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TIRE ENTERPRISES STRATEGY: APPLIED ASPECTS

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The article is devoted to the determination of the tire enterprises strategy elements based on the integral index of the tire enterprises production competitiveness estimation. The principles of the system approach have been considered in the formation of the enterprise strategy. The contents of the tire enterprises portfolio strategy elements have been determined. These elements are: geographic vector of growth, competitive advantages, synergism and strategic flexibility of the portfolio of strategic management zones. The directions of the tire enterprises competitiveness development have been grounded based on the prospective values of the coordinates of geographic vector of growth individually for each group of tires. The classification of the tires competitive advantages has been formed by means of components of the tires competitiveness estimation. The synergistic effects in the tires production and consumption have been determined. The optimal composition of the tire enterprise portfolio of strategic management zones has been formed. It was determined by considering the synergistic effects between different groups of tires in the production and consumption. The mathematic model of the optimal tires output by maximization of the enterprise gross profit based on linear programming was applied. The structure of optimal composition of the portfolio of strategic management zones by groups of tires has been determined. It has been proved that the optimal composition of the portfolio of strategic management zones by different groups of tires combination assists to increase the enterprise gross profit, net income and output of tires and to decrease the material costs and materials output ratio.

Keywords: enterprise strategy, tire production, product competitiveness, integral index, directions of development, competitive advantages, portfolio of strategic management zones, synergistic effect.

Introduction and problem definition

Strategic management in the increasing of competition on the domestic and foreign markets provides the determination of the elements of portfolio, functional and operational strategies for the implementation of the directions of the enterprise competitiveness development in short- and long-time. The tire enterprises production is shown by significant amount of sizes and models which are designed for different kinds of wheeled transport and the tire production is technologically difficult with five stages of the technological processing. These two facts direct to the expediency of the tires competitiveness components definition with considering of the industry specifics. That is why the problem of forming the methodical approaches to the determination of the tire enterprises strategy elements based on the competitiveness products manufacturing is especially important in the competition for target markets.

Analysis and research publications

The problems of development of the chemical industry enterprises, including the tire enterprises, were investigated by scientists as organizational and economic mechanism of increase the enterprises investment activity [2], forming of anti-crisis programs at JSC «Dniproshina» [5] and detection of the trends and prospects of development of the pneumatic rubber tires market [3]. Strategic analysis of the chemical and petrochemical industry enterprises has been proved in the paper [4], P.G. Pererva emphasizes the expediency of considering the material, energy and environmental factors in the forming of the development strategy of the chemical industry enterprises [7], O.V. Khadzhynova offers the integration associations as a factor of increasing of the enterprises competitiveness in the chemical industry [8].

The issues of the content of strategic set components at the increasing of the tire enterprise production competitiveness have been disclosed in the paper [10]. The formalization of estimation components and definition of the priority directions of increasing of the tire enterprises competitiveness by using the system approach have been offered by

O.V. Khadzhynova [9]. The system of competitive advantages in the tire production has been formed by I.I. Pavlenko [6]. This system provides the definition of the competitive advantages on the tires groups' level (low costs and differentiation) and on the tire enterprise level (profitability, position in the domestic and foreign markets).

Despite the studies in area of formation of the chemical industry enterprises strategy, the issues of the reasoning of the tire enterprises strategy elements for increasing of the product competitiveness including the conditions of production, sale and consumption of tires are unnoticed by scientists. Using of these components allows to carry out more argumentative regulative influence on the level of competitiveness of separate size of tires.

The purpose of the article is to develop of scientific and methodological provisions and practical recommendations for the tire enterprises strategy elements forming based on the integral index of the estimation of the level of the tire enterprises production competitiveness.

Presenting the main material

By system approach the tire enterprises (TE) strategy for increasing the product competitiveness should be considered as a set of the elements to achieve the enterprise objective (to provide the sustainable development by improving the product competitiveness level and increasing in profit) by including the components of the tire production competitiveness estimation and improving the level of competitiveness of separate size of tires in strategic management zones (SMZ).

It should be noted, there are two approaches for the definition of SMZ in the tire production: general SMZ (correspond to tires groups by intending – tires for passenger cars, trucks, agricul-tural machinery ets.) and special SMZ (unite the tires for specific operating conditions, kinds or classes of transport in the area of general SMZ – consumers demand and requirements are different by subgroups of tires) [10].

Determination of the elements of the portfolio strategy should be recommended when choosing, reasoning and implementation of the directions of the enterprise competitiveness development. These elements are: geographic vector of growth (every coordinate of this vector has two levels – current and new – these levels correspond to development process), competitive advantages, synergism and strategic flexibility of the portfolio of SMZ [1]. The geographic vector of growth has been expanded by coordinate «resources» which reflects the specific of the tire production [11].

Forming the elements of the TE strategy is based on principles of system approach:

– ultimate objective – elements of the enterprise strategy are formed for the achievement of this objective – to provide the sustainable development by improving the product competitiveness level and increasing in profit;

– integrity – strategy forming is impossible without every element (geographic vector of growth, competitive advantages, synergism or portfolio of SMZ);

– hierarchy – every element of the strategy is examined as a system of lower level (competitive advantages are divided for the components which are corresponded to product competitiveness estimation parameters, components of the competitive and functional strategies are formed in determination of the portfolio strategy elements);

– multiplicity description – complexity of the strategy elements provides a plurality of variants of the TE development.

Integral index of the quantitative estimation of the tire enterprises production competitiveness (TEPC) is calculated by formula

$$I_{int}^{m} = \mu^{gr} \times I_{prod}^{m} + \eta^{gr} \times I_{cons}^{m}, \quad (1)$$

where I_{prod}^{m}, I_{cons}^{m} – complex indexes of competitiveness of the model of separate size of tires for the conditions of production and consumption respectively; μ^{gr}, η^{gr} – weight of impact respectively the producer opportunities and consumer requirements including the conditions of sale the production on the markets of separate groups of tires.

The components of formula (1) are calculated as

$$I_{prod(cons)}^{m} = \frac{I_{q\_prod(cons)}^{m}}{I_{c\_prod(cons)}^{m}}, \quad (2)$$

where $I_{q\_prod(cons)}^{m}$ – complex index of quality of the model of separate size of tires for the conditions of the production or consumption; $I_{c\_prod(cons)}^{m}$ – comparative index of cost of the model of separate size of tires for the conditions of the production or consumption.

The directions of the TE competitiveness development are determined by the elements of geographic vector of growth and indexes of tires competitiveness estimation (fig. 1): tradable (is based on the market geography and includes the coefficients of producer and consumer impact on the qualitative and cost characteristics of products on the markets of separate groups of tires); marketing (is determined by need and includes the components of index of competitiveness for the conditions of tires consumption); production (is determined by technology of production and based on the components of index of competitiveness for the conditions of tires production); resource (is determined by content and

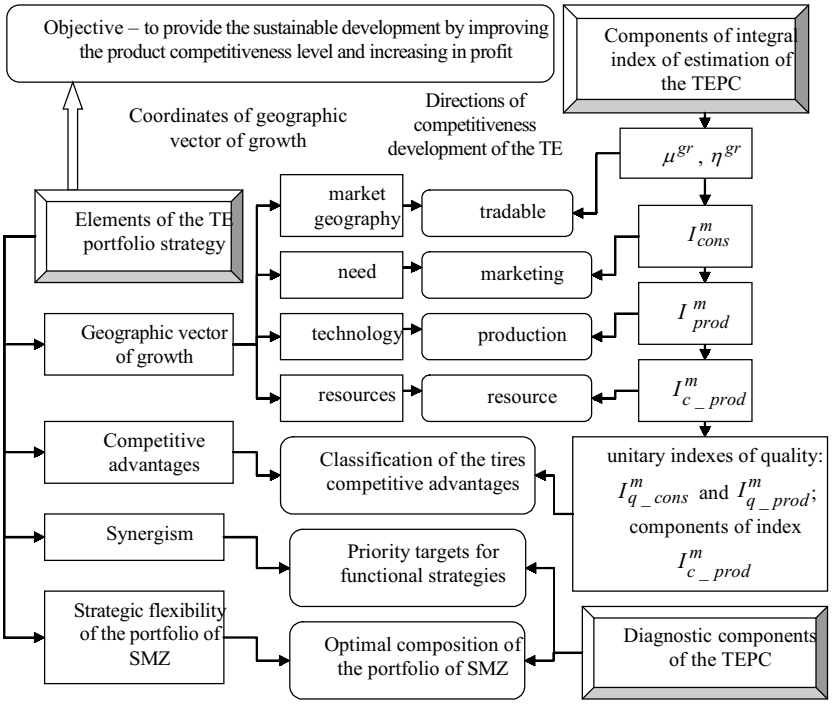

Fig. 1. Forming the elements of the tire enterprises strategy for improving the product competitiveness level
Note: offered by author

Table 1

Content of coordinates of the TE geographic vector of growth

Coordinate	Level of coordinate	
	current (traditional)	new (prospective)
Market geography (tradable direction of development)	Ukraine	increasing the sales volumes in Ukraine by competitiveness production
	another countries (export by long-term contracts)	increasing the number of foreign markets including small-scale consumption
Need (marketing direction of development)	Tires for trucks (coefficient of component significance of the direction of development)	
	resource, reliability	increasing: safety (0,4), load capacity (0,25), comfortableness (0,1), economy (0,2); decreasing the level of internal pressure (0,05)
	Tires for passenger cars (coefficient of component significance of the direction of development)	
	resource, reliability	increasing: resource (0,5), safety (0,3), comfortableness (0,1), environmental friendliness (0,1)
	Tires for agricultural machinery (coefficient of component significance of the direction of development)	
	resource, high permeability	increasing: safety (0,4), economy (0,35), comfortableness (0,15); decreasing the level of internal pressure (0,1)
Technology (production direction of development)	decreasing of consumption of materials, automation of production	constructional component: tires for passenger cars (0,35), tires for trucks (0,3), tires for agricultural machinery (0,15); material component: tires for passenger cars (0,3), tires for trucks (0,4), tires for agricultural machinery (0,55); technologic component: tires for passenger cars (0,35), tires for trucks (0,3), tires for agricultural machinery (0,3)
Resources (resource direction of development)	Materials	
	import of natural rubber, absence of the domestic production of synthetic rubber in Ukraine	import substitution, using the ecological materials (finely ground rubber powders) and new kinds of material

Note: formed and calculated by author

cost of the enterprise resources and includes the product cost).

Content of expended geographic vector of growth for the TE is presented in table 1. It includes the coefficients of significance of every direction of development which are determined by estimation of the TEPC. Current level of the coordinates of geographic vector of growth has been determined by analysis of trends of the tires production and consumption, study of an experience of the domestic tire enterprises functioning and quantitative estimation of the tires competitiveness. It is offered to determine new level of these coordinates including the prospects of world tire industry development and prospective requirements to tires production, sale and consumption based on the components of the integral index of the TEPC forming. Prospective needs should become the base of quality and cost components of the estimation of the tires competitiveness level in forming the management solutions for it improving.

It is expedient to form the tires competitive advantages considering the unitary indexes of quality of the TEPC estimation individually for every group of tires and the components of cost indexes of the TEPC. This forming is based on classification by I.I. Pavlenko [6]: qualitative (are based on product differentiation) and monetary (are based on low costs).

Differentiation of separate size of tires is done by indexes of tires quality for the conditions of production and consumption individually for every group of tires. The elements of tires cost structure are components of monetary competitive advantages (table 2).

Table 2

Classification of the tires competitive advantages

Kind of competitive advantage	Component of competitive advantage
Product differentiation by unitary indexes of tires quality for the conditions of consumption	Tires for passenger cars
	economy: resource of tire; safety: lap time on dry pavement, maximum speed on wet pavement, index of speed category, tread pattern, brake path on wet pavement with ABS; comfortableness: minimum speed for vibration feeling; environmental friendliness: rolling resistance coefficient, silica filler content
	Tires for trucks
	safety: tread pattern, depth of tread pattern, index of speed category; intending: index of load capacity; comfortableness: minimum speed for vibration feeling; economy: resource of tire, multiplicity retreading coefficient, weight of tire; environmental friendliness: level of internal pressure
	Tires for agricultural machinery
	safety: index of load capacity, index of speed category; economy: resource, weight of tire; comfortableness: depth of tread pattern; environmental friendliness: level of internal pressure
Product differentiation by unitary indexes of tires quality for the conditions of production	Constructional component
	tires for passenger cars: conditional resilience in stretching, conditional strength in stretching 300%; tires for trucks: conditional resilience in stretching, conditional strength in stretching 300%; tires for agricultural machinery: conditional resilience in stretching
	Material component
	tires for passenger cars: styrene butadiene rubber content; tires for trucks: styrene butadiene rubber content, main type of cord, number of lid layers, weight of lid; tires for agricultural machinery: styrene butadiene rubber content, combination of textile cords, number of lid layers, weight of lid
	Technologic component
	all groups of tires: total productivity of assembling, productivity of vulcanization
Low costs	saving on material costs; saving on energy costs; saving on labor costs; saving on fixed costs

Note: offered by author

By analysis of the cost structure in every group of tires, the production of tires for passenger cars has the least part of materials and energy costs but the most part of fixed costs. Despite the least need for floating capital this production must be managed to increasing of its turnover in behave of the reimbursement of fixed costs and providing the scale effect. This is a priority target for marketing and production strategies of the TE. The production of tires for trucks and agricultural machinery has the greater need for floating capital so must be managed to effective using of the resources of financing for preventing the loss of financial stability. This is a priority target for financial strategy of the TE.

The composition of the portfolio of SMZ has been formed by the synergistic effects in the production and consumption between separate groups of tires (table 3). The economic effect from saving on material costs, increasing income or gross profit is achieved by this composition.

Economic indicators of the TE in the portfolio of SMZ forming have been calculated due to mathematic model of the optimal tire output by maximization of the enterprise gross profit based on linear programming. This model helps to determine material costs, gross profit, net income, profitability and materials output ratio in the optimal output production considering the impact factors on the output and rescues in the production and consumption of tires.

The structure of the portfolio of SMZ of the TE by groups of tires when using the synergistic effects is represented on fig. 2.

The recommendations to form the portfolio of SMZ by using the synergistic effects in the production and consumption of tires are provided according to rates of the economic indicators which were obtained by mathematic model of the optimal tire output for every composition of the portfolio of SMZ (table 4). Herewith increasing of product profitability is less than 1 p.p. so this indicator may be ignored in the definition of the purpose of the portfolio of SMZ.

While the portfolio of SMZ is formed of tires for passenger cars and trucks material costs are decreased on 3,88% and net income is increased on 1.42% compared with existing level. If the portfolio of SMZ is formed of tires for trucks and agricultural machinery gross profit is increased on 2.98%. The composition of the portfolio of SMZ of passenger cars and agricultural machinery provides the

Table 3

Determination of the synergistic effects in the tires production and consumption

Source of effect/Index for detection of source of effect	Existence of effect/Level of index		
	tires for passenger cars and trucks	tires for trucks and agricultural machinery	tires for passenger cars and agricultural machinery
Technology of production/	+	-	+
Part of materials in the tires cost, %	60% and 73%	73% and 72%	60% and 72%
Volumes of consumption in Ukraine/	+	–	–
Pair correlation coefficient	0,61	0,34	0,13
Volumes of export/	–	+	–
Pair correlation coefficient	0,36	0,8	0,34
Volumes of production/	+	+	–
Pair correlation coefficient	0,69	0,68	0,41

Note:

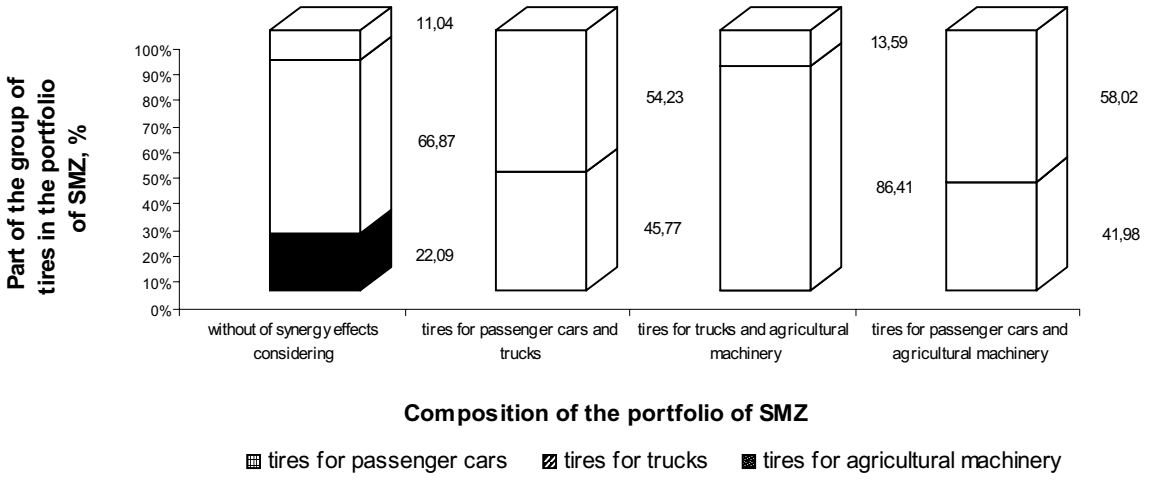

Fig. 2. Structure of the portfolio of SMZ by using the synergistic effects in the production and consumption of tires
Note: calculated and made by author

Table 4

Recommendations to form the portfolio of SMZ for the tire enterprise

Purpose of forming the portfolio of SMZ	Composition of the portfolio of SMZ	Result of using the synergistic effects
to increase the gross profit	tires for trucks and agricultural machinery	increasing of gross profit on 2,98%
to decrease the material costs	tires for passenger cars and agricultural machinery	decreasing of material costs on 3,88%
	tires for passenger cars and trucks	decreasing of material costs on 28,65%
to increase the net income		increasing of net income on 1,42%
to decrease the materials output ratio		decreasing of materials output ratio on 6,45%
to increase the output of tires		increasing of output of tires on 36,71%

Note: calculated by author

decreasing of material costs on 28.65%.

So, in carrying out the regulative influence on the level of competitiveness of separate size of tires the elements of the TE strategy are formed. These elements are: directions of the TE development, classification of the tires competitive advantages, synergistic effects in the tire production and optimal composition of the portfolio of SMZ of different groups of tires by using these effects.

Conclusions

The scientific and methodological provisions and practical recommendations for the tire enterprises strategy elements for increasing of the product competitiveness have been formed. These elements are based on the components of the quantitative estimation of the level of competitiveness of separate size of tires by integral index including the conditions of production, sale and consumption for every group of tires.

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СТРАТЕГИЯ ПРЕДПРИЯТИЙ ШИННОГО ПРОИЗВОДСТВА: ПРИКЛАДНЫЕ АСПЕКТЫ

Чернышева Е.М.

Статья посвящена определению элементов стратегии предприятий шинного производства на основе интегрального показателя оценки конкурентоспособности шинной продукции. Учтены принципы системного подхода при формировании стратегии предприятия. Определено содержание элементов портфельной стратегии предприятий шинного производства: географического вектора роста, конкурентных преимуществ, синергизма и стратегической гибкости портфеля стратегических зон хозяйствования. На основе перспективных значений координат географического вектора роста обоснованы направления конкурентоспособного развития предприятий шинного производства индивидуально для каждой группы шин. С помощью составляющих оценки конкурентоспособности шин для условий производства и потребления сформирована классификация конкурентных преимуществ шинной продукции. Определены синергетические эффекты в производстве и потреблении шин. Сформирован оптимальный состав портфеля стратегических зон хозяйствования предприятия шинного производства, определенный с учетом синергетических эффектов в производстве и потреблении шин разных групп. Применена математическая модель определения оптимальных объемов производства шинной продукции при помощи максимизации валовой прибыли предприятия на основе задачи линейного программирования.

Определена структура оптимального портфеля стратегических зон хозяйствования по группам шин. Доказано, что формирование оптимального состава портфеля стратегических зон хозяйствования при комбинации разных групп шин способствует росту валовой прибыли предприятия, чистого дохода и объемов производства шин, а также снижению материальных затрат и материалоемкости продукции.

Ключевые слова: стратегия предприятия, шинное производство, конкурентоспособность продукции, интегральный показатель, направления развития, конкурентные преимущества, портфель стратегических зон хозяйствования, синергетический эффект.

СТРАТЕГІЯ ПІДПРИЄМСТВ ШИННОГО ВИРОБНИЦТВА: ПРИКЛАДНІ АСПЕКТИ

Чернишева О.М.

Статтю присвячено визначенню елементів стратегії підприємств шинного виробництва на основі інтегрального показника оцінки конкурентоспроможності шинної продукції. Враховано принципи системного підходу при формуванні стратегії підприємства. Визначено зміст елементів портфельної стратегії підприємств шинного виробництва: географічного вектора зростання, конкурентних переваг, синергізму та стратегічної гнучкості портфеля стратегічних зон господарювання. На основі перспективних значень координат географічного вектора зростання обґрунтовано напрями конкурентоспроможного розвитку підприємств шинного виробництва індивідуально для кожної групи шин. За допомогою складових оцінки конкурентоспроможності шин для умов виробництва та споживання сформовано класифікацію конкурентних переваг шинної продукції. Визначено синергетичні ефекти у виробництві та споживанні шин. Сформовано оптимальний склад портфеля стратегічних зон господарювання підприємства шинного виробництва, визначений з урахуванням синергетичних ефектів у виробництві та споживанні шин різних груп. Застосовано математичну модель визначення оптимальних обсягів виробництва шинної продукції за допомогою максимізації валового прибутку підприємства на основі задачі лінійного програмування. Визначено структуру оптимального портфеля стратегічних зон господарювання за групами шин. Доведено, що формування оптимального складу портфеля стратегічних зон господарювання за комбінацією різних груп шин сприяє зростанню валового прибутку підприємства, чистого доходу та обсягів виробництва шин, а також зменшенню матеріальних витрат та матеріаломісткості продукції.

Ключові слова: стратегія підприємства, шинне виробництво, конкурентоспроможність продукції, інтегральний показник, напрями розвитку, конкурентні переваги, портфель стратегічних зон господарювання, синергетичний ефект.