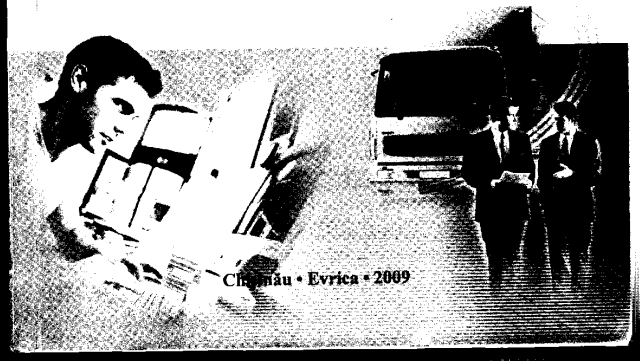
ACADEMIA DE TRANSPORTURI,
INFORMATICĂ ŞI COMUNICAŢII

SISTEME DE TRANSPORT ŞI LOGISTICĂ

Materialele Conferinţei Internaţionale
Chişinău, 22 – 23 octombrie 2009



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PROBLEMELE SISTEMULUI DE TRANSPORT ÎN REPUBLICA MOLDOVA

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În orice societate serviciile de transport au o importanţă deosebită. Prin intermediul transportului de mărfuri, produsele sau materialele pot fi expediate între diferite unităţi economice sau indivizi. Transportul de pasageri permite deplasarea persoanelor atât din motive personale (vizite la prieteni, plimbări etc.) cât şi pentru a participa la activităţi de natură economico-socială.

Îmbunătăţirea eficienţei activităţii de transport a reprezentat unul dintre obiectivele revoluţiei industriale, dar rămâne actuală şi la începutul mileniului III, reprezentând unul dintre pivoţii schimburilor economice internaţionale şi turismului.

Avantajele datorate transporturilor sunt, în general, numeroase. Existenţa unei eficiente reţele de transport reprezintă o condiţie de bază a creşterii economice, a competitivităţii şi a gradului de ocupare a forţei de muncă.

De aceea, devine din ce în ce mai îngrijorătoare constatarea la care s-a ajuns, în primul deceniu, că sistemul nu funcţionează aşa cum ar trebui. Astfel, se constată că, în unele situaţii, datorită unor efecte negative, precum poluarea chimică, s-a diminuat cu mult cererea de locuri de muncă pentru activităţi desfăşurate în aer liber în zonele urbane. Totodată, externalităţile negative datorate activităţii de transport conduc la deteriorarea generală a mediului de viaţă.

Accidentele reprezintă o altă cauză importantă a deceselor. Acest fenomen este principala cauză a deceselor survenite la persoane sub 40 ani.

Chiar dacă actualele politici din domeniul transporturilor vizează reducerea anumitor externalităţi negative activităţii, densitatea aglomeraţiilor, în special din traficul rutier, va tinde spre valori din ce în ce mai mari fără adoptarea unor noi măsuri.

În prezent, starea transportului moldovenesc este similară cu cea a economici din R. Moldova, dar spre deosebire de alte domenii economice, transporturile, ca utilităţi publice, sunt mai intens influenţate de evoluţiile economiei naţionale şi internaţională preluând atât punctele slabe cât şi pe cele pozitive ale acestora.

Зная среднее количество пассажиров, перевозимое за 1 рейс автобусом (в первом приближении можно брать *Qавт=39*) можно определить нагрузку на автотранспортную систему (потребность в автобусах во времени):

$$a^{+}_{1,n}(t)=\frac{q^{+}_{1,n}(t)}{Q_{авт}},$$
$$a^{-}_{1,n}(t)=\frac{q^{-}_{1,n}(t)}{Q_{авт}}, \quad (7)$$
$$n\in\{a01..a09\}$$

Соответственно, суммарное количество самолетов находящихся на самолетной стоянке в момент времени *t* определяется выражением:

$$C_n(t)=\int_{t_0}^{t}\left|c^{+}_{1,n}(t)-c^{-}_{1,n}(t)\right|dt, n\in\{a01..a09\} \quad (8)$$

Аналогичные зависимости построены для всех видов транспорта.

Таким образом, разработанная математическая модель транспортного обеспечения футбольного чемпионата «Евро-2012» позволяет рассчитать потребности в количестве транспортных средств для всех видов транспорта, потребность в стоянках для самолетов, автобусов и автомобилей, оценить существующую и прогнозируемую нагрузку на транспортные системы принимающих городов, разработать организационные мероприятия для снятия пиковых нагрузок и оптимизации работы транспорта.

A PROJECT OF SUGGESTIONS IN DEVELOPMENT STRATEGY OF UKRAINIAN LOGISTICS POTENTIAL

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A lot of factors influence on forming and development of logistics potential, the effective method of estimation, which will give possibility to define perspective progress of the Ukrainian logistics market trends. As logistics potential is determination of logistics possibilities by complex approach, will make attempt find out the group of factors which can influence on the effective result of these possibilities (limiting parameters) (fig.1).

Will get the following dependence to formalize the estimation methods of efficiency on the state logistics potential:

$$LP = f\{[TP]; [W\text{-}HP]; [TrP]; [PP]; [FP]; [NLB]\}, \quad (1)$$

where *LP* is logistic potential,

TP is a transport potential,

W-HP is ware-house potential,

TrP is transit potential,

PP is personnel potential,

FP is financial capital investments,

NLB is a normatively legal base.

Taking into account all these factors, we will be able to get:

- growth of demand on logistics services, related to development trading and multiplying the traffics goods;
- appearance of new logistics services;
- multiplying the particle of logistics services which are passed to on autsorsing the professional logistics companies (development of contract logistics);
- growth demand on complex logistics service in accordance with conceptions of supplies «from doors to the doors», «just-in-time» and etc.;

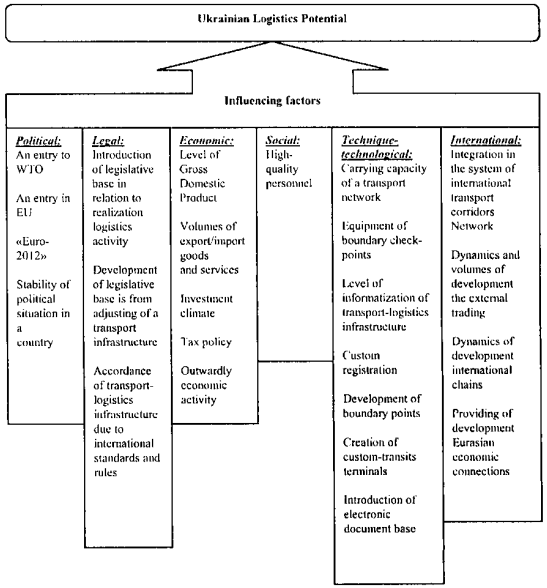

Figure 1. Generalized influence factors on Ukrainian logistics potential

- grant and development of Supply Chain Management;
- standardization and certification of logistics services in accordance with international requirements;
- complex logistics customer service;
- development of logistics providers networks, which will provide typical complex services clients on all territory of Ukraine;
- development of logistics providers (3PL and 4PL), that will carry out the strategic management of business and management of other logistics companies;

- development of strategic partnership with the companies of productions and trading.

Will consider each the component of formula (1) separately.

The feature of a transport infrastructure consists of requires more clear co-operation of separate government services and subsections on providing transportations of loads, saving, technical service and repair of rolling stock, effective use of rolling stock, financial and monies resources, implementation of transportations in the set term and high-quality. Most transport supply chains pass through the followings areas of Ukraine (the roads of international value): Volin, Zhitomir, Kiev, Zakarpatian, Odessa, Winnitca, Chernigov (fig.2).

By a theorem about a maximal stream (Ford-Falkerson's model) for the set network will expect the maximal size of stream.

Going out from the values of thresholds of passing the amount of cars after categories and mean values of categories will find a carrying capacity each of regional roads. Will take calculations to fig.3. Will build count between such areas: Volin, Zakarpattya, Odessa, Kiev, Chernigov (fig.4). Will designate areas as top column. For the set network (set count) the maximal size of stream will equal a minimum carrying capacity to the cut

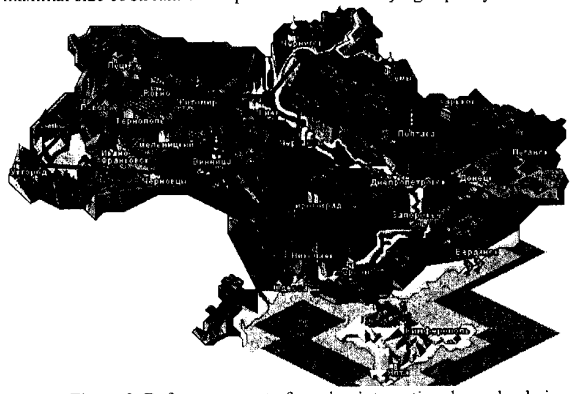

Figure 2. Reference count of passing international supply chain

Figure 3

A division by categories of the Ukrainian and calculation of carrying capacity

Name of areas and value of highways	Distributing of roads with hard coverage on categories (km)					Mean values of categories	Value of carrying capacity, cars/days
	I	II	III	IV	V		
1	2	3	4	5	6	7	8
Vinnitsa	96	366	1814	6284	410	3,73	804
Volin	48	498	1016	3808	374	3,69	813
Zhitomir	232	412	1342	4506	1813	3,87	775
Zakarpattya	17	310	632	797	1564	4,08	245
Kiev	404	1002	3417	3225	462	3,27	917
Odessa	216	574	819	6082	386	3,72	806
Chernigiv	126	190	984	5683	205	3,79	792

Figure 4. Oriented count

Will consider the algorithm of finding maximum stream now. It consists of two parts. First – finding of area, in which it is possible to increase began to flow. If such area is not, a maximum stream is found. The second part of algorithm multiplies a stream along found area. Every top of network in the process of work gets a certain mark: the first constituent of mark shows that a stream must be megascopic or diminished on an arc which connects one top with other. A constituent is second is a current value which a stream must be megascopic on. An algorithm begins a robot from an arbitrary possible stream, which can be and zero. (Addition 1).

Consequently, development strategy of Ukrainian logistics potential must be based on organizationally technical, technological co-operation of different types of transport, to wide development of intermodal and multimodal transportations of loads, based on logistics principles and sponsorship.

For providing of the proper level of service a primary value together with development of transport communications with proper providing must be creation in large transport knots along the route of international transport corridors of multimodal terminal handlers and logistics transport-distributive centers which will function on the basis front-rank logistics technologies and provide integration of goods, materials, information, streams of services and financial.

It is known that in the European countries material well-being warehouse areas settles accounts depending on the amount of population which answers on the average 400 sq.m. on 1000 persons.

Thus, from afore-mentioned will expect necessary material well-being logistics centers in the basic areas of passing the ways of International Transport Corridors (fig.5).

Creation in the afore-mentioned areas of Ukrainian network of regional terminals and logistics centers, incorporated in the regional logistics transport-distributive systems on the basis of forming unique system of the organizationally economic, informative and normatively legal providing of management the system of supply chain, will also provide new workplaces for a population. Using the European indexes of calculation of material well-being new workers placed (75 workplaces are on 10000 sq.m.), we will have a next situation (fig.5).

Figure 5

Calculation of material well-being of the Ukrainian areas logistics centers and population new worker places

Name of areas	Quantity of population	Material well-being is needed ware-house areas	Forecast workings seating capacity
1	2	3	4
Zakarpattya	1243200 persons	497280 sq.m	3730 work places
Lviv	2564100 persons	1025640 sq.m	7692 work places
Rivne	1153200 persons	461280 sq.m	3460 work places
Zhitomir	1311300 persons	524520 sq.m	3934 work places
Kiev	4473400 persons	1789360 sq.m	13420 work places
Chernigiv	1143900 persons	457560 sq.m	3432 work places
Summi	1204100 persons	481640 sq.m	3612 work places
Odessa	2395100 persons	958040 sq.m	7185 work places
Cherkassi	1321800 persons	528720 sq.m	3965 work places
Volin	1037200 persons	414880 sq.m	3112 work places
Vinnitsa	1679300 persons	671720 sq.m	5038 work places
Total (on Ukraine):	46509400 persons	18603760 sq.m	139528 work places

For alteration of logistics centers in the basic areas of Ukraine, it is necessary to provide quality of the motor-car transporting is assured, that the followings tasks must be decided:

- multiplying a carrying capacity by the reconstruction of present and building of motorways, suitable for four-bars road motion,
- strengthening of traveling coverage and use of new materials for providing of travel cars with mass of load of 15t, 20t,
- informatization of the control highways systems,
- pressing down of basic settlements.

Taking into account experience of the European countries and high-quality new tendencies of the last years it is possible to say, that logistics activity must all signs become the basic transmitter of state progress and source of growth national competitiveness.

Also one of directions development strategic of logistics potential it is possible to name state development conception of logistics infrastructure – the basic ways of working out problems of subsequent development of transport-logistics infrastructure must be determined in which, coming from new tasks, which appeared before the state in the conditions of revival of processes of Euro integrations, growth of demand on high-quality logistics services, activations of processes an international transport co-operation of Ukraine.

State development conception of Ukrainian logistics potential must decide question in relation to providing growing on volumes and quality of demand on services logistics market. In other words, it is necessary:

- to co-ordinate work in a transport-logistic infrastructure,
- rationally to begin to use resources and time,
- to attain a profitable degree from the use of geopolitical position of Ukraine and possibilities of its transport communications for international transit of loads by Ukrainian territory,
- to inculcate the adjusted system of multimodal transportations both up country and after its scopes,
- to inculcate and extend the strong network of logistics centers (especially in towns of Ukrainian transits),
- to put right the ways of report between the strategically important cities of Ukraine for providing trouble-free delivery of goods and services in all territory of the state and farther for its scopes,
- to go out on the proper level of informatization a transport process and informative co-operation of transport with other industries of economy,

- to stimulate instrumental in efficiency of finance and economics mechanisms for development of investments on ware-house terminals.

The acceleration of decision these tasks has exceptionally an important value not only for transport-logistics industry but also for the state on the whole, effective functioning of its production and social spheres, external economic connections, realization of geopolitical Ukrainian potential as transit state. All of it must determine the necessity of realization complex of organization-legal, economic and technical-technological measures, counted both on a near and on long-term prospect, what would provide development of transport-logistics complex in close combination with processes which take place in a world and domestic economy, assisted development of productive forces of country, social mobility of population.

Addition 1.

Will conduct description of algorithm through passing iterations.

Iteration 1. Will designate the eventual carrying capacities (c_{ij}, c_{ji}) of all ribs even initial carrying capacities (C_{ij}, C_{ji})

1.Mark a knot a 1 mark [∞, -].

2. $S_1 = \{2, 3, 4\}$ ($\neq \varnothing$).

3. As $c_{14} = \max \{c_{12}, c_{13}, c_{14}\} = \max \{245, 806, 917\} = 917$, mark a top 4 marks [917, 1].

4. $S_2 = \{5, 3\}$.

5. As $c_{43} = \max \{c_{45}, c_{43}\} = \max \{792, 806\} = 806$, mark a top 3 mark [806, 2].

6. $S_3 = \{5, 2\}$

7. As $c_{35} = \max \{c_{35}, c_{25}\} = \max \{792, 245\} = 792$, mark a top 5 mark [792, 3].

8. Determine the prolonged way after marks, beginning from a top 5 and completing a top 1: (5) → [792, 3] → [806, 2] → [917,1] → (1).

Thus, $N_1 = \{1, 4, 3, 5\}$ і $f_1 = \min \{\infty, 917, 806, 792\} = 792$.

Determine remaining carrying capacities along the way of N_1.

$c_{14} = (917 - 792, 0 + 792) = (125, 792)$

$c_{43} = (806 - 792, 0 + 792) = (14, 792)$

$c_{35} = (792 - 792, 0 + 792) = (0, 792)$

Will represent this integration on fig.1.1.

Iteration 2.

1. Mark a top 1 mark [∞, -].

2. $S_1 = \{2, 3, 4\}$.

3. As $c_{12} = \max \{c_{12}, c_{13}, c_{14}\} = \max \{245, 14, 125\} = 245$, mark a top 2 mark [245, 1].

4. $S_2 = \{3, 5\}$.

5. As $c_{25} = \max \{c_{23}, c_{25}\} = \max \{14, 792\} = 792$, mark a top 5 mark [792, 2].

6. Determine the prolonged way after marks, beginning from a top 5 and completing a top 1: (5) → [792, 2] → [245, 1] → (1).

Thus, $N_2 = \{1, 2, 5\}$ і $f_2 = \min \{\infty, 245, 792\} = 245$.

Determine remaining carrying capacities along the way of N_2.

$c_{12} = (245 - 245, 0 + 245) = (0, 245)$

$c_{25} = (792 - 245, 0 + 245) = (547, 245)$.

Iteration is graphically given represented on fig.1.2.

Iteration 3.

1.Mark a top a 1 mark [∞, -].

2. $S_1 = \{2, 3, 4\}$.

3. As $c_{14} = \max \{c_{12}, c_{13}, c_{14}\} = \max \{0, 14, 125\} = 124$, mark a top 4 mark [125, 1].

4. $S_2 = \{3, 5\}$.

5. As $c_{45} = \max \{c_{43}, c_{45}\} = \max \{14, 547\} = 547$, mark a top 5 mark [806, 2].

6. Determine the prolonged way after marks, beginning from a top 5 and completing a top 1: (5) → [806, 2] → [125,1] → (1).

Thus, $N_3 = \{1, 4, 5\}$ і $f_3 = \min \{\infty, 125, 547\} = 125$..

$c_{14} = (125 - 125, 0 + 125) = (0, 125)$

$c_{45} = (547 - 125, 0 + 125) = (422, 125)$.

Will represent this integration on fig.1.3.

Iteration 4.

1.Mark a top knot a 1 mark [∞, -].

2. $S_1 = \{2, 3, 4\}$.

3. As $c_{13} = \max \{c_{12}, c_{13}, c_{14}\} = \max \{0, 14, 0\} = 14$, mark a top 3 mark [14, 1].

4. $S_2 = \{2, 4, 5\}$.

5. As $c_{35} = \max \{c_{32}, c_{34}, c_{35}\} = \max \{0, 0, 422\} = 422$, mark a top 5 mark [422, 2].

6. Determine the prolonged way after marks, beginning from a knot 5 and completing a knot 1: (5) → [422, 2] → [14,1] → (1).

Thus, $N_4 = \{1, 3, 5\}$ і $f_4 = \min \{\infty, 14, 422\} = 14$..

$c_{13} = (14 - 14, 0 + 14) = (0, 14)$

$c_{35} = (422 - 14, 0 + 14) = (408, 14)$.

Iteration is graphically given represented on fig.1.4.

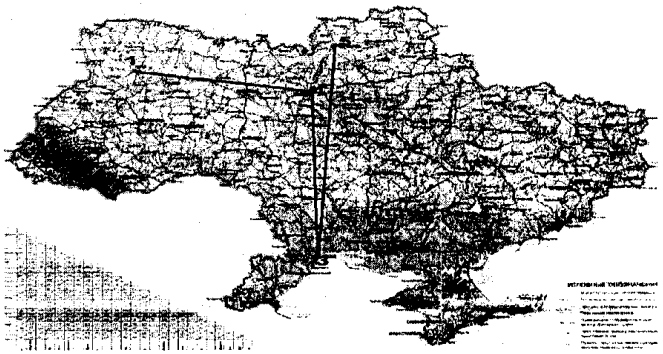

Figure 1.1. Graphic reflection of iteration 1

Iteration 5.

New ways are impossible, as ribs of count, which go out from a top 1, have zero carrying capacities. Pass to the eventual decision of task.

The maximum volume of stream in a network will be even:

F = f1 + f2 + f3 + f4 = 792 + 245 + 125 + 14 = 1176 units.

Thus, the Ukrainian highways (after basic international directions) are able to skip to 1176 units of vehicles of transports on days.

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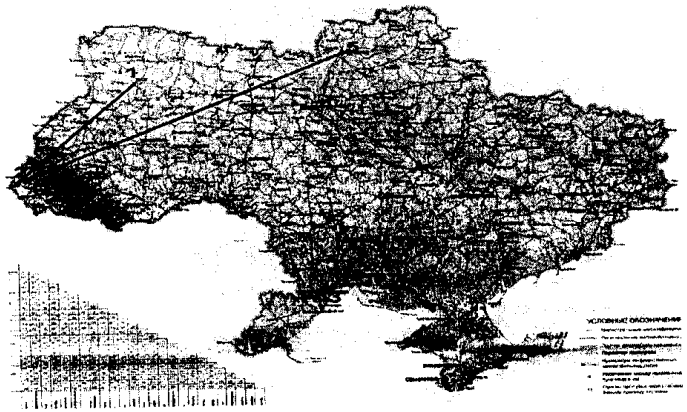

Figure 1.2. Graphic reflection of iteration 2

Figure 1.3. Graphic reflection of iteration 3

Figure 1.4. Graphic reflection of iteration 4

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КОНЦЕПТУАЛЬНАЯ МОДЕЛЬ ЛИЗИНГОВЫХ ОТНОШЕНИЙ В СИСТЕМЕ ИНТЕГРИРОВАННОЙ ЛОГИСТИЧЕСКОЙ ПОДДЕРЖКЕ ЖИЗНЕННОГО ЦИКЛА ВОЗДУШНЫХ СУДОВ

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Для повышения конкурентоспособности отечественных авиакомпаний в условиях «открытого неба» первостепенное значение имеет обновление парка воздушных судов. Учитывая ограниченность собственных средств предприятий, а также сложности привлечения заемных финансовых средств, одним из эффективных инструментов модернизации основных производственных фондов является лизинг.

Несмотря на то, что отечественные и зарубежные ученые много внимания уделяли исследованию экономической сущности лизинга, специфике лизинговых отношений вообще и в гражданской авиации, это направление научных исследований нельзя считать исчерпанным.

Проведенный анализ лизинга воздушных судов украинскими авиакомпаниями свидетельствует о их предпочтении иностранной технике. Например, лидер отечественного рынка авиаперевозок авиакомпания «МАУ» имеет флот, состоящий из 18 современных самолетов типа Боинг–737 в конфигурации бизнес и эконом класса. Несмотря на незначительное падение объемов перевезенных пассажиров в 2009 году, руководство авиакомпании прогнозирует рост объемов перевозки пассажиров на 15,2% - до 1,8 млн. человек в 2010 году. Второй по объемам украинский авиаперевозчик имеет парк из 9 среднемагистральных самолетов типа Боинг–737 и 3 дальне-магистральных типа Боинг–767. Почти все самолеты были приобре-тены по различным лизинговым схемам с ведущими мировыми лизинговыми компаниями, среди которых ILFC, GATX, CIT, Boeing Capital Corporation и др. Наиболее динамично развивающаяся авиакомпания «ДнепрАвиа» в феврале текущего года заключила лизинговое соглашение на приобретение 14 региональных самолетов типа Embraer-145, что увеличит их количество в парке авиакомпании до 25 штук. Кроме указанного типа, у компании имеется 6 машин Boeing-737 и один Boeing-767. Таким образом,

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