

eyefortransport Global Research

The next generation Transportation Management System

- A crucial analysis for the transportation industry



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eyefortransport

7/9 Fashion Street

E1 6PX London, UK

t: +44 (0)207 375 7190

t: 1 800 814 3459 ext 312 (Toll free US)

e: research@eyefortransport.com

w: <http://www.eyefortransport.com>

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Finmatica's mission is to bring technology to the core business of our customers, building applications that manage their strategic activities while adding value through our vertical expertise. With more than 1,500 customers worldwide, Finmatica is present in Europe, the Americas and Australia, with 22 offices in 12 countries.

FINeTMS is Finmatica's strategic software solution and system foundation for the core-process management of logistics service providers: from sales and contract management and automated processing of customer orders, to accurate tracking & tracing of shipments and detailed calculation of both customer charges and supplier costs. New business models being developed between the logistics service providers and their customers and suppliers have profoundly impacted the attributes and architecture of FINeTMS. The solution's modules are defined according to industry processes, allowing the support of an evolving business model as well as the requirements of complex organisations.

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For further information contact Finmatica on www.finmatica.com.

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WHITE PAPER

The next generation Transportation Management System

- A crucial analysis for the transportation industry

"We're seeing a dynamic shift in the relationship between business plans and logistics, a shift from the perception of our industry as a back-end process to a front-end strategy that informs and supports the entire business plan. Your supply chain strategy, in effect, becomes your business plan." - Michael Eskew, Chairman, United Parcel Service

1. Introduction

Worldwide, the transport and logistics services industry is in strategic chaos. Diverse factors, ranging from those that arise from the industry itself to other allied market forces, have set in an industry-wide value migration. The key functionality, i.e. transportation of goods, no longer exists in the traditional sense. What only a decade back had seemed a pure asset-play, has now turned into a maze of new and competing institutional and business enterprise models.

The road haulers, the rail operators, the shipping companies, the airlines, the freight forwarders, the warehousing companies, the postal companies, the packaging and distribution companies no more want to see themselves tied down to their traditional business models based on single services. They now want to be seen as a "one-stop shop" offering mode-neutral or multi-modal cargo carriers in the form of an integrated 3PL company or a lead logistics provider (LLP), an integrated express logistics company or, to cap it all, a 4PL consultant to customers. Many of the companies have already moved into these new business areas in a well-orchestrated drive for top line growth.

What only a decade or so back had seemed a pure and simple asset-play business, providing discrete services, is now transformed into a maze of new and competing institutional and business enterprise models

On a wider horizon, the lines between a delivery company and a manufacturer are starting to blur as well. We are now talking of 3PL and 3PM (third party manufacturing) and have begun to realise both are moving in the same direction. While 3PLs bring in distinct distribution capabilities, the 3PMs bring in manufacturing capabilities, even if they are presently limited in scope, confined to high-tech and short-life cycle products.

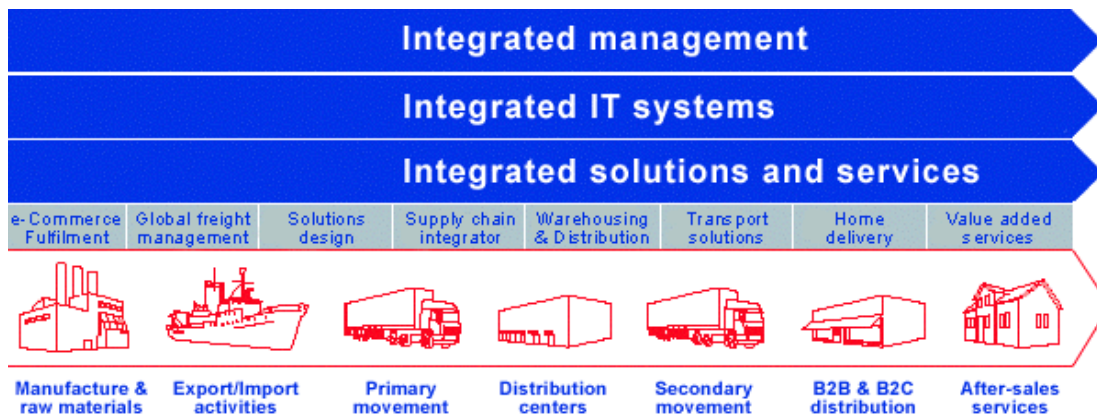
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Developments in the information and communications technology (ICT) are again playing a major catalytic role in improving the service quality and reducing the costs. Transport Management Solutions (TMS) today demand a dynamic and proactive approach to understanding these changing contours of the industry and market. The next generation TMS now appearing on the market are trying to go beyond providing mere discrete functionalities, and are increasingly aiming to deliver great benefits and attractive returns on investments (ROI) to the transportation industry.

1.1 The new road to success

The transport and logistics industry today is working under a multi-layered collaborative business model, moving away from uni-polar (monopoly service provider) or bi-polar (plain shipper-transporter axis). The direct knowledge of how the supply chain dynamics work has provided new strategic advantages to 3PLs, who are now integrating their discrete service offerings for greater price value realisation but rapidly moving into virtual 4PL business space, expanding the logistics value chain.

Emerging 3PL Integration model



Source: Exel

This trend follows major changes in conventional manufacturing and retail businesses, increasingly driven by distributed manufacturing and outsourcing practices. Outsourcing

The relations between manufacturer and vendors/suppliers, the geography of production sites and the business processes underlying the manufacturing value chains is being re-defined.

has redefined relations between manufacturers and their vendors/suppliers, the geography of production sites, and the business processes underlying them. Most of the integrated 3PLs, 3PMs and 4PLs, and LLPs (like K&N Lead Logistics, Vector SCM), are working their way through these intersecting value chains.

The 3PLs are also becoming more solutions-oriented, shifting from the mere one-off service approach. The crucial differentiating factor is how basic services are bundled

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with real-time business solutions and distinct bottom-line advantages. The USP is no longer about "what you have" on offer but "what more", or "how different or beneficial" is your offer. The ability to integrate and innovate on service features is emerging as a critical success factor, and the top-line growth is increasingly becoming a direct function of a 3PL's ability to extend the value of the innovations in logistics services.

1.2 3PL market challenges

The depth and magnitude of changes in the transport and logistics market during the last two decades of its evolution is evident from a number of indicators. For instance, in 1981, logistics costs were equivalent to 16.2% of the GDP, and have since continually declined to a level of 8.7% in 2002. The ongoing "merger & acquisition" trend aimed at achieving new economies of scale and re-defining operational cost structures through diversified geographical presence – end-to-end integration of the freight transport chain – are only some visible symptoms of the transformations currently underway.

Hype	Reality	Challenges
High-growth market is mainly through new incremental value and volume growth	Growth is from absolute increase in current traffic from existing contracts	Adding value to and restructuring costs of existing contracts.
High-end solutions are a must for delivery performance	Basic services (warehousing & transportation) form 80% of business value chain	EBITA on existing asset deployment & operations are key to future growth
"Asset light" is preferable with 4PL as the strategic destination	Assets only need to be in "relevant range" to the business	Restructuring of asset portfolio is driving industry consolidation
Customers prefer long-term relationships and completely outsourced 3PL activities	Most existing contracts are short and need to be renewed frequently	3PLs need to work through the manufacturing value chain

The top line growth of a logistics company is increasingly a direct function of not only the ability to vertically integrate in the value chain but how it is able to actually extend the value change

Over the last five years, the European transport and logistics market in particular has been transformed by a large number of acquisitions that have brought about consolidation of what was a highly fragmented industry. Consolidated 3PLs are trying to diversify their service portfolios and achieve geographical expansion, leveraging technology to improve service quality and cut costs. The ability to build large scale shared user networks, combining and managing an ever increasing number of services, and the

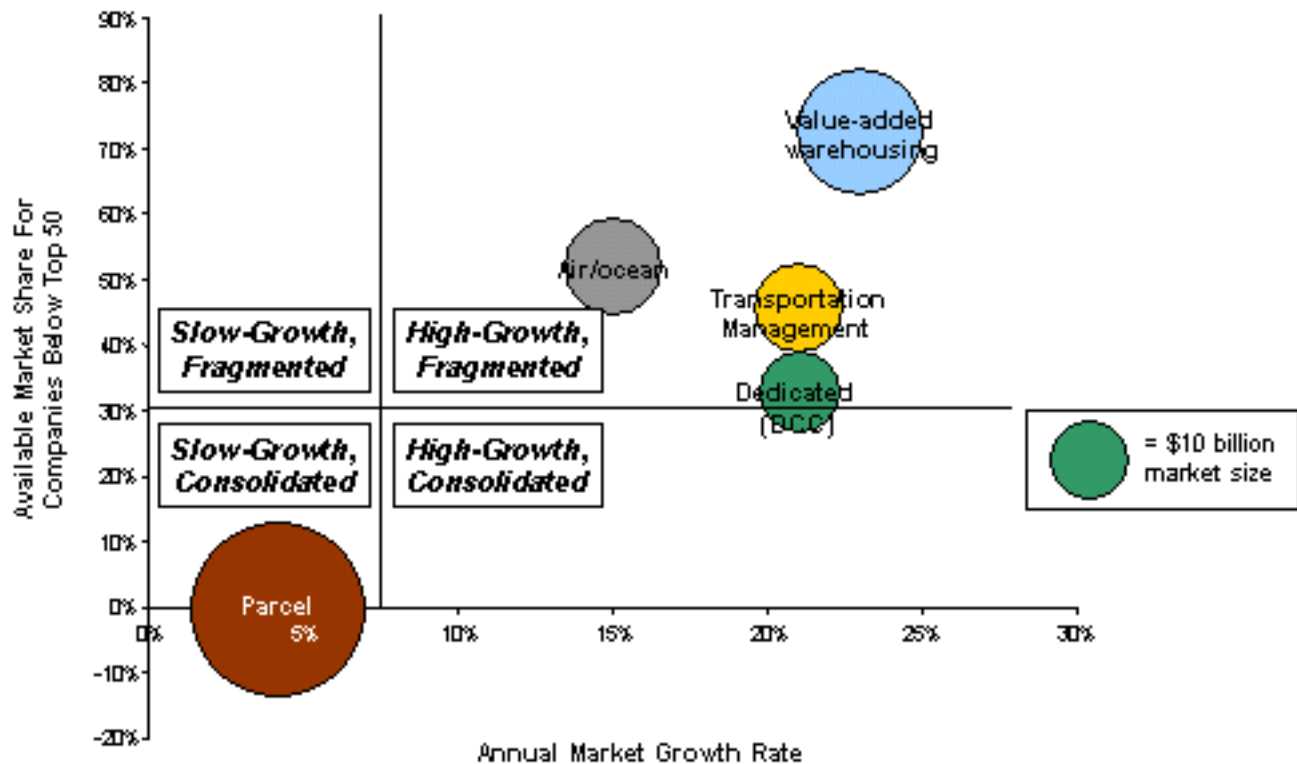
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ability to control the cost of operations and sustain sufficiently attractive operating margins, are key driving factors.

A 3PL's performance, service quality, and innovation are increasingly related to a company's ability to gear up its technology infrastructure and deploy the latest TMS solutions and approaches to its business. A host of issues – the complexity of global supply chains, management of new regulatory regimes relating to cargo and data security, environmental laws, Customs, and ever-increasing customer demands on service quality – confront 3PLs and 4PLs, and demand mission critical IT back-end and front-end support systems.

1.3 The logistics market today

The Logistics Market Today: High-Growth, but Extremely Fragmented



Source: Armstrong & Associates, BG Strategic Advisors analysis

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Across 3PL markets, unit cost of service is no longer the only key differentiating factor that decides market competition. As customers demand high quality service and look closely at returns on investment (ROI), 3PLs are forced to go for high-gear management of service pipelines using TMS-enabled performance metrics of service fulfilment and quality.

The transport services market leadership is no longer determined by the intimidating size and scale represented by huge monopolies in the airline, rail and postal services. Whilst size does matter, what matters even more is how it is leveraged to re-invent the market, with the creation of new services, new quality standards, and the ability to cope with the continuous flux in demand. Failing this, the ongoing consolidation wave in the 3PL industry can only end in a whimper of recuperative deconsolidation. There have been instances of 3PLs (like Wincanton and Christian Salvesen) that have had to downsize and divest some of their post-consolidated assets and acquisitions.

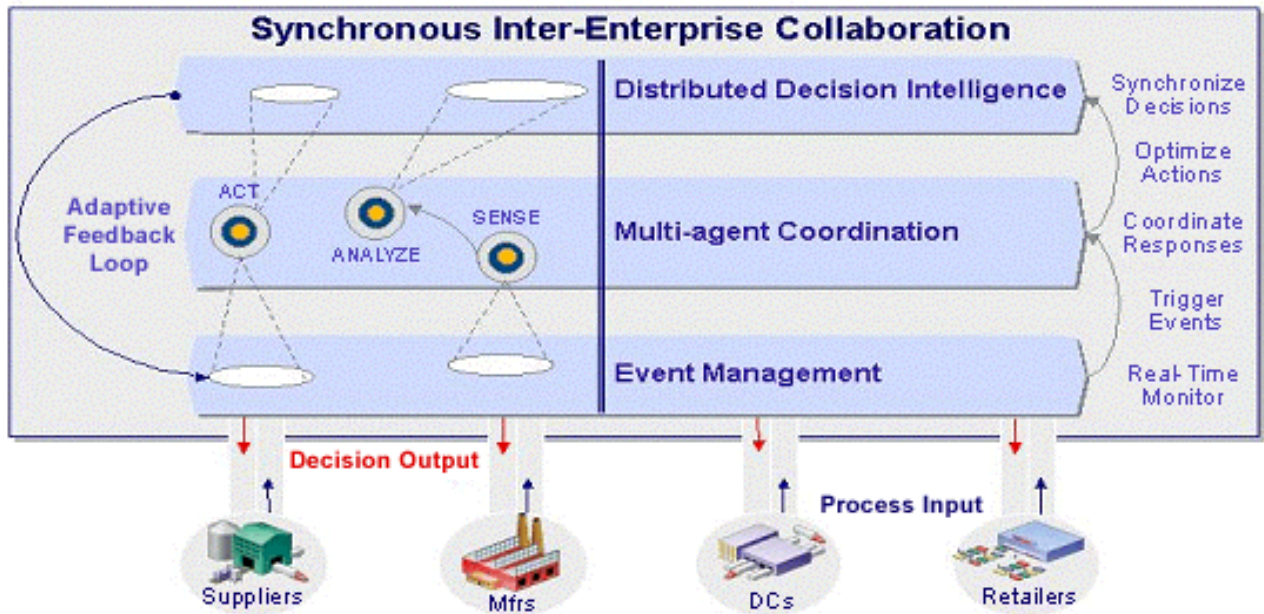
Deutsche Post, the Deutsche Bahn, TNT, UPS etc., indeed, have little to gain by merely acquiring greater size and scale. Instead, their gains can be measured only in how they have integrated and repositioned the businesses they acquired by extending the logistics value chain. Whilst size and scale may seem to disadvantage smaller and medium-sized 3PL companies, what may still work in their favour is how they leverage IT investments to migrate to new emerging business models.

2. TMS and the scope

TMS is an omnibus term that covers a wide spectrum of activities. These could include conventional shipper-centred activities like carrier contract bidding, transportation optimisation planning, labelling and manifesting and transportation monitoring; the manufacturer or retailer-centred inbound logistics activities such as inventory control and planning, scheduling, warehousing, etc.; and transport service provider activities like fleet planning and route optimisation, cargo tracking and tracing, etc.

By and large, the TMS application tools have mainly served internal planning and optimisation tasks within an enterprise. The business and market environment in which these functions assume meaning and relevance for 3PLs have been rapidly changing. Today's 3PLs work within a well synchronised collaborative business framework (see chart on following page), where many enterprises come together in a common value chain.

Especially with globalisation and outsourcing of logistics management functions by the manufacturers and retailers, 3PL companies are now, indeed, at the forefront of managing outsourced logistics services. They combine inbound and outbound logistics activities and provide integrated solutions that have real-time and dynamic front-end service features allowing total visibility of the logistics value chain to their customers.



Source: Finmatica

3PLs are also being drawn to TMS as they realise that incremental investments in conventional assets like transport fleets and warehousing space has a longer payback period compared to TMS related investments that ensure quicker returns, besides improving yield on existing assets. They have also realised that their service and business performance targets need to be constantly evaluated, monitored and controlled by efficient and dynamic data tools and the analytic support that TMS can provide.

2.1 The TMS market growth

The TMS market began to evolve only in the eighties, when user applications to aid transport planning and optimisation were formally introduced for the first time. These tools brought basic computing capabilities into transport planning processes at the enterprise level, and were seen to be highly useful and helpful in reducing transportation costs. The early TMS applications, however, mainly addressed transportation issues from a shipper perspective, rather than for the transporters themselves.

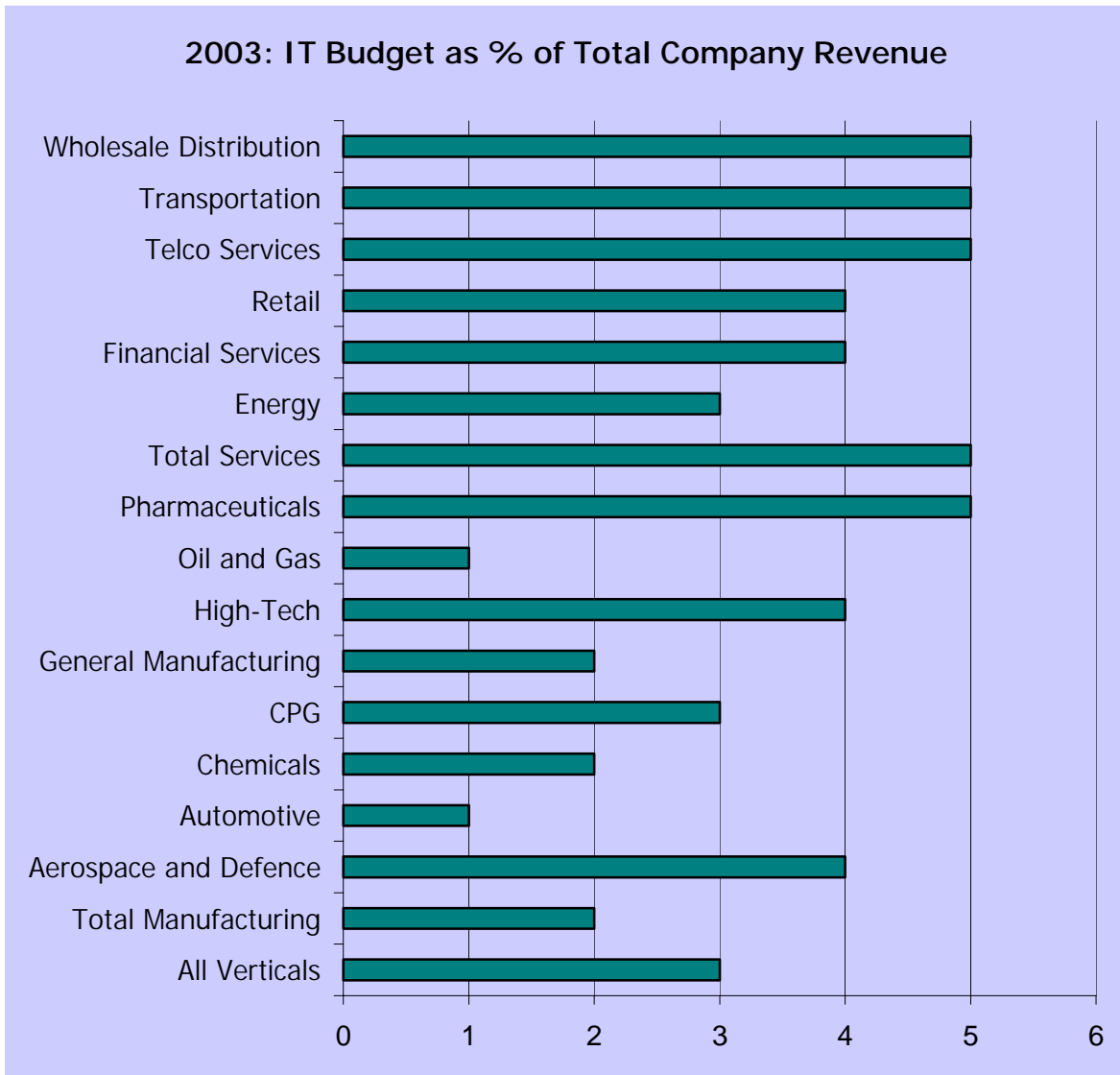
It is only in recent years that TMS truly began to follow the footprints of the transport and logistics industry, as the latter began a rapid movement towards 3PL integration and the

“... new stage in evolution of logistics services is increasingly driven by intelligence “.

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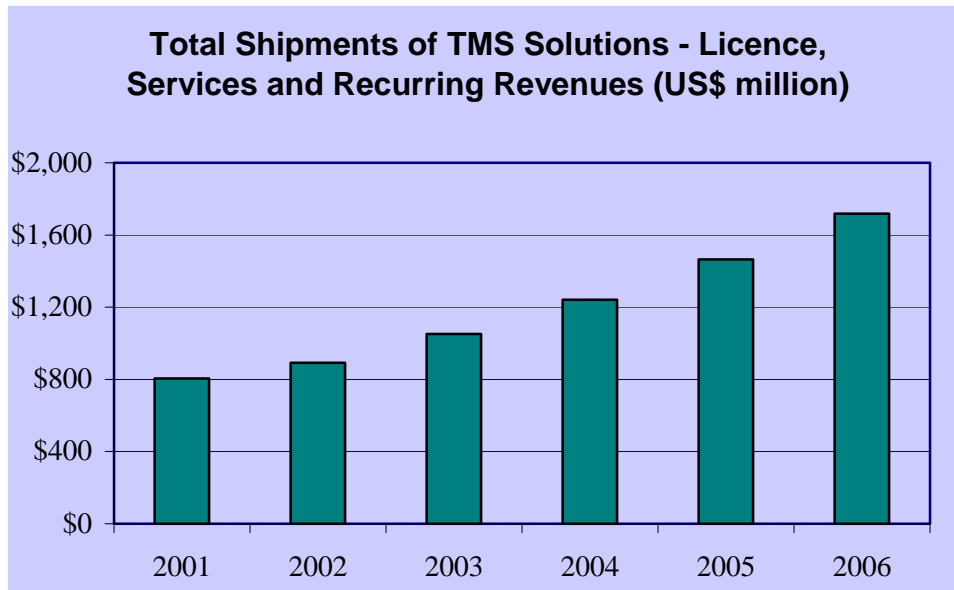
tapping of opportunities in outsourced contract logistics. The TMS market focus has since shifted from shippers (i.e. manufacturers and retailers) to transport and logistics companies. Still at an early take-off stage, the process promises to usher a new stage in the evolution of logistics that is going to be increasingly driven by intelligence.

A recent AMR survey on IT-related investments by global transportation companies (a sample of 50 transport companies including railroads, airlines, road haulers, and local commuter transporters) revealed that most companies are indeed moving beyond the firewalls to improve data collection methods using wireless technologies, upgrading applications with new functionalities, particularly in Supply Chain Management (SCM), Customer Relationship Management (CRM), and sourcing and procurement functions. In the transport services sector, the share of IT investments out of total revenues was 5%.



Source: AMR Research (based on a sample survey of 546 companies)

A similar user survey conducted by ARC Advisory Group found that the overall TMS market had grown by almost 7% in 2002. The survey, covering some 546 different potential users of TMS, has projected a compound average growth rate (CAGR) of 11.6% for the TMS market, from US\$860 million in 2002 to US\$1.6 billion in 2007, nearly doubling expenditure levels in just five years. Given the trend towards outsourced logistics and the increasing role of 3PLs in the segment, TMS penetration would only further deepen within the 3PL industry.



Source: ARC projections

2.2 Rationale for next generation management system

Given that the level of 3PL integration among different 3PL companies varies significantly (often depending on the type of asset portfolios and customers the company has), there is no “one size fits all” TMS solution that would apply to all 3PL companies across the board.

TMS offerings...

- Procurement
- Parcel shipping
- Optimisation
- Execution
- Global trade
- Fleet management
- Managed services

This does not however, eclipse the fact that TMS will indeed act as a “leveller” of the differences that have so far segmented the 3PL industry. The rationale for new generation TMS solutions also derives strength from the fact that smaller and medium sized 3PLs, often with little choice but to scale up, will do so by deploying smart TMS solutions. TMS offers a distinct focal point for driving the necessary changes in the 3PL industry segments. It also impacts other layers of technology-driven processes and sub-structures that are now transforming the transport and logistics industry.

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For instance, trans-oceanic haulage of container cargo between seaports has considerably shrunk in value and price terms, compared to the value and price realisation in terms of overland transportation of the very same containers. This is driving container liners into port terminal operations and overland container logistics management services. Similarly, the road haulers in North America and mainland Europe are taking a market lead over airlines by offering competing services. Indeed, TMS solutions can act as a crucial accelerator in these business transformations.

2.3 Characteristics of Next Generations TMS

The defining characteristics of next generation TMS can be perceived at two different levels - the technology platform that it uses, and the range of services and modular functionality it offers to 3PL companies. Both attributes complement each other, and the same technology can be scaled to produce diverse service functionalities in the supply chain or vice versa.

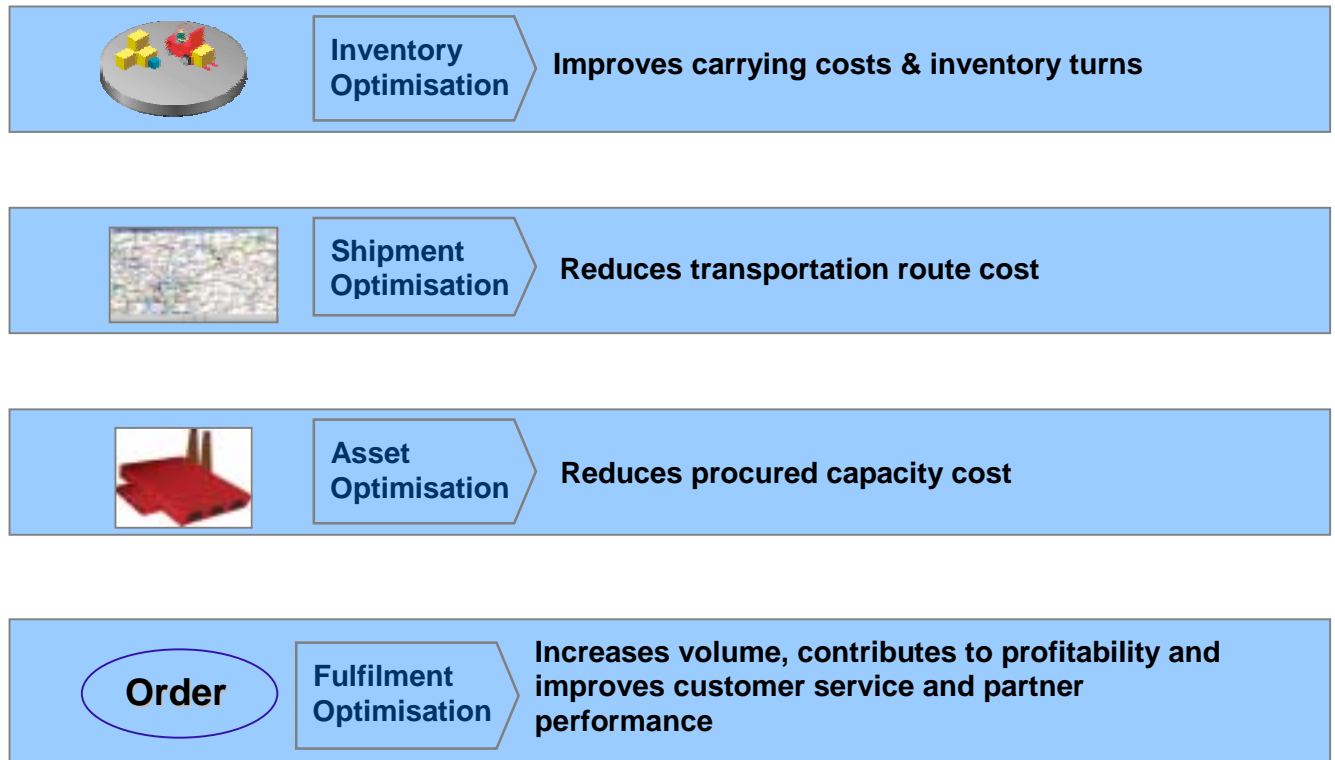
Next Generation TMS attributes

Higher Level Integration	Using different technical architecture elements - i.e. web/wireless technology for processing real-time information through RFID, etc.
Higher Level Visibility	Visibility for all partners enabling optimum scheduling of actions/events and appropriate corrective measures.
Real-time Transaction Enabling	Ability for real-time transaction compared with traditional batch processing etc.
Inbuilt Scalability & Flexibility	Scalability (expansion across geography, locations and users and modularity – adaptable to incorporate regional and international rules and regulations)

The former mainly relates to the use of Internet and wireless communications technology to generate dynamic data management tools. Whilst these can be effectively used to create various services and value added features, online and real-time management of transportation planning and execution can yield several other incremental benefits that impact ROI performance and other performance metrics.

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Incremental benefits of TMS for 3 PL



Source: Finmatica and eyefortransport

That in turn results in...

Better service to customer
higher market share

2.4 Some Key strategic issues

Some of the key strategic issues that emerge from the foregoing discussion can be summarised as follows:

- IT leadership will be key to leadership within the transport and logistics industry, as managing information can be equally, if not more, important than managing the volume of physical activity.
- TMS solutions can provide the critical bridge to migrate to new business models like 3PL and 4PL, and can generate new space for value-added services. Many opportunities for business optimisation arise directly out of capabilities generated by IT technology.

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- NextGen TMS solutions integrate discrete optimisation applications/tools with proprietary and enterprise-level execution strategies. Significantly, they will help 3PLs create new services and offer customer advantages comparable to incremental costs.
- Entry points into emerging supply chain models are many and varied, and recast traditional customer-client framework with a multi-tiered collaborative business model that have competing stakeholders and value triggers. 3PLs will need to effectively leverage their position in the supply chain to create collaborative partnerships.
- Globalisation, market competition and cheaper multi-location sourcing of supplies and merchandise, multi-modal transport, higher lead-time, managing regulatory compliance and overall complexity of supply chain management, demand better tools that are possible only through TMS.
- The market for outsourced 3PL services, as well as next generation TMS solutions, is still largely demand-driven, allowing space for customisation and standardisation of solutions. This benefits both the suppliers of these services (the 3PLs and other service providers) and their customers as they work within a collaborative business space.

3. The developing role of the main players in the transportation and logistics market

The main actors in the transportation and logistics services market include “pure play” transport operators like airlines, shipping liners, trucking and warehousing companies, freight forwarders, integrated express couriers, railways and postal organisations. Each represent distinct but increasingly inter-related service competencies, and are indispensable nodes for value optimisation.

While these “pure plays” will continue to remain, what is remarkable is the trend towards integration and combined offerings, which is beginning to decide top line growth. This trend has become an inevitable strategic growth driver for 3PLs. The traditional distinction between basic service providers and third party logistics providers (3PLs) is less helpful.

This study considers “3PL” designation to apply to all the transport and logistics companies, irrespective of the levels of their integrated service offerings.

3.1 Third Party Logistics (3PLs)

The 3PL providers offer more than just transportation of raw materials and the distribution of finished inventories to the market. They offer clients the best of third party contracting options to outsource all transport and logistics functions. These include transportation, warehousing, distribution, packaging and labelling, order processing and inventory control, billing, and order cycle management. In achieving the required levels of 3PL integration, 3PLs are faced with the following challenges:

➤ **Meeting demands for global sourcing and selling:** Manufacturers and retailers are looking at outsourced manufacturing and supply sourcing opportunities. Globalisation has also translated into many outsourcing opportunities for large OEMs and retailers, especially in fast emerging markets. As trade barriers and import tariff levels are further toppled by the impact of WTO, the overall traded cargo volumes are likely to rise further, creating the need for new logistics pipelines and requiring 3PLs to scale up rapidly.

In an effort to consolidate non-packaging business, integrated express companies like UPS, DHL and FedEx have recently been focusing on growing their break-bulk freight express services segment, and are strengthening their hub-spoke networks in the emerging markets of the Far East and Eastern Europe for handling outsourced manufacturing supplies for large OEMs.

➤ **Maintaining supply chain agility:** Shrinking product life cycles and a high rate of technological obsolescence have increased the pressure on supply chain management (SCM). The emphasis is on achieving supply chain agility and on reducing non-value adding costs. The 3PLs with the logistics resources and necessary skills for reducing the overall costs are thus increasingly seen to be partnering with manufacturers to provide turnkey solutions, either as LLPs or as joint venture partners, enabling their customers to focus on their core activities. The joint venture recently launched by Schenker and Siemens handles various spare parts supply depots, the control of in-house logistics processes, and the supply of spare parts to service technicians all over Germany. The 4PL joint venture combines the specialist expertise of Schenker in freight forwarding and contract logistics with Siemens' industrial process know-how in the product, system and project business.



Main 3PL challenges...

- Meeting demands for global sourcing
- Supply chain integration
- One stop solutions
- Meeting bottom line & competitive pressures
- Flexibility in service offering

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- **One-stop-solutions:** The business models that once supported “*arm’s length*” relations with customers are no longer attractive or desired. Focus is on integrated logistics as “*one-stop*” solutions. There is also a significant migration from asset-based logistics to value-added and integrated contract logistics solutions. This requires 3PLs to take on the challenges of building integrated service offerings. This is particularly vital for handling the long-term logistics contracts between 3PLs and large retailers. Christian Salvesen, Wincanton and Tippet & Britten are among UK’s 3PL companies that provide complete turnkey management of logistics services.
- **Supply chain integration:** Shrinking product life cycles and made-to-order products coupled with distributed manufacturing has further increased competitive pressure on supply chain management (SCM), with the emphasis placed on supply chain agility and the need to reduce non-value adding costs. The 3PLs have come forward to provide the necessary logistics resources and skills needed for reducing the overall costs of final product delivery through various contract logistics and lead logistics partnership (LLP) service pipelines.
- **Bottom line & competitive pressure:** Meeting increasingly dynamic and ever changing customer orders, delivery schedules and service delivery quality - are generating new level of competitive pressures in several industries. Resorting to 3PL solutions or establishing a lead logistics partnership is necessary both for survival and for improving the bottom line. A 3PL can thus, be viewed as the virtual means of bringing down logistics cost structures and induct distribution and sales process improvements using shared networks tools of information technology.
- **Outsourcing business model:** Outsourced manufacturing and logistics is increasingly becoming an acceptable business model for a company to implement, develop and manage. While 4PLs are completely outsourcing models within logistics services itself, several 3PL companies are seeing outsourced logistics services as a fast emerging business opportunity. Apart from their traditional competencies in transport, freight forwarding and warehousing, they are now building competencies such as packaging, labelling, bar coding, re-packaging, re-filling and other inventory planning and control tasks that were traditionally outside their scope of operation.



Coordinating the supply of incoming and outgoing goods on a global scale can account for up to 28% of the overall cost of goods sold.

3.2 Freight Forwarders

The role of freight forwarders is becoming increasingly akin to that of 4PL providers in that they are asset-light service providers. Gartner Group research has estimated that coordinating the supply of incoming and outgoing goods on a global scale can account for up to 28% of the overall cost of goods sold. A trend of this magnitude is turning trade logistics into a strategic weapon that can grow the top and bottom lines, instead of being viewed as a cost centre. In other words, global logistics is being increasingly viewed as a profit centre, particularly for the freight forwarding industry. Bears Stearns has estimated that worldwide freight forwarding revenue exceed US \$200 billion per year, and will further grow at a cumulative average growth rate of 10 to 15% annually.

Main freight forwarder challenges ...

- Span into the 3PL area and provide value-added services
- Cargo security and international trade compliance
- Real-time data capture and management

Much of this growth is, however, likely to come not only from physical trade volumes handled, but also from value added services and integration of outbound and inbound logistics, and managing new global trade regulatory and cargo security policies. The events of 9/11 have resulted in increasing emphasis on international trade compliance. It is critical to ensure that functions such as traffic, taxation, purchasing and finance comply with changing Customs regulations. Governments are demanding electronic data

transfers between shippers, service providers and government regulatory agencies, requiring costly investments in IT. Freight forwarders can be a powerful driver of change in international compliance by helping exporters and importers put the necessary internal controls and processes in place.

The ability to provide real-time access to global transaction data can be invaluable to shippers. Information about trade rules and transactions often resides on many different systems and processes across global supply chains, causing delays in the delivery of goods. A freight forwarder's ability to integrate such content and make it accessible to customers and trade partners around the world represents a significant source of value.

3.3 Postal Services

The postal services – mainly public-owned in most countries and providing core functionalities such as letter and document delivery and parcel services – are facing new challenges to their survival from integrated express couriers. Though they remain indispensable with their vast and dense physical networks for regulated mail services, some postal operators have lately sought to gain prominence by increasing their market share through further value segmentation of their services (especially business and express mail) and adding new services using available infrastructure. Institutional reforms that impinge on governance, however, form the key to unlocking value in this sector.

Postal operators have been slow to respond to the challenges of technological modernisation and privatisation. This is owing to public resistance and universal service obligations (USO) that bind them to public ownership and regulation. Even in the US, postal reforms have been very slow. Varied degrees of deregulation, commercialisation and privatisation are, however, now being introduced in several countries including some in the developing world. The Netherlands (TNT Post), Germany (DPWN) and New Zealand (New Zealand Post) have already successfully privatised their postal networks.

Main Postal challenges...

- Commercialisation and deregulation and increased competition
- Transform business & operations to face global challenges
- Cut cost and optimise utilisation of physical network and resources

Technology developments, increasing competition, and a changing approach to monopoly regulation, mean that the time is right for postal reforms. Postal service monopoly in the delivery of letters and parcels is rapidly losing out to other competing sectors, including the Internet and e-mail. While e-mail will continue to be a looming threat, technology tools can also help the postal sector to reduce costs, improve service quality, and offer new innovative services. Modernisation and IT tools are also crucial for reforming institutional governance standards and structures, besides improving the transactional efficiency of postal operations. Deutsche Post World Net's (DPWN) transformation from a bureaucracy to a trans-national corporation is a new benchmark in postal history.

Modernisation of the mail and parcels network in Germany followed years of persistent efforts to develop new products, e.g. hybrid mail and e-commerce, and, through acquisitions, has set new role models for postal reform elsewhere in the world. DPWN now has interests not only in the traditional mail and parcels businesses but also in express mail, logistics, banking, and much more.

3.3 Integrators/Express

Integrator/ express companies are truly 3PL pioneers – among them the United Parcel Service (UPS), FedEx, DHL-Danzas, TNT and Expeditors – who continue to drive much of the industry transformation. Equipped with global-scale logistics infrastructure, technology and networks, they have been quick to penetrate all segments of the transport and logistics value chain and set their benchmarks in delivery quality, cost of operations and defining of customer expectations.

The integrator/express advantage is, however, not limited to scale and size of operations alone. It stems from their proven competency to leverage new strategic technology and supply chain tools to manage and master the global freight traffic flows using large scale shared networks for consolidation and deconsolidation of cargo, optimal palletisation of

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available transit freight, the use of diverse transport fleets and freight capacities, the creation of hub-spoke networks and, above all, front-end retailing of their services to customers.

Key to their phenomenal growth is also their ability to standardise and integrate the retail front-end of their businesses with robust back-end support systems using various technology tools and brand equity. Features such as automated mail sorting, providing complete visibility of the document and parcel transit process using track & trace (GPS and SATCOM technology), generating proof of delivery (PoD), the extensive use of mobile/ digital wireless devices, automated service networks, and world-wide operations, have been among the key highlights that have helped integrated express companies become leaders of high-value transport and logistics service chains.

Integrators are now increasingly looking for opportunities to use technology tools to create new service pipelines and other modular management tools that will focus on serving non-document market segments like LLP, parts logistics, reverse logistics and break bulk cargo services (such as express break bulk and other possibilities for setting up international milk routes), based on the latest trade and freight trends.

Main Express Integrator challenges...

- Provide complete one-stop-solutions and maintain their advanced technology edge
- Innovate and provide further hybrid services
- Improve co-ordination and utilisation between diverse transportation fleets
- Further grow and integrate a global network
- Integrate flexible and customised services into their existing standardised network without losing profit margins

4. Recent market developments

As globalisation and the outsourcing of manufacturing and trade merchandise and logistics services continue, the 3PL industry is witnessing many fundamental changes. Emerging technologies, in particular wireless and internet-enabled communication tools, as well as institutional and regulatory developments, also have an important bearing on the long-term evolution of the transport and logistics services industry, giving rise to new emerging intermediaries like 3PLs, 4PLs and LLPs.

Regulatory policy changes, free-float currency as well as the large European currency union are also key factors that are impacting the way in which global supply chains are evolving, giving rise to new processes and standards to be followed in international trade management, such as the ban on night flights at several airports and the EU restrictions on aged ships calling on European seaports. Well-intentioned regulatory measures can

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have a major impact on the working of global supply chains, and give rise to new adaptive responses by 3PLs.

Primary Types of 3PL Service Providers

Type of 3PL Service Provider	Primary Services Provided	Companies/ Divisions
Asset- based Transportation Provider	Dedicated logistics transportation, trucking, dispatching & route planning	Schneider, Ryder, Hunt, Danzas, TNT, UPS, FedEx, Airborne, DHL
Non- Asset Based Transportation Optimiser	Integrated logistics service-based, focused on technology and engineering	CH Robinson, Mark VII, Ryder, UPS, Menlo Worldwide, FedEx
Value- Added Warehousing Providers	Integrated and dedicated logistics technology, warehousing, & transportation	Caliber 4, DSC, Tibbett & Britten, GATX, Exel Logistics, Fiege, Menlo
Non- Asset Based International Forwarders	Integrated logistics with international freight forwarding capabilities	AEI, Circle, MSAS, Kintetsu
Software vendors / providers	Logistics software / tools / packages	Finmatica, Manugistics, I2/ Intertrans, McHugh, Logility, Extricity, Manhattan Associates

4.1 The growth of 4PL and LLPs

Fourth Party Logistics (4PLs) or LLPs are the youngest and most dynamic entrants in the logistics services industry. They represent the natural evolution of the 3PLs, though not all 4PLs necessarily have 3PL backgrounds. 4PLs cross-sell expertise in logistics services and most often are outgrowing from an internal subsidiary, servicing needs of the mother organisations. Few 4PLs also operate as independent non-captive entities, having diverse clients, customer backgrounds and competencies quite outside transport and logistics domains. Essentially, the 4PL provider's core competence lies in applying its knowledge of logistics and transport services to provide optimal solutions that yield competitive cost advantages. 4PL providers enable the organisations that employ them to focus on their own core competencies and get more competitive.

Main Challenges for 3PLs/4PLs

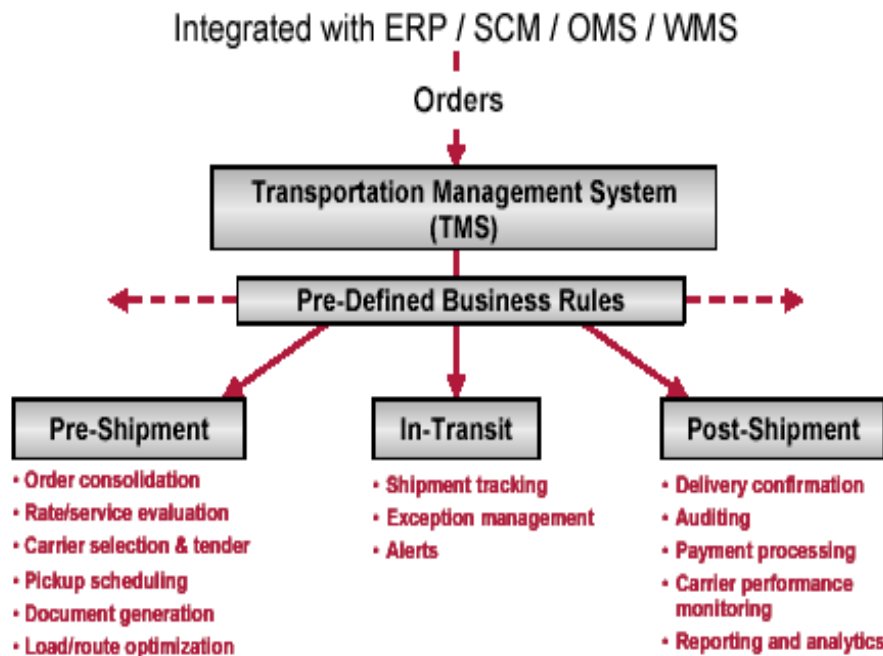
- Manage global-level operations synchronising partnerships between various service providers
- Leverage technology advantages to achieve end-end integration of supply chains
- Redefine logistics cost structures with distinct bottom line advantages for manufacturers & retailers

4PLs thrive on globalisation, distributed manufacturing and increasing outsourcing of retail supplies and merchandise across wide geographies. They provide the space for collaborative business models and the means to benefit from competing supply chains. They do so by drawing upon distinctive competencies of several of the players in the manufacturing and logistics value chain, in effect becoming partners to their clients and helping to extend the value chain.

4.2 Role of ERP, SCM for 3PLs in the future

The global trade growth and outsourced manufacturing trend present compelling opportunities and challenges for businesses (including transport and logistics service enterprises). As 3PLs look for seamless global transport and supply chain networks themselves, outsourcing an increasing number of operations to other service providers to optimise costs, increase visibility, reduce inventory costs and satisfy product and customer requirements, the functionalities built into ERP and SCM are swiftly moving to the enterprise domain of such outsourced service providers.

- Multi-enterprise and multiple businesses models support is crucial for the future of ERP/SCM solutions – 3PLs are a centre piece for this future
- ERP/SCM and TMS solutions are increasingly becoming more integrated, delivering multi-business tasking functionalities that manage broader processes



Source: Finmatica

ERP for collaborative business models: ERP and SCM have so far addressed typical enterprise-level issues but not all requirements. ERP solutions that meet the needs of multi-tiered collaborative businesses, where many enterprises come together, are still to reach the market. Instead of merely filling in single enterprise-level gaps, these need to mature to those multi-enterprise and multi-business tasking functionalities that manage broader processes and transactions. The 3PL companies form a typical instance of such a multi-enterprise and multiple businesses model, which make unique demands on ERP capabilities.

From a logistics perspective, ERP and SCM solutions have so far tried to employ discrete enterprise-level approaches to meet demands relating to warehousing, data collection, transportation management, and labour management. These only provide capabilities of base order and inventory management and some operational benefits. The benefits for single-vendor integrated ERP solutions do not, however, incorporate international trade logistics solutions and necessary domain expertise. Quality solutions necessary to realise the potential savings, especially in the transport and logistics pipelines, thus remain untapped and yet to be concretely addressed.

Compliance in managing Global Supply Chains: Some ERP and SCM solutions have sought to incorporate key account alliances (for instance, Schenker and IBM have been working in this direction) to acquire necessary strategic and operational competencies. The market is now witnessing consolidation between the Warehouse Management (WMS) and Transportation Management (TMS) solutions, and demanding acquisition of advanced capabilities. From a 3PL or 4PL perspective, the ERP, SCM and TMS integration challenge is yet to provide features for global trade compliance and other related capabilities.

Some practical issues for ERP, SCM & TMS integration

- Country-specific trade rules
- Denied persons, embargo and boycott screening
- Licence determination; e-linkages with governing bodies
- Preferential program management; LoC, tariff (duty, tax, & fees)
- Verification & commercial invoice reconciliation
- Product classification and harmonised tariff specific processing;
- Complete country-and product-specific import and export documentation,
- Determination and filing for duty drawback
- Regulatory audit management and trade regulatory compliance

The current SCMs may have considerable inbuilt planning and execution functionalities, but do not include the means to cope with global or international constraints, which could produce differing results. Most SCM systems improve order sourcing and available-to-promise determination by utilising broader information and constraints, but do not factor in Customs or other regulatory international trade practices or carrier-related issues. Providing these missing links are therefore one of the key priorities for reformulating SCM solutions. Effective fulfilment of these gaps calls for a more complete strategic

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approach, targeting best-of-breed solutions. For 3PLs and 4PLs this offers a much sought-after competitive advantage, since without a solution to these key functions their clients will be exposed to financial and operational risks, and non-compliance could impair their business.

4.3 The increased importance of real time performance

Real-time performance management is the next frontier of 3PL operational excellence, and TMS will play a critical role by providing more accurate and timely visibility to costs and other key performance indicators (KPIs). As manufacturers adopt lean manufacturing, just-in-time inventory, make-to-order and other business models that depend on reliable, efficient, and cost-effective transportation operations, real-time performance is going to gain high importance.

Real-time performance management is the next frontier in achieving operational excellence, and TMS will play a critical role by providing more accurate and timely visibility to costs and other key performance indicators.

The wireless-aided transportation management system is the main driver for the usage of real-time applications. In an attempt to improve bottom lines and competitive advantage, progressive organisations are implementing wireless solutions in their transportation operations, which integrate warehousing, transportation and store systems with a new functionality that has a dramatic impact on cost savings and improved asset utilisation.

The distribution centre (DC) would have required wireless LAN access points installed for communication with the tractors operating in the warehouse or yard areas. Used for wireless data collection, a wireless system enables real-time receiving, stowing and picking applications within distribution facilities. When integrated into a host system, these elements allow 3PLs to virtually extend the enterprise network, providing for real-time operational control over the resources and assets deployed in the field.

Real Time Enabled TMS: Some Key Elements

- Rugged portable computers with electronic signature capture capability
- Wireless LAN communications (WLAN) via IEEE 802.11x Standards
- On board computers (OBC's) for trip recording using GPS
- Wide Area Wireless Communications (WWAN), i.e. Mobitex/ Cingular, DataTac/ Motient, CDPD, GPRS, CDMA, and others

4.4 New market initiatives, including Walmart’s RFID mandate

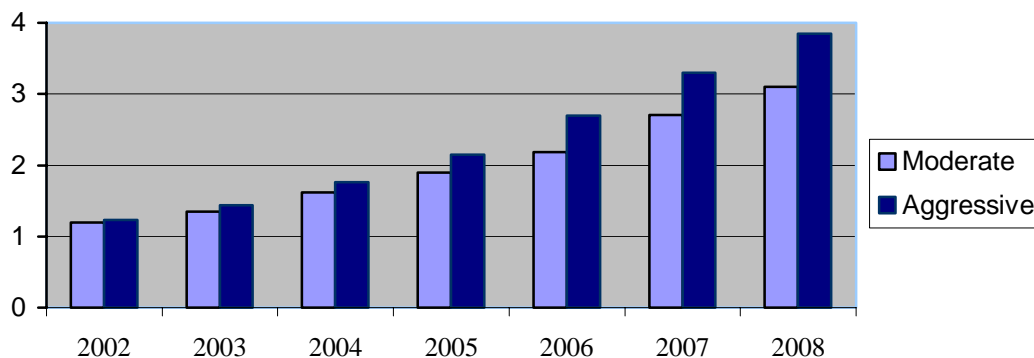
On June 10, 2003 Linda Dillman, the CIO of Wal-Mart announced that the company’s top 100 suppliers would be required to utilise Radio Frequency Identification (RFID) tags on their cases and pallets by January 2005. This requirement is likely to spread to various stakeholders in the sector including other major retailers and Wal-Mart’s logistics and supply chain partners. It is also likely to expedite the implementation of RFID and Electronic Product Codes (EPC), enhancing management of the product pipeline and ushering in an era of renewed supply chain efficiencies.

Already, Tesco and the US Department of Defense are also contemplating the usage of this technology. Three of Wal-Mart’s top 100 suppliers – Kraft Foods, Procter & Gamble and Pfizer – are moving forward to meet the retailer’s RFID requirement. While very large retailers are looking at RFID, they are reluctant to spend as much money as Wal-Mart, unsure whether the technology still needs to mature and be embraced by suppliers. However, other players may not risk a dominant player getting too far ahead in what may eventually become the industry standard. The boost given by Wal-Mart to RFID technology confirms that this is not just a passing fad but may well be the direction in which the market is moving.

The usage of RFID technology could bring benefits such as:

- Inventory visibility throughout the product pipeline
- Labour efficiency as a result of increased sophistication and automation
- Improved fulfilment due to reduced shrinkage, improved asset utilisation and improved product trace ability

**Total RFID Market Value
World Market: 2002-2008**



Source: ARC projections

4.5 Government regulations

A number of trade and transport regulatory organisations, such as the Container Working Group (CWG), the US Department of Transportation (DOT), the Customs Trade Partnership Against Terrorism (C-TPAT), and the Transportation Security Administration (TSA), have started initiatives to improve cargo container security and set US Cargo Security Policy. In particular, the United States Customs Services (USCS) has mandated that carriers and their agents must use the Automated Manifest System (AMS) to electronically file their cargo manifest 24 hours prior to a vessel's departure. The new security regulations have created new challenges for scheduling the movement of trade cargo, generating new demands along the entire logistics chain. However given that US is one of the major trading nations in the world and the new security regulations are of a long-term nature, other regions and nations would sooner than later adopt similar policies. The TMS solutions will have to incorporate these provisions for cargo security.

5. Necessary components for next generation TMS solutions

The TMS solutions have mainly addressed the manufacturers, distributors and retailers – “the “shippers” – who need to manage, control and plan their transport and logistics operations as a part of their materials planning, procurement and distribution functions. However, they failed to see that transport and logistics activities would be increasingly outsourced to 3PLs and 4PLs. Though outsourced contract logistics accounts for only 10% of the total market, the value growth on a time scale is impressive. For instance, the European contract logistics market grew by CAGR of 13% between 1997-2002, a sure enough sign that when margins are under severe pressure, every penny that can be squeezed out of operations is important.

The 3PL or 4PL business strategy is essentially powered by its ability to leverage its knowledge of global supply chains, and its competency for skilful exploitation of dynamic data layers embedded in the working of transport and logistics chains. Dynamic data modelling based on RFID and wireless network, real-time document exchange, track and trace, multi-country and multi-lingual interfaces are only some pointers to the adaptive challenges facing next generation TMS solutions. TMS can achieve this for 3PLs and 4PLs in a number of ways.

5.1 Risk mitigation

3PLs cannot afford to make a mistake when selecting a mission critical solution. The service obligations bind them to service delivery standards that go beyond conventional third party freight handling and carriage-related risks. This is particularly evident in 4PL and LLP contracts, where the service provider bears partnership risks in successful

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management of the supply chains, often at the front-end with suppliers/vendors. As part of the contract, they also handle synchronisation tasks relating to production/supply scheduling, quality audits, inventory control and planning, and transport logistics, all of which require business risk management.

Risk mitigation and assessment practices in LLP contracts thus involve detailed logistics engineering and iteration of tasks, processes and responsibilities that have to be well-defined and built into a total system management and execution design. The TMS for such contract logistics assignments need to factor in structural and functional components responsive to the risk mitigation needs of 3PLs and 4PLs. They also need to be sensitised to business risks arising out of deployment of their fleet and warehousing assets and other high cost shared networks and hub-spoke operations.

5.2 IT architecture

The technical architecture on which TMS solutions have been developed is in continuous evolution along with developments in information and communications technology. Whilst client-server and web-enabled solutions that utilise proven technology (e.g. J2EE, Java, HTML, XML, etc.) to facilitate information sharing and cost reductions are available, the final choice will be a function of HOW particular technology is acceptable to the industry for its ROI performance. Further design and engineering choices for next generation TMS solutions will continue to be dependent on how the 3PLs and the IT companies decide to partner and relate to one another.

System Characteristics	Advantages
Hosted, not installed	Enables the TMS to be implemented more quickly, at lower cost, with reduced risk and complexity; adoption is driven by business considerations, not technological constraints
Subscription or transaction-based pricing	Shifts the performance risk from the customer to the TMS vendor and opens the TMS market to much smaller shippers
Multi-tenant architecture	Passes along scale economies (data centre, hardware, database, and systems software) to smaller shippers
Web native architecture	Is a true multi-tiered architecture, including a web-based server component; does not just put a web front-end on a client-server system; enables scalable system securely accessible by anyone with a Web browser
Single code base	Is less cumbersome than supporting multiple code bases across customers, reducing cost and complexity of upgrades, and allowing more frequent upgrades

5.3 Flexibility and scalability

The 3PLs manage diverse and demanding operations. While some are based on asset-networks, others are based on dynamic information sharing and exchange capabilities. 3PLs also serve multiple customers who require solutions based on diverse service competencies and asset support bases. Next generation TMS solutions therefore need to be flexible and scalable to users' businesses and transaction process requirements. Modular application development that moves in outward concentric circles, starting from core process capture graduating to more dynamic aspects of process capture, could be most appropriate. They need to be user configurable and re-configurable (e.g. parameter or rule driven software) and enable generation of analytic and implementation support. Unless TMS solutions enable such flexibility and scalability features, they will be less acceptable for solving practical problems confronting 3PLs.

5.4 International features/ languages

Logistics service providers operate across wide geographies and cultural landscapes. While many attributes of their operational conditions need to be standardised and built into a common framework, exceptions management forms an inseparable aspect of international logistics management. Operating conditions vary widely from country to country, region to region, and often airport to airport/seaport within the same country. Logistics service providers will need solutions that can help in making choices between different modes, like air and sea routes across the globe and truck routes across Europe, North America and South America, and also evaluate and inform how different countries of the world would impact them and operations.

Cross-border movements, Customs regulations governing trade merchandise, different product nomenclatures, goods classification, documentation requirements, hub connectivity to cargo origination and pick-up points, trade issues like currency exchanges, taxation, trade restrictions, anti-dumping, banned goods list, preferential trade policies of governments and official language in which documentation is acceptable, can present issues that can make or break critical operations. Exception management features in terms of the above issues and multi-lingual interfaces are therefore key enabling features that need to be built into next generation TMS solutions. LSPs will also need the ability to view the applications in several languages, depending on each user's profile.

5.5 Security Applications

Security is a compelling and recurring event for which both shippers and 3PL companies are trying to come up with a well-structured response. From a logistics perspective, security compliance gives rise to many process imperatives that impact the logistics chain, starting from pre-shipment of freight to the final delivery cycle. To ensure that security compliance overcomes delays and hold-ups in the smooth conduct of logistics operations, it needs to be factored into formal logistic process planning and execution

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systems as a well-defined element. Security issues also concern data security, claims processing, product safety, etc., which also need to be protected.

3PLs become the principal vehicle for implementation of security-related compliance programs, and have a great deal to gain from next generation TMS solutions that incorporate these features.

5.5.1 Customs documentation

Cargo manifests for export/import cargo need to comply with Customs laws requirements that vary from one country to another. Some aspects of Customs administration, like harmonised coding and commodity classification, are already part of internationally accepted standards and protocols governing cross-border trade. Knowledge of tariff practices under various Customs unions and preferential trade arrangements and the implications of these for day-today management of freight traffic, is one of the most tenuous tasks of international global logistics management.

Increasing standardisation demands by 3PLs form a crucial element to be included in how future TMS solutions are designed. Building necessary interfaces between the different Electronic Document Interchange (EDI) standards followed by different agencies is one of the key requirements of 3PLs.

5.5.2 Proof of delivery

Proof of delivery (PoD) marks the completion of a single conventional freight shipment cycle, and generates a billing cycle. Track and trace features enabled by GPS and other satellite-aided communication networks are now used extensively by major 3PLs. But the concept of PoD and unit transaction costing, pricing, and billing in contract logistics operations presents a different scenario. Not all value-added activities here will have the same attributes as conventional freight. With total visibility of the service pipeline and the nature of the service itself, the PoD means different things to different partners in the service chain.

Performance and service delivery commitments of 3PLs can only be defined contractually, and entail a range of performance and fulfilment parameters. Tracking and monitoring such performance metrics requires advanced TMS solutions geared to generate the required data and analytics on a real-time basis.

5.5.3 Certified shipper's status

Conventional distinctions between “shipper” and “consignee” have increasingly come under the scrutiny of various regulatory programs. They also impinge on value-added service features that 3PLs provide for their clients, such as claims processing, demurrage, indemnity and insurance, Customs clearance of goods, and cargo

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deconsolidation and distribution at destination ports. Bundling of several of these features into comprehensive service contracts by 3PLs and integrated forwarders have tended to overcome the effects of these conventional distinctions, by recourse to various Customs accreditation and shipper certification programs.

Increasing pressures on 3PL service contracts to assume greater “shipper” responsibilities as in break bulk carriage of goods and parcel services, handling of parts logistics, “merge-in-transit” and reverse logistics services, have encouraged various shipper accreditation programs, e.g. by the World Customs Union (WCU), and “known shipper”. These have important beneficial consequences for managing trade documents like the House Airway Bill, Airway Bill, Bill of Lading, Custom’s Import Manifest, Carrier’s Cargo Manifest etc., which require clear definitions and separations of responsibilities, liabilities and service obligations.

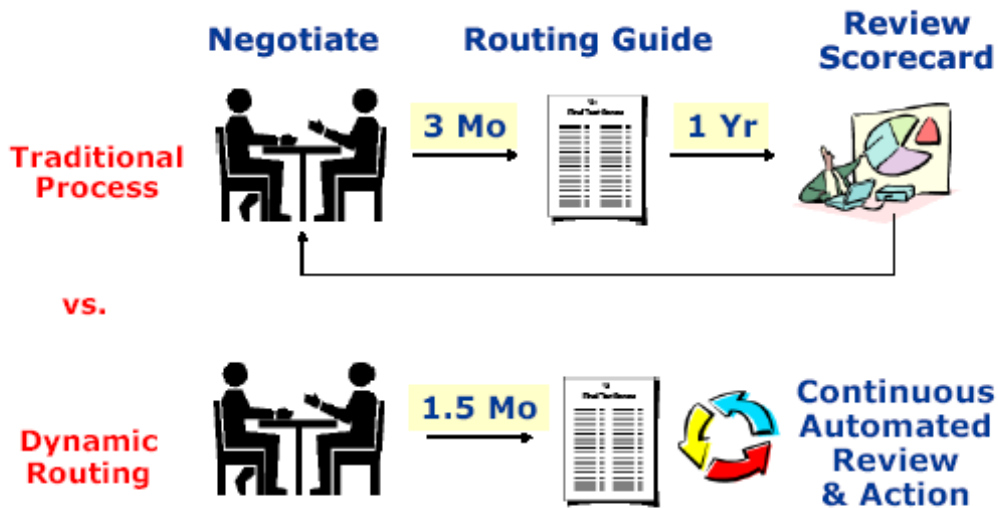
3PLs need to work their way through a maze of “speed-breakers” in the logistics chain. The only way to minimise their impact is to build high-g geared security compliance systems and features that span the entire logistics chain. The next generation TMS would need to have foolproof security audit features that ensure the objectives of various certified shipper programs are met.

5.5.4 Event tracking

To achieve best-in-class service standards, leading 3PLs have been effectively using various IT tools like bar code and radio frequency technologies that ensure total visibility to their customers. Event tracking further helps service providers to plan and allocate required warehousing space, carriage slots for transit, determine likely pallet sizes, number of containers required, etc. The successful use of IT based event tracking enables 3PLs to leverage low-cost methods to accurately gather and disseminate data.

Apart from freight transit visibility features, comprehensive event tracking systems, including video capture, can promote understanding of real-time data events, support decision-making capabilities, and automatically trigger proactive intervention measures and corrective actions. Where supply chains tend to continuously multiply and criss-cross each other, effective event tracking assumes a critical relevance.

With logistics processes integrating ever-greater supply chain functionalities (like inventory planning and control, warehousing, both inbound and outbound movement of goods), the 3PLs are confronting a far greater degree of complexity of events to manage and those to be assigned to TMS.



Traditional versus Dynamic Routing Process

Source: Finmatica

5.5.5 Data security

Information and data on how logistics pipelines actually work is as important as what goes on in those pipelines. The scope of such data is very wide and covers many different types operational data – both of a proprietary and a non-proprietary nature. Significant opportunities for value addition hidden in these data layers can be captured and used by various stakeholders. Hence access and use of such information, and the question of whether access and usage is to be allowed - and to what level? - are among key data security issues. The vexing issue of whether data needs to be disclosed to Customs should also be fully clarified by the shipper and freight carrier/ forwarder.

As 3PL business models undergo basic changes, there is a case for openness between contracted parties and a need for shared information.. Multitudes of data streams that emanate from complex logistics operations are making demands on data warehousing and retrieval methods. Thus the use of appropriate network security protocols and encryption standards for data protection assumes a key importance, particularly in respect of the new international security regulations.

The next generation TMS solutions would have to incorporate a range of data security features with regard to data capture, storage, retrieval, access and encryption. The ability of 3PLs to improve the efficiency of operations and validate customer service levels is also directly related to their ability to capture data and analyse, prioritise, adjust and redesign the operation.

5.6 Difference between old and next generation TMS

Over the last decade, TMS solutions have undergone a sea change in how key strategic issues in the transportation and logistics services market have been addressed. Changes have occurred not only in technical architecture, e.g. offline data processing/management and real-time data/event capture, LAN/WAN-based networks and web-enabled and wireless/mobile protocols like GPS, GSM and conventional bar-coding, and dynamic RFID technology, but, more importantly, real-time operational, execution and decision support issues are being addressed.

The first generation TMS addressed issues of planning, optimisation and rationalisation issues like fleet or vessel deployment, shipment order processing, route optimisation and other strategic functions. Most of these were, however, stand-alone tools, and did not allow space for exceptions and dynamic changes. However, as industry users began to realise the benefits of optimisation and transport planning tools, they started to look for integrated solutions that combined optimisation and planning features with the execution of internal processes of decision-making and information sharing within various layers the enterprise.

TMS focus also gradually widened from outbound logistics to include inbound logistics, in particular the incorporation of Warehousing Management Systems (WMS) features for a more diversified user community. Since then, 3PL companies had to increasingly factor in the critical domain-specific issues in their TMS platforms, particularly in regard to managing dynamic business process issues, rather than merely emphasising the generic advantages of their technology solutions.

5.7 Illustration of next generation TMS

The future of the next generation TMS has to support mainly three core business functionalities:

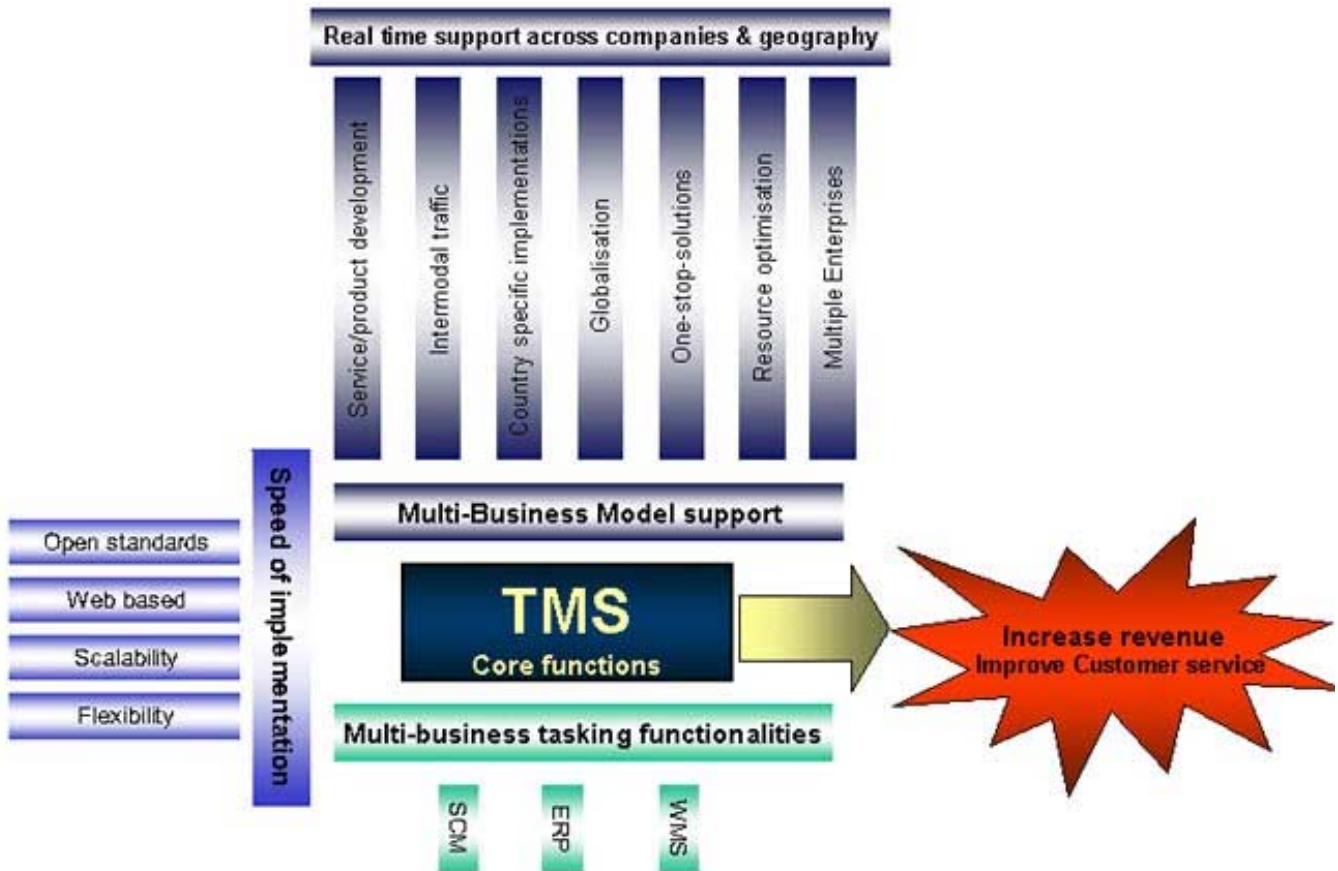
- Multi-business model support
- Multi-business tasking functionalities
- Speed of implementation

Multi-business model support will be a key enhancer for the future of the transportation industry. Supporting an ever-expanding business model across geographies, intermodal traffic and service enhancements will allow transportation service providers to stay competitive in the future and simultaneously increase revenues and customer services.

Multi-business tasking functionalities is another area that is growing in importance, specifically considering the convergence of 3PLs and integrated service offerings with clients. Integration with back-office functionalities directly into customers' information infrastructure will be a necessity.

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Speed of implementation is a crucial factor. When looking at a project spanning years ahead it's important that there will be no technical liabilities or bottlenecks to implement a new service infrastructure.



Source: eyefortransport

6. Conclusions

The transport and logistics services market is witnessing fundamental transformation that presents many new business opportunities as well as challenges. 3PLs and 4PLs face the uphill task of not only reducing the logistics costs of their customers and clients but also their own operating costs as well as improving the profitability of their business.

They can do so only by extending the logistics value chain by innovations in their service offerings that will benefit all partners in the collaborative business model. A key enabler in this direction is the 3PLs' ability to leverage their knowledge and assets using the best-of-breed transport management solutions. In order to meet their needs and requirements, next generation TMS solutions would have to incorporate features that support their business and operations.

Some of the main conclusions that emerge from the foregoing sections can be summed up as follows:

1. There is a trend towards a business model based on integration of different types of transport and logistics services. One of the most significant we can see is the convergence of TMS and Supply Chain Solutions. 3PLs identify this trend and demand integrated TMS solutions that combine planning with execution features.
2. 3PLs increasingly handle outsourced logistics once managed by manufacturers and retailers themselves. This shift will have implications for next generation TMS development in terms of meeting the needs and requirements of its new target users.
3. Rapid developments in technology like the Internet and wireless networks have generated new capabilities that enhance logistics service quality, speed and operating costs.
4. The adoption of new TMS solutions can enhance operational capabilities that are increasingly indispensable for top line growth and the successful restructuring of operating costs.
5. There is increasing emphasis on providing total visibility in the supply chains as a multi-tiered collaborative business framework takes hold of outsourced logistics services.
6. Globalisation of manufacturing and sourcing needs extended geographical networks, diverse service portfolios, and consolidation of pressures in the 3PL industry.

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7. Trade regulations and cargo security have undergone basic changes, and demand a structured response from the 3PL and shipper community, as well as the application of advanced technology tools to ensure compliance.
8. The next generation TMS will have several new components, and will provide 3PLs with the required flexibility, scalability, data security and risk mitigation features underlying the requirements of their business and operational needs.

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