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DETERMINATION OF COMPETITIVE ABILITY OF COMPANIES PRODUCING CONCRETE AND CONCRETE ARTICLES BASED ON DUAL ASSESSMENT OF SERVICE PERFORMANCE

The article offers scientific and methodic support for the assessment of service competitive ability of a company producing concrete and concrete articles based on the dual approach. The dual approach allows taking into account not only service quality but also the availability of certain characteristic of the service to assess competitive ability of this service. The proposed approach allows for more differential assessment of product competitiveness risks using two indices of advantage (service availability and quality of its provision) over each competitor of the company producing concrete and concrete articles.
Keywords: competitiveness; enterprises-manufacturers; concrete products; construction materials.

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ВИЗНАЧЕННЯ КОНКУРЕНТОСПРОМОЖНОСТІ ПІДПРИЄМСТВ-ВИРОБНИКІВ БЕТОНУ ТА ВИРОБІВ З БЕТОНУ НА ОСНОВІ ДУАЛЬНОГО ОЦІНЮВАННЯ СЕРВІСНОЇ ДІЯЛЬНОСТІ

У статті запропоновано науково-методичне забезпечення оцінювання конкурентоспроможності сервісу підприємства-виробника бетону та виробів з бетону за дуальним підходом. Дуальний підхід дозволяє враховувати при оцінюванні конкурентоспроможності сервісу не лише якість надання послуг, а й наявність певних характеристик сервісу. Запропонований підхід дозволяє більш диференційовано оцінювати ризики конкурентоспроможності продукції, використовуючи два показники переваги (наявність послуги та якість її надання) над кожним з конкурентів підприємства-виробника бетону та виробів з бетону.
Ключові слова: конкурентоспроможність; підприємства-виробники; вироби з бетону; виробництво будівельних матеріалів.
Форм. 3. Табл. 3. Літ. 10.

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ОПРЕДЕЛЕНИЕ КОНКУРЕНТОСПОСОБНОСТИ ПРЕДПРИЯТИЙ-ПРОИЗВОДИТЕЛЕЙ БЕТОНА И ИЗДЕЛИЙ ИЗ БЕТОНА НА ОСНОВЕ ДУАЛЬНОЙ ОЦЕНКИ СЕРВИСНОЙ ДЕЯТЕЛЬНОСТИ

В статье предложено научно-методическое обеспечение оценивания конкурентоспособности сервиса предприятия-производителя бетона и изделий из бетона с помощью дуального подхода. Дуальный подход позволяет учитывать для оценки конкурентоспособности сервиса не только качество предоставляемых услуг, но и наличие определенных характеристик сервиса. Предложенный подход позволяет более дифференцированно осуществлять оценку рисков конкурентоспособности продукции, используя два показателя преимущества (наличие услуги и качество ее предоставления) над каждым из конкурентов предприятия-производителя бетона и изделий из бетона.
Ключевые слова: конкурентоспособность; предприятия-производители; изделия из бетона; производство строительных материалов.

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General problem statement. Construction materials production is an activity based on compliance with certain standards. Therefore, the same articles of different companies producing construction materials are subject to comparison by their characteristics while defining the parameters of their competitive ability. Concrete and concrete articles are not standardised goods. That is why their competitive ability shall be defined first of all by reinforcement, i.e. service. Reinforcement here means the provision of a concrete pump. Under circumstances when risks are growing and demand is going down, the importance of service increases as it gives the client a reason to buy which actually stipulates the necessity to develop scientific and methodic approaches to defining the level of competitive ability in terms of service activity analysis.

Recent research and publications analysis. The term "competitive ability" according to contemporary scientific approaches is used to assess both the company and its products. In order to evaluate the competitive ability of the articles produced it is proposed in (Alekhine, 2011; Balabanova and Kholod, 2006; Zagorodniy and Chulay, 2007; Illyashenko and Peresadko, 2009; Yankov et al., 2013; Oklander et al., 2012; Oklander and Zlatova, 2014; Oklander and Kirnosova, 2014; Sopilnik and Kolodiychuk, 2009) to use the single indices calculated according to basic characteristics of the research subject and also integral (cumulative) indices calculated according to technical and economical parameters of the research subject. Graphical assessment of competitive ability by means of competitive ability polygon (radar) is also popular.

In our opinion scientific studies dedicated to assessment of the competitive ability of company's articles do not sufficiently consider the assessment of competitive ability of the service accompanying sales of goods. Sometimes provision of a service is the only tool to gain competitive advantages for goods without technical or quality advantages over competitors.

The research objective. The objective of this article is to develop scientific and methodic approach to competitive ability assessment of the service activity of the companies manufacturing concrete and concrete articles based on the dual approach.

Key research findings. Marketing intelligence tools can be proposed as a primary instrument the concrete manufacturing company uses to collect information regarding competitors' service level. Company's marketing expert can know that competitors have reinforcement service package available having made a call as a "potential client" (the method of ghost shopper) or from the clients of the competing company directly. It is also important to get information on the level of service which can be assessed according to a certain scale (Table 1).

It is clear that the list of services provided by concrete manufacturing companies is not stable and can change. The importance of each service from the above list shall be determined by marketing expert and must consider the weight of certain service for clients; the more important is the service in client's opinion, the bigger value it gets. The amount of all importance coefficients q_i has to be one. The availability of this service shall be assessed for each client according to the dichotomic scale (Yes/No), where "Yes" shall be valued as 1 and "No" as 0 and the quality of provision shall be assessed from 1 to 5 according to the Likert scale where 1 is "very poor" and 5 is "very good". Dichotomic assessments for the j-th competitor ($j = 1...m$) according to each

service characteristic i ($i = 1...n$) we name aij. Assessment of characteristics according to the Likert scale for competitor j according to each service characteristic i we name b_{ij}.

Table 1. **Monitoring parameters of the service list of a competitor for the company manufacturing concrete and concrete articles,** *authors*

Service list	Importance of the service q_i	Competitor j (j = 1...m)		Company	
		Dichotomic assessment a_{ij}	On-scale assessment b_{ij}	Dichotomic assessment a_{im+1}	On-scale assessment b_{im+1}
Provision of a concrete pump	q_1	Yes/No (1/0)	1...5	Yes/No (1/0)	1...5
Filling at night time	q_2	Yes/No (1/0)	1...5	Yes/No (1/0)	1...5
Cleaning rubbish on construction site	q_3	Yes/No (1/0)	1...5	Yes/No (1/0)	1...5
Repeated order discount	q_4	Yes/No (1/0)	1...5	Yes/No (1/0)	1...5
$\sum q_i$	1				

Dichotomic assessments of competitor's service availability together with assessments of its provision level according to the Likert scale will let us get fuller assessment of competitive ability of a concrete manufacturing company. Available research and methodology approaches to the assessment of competitive ability of an article or service such as calculation of competitive ability index, building of competitive ability polygon or determination of competitive ability rating, do not consider the case when an article or service characteristic is missing according to which we are comparing goods of certain manufacturer with competitor; i.e. all the characteristics are considered as available. Nevertheless, certain characteristics of the article may be essential for the consumer and its absence cannot be compensated by other characteristics with high quality. If so, high competitive ability index does not always guarantee advantages to a manufacturer over its competitors.

In order to have more objective assessment of competitive ability of service of the companies manufacturing concrete and concrete articles a ***dual approach*** was proposed based on the calculation of two indices:
- completeness of service index, *CS*;
- quality of services index, *QS*.

CS is calculated as:

$$CS_j = \sum_{i=1}^{n} q_i a_{ij} \quad (j = 1...m), \tag{1}$$

where CS_j is the completeness of service index of the j-th competitor ($j = 1...m$); q_j — the weight coefficient of the i-th characteristic of the service; a_{ij} — dichotomic assessment of availability of the i-th service characteristic of the j-th competitor.

Maximum value of the completeness of service index is equal to 1, which means that the competitor has the full range of service characteristics. Minimum value is 0 meaning that this competitor may not have any service characteristics at all.

Quality of services index (QS) is calculated as:

$$QS_j = \sum_{i=1}^{n} q_i b_{ij},(j=1...m), \qquad (2)$$

where QS_j is the quality of services index of the j-th competitor ($j = 1...m$); q_j — the weight coefficient of the i-th characteristic of the service; b_{ij} — assessment of quality of the i-th service characteristic of the j-th competitor according to the Likert scale.

Maximum value of the quality of services index is equal to 5 which corresponds to the maximum assessment of all service characteristics. After the calculation of completeness of service and quality of services indices for all competitors we determine these indices for the concrete manufacturing company in question. Let us call the company in question as $m + 1$. The indices of service completeness and service quality shall be respectively calculated according to:

$$CS_{m+1} = \sum_{i=1}^{n} q_i a_{im+1}, \quad QS_{m+1} = \sum_{i=1}^{n} q_i b_{im+1}. \qquad (3)$$

According to the dual approach to the competitive ability assessment the indices of service completeness and service quality are placed in a table (Table 2).

Table 2. **Dual assessment of competitive ability of companies manufacturing concrete and concrete articles,** *authors*

	CS_j ($j = 1...m$)	Indices of advantage of the company manufacturing concrete and concrete articles over each competitor upon the availability of services C_j	QS_j ($j = 1...m$)	Indices of advantage of the company manufacturing concrete and concrete articles over each competitor upon quality of services L_j
Competitor 1	CS_1	$C_1 = CS_{m+1} - CS_1$	QS_1	$L_1 = QS_{m+1} - QS_1$
Competitor 2	CS_2	$C_2 = CS_{m+1} - CS_2$	QS_2	$L_2 = QS_{m+1} - QS_2$
…	…	…	…	…
Competitor j	CS_j	$C_j = CS_{m+1} - CS_j$	QS_j	$L_j = QS_{m+1} - QS_j$
…	…	…	…	…
Competitor m	CS_m	$C_m = CS_{m+1} - CS_m$	QS_m	$L_m = QS_{m+1} - QS_m$

Conclusions on the assessment of competitive ability risks according to Table 2 are proposed to be made according to the rule in Table 3.

1. If all the indices of advantage of the concrete manufacturing company by availability of service C_j ($j = 1...n$) and all the indices of advantage of the concrete manufacturing company by the quality of service L_j ($j = 1...n$) are positive, we conclude that competitive ability of the company is high, i.e. the risk of competitive ability loss can be considered as close to zero.

2. If all the indices of advantage of the concrete manufacturing company by availability of service C_j ($j = 1...n$) and all the indices of advantage of the concrete manufacturing company by quality of service L_j ($j = 1...n$) are integral, we conclude that the competitive ability of the company is sufficient, i.e. the company manufacturing concrete and concrete articles has advantages over certain competitors or does not yield to them either in number of service characteristics, or in their quality.

Table 3. **Assessment of risks according to the dual approach to competitive ability assessment of the company manufacturing concrete and concrete articles,** *authors*

	Advantage / yield by availability of services Advantage / yield by quality of services	Assessment of competitive ability risk
1	$C_j > 0$ $(j = 1...n)$ $L_j > 0$ $(j = 1...n)$	The risk is close to zero. According to all service characteristics concrete manufacturing company is ahead of competitors. High competitive ability.
2	$C_j \geq 0$ $(j = 1...n)$ $L_j \geq 0$ $(j = 1...n)$	Low risk. According to all service characteristics concrete manufacturing company is either ahead of competitors, or not worse than them. Sufficient competitive ability.
3	For certain competitor j, $C_j > 0$ and at the same time $L_j \leq 0$	Moderate risk. According to a number of service characteristics the concrete manufacturing company has advantages over the competitor but the quality of service is worse.
4	For certain competitor j, $C_j = 0$ and at the same time $L_j < 0$	High risk. According to a number of service characteristics the concrete manufacturing company has no advantages over the competitor and the quality of service is worse.
5	For certain competitor j, $C_j < 0$ and at the same time $L_j < 0$	Very high risk. According to a number of service characteristics the concrete manufacturing company stands down to the competitor.
6	For certain competitor j, $C_j < 0$ and at the same time $L_j = 0$	High risk. According to a number of service characteristics the concrete manufacturing company has no advantages over the competitor but the quality of service is higher.
7	For certain competitor j, $C_j < 0$ and at the same time $L_j > 0$	Moderate risk. According to a number of service characteristics the concrete manufacturing company has no advantages over the competitor but the quality of service is much higher.

3. In other cases the analysis is performed by each of n competitors of the company and there is a comparison of indices pairs C_j and L_j $(j = 1...n)$:

- if $C_j > 0$ and at the same time $L_j \leq 0$, than the company manufacturing concrete and concrete articles has advantages over the *j*-th competitor by a number of services but yields in their quality. In this case the risk of competitive ability loss as compared to the *j*-th competitor can be considered as moderate. There is a certain grading of risks in this case. We observe the smallest risk by $L_j = 0$, and the less is L_j from 0 the worse is the assessment of service of the company manufacturing concrete and concrete articles as compared to the competitor, and respectively the higher is the risk of competitive ability loss;

- if $C_j = 0$ and at the same time $L_j < 0$, than the company provides the same number of services as the *j*-th competitor does but yields in their quality, that is why the risk of competitive ability loss can be considered as high;

- if $C_j < 0$ and at the same time $L_j < 0$, than the manufacturer of concrete and concrete articles provides less number of services as the *j*-th competitor and also yields in quality; that is why the risk of competitive ability loss can be considered as very high;

- if $C_j < 0$ and at the same time $L_j = 0$, than the company provides less number of services as the *j*-th competitor, but has higher service quality, so the risk of competitive ability loss can be considered as high;

- if $C_j <$ and at the same time $L_j > 0$, than the company manufacturing concrete and concrete articles provides less number of services as the *j*-th competitor but has higher service quality, that is why the risk of competitive ability loss can be considered as moderate.

Assessment of competitive ability of the company manufacturing concrete and concrete articles as per Table 3 has to be applied in determination of company development strategy in the line of its competitive ability increase.

Conclusions. The service of standard products of the companies manufacturing concrete and concrete articles shall be assessed based on the dual approach taking into account both availability of the service in the service list of the company and quality evaluation of its provision. According to the dual approach a list of advantage indices is made for the company manufacturing concrete and concrete articles over each competitor by availability of the service and also quality of its provision. The offered approach allows for more differential assessment of product competitiveness risks using two indices of advantage over each competitor of the company manufacturing concrete and concrete articles which are the availability of service and the quality of its provision.

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