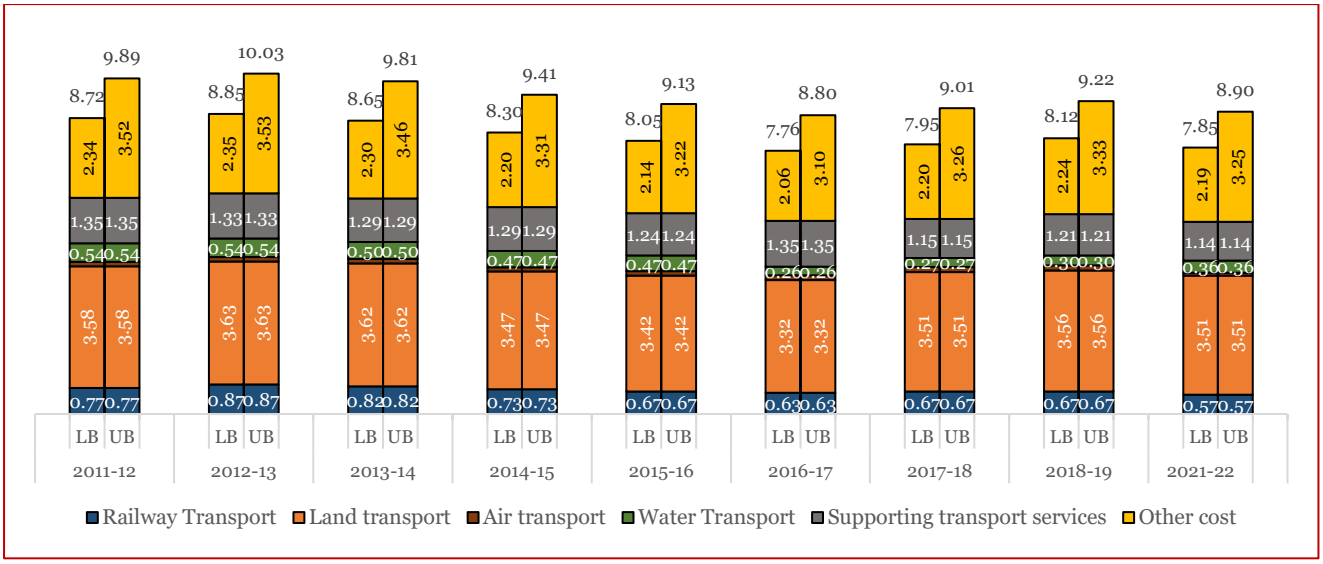
Note: Years 2019-20 and 2020-21, being abnormal years, have been excluded from the study.
Sources: NCAER computations based on Supply and Use Tables, various years; 2023 National Accounts Statistics.

Table 5: Total Estimated Logistics Costs (including imputed costs of other components)

	Total cost (INR '00 crore)		GDP (INR '00 crore)	Total cost (as % of GDP)	
	LB	UB		LB	UB
2011-12	7617	8640	87363	8.7	9.9
2012-13	8796	9978	99440	8.8	10.0
2013-14	9712	11017	112335	8.6	9.8
2014-15	10343	11732	124680	8.3	9.4
2015-16	11089	12579	137719	8.1	9.1
2016-17	11939	13543	153917	7.8	8.8
2017-18	13579	15403	170900	7.9	9.0
2018-19	15355	17417	188997	8.1	9.2
2021-22	**18426**	**20901**	**234710**	**7.8**	**8.9**

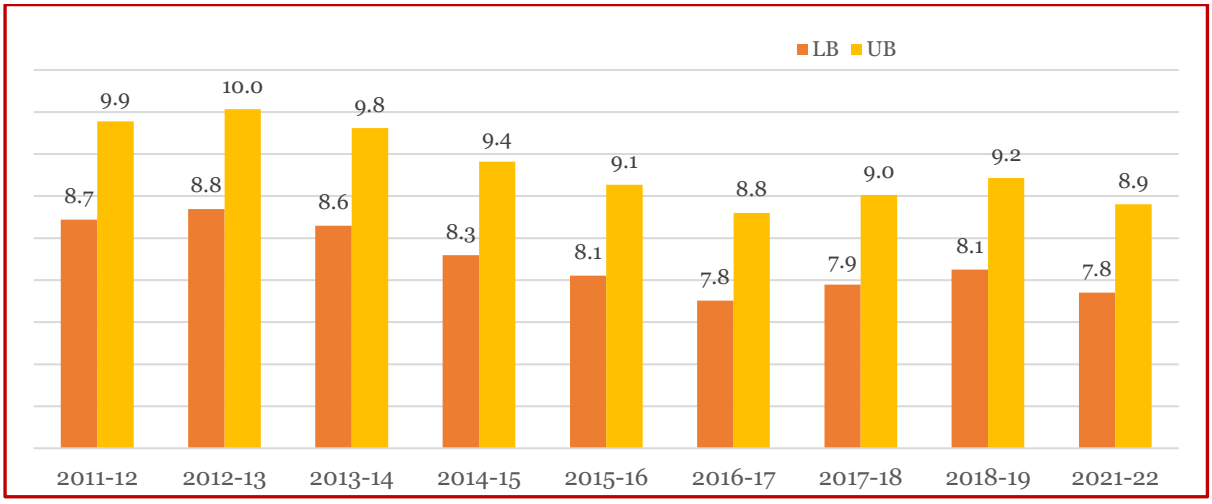
GDP = gross domestic product, LB = lower bound, UB = upper bound.
Note: Years 2019-20 and 2020-21, being abnormal years, have been excluded from the study.
Sources: NCAER computations based on Supply and Use Tables, various years; 2023 National Accounts Statistics.

Figure 2: Components of Logistics Costs (as % to GDP)



Note: Years 2019-20 and 2020-21, being abnormal years, have been excluded from the study.
Sources: NCAER computations based on Supply and Use Tables, various years; 2023 National Accounts Statistics.

Figure 3: Total Logistics Costs (as % GDP)



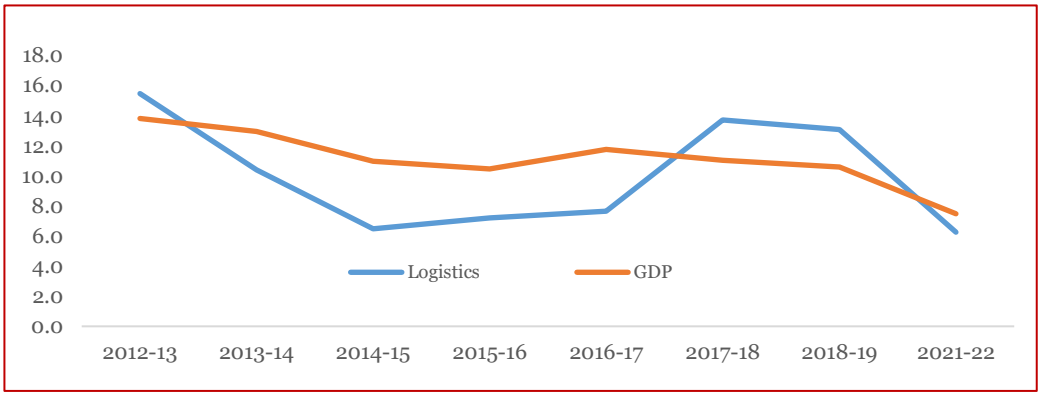
LB = lower bound, UB = upper bound.
Note: Years 2019-20 and 2020-21, being abnormal years, have been excluded from the study.
Sources: NCAER computations based on Supply and Use Tables, various years; 2023 National Accounts Statistics.

The interim assessment, as shown in Figure 3, suggests that logistics costs for India fall in the range of 7.8%–8.9% of GDP for 2021-22, using the LB and UB shares of other components. While this interim assessment provides the logistics cost covering all the production sectors, modes of transport, and geographies of the country but it cannot present the costs separately for these parameters, which is an essential requirement to track the logistics cost for a vast country like India. Hence, going forward, a comprehensive study with a primary survey, is required.

Figure 3 also shows a declining trend in logistic costs as percent to GDP in 2014-15 and 2016-17, and the subsequent increase in 2017-18 and 2018-19. This could be due to several reasons, including the following:

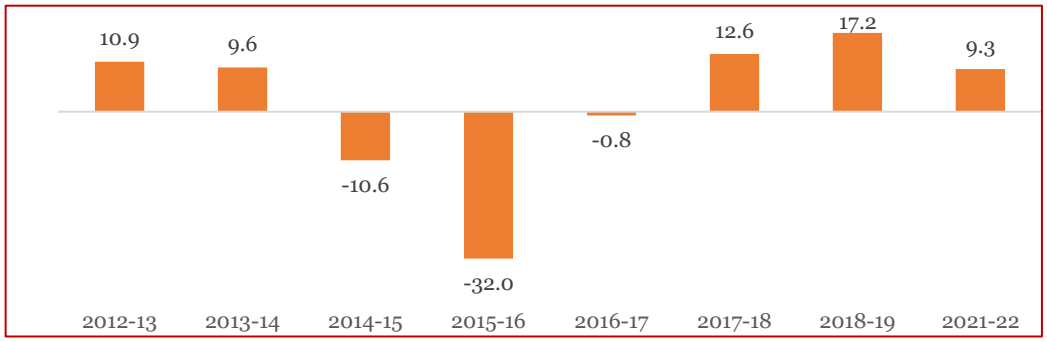
1. GDP growth during 2014-15 and 2016-17 outpaced increases in logistic costs, therefore resulting in smaller ratios to GDP (Figure 4).
2. Fuel inflation, as measured by the Wholesale Price Index for fuel, which was low in 2014-15 and 2016-17 and high in 2017-18 and 2018-19, could have led to a fall in logistics costs during the former and temporary increase during the latter period (**Figure 5**).

3. Figure 4: Growth in GDP Vs Logistics Cost (y-o-y, %)



Sources: NCAER computations based on Supply and Use Tables, various years; 2023 National Accounts Statistics

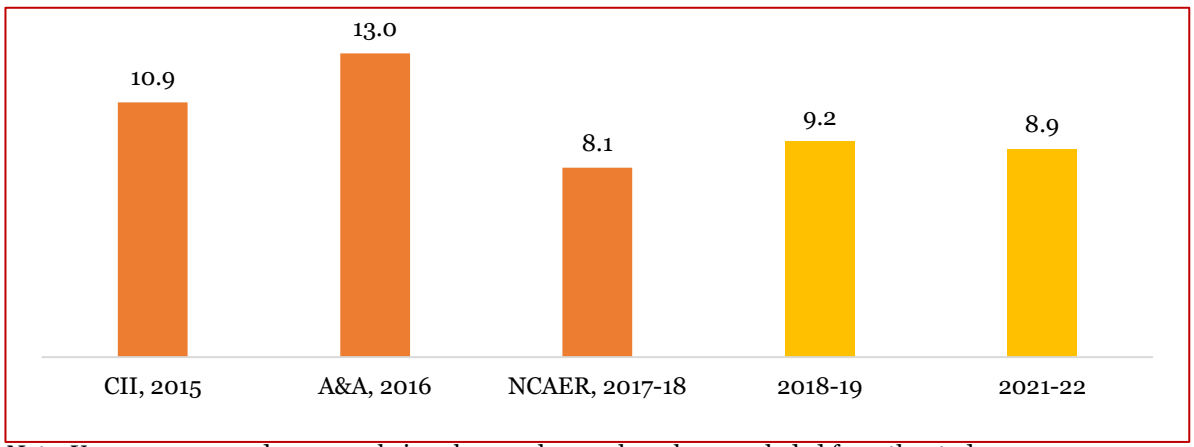
Figure 5: Price change in Fuel prices (y-o-y, %)



Source: Ministry of Commerce and Industry

Figure 6 compares the estimates of logistics costs from various studies, including the estimates derived in the present study for 2018-19 and 2021-22.

Figure 6: Logistics Cost Estimates (as a % GDP) from Various Studies



Note: Years 2019-20 and 2020-21, being abnormal years, have been excluded from the study.

A&A = Armstrong and Associates, CII = Confederation of Indian Industry, NCAER = National Council for Applied Economic Research.
Sources: A&A, CII, NCAER-2019, and NCAER present assessment.

10. *The Way Forward for Logistics Cost Estimation*

This report presented a tentative assessment of India's logistic costs using data from secondary sources. However, given the Government of India's increased investment in developing infrastructure, which would make the movement of goods smoother and faster, logistics costs should be estimated on a regular basis to measure the impact of these policy actions. **It is also equally important that the mechanism for estimating logistics costs can provide tangible policy advice on ways to reduce logistics costs.**

The currently available official data, the SUTs, provide a reliable estimate of freight transport costs as TTM. However, TTMs are derived numbers and may not reflect the actual estimate of transport costs, since SUTs are only available with a lag of 2-3 years.[8] Further, this procedure does not encompass all the components of logistics costs. **Therefore, a primary survey is required to arrive at more robust and timely estimates for logistics costs.**

Moreover, the SUT approach does not provide the following disaggregated information that is critical for policymakers:

- freight transport costs by mode of transport for all 140 principal commodities given in the SUTs;
- route-wise logistics costs to determine which are the efficient and inefficient routes;
- routes exhibiting the fastest growth of freight traffic and where investments are required; and
- congestion points of freight traffic where policy action is required.

Future methodology needs to address the twin objectives of (a) timely and robust measurements of logistic costs, and (b) policy-relevant information such as ways to reduce logistic costs by streamlining bottlenecks in the logistics ecosystem. This requires origin-destination route surveys of selected products to obtain the relevant time and cost of transportation and storage. The survey can also collect information on bottlenecks in logistics, such as administrative bottlenecks at customs and other informal hurdles along the route. Interviews with freight and forwarding agents, port authorities, and logistics experts could also provide information on policy recommendations to reduce logistics cost.

10.1. Primary Survey

The survey will target the following stakeholders to get an understanding of the logistics costs, pattern of cargo transportation, and other dynamics, including the following:

- Transporters and insurance companies
- Logistics firms (third-party logistics, second-party logistics, others)
- End users managing their own logistics (first-party logistics)
- Freight forwarders and clearing agents
- Warehousing survey

[8] TTMs are based on assumptions of older surveys and may not capture the current economic structure.

Further, the survey will collect information on the time in hours and costs of transporting cargo across the following:

- Modes of transport such as road, railways, air, and waterways)
- Multimodal and transfer costs between modes
- Type of products and cargo moved (e.g., containerised versus non-containerized, perishable versus non-perishable)
- Nature of logistics operations, including first-party logistics players, second-party players, and third-party players

In addition, the following logistics players will also be interviewed:

- Standalone warehouse operators to determine the storage and distribution costs
- End-users (i.e., manufacturing companies as well as standalone importers) to determine their operating dynamics
- Port authorities and logistics experts to assess the market landscape, operating dynamics, logistics costs at ports, and other relevant components

With these objectives, the survey will be able to assess the:

- Cargo movement patterns across the country;
- Proportion of the cost of each logistics component in the overall logistics cost;
- Logistics cost per ton per km on each of the logistics routes under consideration;
- Differential in logistics costs across routes, modes, products, types of cargo, and service operations.

10.2. BIG Data

Finally, the methodology can benefit from the use of Big Data—such as E-way bills, GST information, and FASTag data—to estimate the volume and value of freight transport across India along with the time cost of movement of freight across various corridors. E-way bill data is a rich and reliable source of data on freight transport costs, the prime component of logistics costs. Such data can provide the sampling frame needed for a pan-India survey (**Box 1**).

Box 1: Data Available through E-Way Bills

E-way bills are unique bills that are number generated for a specific consignment involving the movement of goods. The bill must be generated before transporting or shipping goods worth more than INR50,000 within state or between states. There are two parts of an E-way bill:

Part A: Details of Consignment

- ✓ GSTIN of the recipient
- ✓ Place of delivery (PIN), which also gives distance in kilometres
- ✓ Invoice or *challan* number against which the goods are supplied
- ✓ Value of goods
- ✓ Harmonized System of Nomenclature Code (international classification system of commodities)
- ✓ Reasons for transportation
- ✓ Transport document number (e.g., goods receipt number, railway receipt number, airway bill number, or bill of lading number)

Part B – vehicle number in which goods are transported

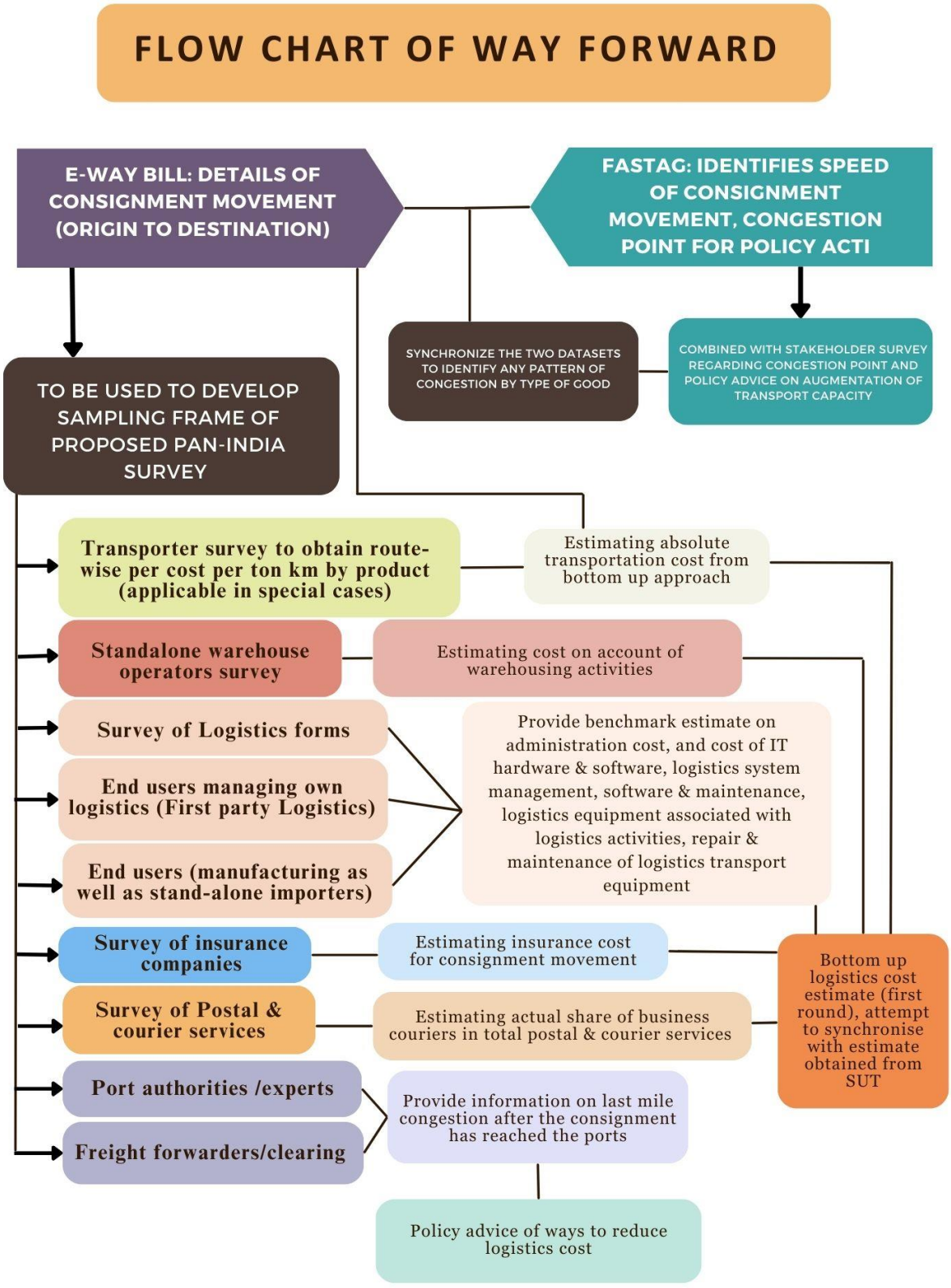
FASTag bills, which are an electronic toll collection system in operated by the National Highways Authority of India, can also be can also be extremely useful. It uses radio frequency identification (RFID) technology for making toll payments and reveals the speed of movement of the consignment along the route. Hence, its principal advantage is that it can help in identifying bottlenecks (i.e., time costs) across various routes.

10.3. Summary

Figure 7 provides a flow chart of the proposed future methodology. As this methodology indicates, multiple surveys of stakeholders will be conducted. In addition, E-way bill data along with the transporter's survey will provide a benchmark estimate for transportation costs. The survey of other components will enable measurement of the costs for different elements of logistics. Finally, an attempt will be made to compare costs via a bottom-up approach with those generated from a top-down approach based on SUTs to arrive at the final numbers.

Synchronising the data of FASTag with E-way bills will provide a time cost of consignment movement by product and route. This will help in identifying congestion points for use in a subsequent comprehensive analysis.

Figure 7: Proposed Methodology



Source: Authors' illustration.

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Annexure I: Elements of Logistics Cost in the Literature

Literature	COUNT	**Articles**	COUNT	**Statistics based studies**	COUNT	**Surveys**	COUNT
Transportation	8	Transportation	7	Transportation	7	Transportation	12
Inventory carrying	7	Warehousing	5	Administration	5	Warehousing	12
Warehousing	7	Inventory carrying	4	Inventory carrying	4	Administration	11
Packaging	4	Administration	3	Warehousing	3	Inventory carrying	7
Administration	2	Risk and Damage	3	Cargo handling	3	Other	5
Customer service	2	Insurance	2	Transport pack.	2	Transport pack.	3
Order processing / information	2	Packaging	2	Communication	2	Insurance	2
Associated labor	1	Tied capital costs	2	Customer service	2	Obsolescence	2
Tied capital costs (transportation)	1	Cost of commodities space	1	Documentation	1	Customer service /order entry	2
Communication	1	Customer service	1	Equipment	1	Appraisal	1
Consultancy	1	Customs	1	Information	1	Cost of capital	1
Cost of damage during transit	1	Design, restructure and option cost	1	Insurance	1	Customs	1
Fixed costs	1	Forecasting	1	Internal logistics	1	Damages	1
Logistics	1	Cargo handling	1	Internal services	1	Depreciation	1
Lot quantity	1	Indirect logistics	1	Obsolescence	1	Delivery	1
Manufacturing	1	Information	1	Outsourced logistics	1	Distribution centers	1
Procurement	1	Order processing	1	Order processing	1	Management/overhead	1
Purchased	1	Other costs	1	Other costs	1	Other indirect log. costs	1
Quality control	1	Permission losses	1	Plan/management	1	Shipper related	1
Recycling logistics	1	Procurement	1	RandD	1	SUM	66
Reverse logistics	1	Substance	1	Shipper related	1		
Stock-out costs	1	Returned goods	1	SUM	41		
Trade costs	1	Wages, bonus, allowance	1				
Value-added	1	SUM	43				
SUM	49						

Source: Adapted from Pohit et al. (2019) "Survey of Literature on Measuring Logistics Cost: A Developing Country's Perspective," Journal of Asian Economic Integration, 1(2), pp. 260–282.

Annexure II: Supply and Use Tables

The SUT includes the following tables:

- The Supply Table at the purchaser's price. This table records the domestic and imported supply of commodities at basic price, commodity-specific taxes, and margins.
- The Use Table at the purchaser's price. This table records the use of commodities by users valued at the purchaser's price.
- The value added by industry is presented at the bottom of the Use Table.

SUTs describe the entire economy by industry and products. The tables show links between components of gross value added, industry input and outputs and the commodity supply, and the use of these commodities. The Supply Table shows where commodities are sourced from (i.e., either the domestic market or imported from the rest of the world). The Use Table shows the use of these commodities either as an intermediate input in production, used by domestic final consumption, or exported to the rest of the world.

Figures A.1 and A.2 are simplified illustrations of the Indian SUTs. Figure A.1 contains information on the supply of commodities, while Figure A.2 contains information on the use of these commodities valued at the purchaser's price and the basic price. For a detailed overview of SUTs, see the Handbook on Supply, Use and Input-Output Tables with extensions and applications (United Nations 2018).

Basic price: "The basic price is the amount receivable by the producer from the purchaser for a unit of a good or service produced as output, minus any tax payable (i.e. VAT and excise duties), and plus any subsidy receivable, on that unit as a consequence of its production or sale. Basic prices exclude any transport charges involved separately by the producer" (United Nations, 2009: 275).

Producer's price: "The producer's price is the amount receivable by the producer from the purchaser for a unit of a good or service produced as output, plus VAT, or similar deductible tax (less any subsidy receivable). It excludes any transport charges invoiced separately by the producer" (United Nations, 2009: 275).

Purchaser's price: "The purchaser's price is the amount paid by the purchaser, including any deductible VAT or similar deductible tax, in order to take delivery of a unit of good and service at the time and place required by the purchaser. The purchasers' price includes any transport charges paid separately by the purchaser to take delivery at the required time and place" (United Nations, 2009: 275).

Figure 1 shows the Supply Table at the purchaser's price. This table show the supply of 140 commodities and services, from 66 domestic and foreign industries. Domestically produced commodities by local industries are illustrated by rows 1-140 and columns 1- 66. Column 67 is the total commodity supply from domestic industries valued at basic price and is calculated as the sum of commodity output over all industries. Column 68 shows the commodity-specific net product taxes. Column 69 is the total commodity supply at the producer price and is calculated as total commodity output at the basic price and net product taxes.

Columns 70-73 shows the CIF/FOB adjustment,[9] imports of goods and services, and import duty. Total imports is calculated as the sum over all the import columns.

Total commodity output at the producer price is calculated as the sum of the domestically produced commodities at producer price and imported commodities valued at producer price (Column 75 in Figure A.1). Column 76 shows the total value of trade and transport margins to facilitate the flow of commodity c to the users. There are five margin types: trade, railway, road, air, water, and other transport activities.

The Supply Table at basic prices is transformed into the Supply Table at purchasers' prices by adding the total output of domestic commodities (column 69), commodity-specific imports (column 74), and commodity-specific margins (column 76). If the SUT is balanced, the total supply of output at the purchaser's price is equal to the total demand (use) of output at the purchaser's price.

Figures A.2 illustrates the simplified structure of the Use Table and provides information on the users of the different commodities and services. The users are intermediate consumption by industry (row 1-40, column 1-66), final consumption by households (column 68) and the general government (column 69), gross capital formation (column 70), change in inventories (column 71), and exports (column 72). The table further shows the components of gross value added by industry. The components are net production taxes, compensation of employees, and gross operating surplus and mixed income. Total demand (use) of commodities is the sum of the commodity-specific intermediate use and final demand. This is presented in column 73.

[9] Data on the imports of commodities from trade statistics are usually valued at CIF prices. However, in the System of National Accounts total imports of goods are valued FOB. An additional row for CIF/FOB adjustment on imports is included to reconcile the different valuations (UN, 2018; 132). The CIF/FOB adjustment arise from the situation where goods are transported by ship from one country to another and it is unreasonable to assume that transport to and from the ship would be undertaken by carries resident in the relevant economy. The Supply Table records negative values for the commodities called freight transport and insurance services (UN, 2008; 336).

Figure A.1. Simplified Structure of the Supply Table

			Industries										Imports				Margins	Total
			1 to 66							67	68	69	70-72	73	74	75	76	77
		Commodity by user	Agriculture	Mining and quarrying	Manufacturing	Wholesale, Retail trade	Transport eg. By air, rail, pipeline and water, by road	Services eg. Accommodation services, Insurance, Real estate services	Public Administration and defence	Supply at basic price	Product taxes less subsidies	Output at producer price	Imports of goods and services and CIF/FOB adjustment	Import duty	Final import	Output at producer price including imports	Trade and transport margins	Total output (supply) at purchasers price
Commodities	1 to 140	Agriculture eg. Wheat, Other cereals Mining eg. Crude petroleum and natural gas Manufacturing eg. Meat products, Bakery products, Motor vehicles, trailers and parts thereof Construction eg. Residential buildings, Non-residential buildings. Trade eg., Wholesale, Retail trade Transport eg. Passenger transport, Freight transport Services eg. Accommodation services, Insurance, Real estate services Public Administration and defence	Multi-product matrix															
	141	CIF/FOB adjustment on imports																
	142	Total																

Source: Ministry of Statistics and Programme Implementation.

Figure A.2. Simplified structure of the Use Table

			Industries								Final demand					
			1 to 66							67	68	69	70	71	72	73
			Agriculture	Mining and quarrying	Manufacturing	Wholesale, Retail trade	Transport eg. By air, rail, pipeline and water, by road	Services eg. Accommodation services, Insurance, Real estate services	Public Administration and defence	Inter-Industry consumption	Household final consumption including NPISH	Government final consumption	Gross capital formation	Change in inventories	Export	Total use at purchasers' price
Commodities	1 to 140	Agriculture eg. Wheat, Other cereals Mining eg. Crude petroleum and natural gas Manufacturing eg. Meat products, Bakery products, Motor vehicles, trailers and parts thereof Construction eg. Residential buildings, Non-residential buildings. Trade eg., Wholesale, Retail trade Transport eg. Passenger transport, Freight transport Services eg. Accommodation services, Insurance, Real estate services Public Administration and defence														
	141	**Total use at purchasers' price**														
	142	Production taxes less subsidies														
	143	Consumption of fixed capital														
	144	Compensation of employees														
	145	Gross operating surplus/mixed income														
	146	**Gross value added**														

Source: Ministry of Statistics and Programme Implementation.

Annexure III: Lower Bound and Upper Bound of Other Components of Logistics Costs

The NCAER study in 2019 presented the cost analysis of cargo movement on major trade routes for domestic and export–import cargo movement. The percentage distribution of cost by different components for each of the major trade routes is presented in Table A1 below.

The contribution of transportation, warehousing, and material handling in total logistic costs ranges between a minimum of 67% (for the route NCR to Mumbai) and a maximum of 76% (for the route NCR to Bengaluru). Corresponding shares of other components of logistics costs, therefore, work out to be 33% and 24%, respectively, the former being considered as Upper Bound (UB) and later being Lower Bound (LB).

For this study, the UB shares have been considered to estimate the values of the remaining components.

Table A 1: Percentage distribution of Cost by components of Logistics Cost for each major trade route

	Ahmedabad to Bangalore	Ahmedad to Kolkata	Bangalore To Kolkata	Bangalore to Nagpur	Hyderabad to Kokata	Jaipur to Bangalore	Jaipur to Kolkata	Ludhiana to Kolkata	Ludhiana to Bengaluru	Ludhiana to Mumbai	Mumbai to Bnagalore	Mumbai to Chennai	Mumbai to Hyderabad	Mumbai to Kolkata	NCR to Bengaluru	NCR to Chennai	NCR to Guwahati	NCR to Hyderabad	NCR to Nagpur	NCR to Mumbai
Others	3%	2%	2%	2%	3%	3%	3%	0.03	3%	2%	3%	4%	3%	3%	0%	2%	0%	3%	1%	2%
Speed Money	1%	1%	1%	1%	1%	1%	1%	0.01	0%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
IT - Hardware and Software Cost	2%	1%	2%	2%	2%	1%	2%	0.01	2%	1%	1%	2%	2%	1%	1%	2%	2%	1%	2%	2%
Marketing cost	2%	1%	1%	1%	1%	1%	2%	0.01	1%	2%	1%	2%	1%	1%	1%	1%	1%	1%	1%	2%
Cost of Logistics Equipment	2%	3%	2%	2%	3%	2%	3%	0.04	2%	1%	2%	2%	3%	2%	2%	2%	2%	3%	2%	1%
Software and Maintenance	2%	2%	2%	2%	2%	2%	2%	0.03	2%	2%	2%	2%	2%	2%	2%	2%	2%	1%	1%	3%
Insurance cost	1%	2%	2%	2%	2%	2%	1%	0.03	2%	3%	2%	2%	2%	2%	2%	2%	3%	2%	3%	3%
Administration cost	3%	2%	3%	3%	3%	2%	2%	0.03	2%	4%	3%	3%	3%	2%	3%	2%	4%	2%	3%	3%
Packaging Costs	3%	4%	4%	4%	3%	3%	3%	4%	3%	4%	4%	3%	3%	3%	3%	3%	5%	4%	4%	5%
Logistics System Management	3%	4%	3%	4%	4%	3%	3%	5%	3%	4%	4%	4%	2%	3%	4%	5%	3%	4%	3%	6%
Documentation	5%	5%	4%	6%	5%	6%	5%	3%	6%	6%	5%	5%	5%	6%	5%	5%	4%	7%	4%	5%
Material Handling	11%	11%	12%	13%	13%	11%	12%	12%	11%	12%	12%	12%	10%	11%	12%	12%	10%	11%	12%	12%
Warehousing	10%	10%	14%	14%	11%	13%	13%	13%	13%	11%	10%	14%	12%	11%	13%	13%	9%	11%	10%	13%
Transportation	52%	52%	49%	46%	48%	50%	51%	44%	50%	48%	50%	47%	51%	51%	51%	48%	54%	49%	53%	42%
Total	100%	100%	101%	100%	100%	100%	100 %	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100 %	100%
Transport + Warehousing + Material handling	73%	73%	75%	73%	72%	74%	75%	69%	74%	71%	72%	73%	73%	73%	76%	73%	73%	71%	75%	67%
Others	27%	27%	26%	27%	28%	26%	25%	31%	26%	29%	28%	27%	27%	26%	24%	27%	27%	29%	25%	33%

Source: Analysis of India's Logistics Cost, NCAER (2019)