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## **TIME-BOUND LOGISTICAL SERVICES AS A RELEVANT FACTOR FOR MULTIMODALITY IN SHIPPING**

*The baseline of this paper is the current market situation that in the present global situation with the full swing of transportation and new logistical concepts, demands new approaches to organization and management of the maritime business towards integration in the supply chains.*

*The purpose of this paper (contribution) is to inform the reader on the concept of time-bound logistical services that appear as a relevant factor in multimodality of maritime operations, and to highlight the features of multimodality which is becoming a business reality, thanks to the underlying need to cover and control the business processes within the entire supply chain. The time and timely information have become a part of competitive logistics. A competitive service is the groundwork and incentive in introducing the multimodal concept into the maritime business.*

*Conclusions of a research confirm the implication that the time, time-bound logistical services and the multimodal concept are closely interrelated and therefore a constant in the modern conduct of business. For that reason the concept of time-bound logistical services is an issue in the sea transport that deserves further study, analysis and eventual introduction in the business practice of the Slovenian enterprises.*

**Key words:** *Logistical services, time component, multimodal transport, integration, distribution centres, transportation by sea*

### **1. INTRODUCTION**

The growth of world trade and the explosion of container operations have posed a serious challenge to multimodal services. The underlying problem can be attributed to the insufficiency of the supporting infrastructure, which was designed to assure a smooth operation of multimodal services, to catch up with

the growth of containerised transportation. Time-bound logistical solutions bring an additional aggravating element - the time pressure under which the service is to be performed, and the demand for integral logistical services with the shortest lead time possible is rising. As a result, revolutionary changes emerge in the market of logistics, both within the service and its individual elements, which often find inadequate multimodality profile. Logistics is gaining new dimensions. In its unwritten law – to deliver the goods in the right quantity, in due time and to the right place – the characteristic of accuracy is all the more highlighted: A delivery in due time and the compatibility of infrastructure are getting extremely important. Concepts like Just-In-Time, Quick Response, Supply Chain Management, multimodality, only add to the relevance and highlight the materiality of time component in optimising the logistical service.

On the other hand, the pressing need for a timely execution is not a recent trend for undertakings in the transportation business. Road and air transport have been there as a faster alternative to shipping by sea for some time. Ships are typical means of transport with long and varying, unstable transit times in particular lately, with congestion in most of the bigger global ports resulting from the high demand for shipping by sea, or over-occupancy of ships. Difficulties can emerge with the so-called integrated logistical solutions, i.e. in the global logistics where different types and modes of transport are combined, along with other elements of logistics in the broader, global framework. The solution can be found in the break-through of multimodal concepts into operational thinking from the viewpoint of integrating the multimodal concepts into the business processes and strategies, as well as developing an adequate port and terminal infrastructure. All the links in the supply chain must be designed with some bearing on the multimodal concept, such as efficient management / streamlining/ development of cargo handling in a way that would support effective fulfilment of the goals set for the entire, global logistical chain. We can see that linking multimodality to the time-bound logistical services is inevitable. In particular, highlighting the transition in the way of thinking. Narrow-angle business strategies, without a broader perspective, belong definitely to the past. The future is open for a joint/shared broad-based business strategy that comprises the globally positioned supply chain in which the multimodal concept will successfully support time-bound or time-dependent logistical services.

## **2. INTEGRATION OF ENTERPRISES INTO NEW LOGISTIC CONCEPTS**

Time-bound logistical services offer better transparency and facilitate planning, which eventually leads to reduce inventories – in particular the so-called safety inventories. Time-bound logistical service is typically limited by three

factors: the transit time, Real-Time Track & Tracing), and interoperability of the transport infrastructure and other logistical attributes. This fact was not overlooked/ ignored in the world: soon this certainty became the main promoter for enterprises to get integrated in concepts such as the Just-In-Time and similar concepts.

On the sea, logistical solutions in which time is relevant are not feasible yet. What are the possibilities, then? Is that possible, after all? Experts believe so and give practical examples for it. If we look into the operations, we find proof that big enterprises – logistics integrators are capable of doing that. In the 1970's, FedEx broke through with a truly revolutionary change by supporting the time-bound shipments to introduce night delivery. There is a solution to each problem, after all.

### **3. INTEGRATION OF THE MULTIMODAL CONCEPT INTO DECISION-MAKING IN TRANSPORTATION**

By definition, multimodality is the process of providing the door-to-door service to a sender /consignor that integrates two or more forms of transport and certain merchandise (freight/ cargo) being conveyed in a general and unified form through all the transport phases. It contains a service that is defined in advance and dedicated. Main forms of multimodality comprise (Branch, 2002):

- Trailer/ truck (road/ sea/ road),
- Swap platforms (road/ railway/sea/ railway),
- “land bridge” – pallet/container (road/sea/airplane/road),
- “land bridge” – trailer/ truck (road/ sea/ road),
- Containerisation (FCL/ LCL/road/sea/railway).

Multimodality is developed in close correlation with the container movement or transport by trailers, and typically influences the time component of the logistical chain implementation. Adequate coordination in terms of time, infrastructure and organization is vital for the implementation of all the steps in the process to satisfy the market demand, in most cases also subject to time requirement. Moreover, integrating the multimodality in transport decisions is a complex task, demanding a great deal of knowledge of the transport route and other logistical issues. Geographical position, differences in infrastructure and time requirements, availability of capacities, handling and freight characteristics are only some factors, out of a great number, that determine an adequate integration, or the feasibility of a multimodal undertaking in a concrete case.

#### 4. FEATURES OF MULTIMODALITY

Branch (2002) has thoroughly analysed multimodality in his work. The analysis reveals the features listed below:

- Multimodality functions in the NVOCC or NVOC organization.
- It relates to a regular, reliable, reasonably priced and quality-level service from “door-to-door”, with transit time in the normal range, acceptable to customers. The process is IT-supported, containing EDI solutions that enable the operator /the undertaking to assume a full control over multimodal operation.
- It develops and coordinates the best performing of all transport models.
- Hand in hand with dissemination of the information–communication technology.
- The network of multimodal solutions is quite broadly extended and fast growing. A wide range of various logistical solutions bring a favourable impact on the expansion of international goods flows and growth of international trade.
- Placed in the logistical environment, it is managed from the consumer’s aspect. Driven by the market principles, which mean that it unites the markets, customers and sales staff.
- The profits generated in a multimodal network and their use ensure the competitiveness of the of “door-to-door” service. In this way, the economies of scale and purpose are used.
- The International Chamber of Commerce and other international bodies assure of a shared responsibility and document management. Trust has been established in the market and trading with multimodal documents through financial institutions, carriers, agents, ship owners, buyers, sellers, and port authorities.
- Multimodality promotes the new role of ports and airports. Ports have become relevant distribution centres where the existing multimodal networks are being developed and improved. We need to mention the development into the so-called “hub and spoke” ports, i.e. a system of bigger 'distribution' ports and smaller “destination” ports. The developing new role of ports is changing the sample of international distribution, faced with a decline in the quantity of direct freight from "port to port", giving way to increased multimodality. The so-called dry ports are developing (within the sea ports or their surroundings).

Multimodality certainly facilitates the development of new markets and an expansion of international trade. It also improves the quality of goods as it has a bearing on appropriate delivery (timely and physical). The quantity of goods

carried rises, and the transit times are shorter. Last but not least, that system reduces the need for packaging and enhances the development of high tech consumer markets. To conclude with, we can say that it joins various cultures and modes of operation, which contributes to approximation of modern business world.

## **5. HOW DOES MULTIMODALITY EVOLVE?**

The situation in the market and the development of Distribution Centres demand multimodality as the underlying distribution method in competitive markets. The parties involved in a concrete business seek optimum transport route at the competitive rates and in within acceptable transit time. The basic intention is to assure the delivery in due time. Branch (2002) has listed a number of reasons that support the development of multimodality and highlight its attractiveness. The “Just-In-Time” concept, among others, has already taken the decisive role in modern operations of enterprises and requires a dedicated and scheduled arrangement within the warehouse and transport facilities, in which the lead times are highlighted. The conditions governing the market demand continual improvements in the organization of distribution networks. Another favourable promoter is the legal commitment by the multimodal operator, who is held liable throughout the documentation for the multimodal undertaking in all respects and commits itself in the code of practice, under the protection of ICC and other international bodies. A further relevant impact can be attributed to the fast growing containerisation and its infrastructure, thereby expanding the concept through a network of ports. In addition, this development comprises parking lots, free trade zones, centres with a high added value, and similar facilities.

As a result of globalization of international operations, the corporate strategies must change towards synchronisation of the Supply Chains. Accordingly, the synchronisation of the supply chains demands precise and accurate planning of all the steps in the execution of a logistical service within the given supply chain. Precision and accuracy is only possible by a coordinated, concerted action of all the elements, such as different transport types, and the so-called interoperability of various systems. Multimodality is the only way that satisfies all these requirements.

Logistical enterprises have specialised in offering complete “door-to-door” logistical solutions. There is practically no place on the Earth to which a delivery of goods cannot be made. Big logistical operators in international environment (Exell, Kuehne + Nagel International AG, Schenker, DHL Danzas Air & Ocean, P&O Nedlloyd, UPS Supply Chain Solutions, Panalpina, etc.), can advise their clients to select the most cost-efficient method of distribution,

transport, warehousing and other handling within the optimal transport route. In addition, the development of information and communication infrastructure is going on concurrently, which facilitates “on-line” recording and tracking & tracing of all the operations in the given door-to-door service. As a result, the planning and positioning the required equipment and facilities is greatly improved.

*Table 1: Biggest logistics providers in 2004*

	3 PL Provider	In mio USD
1.	Exel plc	11.600
2.	Kuehne + Nagel International AG	9.316
3.	Schenker	8.900
4.	DHL Danzas Air & Ocean	8.500
5.	P&O Nedlloyd	6.700
6.	UPS Supply Chain Solutions	5.300
7.	Panalpina	5.300
8.	TNT NV	4.800
9.	C.H. Robinson Worldwide	4.300
10.	Schneider Logistics	3.400

Source : Global Logistics and Supply Chain Management, 2005.

## **6. HOW ABOUT THE DEVELOPMENT OF DISTRIBUTION CENTRES?**

The success of multimodal concept can only be feasible if supported by adequate distribution centres that enable a smooth operation and execution of all the activities inherent to the multimodal requirements. Lately, we have seen such centres develop near ports, or in the ports resp. That is a logical development, based on the underlying characteristics of the ports as a junction where the sea and land routes meet and the point of exchange of goods and passengers, either between ships or between a ship and means of land transport.

Sea ports have assumed several functions in addition to the conventional one, which has greatly changed over time. Likewise, the logistics has undergone continual changes as a result of globalisation, when there is no inaccessible point left in the world, the technological capacities assure the transfer of

information to any part of the world, and the flows of knowledge, capital, information, people, goods, etc. have no physical limits. These changes have definitely had impact on the conventional functions of ports, which have until recently comprised: the traffic, trading and industrial function (Jakomin, 2002). A new functionality has emerged: the distribution function of the ports, which is closely interrelated with the former functions. The existence of the latest function (Distribution) is feasible and reasonable only if the conventional functions – traffic, trading and industrial are adequate.

## **7. THE DISTRIBUTION FUNCTION OF THE PORTS**

The functions listed above have brought about the development and view that the concept of Distribution is fulfilled. Thereby, the situation was ripe for the introduction of distribution centres in the ports or adjacent to them. On the other hand, with further development of the traffic, trading and industrial functions emerged the distribution activities which called for the organization and specific management.

The role of the ports in the Distribution is viewed as a function emerging as a part of the supply chain for the reasons explained below. Big ship owners have assumed the role of operators in particular big container terminals. As a result, we can see the development of bigger consolidation and logistical centres, the so-called Distribution Centres, designed to feed smaller terminals on the lines established. In these terminals, ship owners have themselves developed the physical distribution to the end user.

It should be noted that ports are not the only point for Distribution centres. But ports are the entry/exit point of cargo from/to a geographical area in which certain distribution activities are in demand. If we look into the practical operations, we actually find many distribution centres located near ports.

## **8. MULTIMODALITY AND DIFFICULTIES IN SEA TRANSPORTATION**

Multimodality and time-bound logistical services are interrelated to the problematic issues of the transport by sea. IN actual situations integrating multimodality in sea transport there are numerous difficulties relating to the transportation by sea.

The current volume of time-bound consignments in sea transport is estimated at 4.8 million TEU. That stands for 6.6 % of the entire market in 2004.

This share is divided in two trading directions: the Trans-Pacific, and the Asia-Europe routes. The products involving the highest dependence on time include the consumer goods and high technological equipment. In short, all products, whose useful life is reduced at a fast rate. At present, the market of the sea transport, or rather the established sea transport system, is not capable of optimisation within the time-bound services, which can be attributed to the lack of any creative re-organization in that area. The control of shipments is not possible, due to non-existing connectedness of the system and numerous transfer of liability. Moreover, real-time transparency is not possible either, due to various information and communication platforms of all the participants, lacking the support to efficient information sharing, and in the environments where the information on shipments is still captured and recorded manually. Likewise, a view from the operational perspective is not favourable for sea transport either. Further factors, like weekly services, transshipment ports, congestion and long queues before the ports, delays in railway deliveries and (crowded) packed motorways near the ports, extend the transit times and by no means facilitate the transport by sea. Sea carriers are coping with three major problems that aggravate their business, i.e.:

- High and constantly increasing costs of the management of the equipment (control and positioning of containers)
- All the higher demand for maritime transport,
- Increasing cost for information - communication technologies.

Despite big investments in equipment for tracing & tracking in the supply chain, there are still dead zones or blind spots where every trace for a consignment is lost. Once a container is on board or brought to the port terminal, it is easy to locate it; the trouble begins when it is loaded on a wagon or truck and shipped to its consignee. Traceability is even more aggravated on the interim terminals, not to mention the time if a container is standing for some time at the consignee. The deficient traceability in such dead zones or blind spots is preventing a better utilisation of the equipment, and extends the transit time. An efficient and reliable tool supporting the real time tracing & tracking allows for a faster capture of status data and locations of the equipment. At this point, an advanced information and communication infrastructure of all the parties involved in a multimodal undertaking proves to be an asset: it enables prompt positioning of the container if the customer requires so.

The congestion of ports is a further, very relevant factor that aggravates a timely delivery of consignments in sea transport. All the ports in North Europe, on the US East and West Coast, in China and entire Asia are faced with the problems of too big demand compared with the capacities available. Terminals are not capable of accepting and dispatching a big quantity of cargo to provide a regular and timely support to the incoming/outgoing goods flows.



The transport policy of the EU has opted for, and advocates the so-called modal shift, i.e. directing the freight from roads to the sea way. However, the transport by sea has come to a paradoxical and extremely unfavourable situation, inadequate to cope with this trend. North European ports and numerous inland ports (along rivers) are extremely congested. Rotterdam, Antwerpen, Hamburg, Le Havre and other ports are struggling with problems that cannot be overcome and are mainly the result of economic situation in China. Its economic growth and rising exports affect the European points of entry.

The congestion of ports has become the major problem of Europe and it is gradually developing towards a threat to the competitiveness of the European economy. The operational problems arising therefrom are detrimental to the supply chains of European importers and exporters: the saturation logically brings the introduction of new rates, and an increase in the current rates. Various surcharges for congestion, the vehicle/truck accounting days of hauliers, aggravated circumstances for the work of stevedores and similar affect considerably the pricing policy of a transport undertaking. The costs for the transportation of containers are increasing.

It is clear that the modal shift from the road to the sea, or the "motorways of the sea" resp., must enable equal or better possibilities for transportation, as well as the quality of services. We need to be aware of the different aspects in the quality of such services, such as compatibility of infrastructure, traffic management and tracing & tracking, efficiency of the administration, and the most relevant element of all – efficient ports with efficient port operations in practice. Only after all that is implemented can we expect a full utilisation of the multimodal capacities, and that would contribute to the competitiveness of sea transport in a multimodal undertaking.

## **9. MULTIMODALITY IN THE FUTURE**

There is no doubt that in the era of globalisation and expansion of markets, the distribution has assumed a highly important role in the supply chain. The markets are benchmarking their growth against the global growth, aiming to achieve an efficient exploitation of all the infrastructures involved. In the course of technological progress, multimodality emerges as a logical solution to the new market circumstances. Therefore, the pressure for the development of multimodality is in the interest of every party involved, for the economic sector and industries, as well as for the governments through adequate traffic policies.

A multimodal undertaking as a provider of logistical service has assumed the responsibility to organise and coordinate other carriers and suppliers of resources, and provide for high technological multimodal network at reason-

able rates that can be accepted and competitive in the market. Here comes the need to assure a uniform liberalised structure of the participants in a multimodal undertaking, who operate in a fully transparent way. In addition, a business environment, fully deregulated from the national bias or culture and political appetites of any kind, is needed as well. Innovation and adoptions as a response to emerging opportunities and threats, are the key elements of the multimodality both in the short and the longer run. The preconditions for such development comprise an integrated and connected transport network, service-oriented business culture, or focusing entirely on the cost reduction, resp. (Marjetič, 2005).

## 10. CONCLUSION

Multimodality will be dictating the execution of logistical services in the future. Bearing that in mind, we can see already today how the container lines are assuming control of their internal services, quality and cost management. Traditional logistics providers are struggling to retain their market shares and apply more multimodally oriented business strategies. This trend has also taken the ports and terminals that are continually competing in introducing and promoting the multimodal solutions. Therefore, it has to be clear to all the parties involved in a supply chain that only multimodality is an appropriate solution for achieving time-bound and quality-driven handling operations in the transition between the numerous links in the chain. The new role of ports as distribution centres dealt with herein, and the enhanced activities of the container-shipping undertakings have given rise to intensify investments in industry, offering exceptional opportunities for increasing the multimodality for various purposes, primarily for the economic ones. Time-bound logistical services remain to be, and are gaining ground towards becoming a key factor that affects the creation and use of the multimodal opportunities.

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## Sažetak

### VREMENSKI OGRANIČENE LOGISTIČKE USLUGE KAO VAŽAN ČIMBENIK MULTIMODALNOSTI U BRODARSTVU

*Kao temelj ovoga rada uzeto je sadašnje stanje tržišta koje u današnjoj globalnoj situaciji punog zamaha prijevoza i novih poimovanja logistike, zahtijeva novi pristup organizaciji i rukovođenju poslova u pomorstvu u svrhu spajanja čitavog niza prijevoznih lanaca.*

*Svrha ovoga rada jest da zainteresirane osobe upozna s konceptom vremenski ograničenih logističkih usluga koje se pojavljuju kao važan čimbenik multimodalnosti pomorskog transporta, te da istakne značajke multimodalnosti koja postaje sve veća realnost u poslovanju zahvaljujući neophodnoj potrebi da se poslovi između čitavog niza prijevoznih lanaca pokrivaju i nadziru. Vrijeme i pravovremene informacije postale su dio konkurentске logistike. Konkurentska usluga predstavlja temelj i poticaj pri uvođenju multimodalnog koncepta u pomorstvo.*

*Zaključci do kojih se u ovome istraživanju došlo potvrđuju misao da su vrijeme, vremenski ograničene logističke usluge i multimodalni koncept usko međusobno povezani, pa stoga predstavljaju konstantu u suvremenom vođenju poslova. Zbog toga koncept vremenski ograničenih logističkih usluga predstavlja glavnu točku rasprave u okviru pomorskog prijevoza koju treba još uvijek proučavati, analizirati te eventualno uvesti u praksu slovenskih poduzeća.*

***Ključne riječi:** logističke usluge, vremenska komponenta, multimodalni prijevoz, integracija, centri distribucije, pomorski prijevoz*

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