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Zarządzanie projektami logistycznymi

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CITY DISTRIBUTION LOGISTICS AS AN ENVIRONMENTAL FACTOR

1. Introduction

The development of the theory of distribution organisation (*SoftLogistics SL*), has reached the stage where it has become necessary to consider the physical features of distribution tools, such as trucks, vans, busses, trams, cars, boats and related material handling equipment.

Usually there is a number of technical solutions (*HardLogistics HL*) applicable to a particular local conditions which can considerably increase economical effectiveness of the whole distribution system. On the other hand the technical solutions have a strong influence on human environment and this aspect should be taken into consideration, too. To some extend local environmental rules and regulations combine both economics and environmental concern. Following the regulations, distribution network operators (as haulage companies, municipal transport enterprises etc.) are constrained by the low to regard environmental standards and press them towards competitive yet sustainable solutions in the *HL* area.

The problem of technical solution *HL* in urban distribution logistics should be divided into logistics *UL,* public and private transport *PT,* and cargo distribution logistics *CD.*

Urban logistics *UL* deals with people conveying and consumable goods flow throughout a network of dense and independently traffic controlled layout of streets connecting a large number of delivery points and collection points, at daily, weekly and seasonal traffic fluctuation.

2. City logistics

City logistics *CL* is a very crucial part of the *UL* logistics. City logistics *CL* is being derived because of the downtown specific traffic conditions-crowded pedestrians areas, narrow streets, concentration of services and shops, air pollution and aesthetics of the representative area.

Cargo distribution logistics *CD* means here organization and control of delivery of medium and small quantity of cargo into an urbanized area, mainly to shopping centres, supermarkets, retailers, households, local industry street infrastructure and building recovery sites.

3. EU transport policy

The EU imported 49% energy demands in 1998. The extrapolation for 2030 says the import will increase up to 71%[1]. The most ineffective fuel consumption takes place in traffic jams. In the EU, about 10% of the roads suffer congestion. It means that 6% of total engine fuel turned into gas emission is directly related to traffic jams[2]

Policy for clean transport should concentrate on the reduction of exhaust gases and noise emission. Approximately, trucks transport covers just 10% of all flows within urban area and it produces 40% of pollution. In addition, it slows the traffic significantly and causes infrastructural problems.

EU energy and transport policy is handled by the Directorate-General for Energy (DGTREN) and Transport and is implemented over most of continental Europe. The objectives are:

- reduction emissions of the six greenhouse gases,
- sustainable urban transport,
- deceleration of progress of haulage transport with reference to economic growth,
- funding infrastructure to discharge congestion and pollution,
- stimulation of increase in rail transport.

There are two basic factors driving the policy:

- energy demand forecast,
- environmental pollution (Kyoto Protocol on greenhouse gases emissions).

Researches on local transport policies (Best Urban Freight Solutions BESTUFS) pointed out the key topics of the *UL*:

- urban freight platforms,
- traffic planning and policy,
- access restrictions,
- weights and dimensions,
- transport units,
- unusual transport modes,
- tolls and heavy vehicle fees,
- intermodal urban freight aspects,

[1] *European Commission (2001) Green Paper: Towards a European strategy for the security of energy supply.* Luxemburg, Office for the Official Publications of the Europeam Communities, p. 5.

[2] T.H. Zunder., J.N. Ibanez, *Urban freight logistics in the European Union*, "European Transport", 28(2004), p. 79.

- e-commerce,
- door-to-door freight transport,
- telematics for urban goods transport,
- environmentally friendly vehicles,
- co-operation of transport operators,
- interfaces between public and
- improvement of Public Private,
- economic improvements,
- environmental improvements,
- improvements for citizens/inhabitants,
- win-win situations.

4. UL objectives

Europe is the most urbanized continent. 80% of the European population live in cities and towns. Approximately 40% of the population live in small towns (10000÷50000 inhabitants), 20% of the population live in medium-sized cities (50000÷250000 inhabitants), 20% of the population live in big agglomerations (over 250000 inhabitants)[3]. These facts imply the importance of the *UL* and motivate the EU to multidirectional researches into urban distribution.

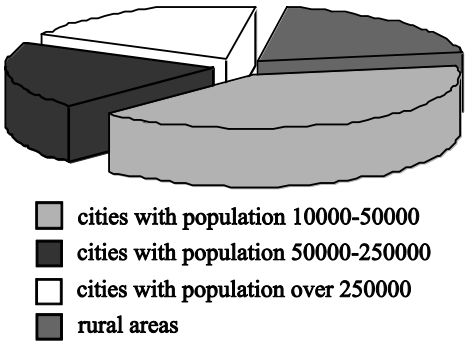

Fig. 1. Population distribution in EU

Source: on basis: J. Munuzuri, J. Larraneta., L. Onieva, P. Cortes., *Solutions Applicable by Local Administrations for Urban Logistics Improvement*, Cities, Elsevier 2005, Vol. 22/1.

Recently, the technical parameters of vehicles and technical equipment applicable have been taken into account. The technical solutions have not yet set out to pay an adequate role in *UL* as a factor of logistic effectiveness and an element of city environment. Nevertheless, technique is involved in logistic main objectives.

[3] T.H. Zunder, J.N. Ibanez, op. cit., p. 79.

The *Urban Logistics'* basic objectives are in general:

- increasing economic efficiency businesses on an area,
- increasing inhabitant's personal efficiency (as though travelling time reduction),
- curbing the spatial impact of goods flow,
- combining distribution delivery destinations,
- integrating the municipal logistical needs,
- reducing negative environmental impact,
- stimulation of co-operation as of logistic operators themselves as of merchants businesses and municipal logistics operators,
- increasing transport safety and reduction of street incidents management time,
- enhancing attractiveness of an area.

The particular list of objectives and their hierarchy is to be established by the local government.

5. Logistic costs

One of the most important logistical targets is cost-effectiveness. On the *HL* field a lot of technical and organizational options exist for achieving the goal at acceptable level, though none without a compromise. To choose the most suitable option the information on:

- the impact of distribution services and waste removal,
- their costs, and
- the consequences of choosing one option over another is needed.

The cost-effectiveness analysis is a tool for combining these three sets of information to obtain a synthetic valuation of the option.

The term "cost-effective" describes the dominating option in such an analysis. The analysis is based on cost limitation or impact level. Thus, for a given cost, option A is cost-effective if its impact is greater than that of option B, all other factors being equal. Or for a given level of impact, option A is cost-effective if its cost is less than those of option B, all other factors being equal.

Transport in logistics[4,5] especially in the supply domain, generates a significant proportion of the logistic global system costs. This regards especially distribution costs. These costs can be minimised through the proper aggregation of means of transport and materials handling equipment, which requires all factors influencing the economical efficiency of transport services to be considered. The importance of reducing transport costs in the supply chain is illustrated in Fig. 2. The relation between economical efficiency and the aggregation of a vehicle and a cargo manipulating device can clearly be observed in channels of removal, too.

[4] E. Gołembska, *Logistyka jako zarządzanie łańcuchem dostaw*, AE, Poznań 1994, p. 41-51.
[5] F.J. Beier, K. Rutkowski, *Logistyka*, SGH, Warszawa 1998, p. 61.

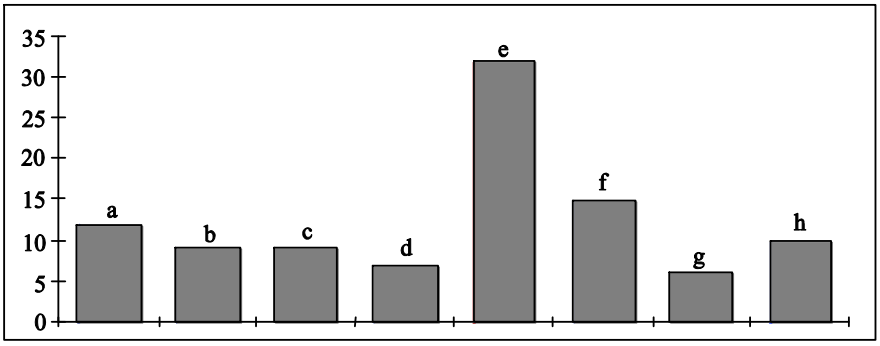

Fig. 2. Structure of costs of *a-logistic system*

a – *supply transport*, b – *materials*, c – *purchasing and storage costs*, d – *production*, e – *distribution transport*, f – *warehousing and forwarding*, g – *distribution financing*, h – *sales management*

Source: M. Savy, STELLA Workshop ICT, Innovation and the Transport System Arlington, VA. 15 – 17.01.2002.

6. Urban logistic and environment

Urban traffic constitutes an important turning point in materials flow, too. Goods are delivered into the area and wastes are to be moved away in opposite direction – Fig. 3.

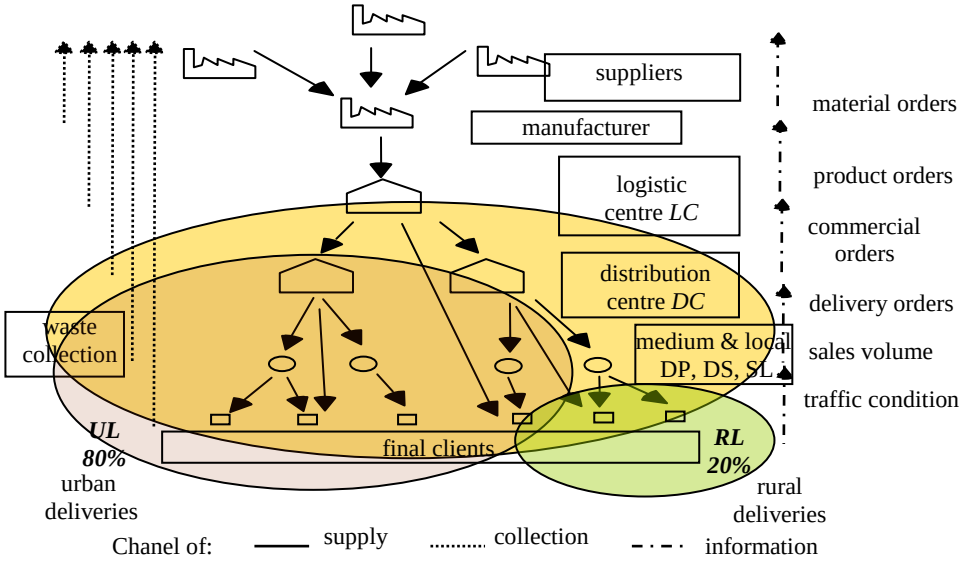

Fig. 3. The supply domain in the logistic system

Source: the author.

The *UL* distribution system consists of an urban infrastructure, the market, technical means of goods transport and handling, municipal traffic, private and transit transport, as well as local authorities.

Local authorities play the key role in *UL*. Local authorities decide on traffic regulation, traffic control and monitoring, city distribution centres and sellers' localization. Usually, the intention is smooth vehicular traffic flow throughout the town and specially – downtown area. Environmental impacts of freight distribution have often been omitted.

In recent years, sustainable solutions have become an important strategy part of all the actors' on urban distribution scene. Local authorities, who are to obey EU regulations, work on, establish and initiate new solutions; these should bring into balance the expectations of local businesses, municipal and transit transport and inhabitants' (voters) needs.

The cost of new solutions is spread unequally on the actors. Higher costs of ecological solutions must be borne by transport providers. Freight companies are expected to be the main opponent of the new solutions in the field of *UL*.

7. UL technical means

Except for ratailers, a significant volume of goods delivered to supermarkets and general stores is supplied in palletised units. Therefore, among the means of transport used in markets supply chain an important role is played by trucks equipped with lifting devices, which are especially convenient in cases of palettised units have to be handled. A group of such devices includes: truck loaders, lifting tables, forklifts and loading platforms (Fig. 4).

Lifting devices on trucks are a source of added value, expanding the range of services by delivery of the goods to a specific location.

Fig. 4. Lifting devices on trucks in the supply chain

Source: technical sheets by Hiab, Palfinger AG, Bear.

The commonly applied selection criteria for these devices are their basic parameters, e.g. load capacity, manufacturer and price. This kind of approach does not ensure optimal economical efficiency. The selection procedure for such a device should involve – apart from cost aspects – costs of technical service and operation, too. Economically efficient selection of a technical solution for materials handling problems within a supply chain affects also the other elements of the logistic system and belongs to the domain of "*HardLogistics*" *HL*, and is an important supplement to the decision processes of "*SoftLogistics*" *SL*.

Palletised units are more suitable for time-saving mechanical handling and they are applicable in mid-size trucks. Therefore, trucks equipped with a handling device should be recognized as effective means of goods delivery to the city centre, in combination with organizational means.

Fairly new concept in *CL* distribution is based on the Cargo Tram solution put into operation by the Volkswagen Factory in Dresden. The idea was adapted to *UL* requirements in the pilot project "City Cargo Amsterdam" and started in 2007.

Fig. 5. Cargo Tram

Source: http://www.citycargo.nl.

The tram usage in *UL* as it is expected will improve the whole city logistic network. The main advantages are the reduction of traffic stoppages, air pollution and noise caused by trucks, increased road safety, the use of an existing tram rail system, shortened delivery time. Additionally, the delivery can be easier planned and controlled, and the cars withdrawn from municipal transport can easily be adapted to cargo vehicles.

Similarly, trolleybuses and commuter trains seem to be very prospective in city logistic networks.

8. UL organizational means

A conductible organizational function in *UL* management is performed by the local authorities as a legal administrator of the urban traffic regulation. The authorities can enforce changes in the urban freight flow system by regulations for the transport within the regarded area. The measures applicable as congestion charging, vehicle weight restriction, vehicle access time restriction, low emission zones and inner city hubs influence goods delivery and reception organization and change (usually increase) the costs of distribution.

All the businesses involved are to bear exploitation, organizational and investment extra costs of adaptation which probably exceed significantly gains, if any. In addition, some companies competing on the freight market will face pressing into co-operation. Vendors will have to accept changed delivery hours and even the place of delivery.

The progress in sustainable *UL* needs step-by-step decisions made by the government. The process should be monitored and the impact of previous steps measured to control effectiveness of the changes and make adequate decision on subsequent operation steps. The presentation of the measured results to the community should be the concern of the government.

9. Conclusions

The dynamic development of urban logistic should be supported with adequate protection of environment. The protective initiative belongs to the local administration and should respect national law. The authorities have to consider expectations both the community and the businesses and deal with their negative perception at the first stage of implementation of sustained logistics solutions.

The impact of the solution will strike mainly businesses, but the costs will be spread unequally. A certain group of stakeholders will finally benefit and the freight companies cannot expect any profits on *UL* implementation.

The decisive position of the administrator has remarkable influence on the life quality in the city during the changes after the final stage is reached. The implementation process that might last for up to a few years, even if a suitable transformation direction has been chosen, might not be socially accepted and even destructive to the freight companies and consequently to economic activity of the city.

Logistics, as a discipline of science, that development was made possible due to the existing technical potential, is reaching a state of saturation and the system-oriented approach to the *CL* cannot neglect the influence of technical solutions. Technology should be regarded as one of the key factors in *UL* and its influence should carefully be analysed by urban planners.

Literature

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MIEJSKA LOGISTYKA DYSTRYBUCJI JAKO CZYNNIK ŚRODOWISKOWY

Streszczenie

W ciągu ostatnich kilku lat ekologiczne rozwiązania dystrybucji stały się strategicznie ważnym przedmiotem działania wszystkich podmiotów uczestniczących w systemie dystrybucji miejskiej w licznych miastach europejskich. Administracja miejska, inicjując działania w tym zakresie, powinna starannie wyważyć oczekiwania podmiotów sfery dystrybucji, transportu komunalnego, transportu tranzytowego oraz społeczności lokalnej.

Koszty nowych rozwiązań rozkładają się na te podmioty nierównomiernie. Większą część kosztów rozwiązań proekologicznych poniosą przedsiębiorstwa transportowe, ponieważ w ich przypadku znaczne zmiany dotyczą sfery organizacyjnej oraz technicznej. Dlatego należy się spodziewać najsilniejszego oporu przeciw takim rozwiązaniom właśnie ze strony przewoźników.

Jeżeli nowe rozwiązania będą wybrane prawidłowo, mogą być społecznie nieakceptowane. Mogą także powodować znaczne pogorszenie stanu przedsiębiorstw przewozowych, co może znaleźć odbicie w stanie ekonomiczno-kulturowym obszarów objętych wprowadzaniem nowych rozwiązań logistycznych. Dlatego władze lokalne powinny starannie przeanalizować wpływ koniecznych zmian w zakresie środków transportu dalekiego i transportu bliskiego na skutki nowych rozwiązań dla całej społeczności.