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ECONOMIC EFFICIENCY OF THE HIGH-SPEED TRAINS RUNNING IN UKRAINE

Objective. To develop methodology of determination of the high-speed running cost effectiveness in Ukraine. **Methodology.** Economic justification of the high-speed running appropriateness in Ukraine is the investment project, providing stage-by-stage investments into construction that will give the possibility to obtain annual revenue from the passenger transportations. For such problem solving, there is applied net present value that may be obtained by the Railway Transport of Ukraine or newly established companies during the project execution and upon its completion. **Results.** On the base of the carried out analysis one may state that there is developed complex method of the high-speed trains construction and operation effectiveness definition with consideration of infrastructure, rolling stock, etc., value. **Scientific novelty.** There is proposed the scientific approach to definition of the high-speed lines construction and operation economic effectiveness that specifies principles of their construction value definition, calculation of the rolling stock units quantity, optimizes calculations of revenue and expenditures in the context of competitive advantages and influence of external factors on the company activity that will give the possibility to increase the feasibility of the managerial decisions and economic effectiveness of the high-speed transportations. **Practical relevance.** Consideration of the abovementioned features increases feasibility of the managerial decisions as to high-speed transportation functioning effectiveness ensuring.

Key words: high-speed running, high-speed line, line topology, capital investments, transportation, infrastructure, transportation income. Expenditures, revenue.

Introduction

During several years there have been operated in Ukraine the high-speed passenger trains Intercity+, but one cannot describe their running as effective one, as such running is not large scale. Transfer to the passengers transportation with the help of trains Intercity+ is limited to present number of high-speed trains, unfavourable schedule, high cost of travel and considerable duration of travel to certain cites of Ukraine.

The mentioned factors negatively influence on introduction of high-speed running in Ukraine, reducing the demand for such trains usage at the transport market of passenger transportation. Modern market of passenger transportation services re-quires considerable speed of movement, as passenger want to travel within the territory of Ukraine for not more than 6 hours, comfortably and at low cost. At present, modern railway high-speed transportations do not comply with such requirements and at certain directions they are even behind the flights of budget companies and buses of lux class.

In order to win its niche at the market of transportation services Ukrainian railway high-speed company must get rid of mentioned shortcomings, and Railway Transport of Ukraine must reconstruct railway infrastructure for running of trains with the speed up to 200km/hour, that is very expensive.

For further increase of competitive ability of the railway passenger transportation and substitution of air transport at certain directions in Ukraine, it is required to construct isolated lines for running of

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trains with the speed of 300-350km/hour, to include Ukrainian high-speed network of Eurasian transport space and to attract for the high-speed lines (HSL) construction private capital, as the state is not able to give such money.

The problem of the passenger railway transportations speed increase has been recently studies by such scientists as A.A. Bosov, V.L. Dykan, Yu.S. Barash, O.M. Hnennyi, N.H. Cheliadinova, Yu.F. Kulaiev, I.M. Aksionov, V.P. Hudkova, O.M. Hudkov and others.

However, complex scientific researches as to definition of economic feasibility of construction and operation of the high-speed lines in Ukraine have not been carried out.

In many countries of the world the high-speed running has already proved to be economically effective. In Ukraine, this issue have been discussed since 2002, but there is still no defined feasibility of its introduction, as it is required to improve foreign methods of calculation of perspective mobility of the population of Ukraine with consideration of transit, number of passengers, who will use high-speed lines, optimal areas of such trains running. Thus, the present actual task is the development of

theoretical and methodological approaches, as well as practical recommendations as to determination of economic feasibility of the high-speed transportation with consideration of the transit potential of Ukraine.

Objective

To develop methodological approach and establish procedures as to determination of the high-speed running cost effectiveness in Ukraine.

Methodology

Economic justification of the high-speed running appropriateness in Ukraine is the investment project, providing stage-by-stage investments into construction that will give the possibility to obtain annual revenue from the passenger transportations. For such problem solving, there is applied net present value that may be obtained by the Railway Transport of Ukraine or newly established companies during the project execution and upon its completion that is defined with the help of formula (1) [11]. The implementation option with the maximum net present value will be the best.

$$ЧДД = \sum_{t=0}^{T} \frac{(Д_t - З_t) \cdot (1 - \frac{\gamma}{100}) + A_t \cdot \frac{\gamma}{100} - K_t}{(1+E_m)^t} \to \max,$$

(1)

where $ЧДД$ – net present value, UAH;

$Д_t$ – annual income that may be obtained by the Railway Transport of Ukraine and newly established structures in the result of all the types of activity subject to different options of restructuring, UAH;

$З_t$ – annual aggregate expenditures of his-speed company in the result of all the types of activities subject to different options of restructuring without depreciation allowances, UAH;

γ – income tax amount, %;

A_t – depreciation allowances;

K_t – annual investments in construction or reconstruction of high-speed lines subject to various options, UAH;

t – target year number: t = 0, 1, 2, 3, … T (T - structural reorganization duration term).

The discount rate, applied in formula (1) shall comply with the concept of cash flows forecasting (base or anticipated prices). In this paper, forecast-

ing is carried out on a base price term. Thus, the discount rate shall comply with real rate of return on capital (i.e. rate of return, cleared from inflationary component). Such discount rate is called in domestic literature as "modified discount rate". Real or modified discount rate is connected with nominal rate of income according to the following formula

$$E_m = \frac{1 + E/100}{1 + p/100} - 1$$

E – nominal income rate, %;
p – forecasted rate of inflation, %.

Peculiarities of methodological principles of the high-speed running functioning effectiveness evaluation. At perspective calculation there was applied the model of passenger transportation demand forecasting, worked out within the program TASIS with participation of such companies as EPV Europrojrkt Verkehr (Germany), SGTE (England), Giprotranstei (Russia) and Transpolis (Ukraine).

To carry out further studies, it is required to develop the algorithm of determination of effective-

ness of introduction and functioning of the high-speed transportation (fig. 1).

This problem has been already partially studied in Europe, CIS countries and Ukraine, but there is still no systematic scientific approach, considering methodological principles of all the components evaluation.

Such algorithm shall consider not only the sequence of studies carrying out, but it also shall describe in details economic calculation at each stage, with consideration of specific nature of modern transport market of the country. Figure 1 shows aggregative sequence of this problem solution for the high-speed running.

Further studies of economic effectiveness of construction and operation of the high-speed lines shall be started from arrangement of the infrastructure construction, procurement of special rolling stock and determination of their value. The term "high-speed infrastructure" means:

• Isolated high-speed gauges laid at the land plot and trestle;
• Single premises;
• Required facilities, electricity supply lines, lines of automotive locking and communication;
• Railway stations for various purposes with the required facilities;
• Railroad passenger terminal;
• Car-repair plant;
• Car-repair depot;
• Other engineering constructions and communications, required for normal operation of the previous items.

HSL topology determination with consideration of the cities population
Determination of the volume of passenger transportations along the HSL, each its area
Calculation of the high-speed trains number with consideration of their running schedule and number of intermediate stops
Calculation of repair subdivisions (plants and depots) number
Determination of the HSL, separate start-up facilities construction sequence
Calculation of value of the high-speed line infrastructure objects and rolling stock at each stage and as to each start-up facility
Calculation of income from passengers transportation as per separate start-up facilities of construction
Calculation of expenditures for passengers transportation along the HSL as per separate start-up facilities and components
Calculation of effectiveness (unprofitableness) of the passenger transportations as per separate start-up facilities
Final determination of the passenger transportation along the HSL effectiveness
Solution of the HSL financing problem at the account of different sources
Selection of final HSL construction option, stage-by-stage financing and activity effectiveness with consideration of dividends distribution

Fig. 1 – Aggregate sequence of problem solution for the high-speed running.

Taking into account the high-speed lines topology at the territory of Ukraine, there shall be constructed new technical station for repair and equipment of the high-speed trains, several passenger terminal stations and transit station at four directions of running.

Number of car-repair sheds, power of passenger technical station (repair and equipment depot) are defined with the help of technical and economical calculations according to special regulations.

The value of the abovementioned premises and communications may be approximately determined with the help of calculations, made by the company SYSTRA or scientists from the Dnipropetrovsk National University of Railway Transport, named after V. Lazaryan in 2002 and 2004, respectively, with the value adaptation to modern construction conditions.

For methodological determination of the approximate value of the high-speed infrastructure, one may use formula (2) that gives the possibility to calculate investments into construction: gauges on ground and trestles, station of various purpose and terminals, constructed according to typical scheme, passenger technical stations and car-repair depots, as well as other engineering premises and communications.

$$BBI = L_{зn} \cdot вк_{зn} + L_{ecm} \cdot вк_{ecm} + \alpha_{np} \cdot вс_{np} + \alpha_{к} \cdot вс_{к} + \delta_1 \cdot вв_1 + \delta_2 \cdot вв_2 +$$
$$+ \varphi_{nmc} \cdot внmc + \gamma_{д} \cdot вд + вiк + вiс + взав + вшс$$
$$, (2)$$

where BBI – value of the high-speed infrastructure, thousand UAH;

$L_{зn}$ – gauges length on the ground with considerations of LEP, communication and automotive locking lines, km;

L_{ecm} – gauges length on the trestles with considerations of LEP, communication and automotive locking lines, km;

$вк_{зn}$ – value of 1km of gouges on the ground, thousand UAH per 1km;

$вк_{ecm}$ – value of 1km of gouges on the trestles, thousand UAH per 1km;

α_{np} – number of intermediate station along the network of the high-speed line, pcs.;

$\alpha_{к}$ – number of terminal station along the network of the high-speed line, pcs.;

$вс_{np}$ – value of typical intermediate station along the network of the high-speed line, thousand UAH;

$вс_{к}$ – value of typical terminal station along the network of the high-speed line, thousand UAH;

δ_1 – number of passenger depots of the first type, pcs;

δ_2 – number of passenger depots of the first type, pcs.;

$вв_1$ – value of typical passenger depot of the first type, thousand UAH;

$вв_2$ – value of typical passenger depot of the second type, thousand UAH;

$\varphi_{внmc}$ – number of passenger technical stations for regular repair and equipment of the high-speed trains, pcs.;

$внmc$ – value of passenger technical stations for regular repair and equipment of the high-speed trains, thousand UAH;

$\gamma_{д}$ – number of car-repair depots for repair of the high-speed trains, pcs.;

$вд$ – value of typical car-repair depot for repair of the high-speed trains, thousand UAH;

$вiк$ – value of engineering communications for the high-speed lines maintenance, thousand UAH;

$вiс$ – value of engineering premises for the high-speed lines maintenance, thousand UAH;

$взав$ – value of construction of the plant for repair of the high-speed rolling stock, thousand UAH;

$вшс$ – value of separate premises, thousand UAH;

Calculation of rolling stock units number (fig. 2) shall be made with consideration of certain arrangement of the high-speed trains running along the high-speed lines, forecasted number of passen-

gers and at given direction (n_j), estimated number of seats in train (КМП), forecasted train occupancy (l_j), mean speed of the train running (v_j) number of the train periods of journey per day (β_j) according to the formula (3).

$$ KPC = \sum_{j=1}^{r} \frac{n_j}{K M \Pi_j \cdot K_j^n \cdot \beta_j} , \qquad (3) $$

$$ \beta_j = \frac{15}{2 \cdot t_{pyx} + 2 t_{oчiк}} , \qquad (4) $$

where: $t_{pyx} = \dfrac{l_j}{v_j}$ – duration of the high-speed train running at the j direction, l km long and at average speed of v km /hour;

$t_{oчiк}$ – duration of the high-speed train down time between two journeys per day.

It is worth mentioning that certain high-speed trains may perform two periods of journey, as they are operated from 06:30 up to 23:00. Restriction of 15 hours is introduced into the formula (4) for stable operation of various trains at one direction.

Estimated number of the high-speed trains considerably depends on its structure, number of motor intermediate and trailing cars, as well as total number of passenger seats.
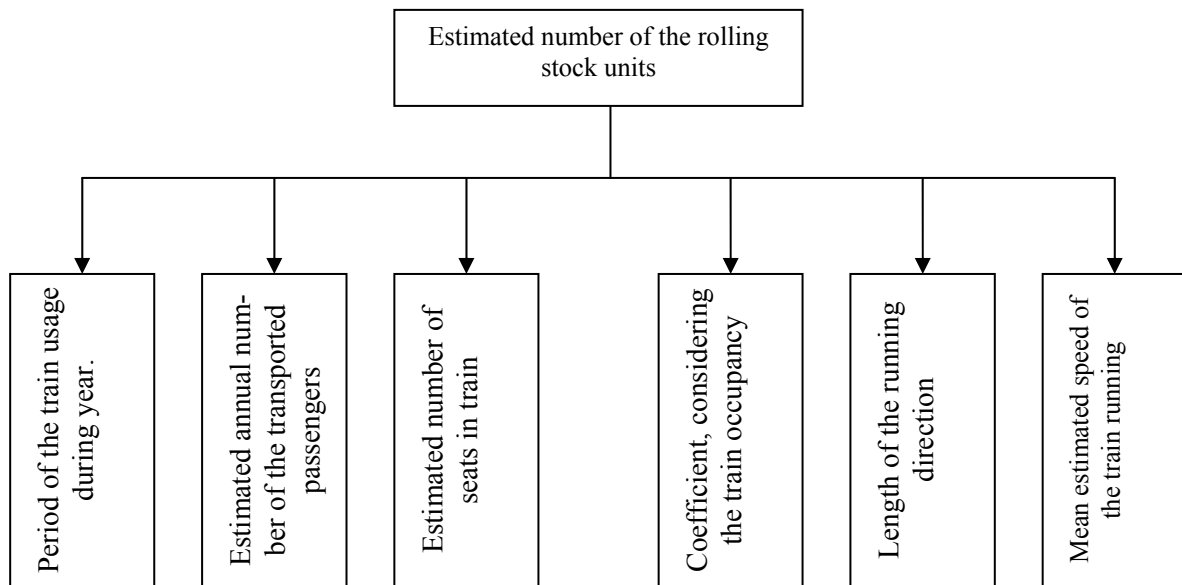

Fig. 2 – Principle of calculation of the high-speed passenger trains number at the given running direction.

Calculation of income from the transportations. It is very difficult to make forecasts as to income form the passengers transportation with the help of the high-speed trains, as it is impossible to calculate estimated volumes of the passengers transportation in Ukraine with high accuracy. There is the calculation method of the French company *SYSTRA,* but it does not consider transit flow of the passengers from Russia and CIS, as well as Crimea and Odessa.

The proposed by them formula (5) is determined in empirical way and has no physical sense.

$$ \Pi_{AB} = k \frac{H_A \cdot H_B}{f(L_{\text{M}} \cdot T_{\text{M}})} , \qquad (5) $$

where Π_{AB} – volume of transportations between two terminal stations A and B;

k, f – model coefficient and travel frequency, respectively;

H_A, H_B – population of two terminal station cities A and B;

L_{M} – route length;

$T_{\text{м}}$ – duration of travel with by the high-speed train between the cities A and B.

In the process of this formula analysis, there emerge a lot of questions:

• What for the number of the population of the cities A and B is multiplied in the numerator?;

• What for there are simultaneously present the route length and travel duration in the denominator, as the last value depends on the first one?;

• What is the coefficient and how is it determined?;

• And the most important, how does this formula consider the transit passenger flow that shall be reasonably partially transferred to the high-speed communication?

Below, the author proposes new formula (6) for calculation of the estimated volumes of the transportations along the high-speed line, that will give the possibility to not only consider passenger transit flow through Ukraine, but also to distribute proportionally to the population of the cities, included into HSL the passengers per individual sites with consideration of the population mobility and with consideration of certain peculiarities of cities that have influence on the travel number:

$$\Pi_{AB} = 2\frac{(H_A + T_A)*(H_B * T_B)}{H_{\text{ВШМ}} + T_{\text{ВШМ}}} * R * K_t * K_{nac} \quad ,(6)$$

where Π_{AB} – estimated annual number of the passengers between two cities A and B, thousand persons;

H_A, H_B – population of the cities A and B, respectively, thousand persons;

T_A, T_B – transit passenger flow from the CIS countries at station A and at reverse direction from station B, thousand persons;

$H_{\text{ВШМ}}$ – total number of population at all the station of the high-speed line, thousand persons;

$T_{\text{ВШМ}}$ – transit passenger form from the CIS countries at all stations of the high-speed line, thousand persons;

R – Ukrainian population mobility along the HSL, share;

K_t – coefficient that takes into consideration the duration of the passengers travel according

to the mean travel duration of 4 hours, fluctuating from 0.75 to 1.25, share;

K_{nac} – coefficient that also takes into consideration the passengers travel frequency at given site (business trips, transfer to flight, off-work time, tourism) that fluctuates from 0.75 to 0.9 for administrative centers with population up to 600 thousand and cities Kryvyi Rih, Melitopol and Mariupol, 0.9 – 1.1 for administrative centers with population 600-1000 thousand and Lvov and Kharkiv, 1.3 – 1.5 for Kyiv, Simferopol and Odesa. This coefficient is determined in shares.

Previously [16] there has been determined the mobility of the population if Ukraine that use railway transport. It is 1.4 travels per year in far communication.

The coefficient that takes into account the duration of the passenger travel between the cities, considerably influences on the HSL usage demand. For example, the duration of travel from Lvov to Simferopol is about 6 hours. At the same time the duration of travel from Kyiv and Dnipropetrovsk is about two hours. Due to such difference in time the demand for the high-speed line fluctuates almost in two times. Such data is observed in France and other countries of Europe.

The experience of the high-speed trains operation in Ukraine in 2013 shows that the demand for the passengers transportation between Kharkiv and Kyiv 1.5 times higher than between Donetsk and Kyiv, as the difference in the travel duration in 1.5 hour.

The coefficient that takes into account the passengers travel frequency at given direction (business trips, transfer to flight, off-work time, tourism) also considerably influences on the number of the transported passengers. For example, in summer, the flow of passenger going to Simferopol increases in several times and may exceed total population of the region. Such fluctuation of the passengers shall be considered at redistribution of the passenger flow during year.

Taking into consideration the abovementioned, as well as value of revenue rate, the calculation of income from the passengers transportation by the high-speed trains is carried out with the help of the following formula (9).

$$\text{ДВШП} = \sum_{j=1}^{r} (ns_1 + ns_2 + ns_3) \cdot \text{ДС}_{\text{вшр}} \quad , \quad (7)$$

where $ДВШП$ – income from the passengers transportation by the high-speed trains, UAH per passenger – kilometer;

ns_1, ns_2, ns_3 – estimated number of passenger-kilometers at the first, second and third areas of the passenger direction. This data may be calculated with the help of the abovementioned method. It is assumed that the high-speed trains will have not more than 2 stops at one direction of the passenger travel;

$ДС_{вшр}$ – mean income rate per 1 passenger-kilometer of the high-speed travel, UAH. It is determined for the mean speed of 200km/hour at the level of 0.785 UAH per 1 passenger-kilometer;

r – number of the high-seed areas between the cities of Ukraine that is determined with the help of the high-speed lines topology.

Expenditures for the passengers transportation. At present, the PJSC Ukrzaliznytsia calculates expenditures for transportation of passengers with the help of the form 10 ЗАЛ, that takes into consideration all the expenditures for maintenance and repair of the railway infrastructure, operation and all the types of repair of cars, locomotives or certain trains, maintenance and repair of all the types of communications and premises, etc.

The high-speed companies will calculate the expenditures for determination of the price cost of the passengers transportation in the same way, but according to separate form, as all these expenditures will take place at isolated high-speed line, where there will be separate terminal stations, car-repair depots, passenger technical stations for trains equipment, technological maintenance premises and communications, as well as rolling stock.

All the proceeds from the passengers transportation will be obtained by the high-speed company-operator that shall pay for services, provided by the company of the high-speed infrastructure, for access to all its structural subdivisions, inclusive of usage of waiting rooms and free of charge services of terminal stations.

The company-operator may be of any form of incorporation but it must have own or operated under contract rolling stock. At the beginning, the company-operator will be able to transport the passengers only subject to usage of services of the rolling stock operation directorate, i.e. the locomotive driver and his/her assistants shall be the representatives of the special structure with license for transportations of the passengers by the high-speed trains. Afterwards, upon certain period of work at the high-speed lines, the company-operator will have the possibility to obtain the license for transportation of passengers with own locomotive driver and assistants.

Every day, the high-speed trains shall undergo maintenance, shall be cleaned externally and internally, as well as they shall be equipped. According to special schedule and established frequency, the trains shall undergo other types of repair and technical revision. For carrying out of the mentioned activities, the company-operator shall pay in favour of the repair-equipment depots (RED), located at the passenger technical stations.

For carrying out of the scheduled types of repair of the high-speed rolling stock, the latter shall arrive with certain frequency to the car-repair depot or to the car-repair plant. For reduction of expenditures for construction, the repair-equipment depot and the car-repair depot may be combined at one passenger technical station. By the way, part of car depots are combined with the repair-equipment posts in Ukraine.

The passengers additionally pays money for chargeable service at the terminal station:
- Storage of things in luggage rooms;
- For chargeable waiting rooms;
- For services of service-center;
- For chargeable WC's;
- For other services, associated with the sale of goods, food, etc.

Taking into consideration the abovementioned, one may say that the value of the passengers transportation by the high-speed trains composes of tariff and intermediary services, charged additionally by the private, intermediate companies-operators.

In its turn, the tariff for the passengers transportation by the high-speed trains composes of three main components:
- Infrastructural component that is received by all the subdivisions of the high-speed infrastructure;
- Locomotive component that is received by the rolling stock operation directorate;
- Other expenditures of the high-speed company, compensating the expenditures for all the types of repair, cleaning and equipment of the trains.

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At introduction of the high-speed running, the passenger transportations may be carried out by various companies-operators of various forms of incorporation that may have not only its own rolling stock, but also operate it under contract. In case of operation under contract, the car component shall be transferred to the trains owner, and the company-operator receives only payment for intermediary services.

In general, the expenditures for the passengers tr5ansportatio by the high-speed trains may be calculated with the help of formula (8):

$$ВВШП = ППÏ + ПЕК + ПРЕД + ПДР + ПЗР + ВВШК, (8)$$

where ВВШП – total expenditures of the high-speed company, thousand UAH;

ППÏ – payment for services of the high-speed infrastructure, thousand UAH;

ПЕК – payment for usage of locomotive crew, thousand UAH;

ПРЕД – payment for services, associated with the maintenance and equipment of the trains, thousand UAH;

ПДР – payment for depot repair of the trains, thousand UAH;

ПЗР – payment for plant repair of the trains, thousand UAH;

ВВШК – own expenditures of the high-speed company, thousand UAH.

Influence of the external environment factors on the high-speed companies activity. Normal functioning of the passenger high-speed company considerably depends on external environment factors, as they may improve its activity or, vice versa, be an obstruction.

The greater influence in the company-operator activity have the consumers of the transport services or the passengers. Thus, for their attraction it is required, first of all, that the company will work with low profitability, and then, when the passengers flow increases, there will be the possibility to increase prices gradually, up to estimated level. Taking into consideration the fact that the tariffs for transportation will be controlled by the independent, non-government authority, the transportation value reduction shall be carried out at the account of reduction of own income of the company-operator. Another factor that also has considerable influence on the HSC functioning effectiveness is competitors. They include automobile and air transport.

Results

On the base of the carried out analysis, one may state that in this paper there is developed the methodological approach to complex determination of the high-speed lines construction and operation effectiveness with consideration of the value of infrastructure, rolling stock, external environment factors influence, etc.

Scientific novelty and practical relevance

There is proposed the scientific approach to definition of the high-speed lines construction and operation economic effectiveness that contrary to existing one includes improved principles of definition of the passenger transportation number, HSL construction value, rolling stock units number, optimizes calculations of revenue and expenditures in the context of competitive advantages and influence of external factors on the company activity.

There is improved the methodological approach to calculation of the perspective volumes of transportations at the high-speed line that considerably differs from the European one, proposed by the French company SYSTRA, as it gives the possibility to consider additionally the passenger transit flow through Ukraine, distribute the passengers between certain sites, proportionally to the population of cities, included into the high-speed line with consideration of average population mobility, duration of travel and coefficient that additionally takes into account the passengers travel frequency at given area, depending on purpose (business trip, transfer to flight, off-work time and others). Consideration of the abovementioned factors increases feasibility of the managerial decisions as to the high-speed transportation functioning effectiveness ensuring.

There is improved scientific approach to determination of the economic effectiveness of construction and operation of the high-speed lines, that specifies principles of calculation of value of their construction, number of the rolling stock units, optimizes calculations of revenue and expenditures in the context of competitive advantages and influence of external factors on the company activity. Consideration of the abovementioned factors increases feasibility of the managerial decisions as to the high-speed transportation functioning effectiveness ensuring.

Conclusions

On the base of the carried out studies, one may make the conclusion that:

1. Existing methodology of the HSL construction and operation economic feasibility definition, developed by the Dnipropetrovsk National University of Railway Transport on the base of the French company SYSTRA requires fine-tuning in Ukraine.

2. New methodology gives the possibility to distribute the passengers per certain areas proportionally to the population of cities, included into the high-speed line with consideration of average population mobility and coefficient that additionally takes into account the frequency of the passengers travel at given area.

3. There is improved scientific approach to determination of the economic effectiveness of construction and operation of the high-speed lines, that specifies principles of calculation of value of their construction, number of the rolling stock units, optimizes calculations of revenue and expenditures in the context of competitive advantages and influence of external factors on the company activity. Consideration of the abovementioned factors increases feasibility of the managerial decisions as to the high-speed transportation functioning effectiveness ensuring.

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ЕКОНОМІЧНА ЕФЕКТИВНІСТЬ КУРСУВАННЯ ВИСОКОШВИДКІСНИХ ПОЇЗДІВ В УКРАЇНІ

Мета. Розробити методику щодо визначення економічної ефективності високошвидкісного руху в Україні. **Методика.** Економічне обґрунтування доцільності організації високошвидкісного руху в Україні є інвестиційним проектом, який передбачає поетапне вкладання коштів у будівництво, що дозволить надалі отримувати щорічно прибутки від перевезення пасажирів. Для вирішення задач такого типу використовують чистий дисконтний дохід, який може отримати Укрзалізниця або новоутворені компанії під час реалізації проекту та після його закінчення. **Результати.** На основі виконаного аналізу можна констатувати, що в роботі розроблено комплексну методику визначення ефективності будівництва та експлуатації високошвидкісних поїздів з урахуванням вартості інфраструктури, рухомого складу та ін. **Наукова новизна**. Запропоновано науковий підхід щодо визначення економічної ефективності будівництва та експлуатації високошвидкісних магістралей, що на відміну від існуючого уточнює принципи визначення вартості їх будівництва, розрахунок кількості одиниць рухомого складу, оптимізує розрахунки доходів та витрат в контексті конкурентних переваг та впливу зовнішніх факторів на діяльність компанії, що дозволить підвищити обґрунтованість управлінських рішень та економічну ефективність функціонування високошвидкісних перевезень. **Практична значимість.** Врахування вищенаведених ознак підвищує обґрунтованість управлінських рішень щодо забезпечення ефективності функціонування високошвидкісних перевезень.

Ключові слова: високошвидкісний рух, високошвидкісна магістраль, топологія магістралей, капітальні вкладення, перевезення , інфраструктура, доходи від перевезень, витрати, прибуток.

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МЕТОДИЧЕСКИЙ ПОДХОД К ОПРЕДЕЛЕНИЮ ЭФФЕКТИВНОСТИ КУРСИРОВАНИЯ СКОРОСТНЫХ И ВЫСОКОСКОРОСТНЫХ ПОЕЗДОВ

Цель. Разработать методику, касающуюся определения экономической эффективности высокоскоростного движения в Украине. **Методика** Экономическое обоснование целесообразности организации скоростного и высокоскоростного движения в Украине является инвестиционным проектом, который предполагает поэтапное вложение денег в строительство и позволит в дальнейшем получать ежегодно прибыли от перевозки пассажиров. Для решения задач такого типа используют чистый дисконтированный доход, который может получить Укрзализныця или вновь созданные компании во время реализации проекта и после его окончания. **Результаты.** На основе проведенных исследований можно констатировать, что в статье разработан методический подход для комплексного определения эффективности строительства и эксплуатации скоростных и высокоскоростных пассажирских поездов с учетом стоимости инфраструктуры, подвижного состава, воздействия факторов внешней среды и т.д. **Научная новизна**. Предложен научный подход для определения экономической эффективности строительства и эксплуатации высокоскоростных магистралей, который в отличие от существующего включает усовершенствованные принципы определения количества перевезенных пассажиров, стоимости строительства ВСМ, количества единиц подвижного состава, оптимизирует расчеты доходов и затрат в контексте конкурентных преимуществ и влияния внешних факторов на деятельность компании. **Практическая значимость**. Учет вышеприведенных факторов повышает обоснованность управленческих решений, касающихся обеспечения эффективности функционирования высокоскоростных перевозок.

Ключевые слова: скоростное и высокоскоростное движение, высокоскоростная магистраль, топология магистралей, капитальные вложения, перевозки, инфраструктура, доходы, затраты, прибыль.