INFLUENCE OF THE TECHNOLOGICAL FACTORS OF BREEDING ON THE COST MANAGEMENT EFFICIENCY OF SPECIALIZED POULTRY ENTERPRISES

Volodymyr Tkachenko¹, Olga Rodina², Tethane Savchenko³

¹ PhD, Energodar Institute of Public and Municipal Administration named after R. G. Khenoh «Classic Private University», Molodizhna str, 3a. Energodar. 71503. Ukraine. Tel. +380954706550. E-mail director.eigmy@gmail.com

² Postgraduate student, senior teacher Energodar Institute of Public and Municipal Administration named after R. G. Khenoh «Classic Private University». Molodizhna str., 3a. Energodar. 71503. Ukraine. Tel. +380663010019. E-mail olga_gelevan@ukr.net

³ PhD, Assoc. Prof. Energodar Institute of Public and Municipal Administration named after R. G. Khenoh «Classic Private University». Molodizhna str. 3a. Energodar. 71503. Ukraine. Tel. +380660153141. E-mail savchenko1802@ukr.net

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Reducing of enterprise costs, improving the organizational and methodological provision of cost management, the objectification of the apparatus to determine their level of efficiency appears to be a priority problem for any enterprise. The main purpose is to improve the methodology for determining the cost-effectiveness of the management taking into account technological factors of growing at poultry enterprises. To improve the quality of the process of assessing the effectiveness of cost management it is recommended to use a balanced system of indicators, which is modified according to the branch features of the enterprise's activity. The basis of the proposed method is the assessment of three group indicators, for results of which calculates the integral coefficient, taking into account the importance of each of the criteria.

Keywords: costs, management efficiency, technological factors of growing, evaluation methodology, specialized poultry enterprises.

JEL Codes: C63, D24, Q10.

1. Introduction

The poultry market in Ukraine plays a very important role. Poultry farming is one of the fast-growing livestock sectors that is characterized by a rapid pace of reproduction of the chicken livestock, the minor costs of material and the costs of human labour per unit of output. The bird features high performance, reproductive capabilities, intense growth, the ability to have the highest feed conversion for its adaptability to industrial conditions of maintenance (Ionov, 2012).

Nowadays the development of the poultry farming provides the search of ways to the further increase of the productivity of poultry due to the wide implantation into practice modern, innovative technologies of up keeping and alimentation based on the use of nontraditional, cheap, available in excess of energy sources, nutritious, mineral and biologically active substances (Shchetinina, 2009).
In modern conditions, the technological processes of production broiler chickens meat are aimed at continuously increasing the productivity of poultry, with a regular constant reduction of the costs for their breeding.

Taking into account the specifics of each enterprise's activity, cost reduction should be considered as one of the main factors for increasing the efficiency of any production and economic activity that will ensure its stable functioning, dynamic development and maximize profit. Enterprise cost management can be considered to be very effective when it enables not only rational use of available resources, but also to provide an active system search for opportunities for further reduction of costs and, accordingly, to ensure the development of the enterprise as a whole. Therefore, the improvement of organizational and methodological support for the cost management of the specialized poultry enterprises, the objectification of the apparatus for determining the level of their efficiency, are of practical importance and predetermine the need for further research.

The main purpose of this study is to improve the methodology for determining the efficiency of the cost management, taking into account the technological factors of breeding at the specialized poultry enterprises.

The research object is the processes of cost management on the specialized poultry enterprises. The above aim was accomplished by fulfilling the following research objectives:

- finding out the composition of technological factors of breeding, that influencing the efficiency of the cost management at the specialized poultry enterprises;
- improvement of methodical approach to the assessment of the efficiency of the cost management at the specialized poultry enterprises;
- development of the substantiated system of indicators of efficiency assessment of the cost management at the specialized poultry enterprises;
- determination of the level of efficiency of the cost management at the specialized poultry enterprises.

Therefore the problems remains unresolved: what changes the existing methods of the cost management in order are required to objectively assessment of their fully effectiveness taking into account the technological factors of breeding chickens at the specialized poultry enterprises? How do the technological factors to influence the breeding of the cost management efficiency at the specialized poultry enterprises.

A. Gavrylenko and V. Zvenyachkina (2011) consider that one of the main components of the cost management process are the methods of their managing, that have to include the purpose of managing, management factors, management elements and their connections, the receptions of influence on these management factors, management resources, social and organizational potentials will using management and the posed purpose are implemented secured all these (Gavrylenko, 2011; Heckmann, 2015).

O. Grytsay (2011) states that there are a lot of cost management methods at the enterprise. But in the cost management – managing method is considered as totality taken decisions, assumptions, aim and procedures intended to implementation cost
management functions. Each method is attractive on its own, it has its advantages and disadvantages and as well as a specific area of using (Grytsay, 2011).

According to L. Dorozhenko (2014) in native practice the most commonly is apply by methods that based on the choice of the original object which the analytical accounting of cost are used (Dorozhenko, 2014; Drury, 2007).

Progressive Western companies attention paid to the strategic cost management (Vorobiova, 2013; Anderson, 2007; Wagnerb, 2012).

Modern economic conditions direct domestic manufactures of poultry products to continuous search and use of effective cost management methods, optimization of the cost structure necessary to strengthen competitive positions and make an effective management decision. The process of breeding broiler chickens is only one phase of an integrated chicken meat production process. The complete integrated process of breeding poultry meat consists of the following shops: a parent stock, the production of incubation eggs, egg incubation, young-stock breeding and young-stock for meat, bird slaughter, processing, sorting and packaging of carcasses (Busenka, 2013). It is characterized by a closed cycle of production with a well-established shop system of technological process. Although the broiler department remains the main process in the whole process of breeding broiler chickens (Breeding ..., 2017). Therefore, the consideration of technological factors for the breeding of chicken meat appears as one of the primary tasks in determining the efficiency of the cost management at the specialized poultry enterprises.

2. Research methodology

The cost management efficiency of breeding broiler chicken at the specialized poultry enterprises is evidenced first of all by the minimum level of cost expenditure achieved and the maximum productivity of the breeding cycle. The objectivity of assessment of the efficiency of the enterprise’s management costs is influenced by a system of indicators used to calculate an integral indicator of cost efficiency management, which is formed under the influence of factors of the external and internal environment and takes into account the specifics of the industry in which the company operates.

In order to evaluate the efficiency of the cost management of breeding broiler chicken meat we consider that there is a need to select the stages that form a certain algorithm which is presented (Fig.).

Nowadays the development of the poultry farming provides the search of ways to the further increase of the productivity of poultry due to the wide implantation into practice modern, innovative technologies of up keeping and alimentation based on the use of nontraditional, cheap, available in excess of energy sources, nutritious, mineral and biologically active substances (Shchetinina, 2009).
Tkachenko Volodymyr, Olga Rodina, Tetyana Savchenko. Influence of the technological factors of breeding on the cost management efficiency of specialized poultry enterprises

The development of a method of assessment of the level of the cost management efficiency of breeding broiler chicken meat at the specialized poultry enterprises involves the need for a comprehensive assessment of the cost management efficiency based on three common (group) indicators, as per the results of which the integral coefficient of the cost management efficiency calculates, taking into account the weight of each group indicators.

In the basis of the calculation method the integral indicator as the sum of weighted normalized indicators has been put. Target values for each indicator (maximum and minimum) are defined is compared with actual. As result of the comparison is a normalized assessment, on which basis the conclusions about the balanced systems of the enterprise cost management are made (Kaplan, 2003).

To implement the project, no additional funding is required, and the information needed to operate the cost management system of the specialized poultry enterprise is collected by individual structural departments, but the process of collecting, processing and analyzing information is unsystematic.

In order to increase the objectivity of the process of assessment of the level of cost for the breeding broiler chicken meat, taking into account the components of technological and production cycles, a system of indicators is needed to determine the level of the cost management efficiency of the specialized poultry enterprise that will meet the specifics of the industry and the conditions of operation of the enterprise.
In order to assess the cost management efficiency, provided that the breeding technology is observed in accordance with the standards, we shall present the following group indicators:

- the efficiency of the technological system, including the technological factors of breeding: the amount of floor space per chicken broiler, the level of sound pressure, the level of illumination, the temperature regime, the term of breeding, relative humidity, the microclimate condition in the premise (E₆);

- the efficiency of the breeding cycle, which includes the technological factors of breeding: the survival of chicken livestock, live weight of chickens, average daily gain, losses during transportation, slaughter yield (E₇);

- the efficiency of the usage of material resources, which includes: heating costs, electricity costs, feed costs, water consumption costs (E₈).

In order to determine the weighted coefficients of the group indicators of cost management efficiency, it is recommended that experts be interviewed in the form of interviews (Kotler, 2007; Mihalovich, 2016). For obtaining the expert assessment, the Delphi method was proposed, which is a kind of method of collective expert assessments, as it has quite significant advantages (Beshelev, 1980; Kapelko, 2016).

The experts at the meeting recommend selecting heads and middle-ranking employees. The total number of experts should be 10 persons, who are invited to assess the weight of the selected group indicators of the cost management efficiency in points as per 10 point scale (assessment criteria of the weight of indicators of the cost management efficiency) (Table 1).

### Table 1. Assessment criteria of the weight of indicators that influencing the level of cost management efficiency for a 10-point scale

<table>
<thead>
<tr>
<th>Scale</th>
<th>Assessment criteria of the weight of indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>The importance of the indicator has a decisive influence on the level of cost management efficiency</td>
</tr>
<tr>
<td>9</td>
<td>The importance of the indicator has a essential influence on the level of cost management efficiency</td>
</tr>
<tr>
<td>8</td>
<td>The importance of the indicator has a significant influence on the level of cost management efficiency</td>
</tr>
<tr>
<td>7</td>
<td>The importance of the indicator has a high influence on the level of cost management efficiency</td>
</tr>
<tr>
<td>6</td>
<td>The importance of the indicator has a higher than average influence on the level of cost management efficiency</td>
</tr>
<tr>
<td>5</td>
<td>The value of the indicator has a medium influence on the level of cost management efficiency</td>
</tr>
<tr>
<td>4</td>
<td>The importance of the indicator has a below average influence on the level of cost management efficiency</td>
</tr>
<tr>
<td>3</td>
<td>The importance of the indicator has a insignificant influence on the level of cost management efficiency</td>
</tr>
<tr>
<td>2</td>
<td>The importance of the indicator has almost does not influence on the level of cost management efficiency</td>
</tr>
<tr>
<td>1</td>
<td>The importance of the indicator has does not influence on the level of cost management efficiency</td>
</tr>
</tbody>
</table>
The obtained experts assessments of the weight $q_{ij}$ of each $j$ group indicator in points are averaged and normalized to obtain the weight coefficient $q_{jn}$. To analyze the coherence of experts the coefficient of variation of the answer variants ($v$) is used. It is calculated by such formula 1:

$$v = \frac{\sigma}{q_j}, \quad (1)$$

where $\sigma$ – medium-quadratic deviation; $q_j$ – average value assessments.

Medium-quadratic deviation is calculated by such formula 2:

$$\sigma = \sqrt{D(q_{ij})}, \quad (2)$$

In turn $D(q_{ij})$ is find by such formula 3:

$$D(q_{ij}) = \frac{1}{n} \sum_{i=1}^{\mu} (q_{ij} - \overline{q}_j), \quad (3)$$

where $n$ – number of experts.

The degree of coherence of experts is determined by the following characteristics of the coefficient of variation (Vasylieva, 2015; Weiss, 2010):

- $v \leq 0.10$ – coherence is high;
- $v = 0.11–0.15$ – coherence is above average;
- $v = 0.16–0.25$ – coherence is medium;
- $v = 0.26–0.35$ – coherence is below average;
- $v > 0.35$ – coherence is below the permissible norm.

After calculation the efficiency coefficient of the cost management of the specialized poultry enterprise, we compare the obtained point assessment with the maximum possible (10 points) and establish its level of the management efficiency. According to the experts the levels cost management efficiency was distributed as follows:

- from 0 to 2 points – the cost management is ineffective;
- from 2 to 4 points – the level of the cost management efficiency is below the average;
- from 4 to 6 points – the level of the cost management efficiency is average;
- from 6 to 8 points – the level of the cost management efficiency is above average;
- from 8 to 10 points – the level of the cost management efficiency is high;
- 10 points – enterprise with the highest level of cost management.
3. Research results

Assessment of the cost management efficiency we shall start with an expert survey of specialists as to determining the level of influence technological and producing components. Answers of experts as to weighting coefficients determination and the coefficient variation is show in the table 2.

Table 2. Calculation of the weighting factors of group indicators of the cost management efficiency of the enterprise

<table>
<thead>
<tr>
<th>An expert</th>
<th>Group indicators</th>
<th>Ets</th>
<th>Ecg</th>
<th>Emc</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>9</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>7</td>
<td>7</td>
<td>6</td>
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<tr>
<td>3</td>
<td></td>
<td>8</td>
<td>6</td>
<td>7</td>
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<tr>
<td>4</td>
<td></td>
<td>7</td>
<td>6</td>
<td>7</td>
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<tr>
<td>5</td>
<td></td>
<td>9</td>
<td>8</td>
<td>6</td>
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<td>8</td>
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<td>7</td>
<td>7</td>
</tr>
<tr>
<td>9</td>
<td></td>
<td>10</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>9</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>qy</td>
<td></td>
<td>8.10</td>
<td>6.70</td>
<td>6.40</td>
</tr>
<tr>
<td>qjm</td>
<td></td>
<td>0.38</td>
<td>0.32</td>
<td>0.30</td>
</tr>
<tr>
<td>σ</td>
<td></td>
<td>0.98</td>
<td>0.82</td>
<td>0.80</td>
</tr>
<tr>
<td>ν</td>
<td></td>
<td>0.12</td>
<td>0.12</td>
<td>0.13</td>
</tr>
</tbody>
</table>

Note: qy – averaged of value of the weight coefficient j-factor’s; qjm – rationally importance of the weight coefficient j-factor’s.

The able 2 shows that coefficient variation is changing in the norm (obtained coefficients variation is not higher 0.13). As results expert assessments is recommended the following dependence of the integral indicator $E_{cms}$ which can be transformed into a mathematical model (formula 4):

$$E_{cms} = 0.38 E_{ts} + 0.32 E_{cg} + 0.30 E_{mc}$$  (4)
The next step is to establish the significance of individual indicators within individual group indicators (is calculated by above methodology) and we will calculate the normalized group indicators of the cost management efficiency of the specialized poultry enterprises and include the results of calculations (Table 3).

Table 3. Calculation of normalized group indicators of the cost management efficiency and breeding broiler chicken meat

<table>
<thead>
<tr>
<th>Group and individual indicators of the cost management efficiency</th>
<th>Lower bound</th>
<th>Upper bound</th>
<th>Actual bound</th>
<th>Normalized assessment</th>
<th>Weight</th>
<th>Group and individual indicators of the cost management efficiency (normalized weighted assessment)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Efficiency of the technological system (E_{ts})</td>
<td></td>
<td></td>
<td></td>
<td>8.0</td>
<td>0.14</td>
<td>1.12</td>
</tr>
<tr>
<td>1. Amount of floor space per boiler chicken, bird per m² (D_l)</td>
<td>15.0</td>
<td>25.0</td>
<td>23.0</td>
<td></td>
<td>0.14</td>
<td>1.12</td>
</tr>
<tr>
<td>2. Level of sound pressure in the premise, decibel (L_{sp})</td>
<td>65.0</td>
<td>90.0</td>
<td>80.0</td>
<td>4.0</td>
<td>0.14</td>
<td>0.56</td>
</tr>
<tr>
<td>3. Level of illumination for chickens aged 15 and more days in daylight, lux (L_i)</td>
<td>10.0</td>
<td>25.0</td>
<td>22.0</td>
<td>8.0</td>
<td>0.15</td>
<td>1.20</td>
</tr>
<tr>
<td>4. Term of breeding, days (T_c)</td>
<td>35.0</td>
<td>45.0</td>
<td>42.0</td>
<td>3.0</td>
<td>0.16</td>
<td>0.48</td>
</tr>
<tr>
<td>5. Temperature regime in the premise for chickens over 7 days, °C (T_m)</td>
<td>15.0</td>
<td>20.0</td>
<td>18.0</td>
<td>6.0</td>
<td>0.16</td>
<td>0.96</td>
</tr>
<tr>
<td>6. Relative humidity in the premise for chickens over 7 days, % (H_a)</td>
<td>60.0</td>
<td>75.0</td>
<td>68.0</td>
<td>5.3</td>
<td>0.13</td>
<td>0.69</td>
</tr>
<tr>
<td>7. Compliance of the microclimate condition in the premise with standards (hydrogen sulfide up to 5 mg/m³, ammonia – 15 mg/m³, carbon dioxide – 0.25%, dust 8 mg/m³, microorganisms 500 thousand tons/m³), points (M_s)</td>
<td>0.0</td>
<td>10.0</td>
<td>7.0</td>
<td>7.0</td>
<td>0.12</td>
<td>0.84</td>
</tr>
<tr>
<td>Efficiency of the breeding cycle (E_{cg})</td>
<td></td>
<td></td>
<td></td>
<td>6.6</td>
<td>0.24</td>
<td>2.06</td>
</tr>
<tr>
<td>1. Survival of chicken livestock up to 42 days, % (P_c)</td>
<td>80.0</td>
<td>97.5</td>
<td>95.0</td>
<td>8.6</td>
<td>0.24</td>
<td>2.06</td>
</tr>
<tr>
<td>2. Live weight of chickens at the age of 42 days, g (L_w)</td>
<td>1500.0</td>
<td>2900.0</td>
<td>2300.0</td>
<td>5.7</td>
<td>0.21</td>
<td>1.19</td>
</tr>
<tr>
<td>3. Average daily gain up to 42 days, g (A_i)</td>
<td>40.0</td>
<td>55.0</td>
<td>50.0</td>
<td>6.7</td>
<td>0.18</td>
<td>1.21</td>
</tr>
<tr>
<td>4. Losses during transportation, % (T_l)</td>
<td>10.0</td>
<td>25.0</td>
<td>18.0</td>
<td>4.7</td>
<td>0.17</td>
<td>0.80</td>
</tr>
<tr>
<td>5. Slaughter yield, % (S_l)</td>
<td>65.0</td>
<td>80.0</td>
<td>75.0</td>
<td>6.7</td>
<td>0.20</td>
<td>1.34</td>
</tr>
</tbody>
</table>
In particular, the lowest bound of the activity of the specialized poultry enterprise engaged in the breeding broiler chicken meat is derived from the group indicator "Efficiency of the usage of material resources" – 4.70 points. Such an assessment is due to overexploitation of material resources in the breeding broiler chicken meat and an increase in the cost of grown products, lack of financial resources of the enterprise. Indicator "Efficiency of the technological system" with the result of 5.90 points is on average. A fairly low result is obtained by the indicators of the level of sound pressure (4 points), term of breeding (3 points), relative humidity (5.30 points).

The highest point (6.60 points) was obtained based on the group indicator "Efficiency of the breeding cycle", but a rather low result was obtained by the indicator "Losses during transportation" (4.70 points), which suggests the need to reduce such losses, possibly due to changing conditions of transportation.

Thus, the results obtained in both individual and group indicators of the cost management efficiency indicate that all efforts of poultry enterprises are aimed at costs reducing.

As a result, the integral indicator of the cost management efficiency of the specialized poultry enterprise), taking into account the received assessments as per the group indicators and weight coefficients (formula 5):

$$E_{ems} = 0.38 \cdot 5.90 + 0.32 \cdot 6.60 + 0.30 \cdot 4.70 = 5.764 \approx 5.80$$  \hspace{1cm} (5)
According to preliminary results of the interweaving of employees of the specialized poultry enterprises, the result of assessment of the efficiency level of cost management (above average) was forecasted. Thus, the received result does not correspond to the expected one, and experts can make suggestions on ways and methods of increasing the efficiency of the cost management at the enterprise.

4. Conclusions

1. The analysis of the specific of the technological process of breeding broiler chicken allowed to clarify and to toad supply the list the technological factors for influence to the cost management efficiency of the specialized poultry enterprises such as: the amount of floor space per chicken broiler, usage of poultry, high-yielding meat breeds, the support of optimal microclimate, illumination regime, feed nutrition and full feeding, the observance of veterinary and sanitary standards.

2. The keeping research of modern approaches to assessment of the cost management efficiency at the specialized poultry enterprises showed that no one of the all-known methods is adapted for assessment of the cost management efficiency lust for the specialized poultry enterprises. To increase the objectivity of assessment of the cost management efficiency of the specialized poultry enterprises is proposed using the system of indicators that take into account the specific of their activity.

3. The overall assessment of the management efficiency should be formed as a system indicator that characterizes a set of factors that cover different areas of the enterprise. Its comprehensive assessment should be carried out in the context of the “strategic vision” of the final results in the form of the planned level of efficiency of the enterprise's cost management. So, in order to improve the quality of the processes of assessment of the cost management efficiency, it should be recommended to use a balanced system of indicators, which is modified according to the specific features of the enterprise.

4. The basis of the proposed method is the assessment of three group indicators - the criteria of the management efficiency (efficiency of the technological system, the efficiency of the breeding cycle, the efficiency of material resources), as per the results of which the integral coefficient calculates, taking into account the significance (weight) of each indicators. Within each of the criteria, the individual indicators of each aspect of the enterprise cost management system are determined and grouped based on the analysis of their intra-group and intergroup relationships. The expert assessment method is used to determine the weight of the criteria of the enterprise management efficiency and individual indicators. The greatest influence on the level of the cost management efficiency of the specialized poultry enterprises makes the level of efficiency of the technological system of the enterprise, as compliance with the standards of breeding broiler chickens directly affects the quantitative and qualitative indices of poultry breeding.

5. The usage for calculation the integral indicator of the cost management efficiency of the specialized poultry enterprises as the sum of normalized weighed assessments will increase the objectivity of the process of determining its level.
Prospects for further scientific developments in this direction is definition and localization the systems of cost management at specialized poultry enterprises as a component of strategic management.

References


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AUGINIMO TECHNOLOGINIŲ VEIKSNIŲ ĮTAKA SĄNAUDŲ VALDYMO EFEKTYVUMUI SPECIALIZUOTOSE PAUKŠTININKYSTĖS ĮMONĖSE

Volodymyr Tkachenko1, Olga Rodina2, Tetyana Savchenko3,
Energodaro R. G. Chenocho "Klasikinio privataus universiteto" Valstybinis ir savivaldybių valdymo institutas

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Santrauka

Atsižvelgiant į kiekvienos įmonės veiklos specifiką, sąnaudų mažinimas turėtų būti laikomas vienu iš pagrindinių efektyvumo didinimo veiksnių. Pagrindinis šio tyrimo tikslas yra patobulinti sąnaudų valdymo efektyvumo nustatymo metodiką, atsižvelgiant į auginimo technologinius veiksnius paukštininkystės įmonėse. Siekiant pagerinti sąnaudų valdymo efektyvumo vertinimo procesų kokybę, rekomenduojame naudoti subalansuotą rodiklių sistemą, kuri yra pakeičiama atsižvelgiant į konkrečias įmonės veiklos pramonės šakos ypatybes. Siūlomos pagrindas yra trijų grupių rodiklių įvertinimas, pagal kurio rezultatus yra apskaičiuojamas integruotas koeficientas, atsižvelgiant į kiekvieno kriterijaus svarbą.

Raktiniai žodžiai: sąnaudos, valdymo efektyvumas, auginimo technologiniai veiksniai, vertinimo metodai, specializuotos paukštininkystės įmonės.

JEL kodai: C63, D24, Q10.