GS1® India

WHITEPAPER

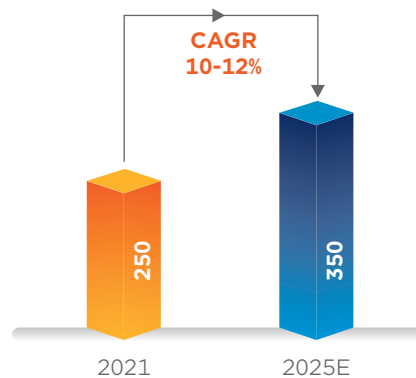## Unlocking the potential of
THE INDIAN LOGISTICS SECTOR

INDEX

LOGISTICS SECTOR IN INDIA: AN IMPORTANT PILLAR OF ECONOMIC GROWTH

Logistics entails activities related to transportation, warehousing, packaging, and inventory management, supported by the flow of information, order processing, and customer service. Logistics is an integral part of any economy and an essential determinant of the economy's growth.

The value of the Indian logistics sector was $250 billion in 2021. Growing at an impressive CAGR of 10-12%, it may reach $350 billion by 2025.[1] The sector is also a significant source of employment generation, employing 22 million people in 2022, with the number of employees expected to grow by 5% over the next five years.[2]

The logistics sector in India is expected to grow in double digits and reach $350bn by 2025

Size of Indian logistics sector (in billion dollars)

CAGR 10-12%

250 — 2021

350 — 2025E

Source: Moneycontrol, Invest India

[1] https://www.moneycontrol.com/news/sector/indias-logistics-sector-takes-to-technology-to-adapt-to-evolving-business-environment-9043061.html

[2] https://www.investindia.gov.in/team-india-blogs/national-logistics-policy-india

II INDIAN LOGISTICS SECTOR LAGS ON GLOBAL BENCHMARKS

India currently spends 13-14% of its GDP on logistics costs, compared to the global average of around 8% of GDP. This has created a competitiveness gap of $180 billion in 2020 that will widen to $500 billion by 2030.[3] India ranked 42nd on the Logistics Performance Index (LPI)[4] for 2018, far behind its international peers such as Germany (1st), the UK (6th), Japan (7th), Austria (8th), China (9th) and the USA (10th). All these countries had an LPI score above 3.90 compared to India's score of 3.22.

Germany showcased an impressive score in the tracking and tracing category at 4.22, followed closely by Austria and the USA at 4.13, attributable to digitalization and functional integration. In comparison, India scored 3.33. Germany led the scoreboard on timeliness again with an impressive 4.40, followed by the UK at 4.32 and Japan at 4.24. In contrast, India scored a mere 3.57.[5]

Indian logistics sector lags on global benchmarks

Comparison between economies based on World Bank Logistics Performance Index 2018

	LPI Rank	LPI Score	Tracking and tracing	Timeliness
Germany	1	4.19	4.22	4.4
Austria	8	3.99	4.13	4.22
US	10	3.92	4.13	4.14
UK	6	4.01	4.1	4.32
Japan	7	3.99	4.03	4.24
China	9	3.96	3.95	4.18
India	42	3.22	3.33	3.57

Source: World Bank

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[3] https://www.adlittle.com/sites/default/files/reports/ADL_Reimagining_Indias_supply_chain.pdf

[4] *The Logistics Performance Index (LPI) is an interactive benchmarking tool designed by the World Bank to assist nations in identifying the opportunities and problems they have in their performance on trade logistics and what they can do to enhance their performance. It is the weighted average of the country's scores on six critical criteria: customs performance, infrastructure quality, simplicity of shipping, logistics services quality, consignments tracking and tracing, and timeliness of shipments. Only tracking and tracing, and timeliness have been covered in this report as they align with standards.*

[5] https://lpi.worldbank.org/international/aggregated-ranking?sort=asc&order=Tracking%20%26%20tracing#datatable, https://openknowledge.worldbank.org/bitstream/handle/10986/29971/LPI2018.pdf
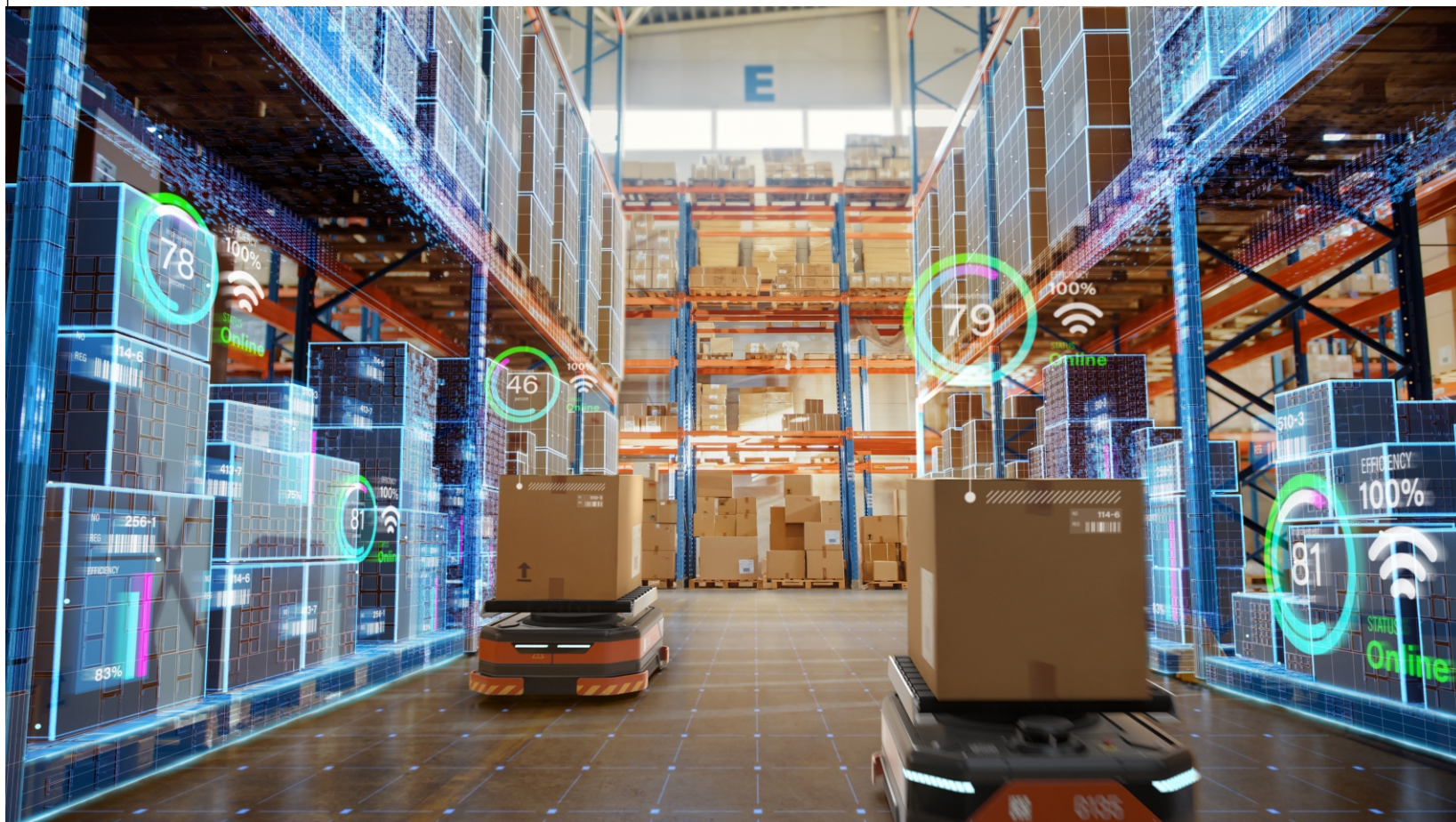
However, as per the Logistics Ease Across Different States (LEADS[6]) 2022 survey, there is a ray of hope as some states, such as Telangana, Punjab, Haryana, and Madhya Pradesh etc., have performed excellently and could act as role models for other states to imbibe best practices and logistical development models. According to the LEADS state-wise rankings for industry benchmarks, different states and union territories across India have been classified as Achievers[7] (90-100%), Fast Movers[8] (80-90%), or Aspirers[9] (<80%).

In terms of the quality of infrastructure, the states of Punjab, Uttar Pradesh, Haryana, and Telangana led the scoreboard. Madhya Pradesh has the largest warehousing capacity in the country. Consequently, it is placed in the fast-moving category for quality warehousing infrastructure, while Bihar's robust rail system puts it in the fast-mover category. Moving on to coastal states, almost all of them have made it to the achiever's category in terms of infrastructure quality, with Gujarat and Karnataka leading in the road infrastructure sub-category.

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[6] *Logistics Ease Across Different States (LEADS) survey is one of the many initiatives taken by the Government of India to collaboratively improve the logistics ecosystem in the country in partnership with States/Union Territories.*

[7] ***"Achievers"**- States that have shown exemplary logistics ecosystems with exceptional infrastructure and transparent regulatory processes*

[8] ***"Fast Movers"**- States who are moving towards becoming Achievers by notifying progressive policy and legislative initiatives along with new infrastructure projects*

[9] ***"Aspirers"** - States which have initiated their journey towards logistics ease and excellence by adopting national best practices to improve further their contribution towards India's emerging position as a global manufacturing and logistics hub*

III THE INDIAN LOGISTICS SECTOR FACES SEVERAL CHALLENGES

Although the Indian logistics market is driving the economy, it also faces several challenges, including a lack of visibility across the supply chain, limited use of automation and data, manual processes, and delays in freight clearance and documentation. Moreover, the need for personalised services, flexibility, and faster deliveries is not met by an adequate number of suppliers.

High hidden costs

Logistics costs are significantly high in India (14% of GDP), with 60% direct (including transportation, warehousing, and value-added services) and 40% indirect (including inventory carrying costs, theft, damages, and losses in transit). In comparison, average indirect costs are only 10% in developed countries.

Inadequate demand forecasting and limited technology adoption lead to inventory mismanagement that raises indirect costs. It also results in higher average inventory days (33 days in India compared to 24 globally)[10] , and high inventory carrying costs, which include costs for holding and storing unsold goods.[11]

Lack of visibility

Logistics firms face problems due to a lack of visibility among trading partners and consumers. Supply disruptions have recently been a significant source of worry. Lack of visibility across suppliers and routes has caused delivery issues for some logistics companies, which ultimately impacts the entire value chain and delays manufacturing. To enable businesses to de-risk supply networks, prevent price increases due to scarcity, and ensure ongoing supply, more significant supply chain visibility is required.[12]

Limited automation

India is still at the very beginning of process automation. Globally, businesses have embraced cutting-edge technology to provide complete transparency and real-time data on supply chain activities.

Furthermore, the Industry 4.0 trends are transforming supply chains globally by helping organisations build agile networks, use disruptive technologies, ensure end-to-end visibility, and better manage risk. These best practices have the potential to ameliorate the Indian supply chain and help the nation in adopt cutting-edge technologies at a quicker pace.[13]

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[10] *https://skillsip.nsdcindia.org/sites/default/files/kps-document/Transportation-Logistics-Warehousing-and-Packaging.pdf*

[11] *https://www.adlittle.com/sites/default/files/reports/ADL_Reimagining_Indias_supply_chain.pdf*

[12] *https://assets.kpmg/content/dam/kpmg/in/pdf/2022/10/The-logistics-and-warehousing-market-in-India.pdf*

THE INDIAN LOGISTICS SECTOR FACES SEVERAL CHALLENGES

The competitiveness gap between India and its international competitors is mainly due to a lack of digitization, poor inventory management, and imprecise demand forecasting in the absence of technology. Low network speeds, poor performance, and unstable hardware and software are signs of insufficient technological infrastructure, resulting in higher costs and poor performance.

Skewed multi-modal mix

Approximately 40% of logistics costs are related to transportation. In 2020, in comparison to rail and water transportation, the cost of moving goods by road was significantly greater (Rs. 2.58 per ton/km vs Rs.1.41 per ton/km for rail and Rs. 1.06 per ton/km for water). Even then, around 60 per cent of cargo is transported via road, 32% via railways and only 5% via waterways. In comparison, the global average stands at 25% for road freight transportation and 60% for rail freight transportation. This skewed multi-modal mix leads to high logistics costs and a reduction in the competitiveness of India's exports. Although road transportation is the dominant type, it is inefficient owing to poor infrastructure, slow commute speeds, multiple checkpoints etc. The railway sector owes its lower share to an oversaturated rail network, made worse by high rail tariffs.[14]

Inadequate physical infrastructure

One of the significant challenges that India's logistics sector faces is poor physical infrastructure. Inadequate and low-quality modal and terminal transport infrastructure hinders the growth of the logistics sector.[15] National highways are only 2.7% of the total road network that gets overburdened as they carry 40% of all the traffic on the road. The average speed of freight trains in India (24-25 kph in 2020) also lags as compared to the US and China (38-40 kph).[16] Ships have high turnaround times (~62 hours in 2020-21, ~8 hours in Japan) because of overcrowded berths and delays in cargo evacuation due to poor infrastructure.[17]

India has a limited warehouse and cold storage space for perishable goods. The lack of suitable land parcels and rising land prices pose a significant challenge for logistics and warehousing businesses.[18]

> In 2022, the Food and Agriculture Organization (FAO) found that 33% of India's agricultural and associated productions get wasted at various supply chain stages that could feed 195 million undernourished people due to inadequate cold storage facilities.[19]

[13] https://www.adlittle.com/sites/default/files/reports/ADL_Reimagining_Indias_supply_chain.pdf, https://blog.forumias.com/logistics-sector-in-india-and-national-logistics-policy-explained-pointwise/, https://www2.deloitte.com/content/dam/Deloitte/in/Documents/public-sector/in-ps-india-on-cusp-of-a-logistics-revolution-noexp.pdf

[14] https://www.adlittle.com/sites/default/files/reports/ADL_Reimagining_Indias_supply_chain.pdf https://blog.forumias.com/logistics-sector-in-india-and-national-logistics-policy-explained-pointwise/

[15] https://www2.deloitte.com/content/dam/Deloitte/in/Documents/public-sector/in-ps-india-on-cusp-of-a-logistics-revolution-noexp.pdf

[16] https://www.adlittle.com/sites/default/files/reports/ADL_Reimagining_Indias_supply_chain.pdf

[17] https://blog.forumias.com/logistics-sector-in-india-and-national-logistics-policy-explained-pointwise/

[18] https://assets.kpmg/content/dam/kpmg/in/pdf/2022/10/The-logistics-and-warehousing-market-in-India.pdf

[19] https://www.news18.com/news/opinion/national-logistics-policy-could-minimise-agri-allied-produce-losses-6183565.html

THE INDIAN LOGISTICS SECTOR FACES SEVERAL CHALLENGES

Fragmented logistics and retail sectors

With nearly 90% of the market, unorganised companies dominate the logistics sector. Most logistics companies in India are tiny and have a small fleet of trucks and vans. Only 10% of truck owners in India operate fleets with more than 25 vehicles; the bulk operate a single truck and rely on third parties to complete their orders. It prevents scale and cost economies. Low margins brought on by fragmentation restrict investments in expanding operations or the adoption of new, effective digital technologies. It also makes it challenging to streamline supply networks.[20]

Even the Indian retail market is unorganised, accounting for 81.5% of the total retail. Digital and E-commerce platforms make up only 6.5 per cent of sales, while organised retail generates only 12 per cent.[21] At the same time, organised retail and internet sales have a far more significant share in China and the US. The supply chain has become complicated due to the abundance of small and micro-scale vendors and the dispersed, ill-integrated paths used to move goods.

Micro, small, and medium enterprises (MSMEs) could greatly benefit from the Indian government's support in creating a supply base emphasising skill building. Furthermore, MSMEs could also benefit from introducing a vendor capability assessment model containing standardised audit and assessment measures.[22]

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[20] https://www.adlittle.com/sites/default/files/reports/ADL_Reimagining_Indias_supply_chain.pdf,
     https://blog.forumias.com/logistics-sector-in-india-and-national-logistics-policy-explained-pointwise/

[21] Kanvic research and analysis, IBEF, IndianRetailer.com

[22] https://www.adlittle.com/sites/default/files/reports/ADL_Reimagining_Indias_supply_chain.pdf

IV THE NATIONAL LOGISTIC POLICY AND PM GATI SHAKTI INTEND TO CAPITALISE ON UNTAPPED POTENTIAL IN THE LOGISTICS SECTOR

The Government of India has recently launched the National Logistic Policy (NLP) 2022 to achieve quick last-mile delivery and to tackle and overcome transport-related challenges by creating a trusted, reliable, cost-effective, resilient, and technologically equipped logistics ecosystem in the nation for rapid and equitable growth that would bridge the current competition gap between India and its global competitors and help the country to fully realise its logistical potential. The NLP 2022 will create a single-window e-logistics, which will also focus on assisting MSMEs to grow their capabilities, competitiveness, and employment opportunities.[23]

The NLP is centered on process re-engineering, digitization, and multi-modal support. The Indian Government has set three key targets for the NLP:

Reduce cost

The policy aims to reduce logistics costs from 14-18% of GDP to 8%, the level recommended by global best practices, by 2030. This would help India align with international benchmarks.

Be among the global leaders

Being the fifth-largest economy in the world, India aims to rank in the top 25 countries in the Logistics Performance Index (LPI) by 2030.

Create an efficient ecosystem

The policy also aims to create a data-driven decision-support mechanism for an efficient logistics ecosystem.[24]

The NLP aims to boost economic growth, provide employment opportunities, and promote the competitiveness of Indian goods. Improving the logistics sector can lead to a 10% decrease in indirect logistics costs (roughly 40% of the total logistics costs), which, in turn, can lead to a rise of 5 to 8% in exports.[25] This would also create opportunities for the integration of digital systems for a smoother and quicker workflow that would increase logistics effectiveness via a unified and integrated logistics platform that would consolidate all the data and activities from various logistical functions into one place for benefiting from cost and time synergies while at the same time providing transparency and visibility.

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[23] https://www.drishtiias.com/daily-updates/daily-news-analysis/national-logistics-policy-2022

[24] https://dpiit.gov.in/sites/default/files/eBook_LogisticPolicy_v3_19September2022_1.pdf
https://dpiit.gov.in/sites/default/files/eBook_LogisticPolicy_v3_19September2022_1.pdf

[25] https://www.clearias.com/national-logistics-policy/#:~:text=The%20goal%20of%20the%20National,growth%20and%20expanding%20job%20possibilities.

THE NATIONAL LOGISTIC POLICY AND PM GATI SHAKTI INTEND TO CAPITALISE ON UNTAPPED POTENTIAL IN THE LOGISTICS SECTOR

The new E-log digital platform, an essential building block of the NLP, developed by the Logistics Division, Department for Promotion of Industry and Internal Trade (DPIIT), will enable businesses to communicate directly with government organisations to resolve issues about services, documentation, processes, and policy, along with identifying interventions for improving the user interface. To register, organise, and track solutions to user issues, authorised user associations will register and upload their complaints and suggestions to a digital system.

The Comprehensive Logistics Action Plan (CLAP) of NLP is working towards integration, standardisation, capacity building, human capital development, service improvement, and infrastructural development centered around growing the logistical capabilities within India.[26]

The NLP also complements the PM Gati Shakti National Master Plan, which aims to develop integrated infrastructure and network planning. The Gati Shakti-National Master Plan for Multi-Modal Connectivity-is a digital platform bringing development projects of 16 ministries-including roads and highways, railways, shipping, petroleum and gas, power, telecom, shipping, and aviation-together for integrated planning and implementation. A project monitoring group continuously monitors its critical projects within the Department of Promotion of Industry and Internal Trade (DPIIT). PM Gati Shakti would also consider the infrastructure plans of various ministries and state governments, as well as make efforts to improve connectivity across multiple sectors and strengthen Indian businesses' competitiveness.[27]

[26] https://www.geeksforgeeks.org/features-of-national-logistics-policy-2022/

[27] https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1763638 `, https://pib.gov.in/PressReleasePage.aspx?PRID=1763307, https://www.briefindia.com/wp content/uploads/2022/04/PM-Gati-Shakti-Master-Plan.pdf
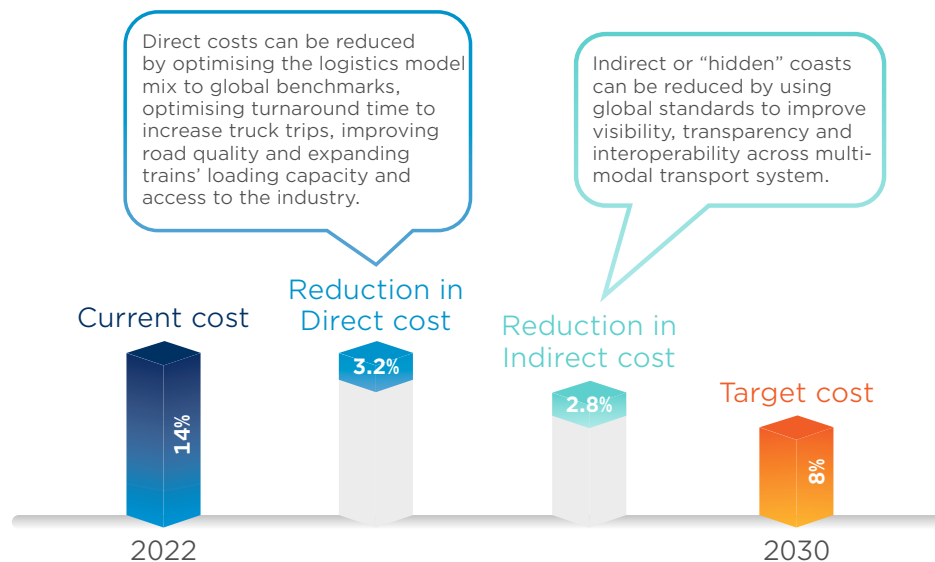
V GLOBAL STANDARDS CAN PLAY A SIGNIFICANT ROLE IN IMPROVING INDIA'S LOGISTICS SECTOR

India aims to reduce its current logistics costs from 14% to 8% of its GDP to meet the global benchmarks. The logistics cost consists of direct and indirect costs. Optimising the logistical modal mix as per international benchmarks, i.e., 25%-30% allocation to roadways, 50%-55% allocation to railways, and 20%-25% allocation to waterways, can reduce direct costs. Furthermore, optimising turnaround time to 700-800 Km per day can increase truck trips by 50%. Expanding freight loading capacity and increasing industry access while increasing freight trains' running speed to 50 Kph will also help. Implementing efficient inventory management and monitoring systems can reduce indirect costs. Therefore, by optimising systems and processes to make them more efficient and aligned with global benchmarks, India can reduce its logistical costs to the 8% target by 2030.[28]

Roadways
25%-30%

Railways
50%-55%

Waterways
20%-25%
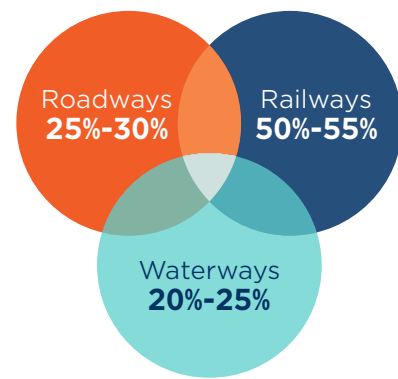
India can achieve its logistics cost target - 8% of GDP- by reducing both direct and indirect costs

India's logistics cost, % of GDP

Direct costs can be reduced by optimising the logistics model mix to global benchmarks, optimising turnaround time to increase truck trips, improving road quality and expanding trains' loading capacity and access to the industry.

Indirect or "hidden" coasts can be reduced by using global standards to improve visibility, transparency and interoperability across multi-modal transport system.

Current cost

Reduction in Direct cost
3.2%

Reduction in Indirect cost
2.8%

Target cost
8%

14%

2022

2030

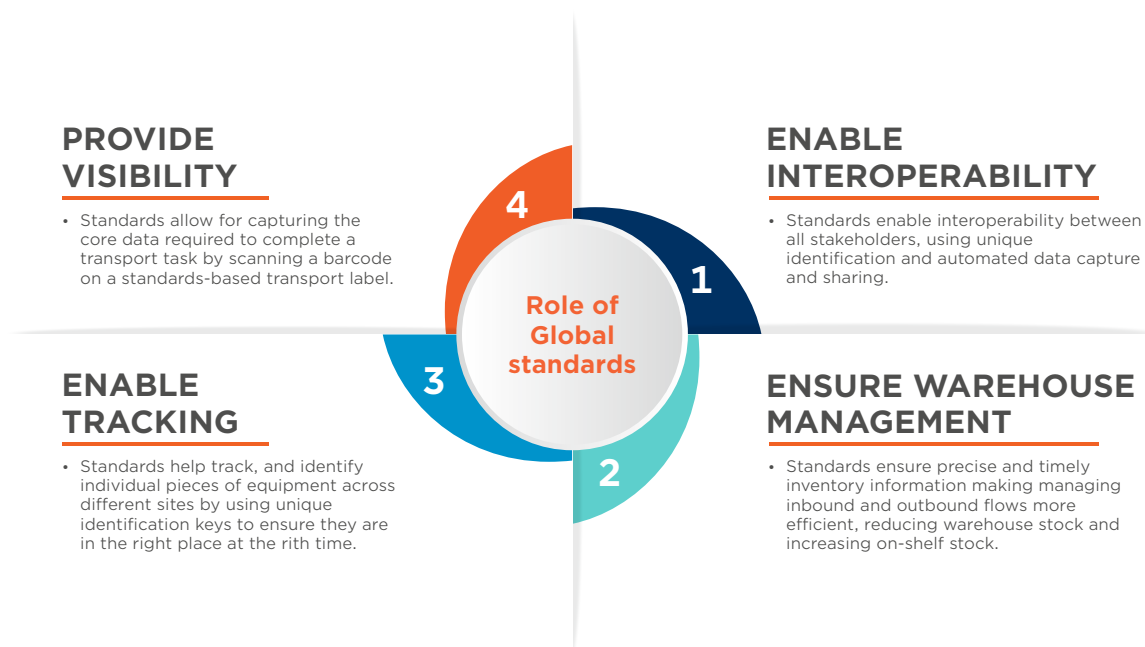*Source: Arthur D Little, Confederation of Indian Industry*

Global standards can help India achieve its logistics cost target by providing visibility, enabling interoperability, enabling tracking, and ensuring warehousing management.

[28] https://www.adlittle.com/sites/default/files/reports/ADL_Reimagining_Indias_supply_chain.pdf

Global standards provide four key benefits to the transport and logistics sector

Role of Global standards in the logistics sector

PROVIDE VISIBILITY

- Standards allow for capturing the core data required to complete a transport task by scanning a barcode on a standards-based transport label.

ENABLE INTEROPERABILITY

- Standards enable interoperability between all stakeholders, using unique identification and automated data capture and sharing.

Role of Global standards

ENABLE TRACKING

- Standards help track, and identify individual pieces of equipment across different sites by using unique identification keys to ensure they are in the right place at the rith time.

ENSURE WAREHOUSE MANAGEMENT

- Standards ensure precise and timely inventory information making managing inbound and outbound flows more efficient, reducing warehouse stock and increasing on-shelf stock.

Source: GS1

Enable interoperability across all stakeholders

Standards can help bring interoperability between all stakeholders in the logistics sector. Firstly, they help all the stakeholder in the logistic sector to share information, work together, and align processes using the Logistic Interoperability Model (LIM).
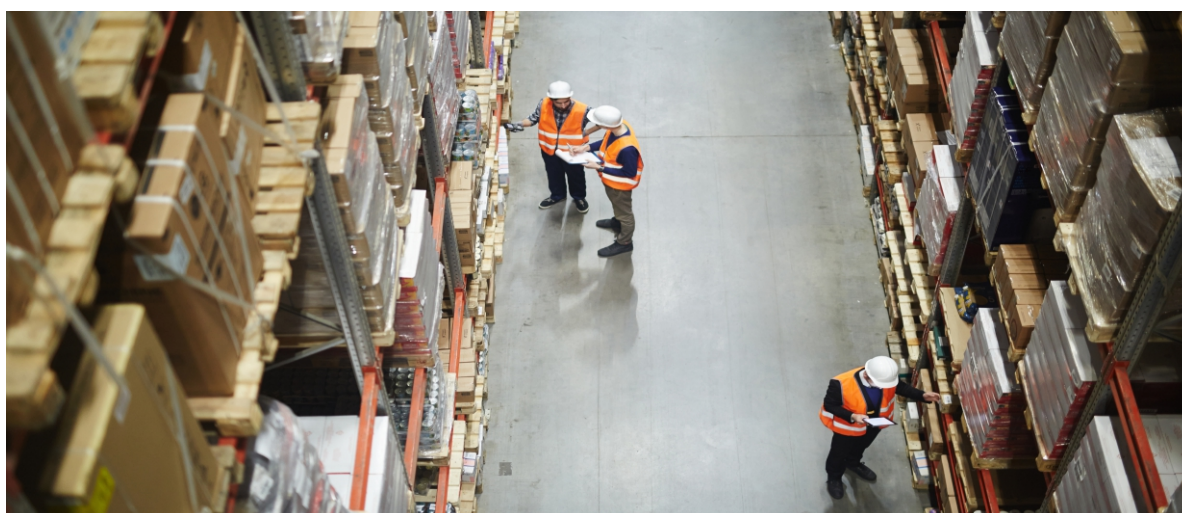
[29] *PM Gati Shakti to create seamless connectivity across India: Goyal | Mint (livemint.com)*

*https://www.gs1.org/docs/EDI/GS1_Logistics_Interoperability_Model_Application_Standard.pdf,
https://www.gs1.org/industries/transport-and-logistics*

National Logistics Policy 2022 - GeeksforGeeks

GLOBAL STANDARDS CAN PLAY A SIGNIFICANT ROLE IN IMPROVING INDIA'S LOGISTICS SECTOR

Secondly, they enable supply chain partners to identify, capture and share information about objects throughout their lifecycle. Organisations can identify pallets and cases and share dispatch and receipt information with trading partners, providing accurate and timely information about incoming shipments, and enabling quick matching of deliveries against advance shipping information. Using such standards will promote the business's ease of logistics through openness and accessibility, a key consideration in the NLP.

Lastly, they also enable the exchange of reliable and accurate product information. Manufacturers can access a shared repository for all product-related information using a cloud-based platform. Barcode standards facilitate improved efficiency and interoperability by providing a standard label across the entire supply chain. They also make it easier to sort and capture address information, including the street, from the barcode on the transportation label. It also helps to improve first-and last-mile processes and increasing customer and client satisfaction.[29]

Furthermore, they make it easier to optimise maritime and port operations, ensure efficient asset management on ships, improve visibility in rail operations, and streamline international trade. Aligning perfectly with NLP's Unified Logistics Interface Platform (ULIP), they help strengthen the policy's implementation.

Ensures warehouse management

Standards can help businesses manage their inventory within warehouses. Firstly, they provide precise and timely inventory information, making the operating inbound and outbound flow more efficient, reducing warehouse stock, and increasing on-shelf stock, and improving consolidation, and bundling of deliveries.

In addition, they give insights into stock levels and emphasis on the items that are first-in-first-out or last-in-first-out. They provide a barcode labelling system, making it easier to segregate products based on their size and category and to store and manage them within warehouses. They can also be embedded in cloud-based platforms to optimise warehouse management activities.

Lastly, they are also helpful in fostering collaboration among trading partners by allowing accurate real-time information to be accessed by everyone involved and help manufacturers and retailers outsource the management of their warehouses and distribution centers to specialist logistics service providers (LSPs). FMCG giant Unilever and DHL used standards collaboratively and it helped in significant streamlining of communication between them for logistical operations .[30]

Enables tracking and tracing of assets

Standards can help in managing the logistics and transportation assets of the business. Firstly, they track, trace, and identify individual pieces of equipment across different sites

[30] https://www.gs1.org/industries/transport-and-logistics/warehouse-management

using unique identification keys to ensure that equipment is in the right place at the right time. As a result, they maximise the use of the available assets, increase the number of on-time deliveries, prevents asset loss, encourage asset returns and reduce disputes between trading partners about the location of assets. They enable the tracking of products and activities across the supply chain. Real-time data makes it easier to estimate delivery times and maintains a transparent and trusting relationship between the manufacturer and client, in addition to achieving quicker lead times.

Additionally, they provide several benefits in rail tracking and traceability, such as improved safety, facilitation of preventative maintenance to avoid accidents and close calls, the reduced environmental impact of transport in a climate-conscious world, improved customer service leading to more significant business development, and greater process efficiencies ultimately leading to reduced costs.

Similarly, these standards are equally helpful and relevant in the maritime sector and greatly aid vessel identification, container identification, transport unit identification, and shipment identification.[31]

Provides visibility in transport

Standards bring visibility across the supply chain. They allow stakeholders to capture the core data required to complete a transport task by scanning a barcode on a standards-based transport label that is useful for storing information relevant to the transport process as it enables the information to be available both online and offline by simply scanning the barcode. They support companies across the transport process, including first mile, sortation and last mile activities and enable them to keep pace with the growing needs of their customers.

Standards enhance delivery accuracy by encoding Ship-to-GEO locations (e.g., Construction sites and rural addresses which do not have a clear/granular street address).[32]

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[31] https://www.gs1.org/industries/transport-and-logistics/scan4transport ,
   https://www.gs1.org/sites/default/files/gs1_standards_in_maritime_011019_hi-res.pdf,
   https://www.gs1.org/industries/transport-and-logistics/asset-management
   https://www.gs1.org/industries/transport-and-logistics/scan4transport ,

[32] https://www.gs1.org/industries/transport-and-logistics

VI SUCCESSFUL CASES OF IMPLEMENTING STANDARDS IN INDIA AND EUROPE

India has adopted several standards to improve its logistics sector. Some of the notable examples are: NICDC Logistics Data Services (NLDS) is a joint venture between the Government of India, represented by the National Industrial Corridor Development and Implementation Trust (NICDIT) and Japanese IT major NEC Corporation, which provides an end-to-end tracking container system across all the ports to the inland container depots (ICDs), container freight stations (CFS) and end users via toll plazas and railway movement on an integrated basis. It features a Radio Frequency Identification (RFID) tag, which would help track the activity of goods whereby the container carrying the goods would be tracked using an RFID reader every time it passes through a toll plaza and shared with the Logistics Data Bank (LDB) system until it arrives at the container freight terminal or inland container depot. In addition, it increases transparency and visibility by allowing anyone with the container number to view the status of the container.[33]

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[33] *https://youtu.be/sgJSjmivDV0*

[34] *NETC FASTag: Pay Highway Toll Online Through RFID | NPCI*

[35] *Indian railways develops real-time train tracking system with ISRO | Latest News India - Hindustan Times*

FASTag is finding increasing relevance in the logistics sector in India. FASTag is a device that employs Radio Frequency Identification (RFID) technology for making toll payments directly while the vehicle is in motion. FASTag (RFID Tag) is affixed to the vehicle's windscreen, enabling customers to make toll payments directly from the account linked to FASTag It has the potential to significantly reduce delivery times while also saving fuel costs associated with idle time on the road at tolls.[34]

The Indian Railways and ISRO have developed a real-time train tracking system. The Real-Time Train Information System (RTIS) is installed in locomotives and assists in the automatic acquisition of train movement timings at railway stations, including arrival, departure and run-throughs times. It is of great significance in having visibility for rail freight operations which provides all stakeholders with transparency and accurate status of the movement of goods in the freight trains. The system also eliminates the need for manual interventions, saving time and reducing the probability of errors. The RTIS give mid-section updates with a periodicity of 30 seconds.[35]

The European Commission also took various initiatives to bring standardisation and improve the efficiency of the transport and logistics sector in the European Union.

The European Commission formed the Digital Transport and Logistics Forum, or DTLF, in 2015 to bring together public and private stakeholders from various transport and logistics communities and aid the European Commission in promoting the digital transformation of the transport and logistics sector. DTLF aims to support the Commission in the creation and execution of appropriate actions and programmes of the Union, particularly those aimed at full-scale digital interoperability and data exchange in a shared, trustworthy, and secured transport and logistics dataspace.[36]

In 2018, the European Commission introduced the "eIDAS" (electronic identification and trust services) regulation, which enables cross-border recognition of electronic ID and permits individuals and businesses to exchange their identity data as needed. The regulation includes various services that aid in confirming internet users' identities and those of organizations, as well as the legitimacy of electronic documents.[37]

In 2020, the European Commission also introduced an electronic freight transport information (eFTI) regulation to address the need for a consistent legal framework and solve the problem of fragmentation in the IT environment in the transportation sector. The regulation will become fully applicable as of August 2025. The legislation creates a framework for the exchange of information electronically between economic operators and enforcement agencies about the movement of commodities across the land, air, and water throughout the European Union (EU).[38] The Regulation will represent a significant step towards the digital transformation of freight transport in Europe with lower administrative costs, increased supply chain efficiency, and more effective union-wide enforcement of freight transport regulations.[39]

[36] https://transport.ec.europa.eu/transport-themes/digital-transport-and-logistics-forum-dtlf_en

[37] https://eur-lex.europa.eu/EN/legal-content/summary/electronic-freight-transport-information.html#:~:text=Electronic%20freight%20transport%20information%20(eFTI)%20is%20a%20set%20of%20data,between%20operators%20and%20competent%20authorities.

[38] https://wayback.archive-it.org/12090/20221222173143/https://ec.europa.eu/inea/en/news-events/newsroom/eidas-regulation-eidentification-entries-force

[39] https://transport.ec.europa.eu/transport-themes/digital-transport-and-logistics-forum-dtlf_en

VII THE NATIONAL LOCATION REGISTRY CAN BE CRUCIAL TO INDIA'S LOGISTIC SECTOR

Gathering and disseminating data regarding physical locations is currently entirely manual. Every organisation in the supply chain that must keep track of external pick-up and delivery locations does so as a unique, curated representation of how they perceive the place. Because there are insufficient effective data maintenance systems, creating and maintaining this information is expensive and prone to errors. Establishing efficient supply chain visibility requires understanding the precise site conditions where physical transit activities occur.

The National Location Registry is a digital database where authorised users can obtain attribute data on actual pick-up and delivery locations. It provides crucial information to improve productivity in the transport and logistics sector.

The National Location Registry provides accurate and reliable location master data. Data validation standards and feedback mechanisms for data quality are incorporated into the registry and used to verify information straight from the source. As a result, it generates accurate and reliable location master data which is currently lacking and causing several operational delays and issues with the items delivery. When location criteria are precisely documented, deliveries are confidently made without being adversely affected by unanticipated or undetected site limitations.

The registry also enables exchange and access to the data for all stakeholders by simplifying communication about locations among supply chain participants. All parties involved use the same data; there is no manual generation or duplication by different parties. The registry allows site owners and their stakeholder partners to publish, save, retrieve, and exchange location master data electronically.

More than 21,000 companies already use the National Location Registry across a range of industries in Australia, including FMCG, consumer goods, healthcare, steel, retail, hardware, and more, to uniquely identify physical locations such as a specific Woolworth's retail store or a specific ward within a hospital. The registry enables place owners and stakeholder partners to publish, store, retrieve electronically, and exchange location master data.[40]

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[40] https://www.nra.net.au/app/uploads/2021/03/2021_National-Location-Registry-Executive-Brief_Final.pdf
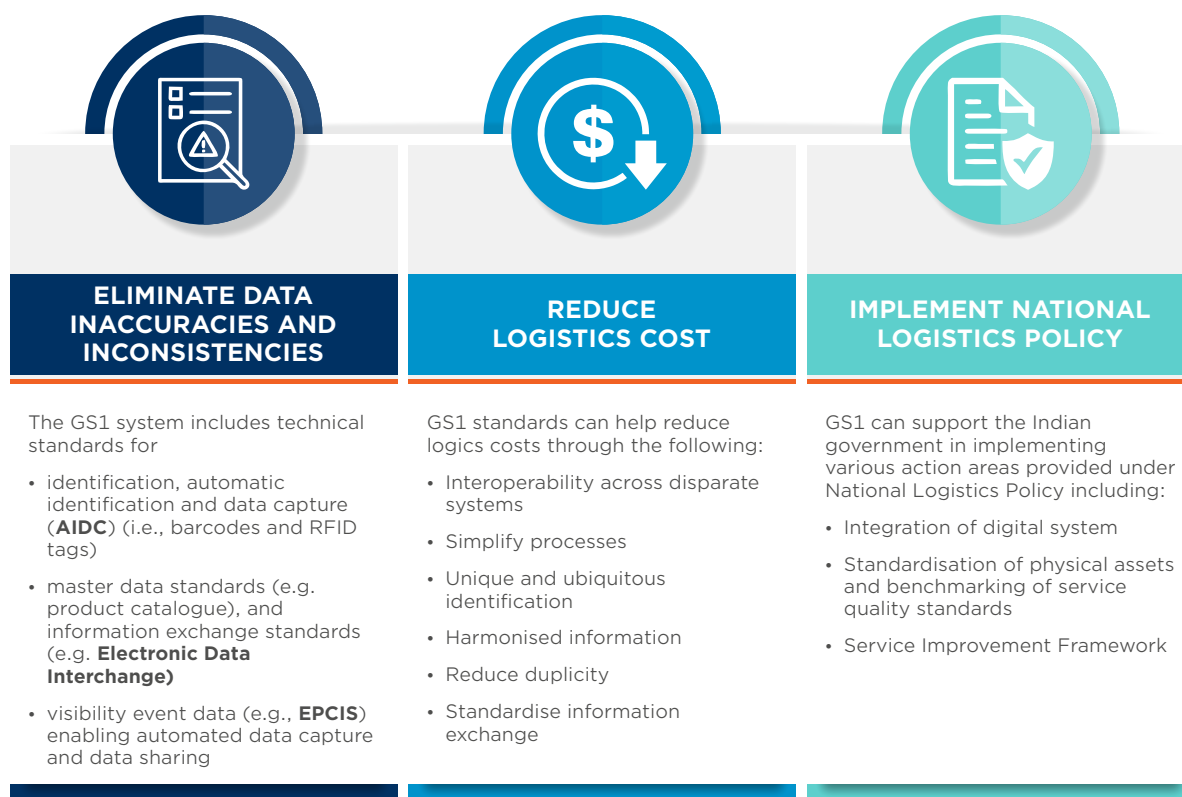
VIII GS1 INDIA CAN PLAY AN IMPORTANT ROLE IN BRINGING IMPROVEMENTS TO THE INDIAN LOGISTICS INDUSTRY

In modern supply chains, stakeholders must deal with various business processes, logistics unit identification procedures, and data exchange scenarios. Different company strategies and methods hinder scalability and visibility, increasing expenses and labour requirements for everyday operations. Interoperable systems and scalable solutions built on standards would benefit stakeholders by improving operational efficiency, transparency, and container movement visibility. GS1 standards enhance supply chain efficiency, safety, and visibility.

GS1 can play an essential role in three areas to bring about improvement in the Indian logistics sector:

GS1 can play an important role in the following areas to bring improvement in the Indian logistics sector

Role of GS1 in tackling challenges and improving the Indian logistics sector

ELIMINATE DATA INACCURACIES AND INCONSISTENCIES	REDUCE LOGISTICS COST	IMPLEMENT NATIONAL LOGISTICS POLICY
The GS1 system includes technical standards for • identification, automatic identification and data capture (**AIDC**) (i.e., barcodes and RFID tags) • master data standards (e.g. product catalogue), and information exchange standards (e.g. **Electronic Data Interchange)** • visibility event data (e.g., **EPCIS**) enabling automated data capture and data sharing	GS1 standards can help reduce logics costs through the following: • Interoperability across disparate systems • Simplify processes • Unique and ubiquitous identification • Harmonised information • Reduce duplicity • Standardise information exchange	GS1 can support the Indian government in implementing various action areas provided under National Logistics Policy including: • Integration of digital system • Standardisation of physical assets and benchmarking of service quality standards • Service Improvement Framework

Source: GS1

Eliminating inaccuracies and inconsistencies in data

The GS1 system includes technical standards for identification, automatic identification and data capture (AIDC) (i.e., barcodes and RFID tags), master data standards (e.g., product catalogue), information exchange standards (e.g., electronic data interchange), visibility event data (e.g., EPCIS), enabling automated data capture and data sharing.[41]

The GS1 standards offer ways to automatically capture data directly carried on physical items, connecting the physical world with the electronic information world.[42] GS1 Identification keys correspond with electronic records in databases to help validate the information. They can aid in improving the quality of data in declarations and documents, thus increasing transparency and trust in the data.[43]

GS1 standard Electronic Product Code Information Services (EPCIS) instantly shares event data. It enables shippers, shipping lines, port administrations, terminals, agents, railroad operators, infrastructure firms, cargo owners, and many more to communicate with one another and exchange information about the "what, where, when, who and why" of each event. It also provides precise data about the location and movement of individual vehicles as they move from one country to another.[44]

The stakeholders can share reliable master data on facilities around ports to ascertain whether a ship can enter the port safely and load and unload its cargo by utilising GS1 Global Location Numbers (GLN) to identify maritime places and facilities (e.g., safe port & safe berth). They may connect a large amount of data to the GLN, including depth information, geographic parameters that specify an area (such as a polygon), and much more.[45]

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[41] https://www.gs1.org/sites/default/files/gs1_standards_in_maritime_011019_hi-res.pdf,
https://www.gs1.org/standards/gs1-system-architecture-document/current-standard#2-Overview-of-the-GS1-System-Architecture+2-1-The-role-of-standards

[42] https://www.gs1.org/standards/gs1-system-architecture-document/current-standard#2-Overview-of-the-GS1-System-Architecture+2-1-The-role-of-standards

[43] https://www.gs1.org/docs/tl/GS1Standards-Key_in_Border_Procedure_Management-White%20Paper-i1f.pdf

[44] https://www.gs1.org/docs/tl/GS1_visibility_in_rail_leaflet.pdf,
https://www.gs1.org/sites/default/files/gs1_standards_in_maritime_011019_hi-res.pdf

[45] https://www.gs1.org/sites/default/files/gs1_standards_in_maritime_011019_hi-res.pdf

Reducing Logistics Cost

GS1 standards provide several benefits to the transport and logistics sector that can help reduce the cost of the Indian logistics sector, including reduction of distribution costs:

- **Interoperability across disparate systems:** By recognising, collecting, and sharing information regarding the movement of products and digitising routine business processes, GS1 standards improve interoperability across stakeholders.

- **Simplify processes:** GS1 standards ensure accurate and real-time visibility across the supply chain. It increases the speed, efficiency, and accuracy in the transport and logistics sector by focusing on managing the asset, warehouse, transport, and delivery processes.[46]

   GS1 EDI (Electronic Data Interchange) provides global standards for electronic business messaging that allow the automation of business transactions across the supply chain. It covers master data alignment, order and delivery, financial settlement, transport, and warehouse management. It is relevant to retailers, manufacturers, material suppliers and logistic service providers. It helps ease and streamline logistical operations.[47]

- **Unique and ubiquitous identification:** Users can uniquely identify logistic units with the GS1 Logistic Label, enabling them to track and trace throughout the supply chain. The actual movement of units matches the electronic business messages that refer to them by scanning the Serial Shipping Container Code (SSCC) barcode on each logistic unit. Implementing various applications, including cross-docking, shipment routing, and automated receiving, is possible when SSCC identifies individual units.[48] Throughout the supply chain, using a common, uniform approach to the numbering and barcoding of trade items and logistics units enhances speed and accuracy and lowers handling and distribution costs.[49]

- **Harmonised information:** GS1 standards bring coordination among stakeholders by providing access to real-time data. Companies can access information about their supply

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[46] *https://www.gs1.org/industries/transport-and-logistics*

[47] *GS1 Electronic Data Interchange (EDI) - Standards | GS1*

[48] *https://www.gs1.org/docs/tl/GS1_Logistic_Label_Guideline.pdf*

[49] *https://www.gs1.org/docs/EDI/GS1_Logistics_Interoperability_Model_Application_Standard.pdf*

chain components quickly and precisely with GS1 Identification Keys. They can also share this information with their international trading partners.[50]

- **Reduce duplicity:** GS1 standards enable the automated capture of data carried directly on physical objects, establishing a link between the physical and electronic information worlds. This automation in data collection reduces the chance of data duplication.[51]

- **Standardise information exchange:** GS1 Standards allow trading partners to electronically transmit data to confirm that cargo has been received quickly and to pre-announce that it is on its way.[52]

Implementing National Logistics Policy

The Comprehensive Logistics Action Plan (CLAP) will help implement the National Logistics Policy (NLP). GS1 can support the Indian government in implementing various action areas provided under CLAP:

- **Integration of digital system:** NLP aims to develop a system of unified logistics interface to connect multiple data sources and give logistics stakeholders cross-sector use cases. It will integrate data from several ministerial departments to smooth cargo movement and lead to a smoother, quicker workflow, significantly increasing logistics effectiveness.

  GS1 standards offer an integrated approach to logistics unit identification, automated data collection, and electronic data exchange. GS1 Logistics Interoperability Model (LIM) supports sharing information, working together, and aligning their processes. LIM offers a

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[50] https://www.gs1.org/industries/transport-and-logistics/warehouse-management, https://www.gs1.org/docs/tl/GS1Standards-Key_in_Border_Procedure_Management-White%20Paper-i1f.pdf

[51] https://www.gs1.org/docs/tl/GS1Standards-Key_in_Border_Procedure_Management-White%20Paper-i1f.pdf

[52] https://www.gs1.org/docs/tl/GS1Standards_DeliveryManagement.pdf

framework for standard business procedures supported by data sharing, from master data alignment to financial settlement.[53]

■ **Standardisation of physical assets and benchmarking service quality standards:** NLP aims to standardise physical assets and compare service quality benchmarks to improve interoperability, lower handling risks, streamline processes, and facilitate company operations in the logistics sector.

GS1 standards can help keep track of transportation and logistics equipment. GS1 Identification Keys is used to identify returnable and individual assets. The key comprises a

GS1 Company Prefix, asset type, check digit, and optional serial number.[54] Each asset is accurately recorded and tracked with the identification key.

Radio-frequency identification (RFID) tags help manage returnable transport items' assets. Each stage of the processing of returnable containers, such as pallets, plastic trays, collapsible crates, and dollies, in Returnable Transport Items (RTI) pool warehouses is recorded by Global Returnable Asset Identifier (GRAI), from arrival to counting and sorting washing, repair, allocation, and despatch to logistics providers. Automated inventory and maintenance processes provide transparency for pool operators and their supply chain customers by removing the need for manual intervention and guesswork.[55]

■ **Service Improvement Framework:**

NLP also includes a plan for enhancing the regulatory interface to encourage standardisation, formalisation, and interoperability; eradicating fragmentation in

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[53] https://www.gs1.org/docs/EDI/GS1_Logistics_Interoperability_Model_Application_Standard.pdf, https://www.gs1.org/industries/transport-and-logistics/transport-management

[54] https://www.gs1.org/docs/tl/T_L_Keys_Implementation_Guideline.pdf

[55] https://www.gs1.org/standards/gs1-system-architecture-document/current-standard#2-Overview-of-the-GS1-System-Architecture+2-1-The-role-of-standards

documentation, formats, workflows, and liability frameworks; and closing gaps in the regulatory architecture.

The GS1 system of standards offers a comprehensive collection of standards to identify, capture, and share information about objects throughout their lifecycle, providing an essential framework for interoperability. Once the data is captured and determined, the gathered data is refined and enhanced with business context to transform it into data that can be shared using standard semantics, a standard format, and standard exchange protocols.

GS1 standards offer compliance with the trading partners' needs and the prerequisites of legal rules while also assisting in improving operational efficiency and internal supply chain management.[56]

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[56] *https://www.gs1.org/docs/EDI/GS1_Logistics_Interoperability_Model_Application_Standard.pdf*

IX CONCLUSION

This concept paper has meticulously discussed the acute challenges that the Indian logistics sector is facing and the opportunities for improvement and growth. It has been highlighted that the Indian logistics sector is lagging behind global benchmarks. In addition, it has also highlighted the challenges and attributes of the logistics supply chain that make it inadequate for end-to-end visibility and efficient optimisation.

Further chapters in the concept paper highlighted the various efforts undertaken by the Indian Government to tackle challenges in the Indian logistics sector, such as the National Logistic Policy and the PM Gati Shakti Policy, and the role that global standards and the National Location Registry can play in implementing government policies and bringing improvements to the sector.

Finally, the concept paper concluded how GS1 can help improve the Indian logistics sector by eliminating data inaccuracies, lowering costs, and assisting the government in implementing the National Logistics Policy to achieve its objectives.
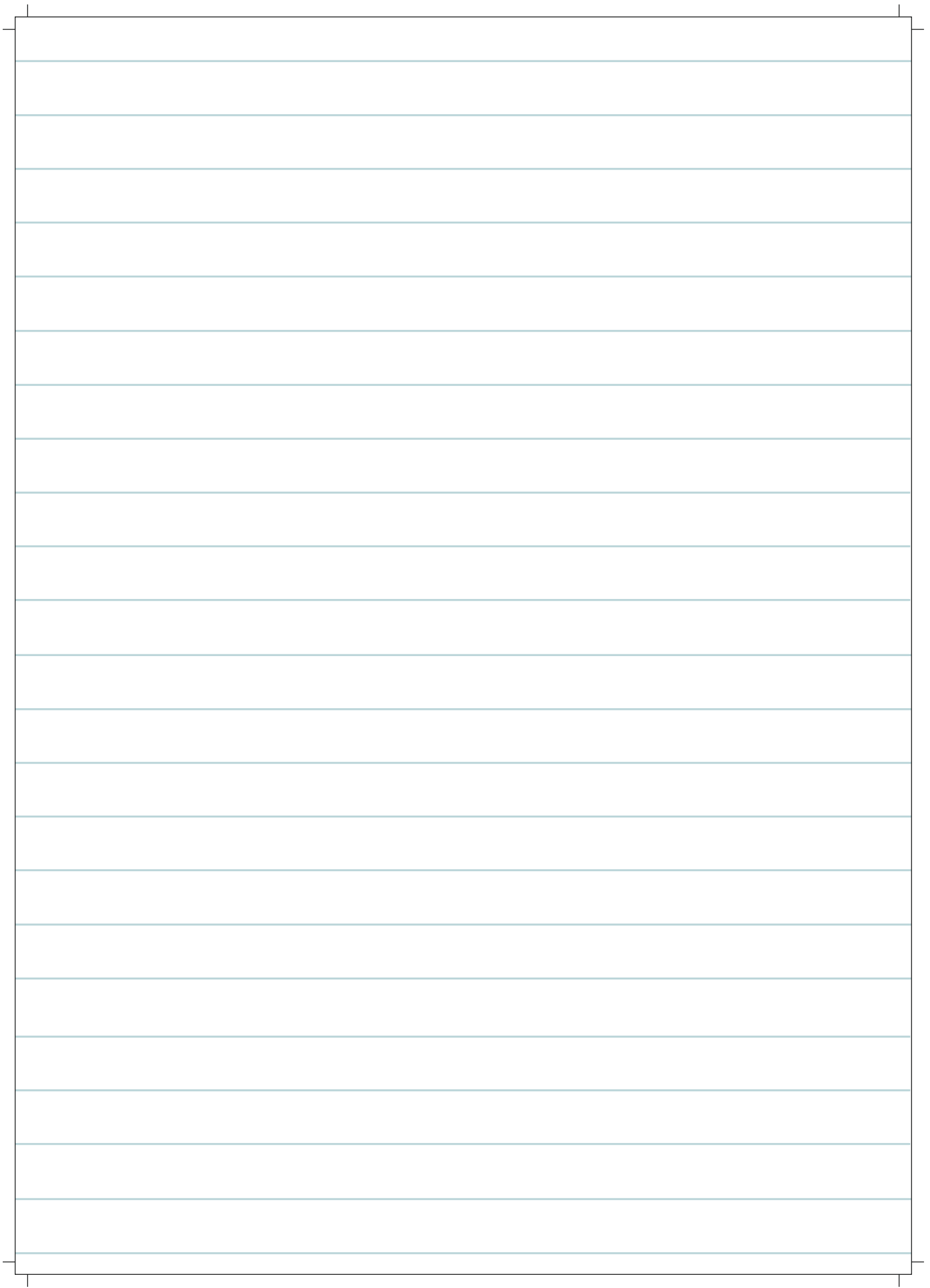
About GS1 India

GS1 India is a standards organisation setup by the Ministry of Commerce & Industry, Government of India and apex trade bodies comprising CII, FICCI, ASSOCHAM, FIEO, IMC besides BIS, IIP, Spices Board and APEDA to spread awareness and provide guidance on adoption of global standards by Indian Industry, Government on barcodes and RFID.
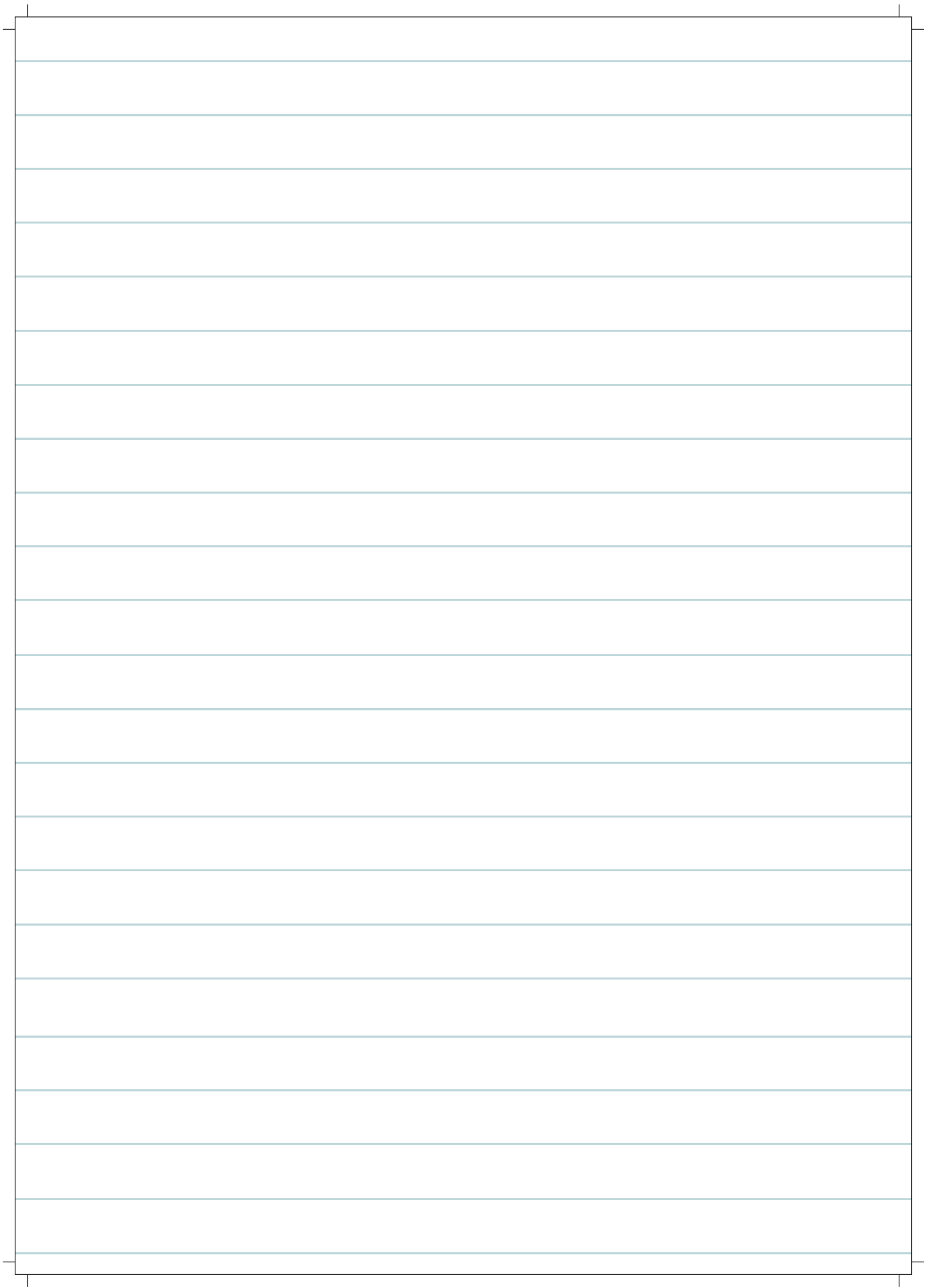
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