



# Business Intelligence and Logistics

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Over the last few decades the role of logistics management has undergone a paradigm shift. It is widely recognized as an extremely important aspect of the overall business strategy. At the same time, a number of factors have increased the complexity of logistics management. This has led many companies to outsource their logistics activities to Third Party Logistics (3PL) providers. Today, 3PLs play a critical role in the supply chains of their customers. They are increasingly viewed as strategic partners who can play a pivotal role in optimizing the supply chain and thereby providing sustained competitive advantage.

To effectively manage the supply chains of their customers, 3PLs need to constantly analyze data collected from various sources and convert it into actionable information. Business Intelligence (BI) tools like data warehousing and OLAP can significantly help 3PLs in achieving this objective. By providing a unified view of the entire supply chain, these tools can help improve the functioning of basic 3PL services like transportation management, warehousing, and inventory management. 3PLs can leverage BI tools to provide their clients with information specific to their supply chain, thereby increasing their market responsiveness. BI tools can also help 3PLs improve their own internal organizational functions like human resources and financial management.

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# Application of business intelligence tools like data warehousing and OLAP in the 3PL industry

## Evolution of logistics as a strategic function

Logistics came to be recognized as a distinct function with the rise of mass production systems. Production and distribution were viewed as a sequential chain of extremely specialized activities; the role of logistics was to ensure availability of all the requisite materials before each step in this chain. Obviously inventory of raw materials, semi-finished and finished goods was a must across this chain to ensure its smooth functioning. Business environment was relatively stable and the mass production system ensured huge economies of scale for the manufacturers. So far so good.

Enter the Japanese. The whole paradigm of mass production system came crumbling down! Suddenly companies scrambled to adopt Japanese philosophy in manufacturing and distribution – Lean manufacturing, Just-in-Time, Kaizen, and Quality Circles became the key techniques. Simultaneously the role of logistics underwent a paradigm shift. It became the cornerstone of business strategy – a key enabler for the new techniques. Lean manufacturing called for drastic reduction in inventory costs across the supply chain. This required on-time delivery of raw materials, semi-finished and finished goods at different points in the chain; often the window of on-time delivery was as low as 10 minutes. Hence logistics became an extremely complicated process and firms hired experts to do this job.

Logistics management has, if anything, grown much more complex ever since. Product lifecycles have shortened, customer behavior has become very fickle and business environment as a whole is extremely volatile. Manufacturers can no longer push their products down the supply chain; it is the consumer who pulls the products she desires. And the products should be there right in front of her, as and when she wants them. Price and quality are no longer sufficient to thrive in this market; speed to market and flexibility of the supply chain are also of paramount importance. To achieve this flexibility, information has to freely flow throughout the supply chain – information not just about where the products are but also how the supply chain as a whole has been functioning. The performance of the supply chain needs to be constantly analyzed and improved to ensure its survival.

## Rise of Third Party Logistics (3PL) Providers

Increased impetus on core competence and growing complexity of the logistics function has led many companies to outsource logistics activities like transportation and inventory management to Third Party Logistics (3PL) providers. In addition to this, by outsourcing to 3PLs, companies avoid locking capital in warehouses, trucks, containers, etc.

Another factor influencing the adoption of 3PL services is globalization. As firms expand their markets beyond national boundaries, the need for more sophisticated services like multi-modal transport and international trade rules compliance increases. Smart 3PLs have developed these competencies and can effectively ship products to multiple countries, using multi-modal transport, and meeting

all the international trade requirements.

The emergence of Internet has given rise to a new breed of e-Logistics companies, which provide a spectrum of solutions. These web based logistics portals seek to bring together shippers, 3PLs and other interested parties to provide more effective collaboration. Often these portals are perceived to be in competition with conventional 3PLs. In fact they provide complementary services and together they can cover the worldwide supply chain needs for their customers. In conjunction with e-Logistics companies, 3PLs can provide services like cross-border transport, customs clearance and international trade settlement by effectively coordinating with concerned agencies.

But there are still many companies which believe that logistics is too critical a function for them to relinquish control to third parties. To win over these customers, 3PLs need to establish themselves as key business partners involved in the entire supply chain – right from logistics strategy formulation to its implementation. And they need to effectively share information and knowledge with the customers.

## Business Intelligence and the 3PL Industry

The 3PL industry is extremely varied in the types of services it provides. At one end are conventional freight movers involved in transportation of shipments from one location to another. Generally these services are restricted within a geographical area and use limited modes of transportation. At the other end are 3PLs who can execute complex end to end supply chain projects involving multiple countries and multiple modes of transport. 3PLs may or may not own carriers and warehouses. Accordingly they are classified as asset based and non-asset based 3PLs.

Currently the 3PL industry is in a state of transition. Players are adding more and more services to their portfolio as customers demand more integrated solutions. 3PLs are viewed as strategic partners who can optimize the supply chain, reduce the cycle time, and provide unprecedented customer responsiveness. The key to effectively provide these services is Information Technology. More sophisticated 3PLs have quickly embraced IT to enable better coordination of activities by providing tracing and tracking facility to its customers. But this is hardly enough to ensure sustained competitive advantage. To squeeze out the last drop of inefficiency from the supply chain, eliminate bottlenecks, and continuously seek process improvement, the ability to analyze all the activities in the logistics process is vital.

Business Intelligence can help the 3PLs in three ways:

1. **Service Improvement:** Traditionally 3PLs have been providing services like transportation management; warehouse and inventory management; and value added services like light assembly, kitting, etc. Business Intelligence can improve the effectiveness of these services by in-depth analysis and reports on various functions involved in these services.
2. **Provide Information Technology Based Services:** With the help of BI, 3PLs can provide their clients with analysis and reports specific to their supply chain. These

can significantly help the customers increase their responsiveness and time to market.

- 3. Improve Organizational Support Functions:** BI can significantly improve organizational support functions like HR and financial management by providing an integrated view of these functions and supporting their specific decision making requirements.



## Transportation Management

Transportation planning and management is a basic service provided by 3PLs. They can deploy their own fleet or negotiate with one or more third party carrier companies. Apart from this, 3PLs provide inbound and outbound traffic control, route optimization, delivery using multiple modes of transport and payment services.

Business Intelligence tools can help gain insight into the complex process of transportation management. Some of the possible BI applications in this area are:

- Carrier Performance Evaluation:** The performance of third party carrier companies can be analyzed on various factors like on-time delivery, cost, adherence to supplier's standards, etc. This analysis can be used to assign quality points to the carriers, which can significantly help in selecting the best carriers for future projects.
- Mode-Cost Analysis:** The costs associated with various modes of transport and the corresponding vehicles employed can be analyzed. This can help in selecting cost effective modes and third party carrier companies for projects.
- Supplier Compliance Analysis:** Often the suppliers do not ship products on time resulting in delays beyond the control of 3PLs. Supplier compliance can be analyzed over a period of time, across different loading points, so that the

supplier can be intimated about trends in such delays. Also the supplier compliance with respect to invoice payments can be tracked for a detailed analysis of the supplier payment history.

- **Carrier Relationship Management:** Third party carrier companies can be intimated about specific delivery problems, and their improvement can be tracked over a period of time. This can help in designing Carrier Relationship Programs/ Carrier Excellence Programs that go a long way in establishing mutually profitable relationships.
- **Capacity Planning:** Business Intelligence can significantly help in analyzing available capacity, loss of revenue due to shortfall in capacity, and future capacity increments. It can also help in short term capacity planning like engaging empty carriers returning after delivery, thereby reducing 'empty miles'.
- **Cycle Time Analysis:** The importance of cycle-time – time gap between placement of order and the actual receipt of shipment – cannot be overemphasized. BI tools can help critically analyze the entire cycle-time for different combinations of goods, routes, modes, weather conditions, etc.
- **Routing and Scheduling:** BI tools can help in routing and scheduling by presenting an updated view of capacity and manpower available at any point in time.
- **Truck and Driver Performance Analysis:** Asset based 3PLs can use BI tools to monitor the performance of drivers, trucks, and other vehicles over a period of time. This can help in maintaining the vehicles and improving driver performance.
- **Root Cause and Claims Analysis:** BI tools can help analyze the root causes for accidents and damage to goods and the claims against these.

## Warehouse Management

This is another core service provided by many 3PLs. Again, 3PLs themselves may or may not have their own warehousing facilities. The various functions in this service include inventory management, cross-docking, metering, picking etc.

- **Inventory Analysis:** A host of analyses can be done on inventory in the warehouses. This includes inventory by supplier, inventory by material class, etc. for a time period or at a point in time. Key inventory performance indicators like inventory accuracy and inventory turnover can also be tracked over a period of time.
- **Warehouse Performance Analysis:** Compare the performance of various warehouses along key performance indicators like picking accuracy, shipping (from warehouse) accuracy, lines per hour (LPH), percentage over-time hours and percentage on-time shipments. This analysis can be used to compare the performance of warehouse operators/ managers.
- **Assigning Warehouse Costs:** Warehousing costs depend on product dimensions and handling requirements. Based on past data, warehousing

costs can be assigned to combinations of dimensions and handling requirements (on appropriate scale) and this data can be used for pricing of the warehousing service.

- **Picking Analysis:** It involves analysis of products on the basis of number of picks required. It also includes analysis of products which tend to be picked together for grouping of products during picking. Picking analysis can significantly improve warehouse efficiency and help in the layout design.
- **Warehouse Space Utilization Analysis:** Analyze how effectively the warehouse space has been utilized and the cost per unit of space over a period of time.

## Value Added Services

In addition to transportation and warehouse management, many 3PLs provide various value-added services like light assembly, handling reverse logistics, packing and labeling, kitting, customs brokering, etc. Often these services are the key differentiating factors between two 3PLs. BI tools can improve the effectiveness of these services. Some of the applications in this area are:

- **Cost-Benefit Analysis:** Costs and benefits associated with a particular service can be analyzed over a period of time. This can help in deciding whether to continue the service or not.
- **Reverse Logistics:** Reverse logistics – the ability to handle customer returns – is one of the major challenges in this industry. BI can help effectively manage reverse logistics by associating the returns with the right order, analyzing the reasons for returns, and by analyzing returns delivery time to the supplier. It can also help identify patterns in reverse logistics, which can serve as an important feedback to the supplier.
- **Assembly Analysis:** Light assembly is a very common value added service provided by many 3PLs. Business Intelligence can significantly help in analyzing and improving this activity over a period of time.
- **Kitting:** Bundling of parts in predefined kits for shipment is called Kitting. BI can help in designing these kits based on part dimensions and handling requirements. This can significantly bring down the overall transportation cost.

## Information Technology Services

Companies are increasingly looking towards 3PLs to provide Information Technology based services. With the emergence of Internet, 3PLs can now reengineer the customer's supply chain by providing online collaboration and synchronization via the web. Even before the widespread acceptance of Internet, sophisticated 3PLs used custom developed software for electronic data interchange (EDI) with the clients. Other IT based services that are provided by the 3PLs are transportation planning, online ordering, automatic invoicing, forecasting, shipment tracing and tracking, etc. Business Intelligence tools can leverage the data created by the existing IT infrastructure to provide valuable additional services to the customers.

Some of these services are:

- **Supply Chain Visibility:** Typically the order data and shipment data are available in different operational systems. To provide complete supply chain visibility to the customers order and shipment data needs to be collected in a real time data warehouse or an operational data store (ODS), from where seamless online tracing and tracking can be provided.
- **Forecasting:** Sophisticated demand and supply forecasting models can be created using the available inventory movement data. These forecasts can significantly help customers optimize their distribution and logistics network by significantly reducing the inventory costs.
- **Customized Reports and Analyses:** To become critical business partners, 3PLs should provide customers with knowledge pertaining to the customers' supply chains. The knowledge can be delivered in the form of reports and analysis created from the data captured by 3PLs.

## Corporate Management

This typically involves the various activities performed by the top management; and the role of BI tools is to provide the top management with reports and analyses to meet their decision-making requirements. One possible application in this area is:

- **Dashboard Reporting on KPIs:** Key performance indicators like contribution margin, shipping accuracy, inventory accuracy, percent on-time delivery and order-turnaround windows can be presented in dashboard reports to the top management to facilitate decision-making process. Also alerts can be triggered if any KPI reaches a pre-defined threshold level. These reports can incorporate 3PL industry benchmarks as threshold levels for various KPIs.

## Marketing and Sales

For any 3PL to be successful in this market, it is not just important to get new customers, but also to maintain relationships with the existing customers. 3PLs should strive to provide more and more value-added services that help their customers in meeting the challenges of the modern economy. Some of the applications of BI that can help 3PLs achieve this are:

- **Customer Service Portfolio Analysis:** Marketing managers can do a thorough analysis of the various services offered to different clients on the basis of profitability of these services. Based on this information, they can offer more value-added services to the existing clients.
- **Customer Profitability Analysis:** Not all customers are equally profitable. Marketing managers can do a detailed analysis of the profitability of all the customers along different factors which affect customer-profitability.
- **Customer Service Level Analysis:** Marketing managers need to analyze how the

company has been performing on various counts with respect to the service level agreement with the customer. Detailed reports and analysis can be made on the reasons and margin by which the service level was not met.

## Human Resources

Business Intelligence tools can significantly help in aligning the HR strategy to the overall business strategy. It can present an integrated view of the workforce and help in designing retention schemes, improve productivity, and curtail costs. Some BI applications in HR are:

- **Human Resource Reports/ Analytics:** Reports and analysis can be generated to support an integrated view of the workforce. Various analyses include staff movement and performance, compensation and attrition, and other customized analyses and reports. The HR data can be integrated with benchmark figures for the industry and various reports can be generated to measure performance vis-à-vis industry benchmarks.
- **Manpower Allocation:** This includes allocating manpower based on requirements. According to the need, temporary manpower like additional drivers can be hired to maintain service levels.
- **HR Portal:** Employers need to maintain accurate employee data, which can be viewed by the employees for information relating to compensation, benefits, retirement facilities, etc. Payroll data can be integrated with data from other human resource management applications in the HR data warehouse. This data can then be circulated within the organization through the HR portal.
- **Training and Succession Planning:** Accurate data about the skill sets of the workforce can be maintained in the data warehouse. This can be used to design training programs and for effective succession planning.

## Financial Management

The role of financial reporting has undergone a paradigm shift during the last decade. It is no longer restricted to just financial statements required by the law; increasingly it is being used to help in strategic decision making. Also, many organizations have embraced a free information architecture, whereby financial information is openly available for internal use. Many companies, across industries, have integrated financial data in their enterprise wide data warehouse or established separate Financial Data Warehouse (FDW). Some of the applications of data warehousing in finance are:

- **Budgetary Analysis:** Data warehousing facilitates analysis of budgeted versus actual expenditure for various cost heads like fuel costs, labor costs, warehouse lease costs etc. OLAP tools can provide drill down facility whereby the reasons for cost overruns can be analyzed in more detail. It can also be used to allocate budgets for the coming financial period.

- **Fixed Asset Return Analysis:** This is used to analyze financial viability of the fixed assets owned or leased by the company. It would typically involve measures like profitability per kilometer of distance covered, total lease cost vs. profitability, etc.
- **Financial Ratio Analysis:** Various financial ratios like debt-equity, liquidity ratios, etc. can be analyzed over a period of time. The ability to drill down and join inter-related reports and analyses – provided by all major OLAP tool vendors – can make ratio analysis much more intuitive.

## Conclusion

The third party logistics industry is in a state of flux. Internet, supply chain management and globalization has made sweeping changes in the existing business models of the 3PLs. To compete in this market, a 3PL has to continuously improve the existing services, add new services based on technology and make its internal organizational functions more effective. BI tools like data warehousing can significantly help a 3PL achieve these objectives.

Recognizing the need for an effective business intelligence solution is just the first step. The real challenge is to make it an integral part of the decision making process. It is vitally important to set clear business objectives for the business intelligence solution with total top management support.

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## Wipro in Business Intelligence

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Wipro has evolved its "Insta Intelligence" project management and delivery methodology built around leading edge technologies in the areas of Data Acquisition, Data Modeling, Data Management, OLAP, Data Mining, and Meta-data Management to deliver innovative, surefire solutions to its customers. It has entered into Business and Technology alliances with some of the leading vendors like IBM, Informatica, Cognos, Microstrategy, Brio, SAS to offer customized solutions to its customers.

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