DOI: 10.26411/83-1734-2015-3-43-8-19

Performance Management in Logistics Companies – a Two – Dimensional Approach

Michał Comporek
The University of Łódź, Poland

The main aim of the article is to emphasize the problem of selecting performance management (PM) indicators in logistics companies. This issue is particularly significant, because the proper selection of PM measures affects the following: the effectiveness of the implemented performance measurement system, the nature of information provided to its individual stakeholders, the system of interconnections within the organization, and often even the efficiency of the entire business entity on the market. However, the paper draws attention to the potential of deliberately distorting the reported company results by the management team. Hence, the secondary goal of the article is to select various tools and/or techniques which may be helpful in assessing the quality of reporting PM - in relation to the real earnings management (REM). The applied research methods are based on a critical analysis of the literature on the subject matter.

Keywords: performance management, real earnings management, logistics enterprises.

1. INTRODUCTION

Contemporary logistic enterprises are characterized by the multidimensionality of economic, social and individual goals, which cause difficulty in clearly and authoritatively presenting the ultimate aim of their functioning. Conducting business activities in order to maximize economic benefits, the leading motive of their participation in the market should be considered striving to maximize the wealth of current and future shareholders (with an acceptable level of risk). However, its implementation would not be possible without proper care to ensure the continuity of the company's existence, and the necessity to fulfil all the premises determining the persistence and development of the business entity on the market. Particular attention should be paid to operations aimed at a fair distribution of the created value and taking into account the needs and interests of a wide range of stakeholders of the logistics enterprise with simultaneous explicit care in the way of measuring the results and achievements of business entity. However, it requires multi-faceted targeting of value carriers and linking them with evaluation measures [Nita 2014, p. 38].

Large diversity of means and objects of work, applied management techniques, employee competences, and conditions for the implementation of logistic processes make it impossible to formulate indisputable and unambiguous criteria allowing to evaluate the effectiveness and efficiency of activities undertaken in the organization. The growing importance of non-financial generators of future business results (e.g. logistic customer service), along with the adaptation of the Stakeholders Theory [Jones, Wicks 1999, pp. 206-221] progressively forces contemporary logistic companies to implement modern management techniques based on a comprehensive assessment of achieved results and referred to as Performance Management (PM)[1].

On the other hand, business practice indicates that relations occurring between individual

[1] In the paper the opinion is presented, according to which performance management is a term that should be holistically considered in connection with aims, satisfaction of stakeholders and the economic condition of the enterprise [Bernardin 1995, p. 462]. More clearly, this is a process by which organizations set goals, determine standards, assign and evaluate work, and distribute rewards.

stakeholders of the enterprise are burdened with a large asymmetry in access to information, which may cause some dysfunctional behaviour on the part of the management. Managers aiming at realizing private benefits may focus on formal achievement of predefined target values for individual measures, but not engage in areas of performance that are unmet. As a result, the organization's efficiency will be reduced [Niemiec 2016, p. 22]. What is more, they can often strive to artificially and intentionally present the results of an economic entity in a better light than the economic realities and the PM reporting process would be deliberately distorted.

The main goal of the paper is to emphasize the problem of selecting appropriate indicators in measuring the performance of logistics companies. This issue is particularly significant because the implemented measurement systems in logistic organizations are a binder linking all organizational systems existing in these enterprises [Spitzer 2007, p. 13]. The proper selection of a few or a dozen PM indicators may depend not only on the effectiveness of the implemented performance measurement system, but also on the efficiency of the entire business entity on the market.

The secondary objective of the article is to select various tools and/or techniques, which may be helpful in assessing the quality of reporting PM - in relation to the financial plane of the entity's operations. In this context, research optics will be directed to the presentation of these measures, which are not strictly related to the PM process, but may be useful in detecting the intentional shaping of selected PM indicators by the management staff of logistics enterprise.

2. SELECTION OF PM INDICATORS IN LOGISTICS COMPANIES – MAIN ASSUMPTIONS AND EXAMPLES

Both the national and international literature on the PM in logistic enterprises is very extensive and treats the discussed issues in a multifaceted way. The vast majority of these works refers to a narrow section of logistic problems, referring to the PM sphere in: supply chain management [see inter alia: Gulledge, Chavusholu 2008, pp. 750-770; Forslund 2015, pp. 652-670; Christopher, Towill 2002, p. 1-14], transport [Nowicka-Skowron 2000, p. 138; Sinha, Labi 2007; Kovacs 2017, pp. 121-134], logistic customer service [Gajewska 2016, pp. 1320-1326; Kramarz, Kramarz 2015, pp. 323-324], warehouse management [see: Moberg, Speh 2004, pp. 71-76; Colson, Dorigo 2004, pp. 332-349] etc. However, attention is more focused on the assessment of logistic functions in the enterprise than on the measurement of achievements of logistics entities as a whole. What is also underlined is the unavailability of ready-made solutions that could be used in economic practice without major modifications.

As Bokor notes [2008, p.33] PM in logistics is a coherent set of tools which support logistics (management) decisions and thus the planning, controlling and monitoring of related business processes. PM in the context of the logistics company's activity requires focusing attention on complex multi-criteria evaluation schemes integrating financial as well as technology oriented measures[2] . However, the main difficulty facing the managerial staff is the selection of a number of indicators that will be optimal from the perspective of the individual organization. What's more, the literature on the subject emphasizes the fact that too many areas of measurement may be treacherous for economic practice [Korneta 2018, p. 273].

The scope of PM in logistic enterprises can be considered from various points of view. According to Niemiec [2016, p. 34], the important PM criteria should include the following: business area, performance measurement level, stakeholder's perspective, reference horizon, etc [Figure 1]. Reporting PM in relation to individual functional areas of the enterprise assumes that each of them has a distinct specificity and may require the quantification of many determinants of achievements. From the perspective of the classification criterion referring to the measurement level of achievements, it is worth pointing out that this categorization complies with hierarchical organization structures. In general meaning, there are three levels of measurement of achievements: strategic, tactical and operational (individual achievements). The strategic context

[2] For example, Bowersox and Closs [1996] note that traditional logistics measurement systems are related to the following five performance categories: asset management, cost, customer service, productivity and logistics quality. Chan and Qi [2003, pp. 179-190] measure logistics from the perspective of: cost, time, capacity, capability, productivity, utilization and outcome dimension. Whereas Franceschini and Rafele [2000, pp.49-54]) designed the following criteria to capture performance of logistics, namely: lead time, regularity, reliability, completeness, flexibility, correctness, harmfulness and productivity.

refers to the most important determinants of creating the value of an economic entity and shaping its long-term competitive advantage [Nita 2014, p. 41]. At the same time, it serves to settle between the managerial staff and the owners. On the other hand, operational and tactical levels deal with (respectively): mid-level and bottom-level management decisions. The reference horizon of PM refers to recommendations regarding data collection and indicators publishing. The frequency of measurement should depend on the analytical capabilities of the subject and information needs [Niemiec 2016, p. 85]. Therefore, PM measures can be divided into: long-term, medium- and short-term categories. In turn, referring to the category of company's stakeholders, we should consider different needs and desires of individual groups with interest in their functioning on the market.

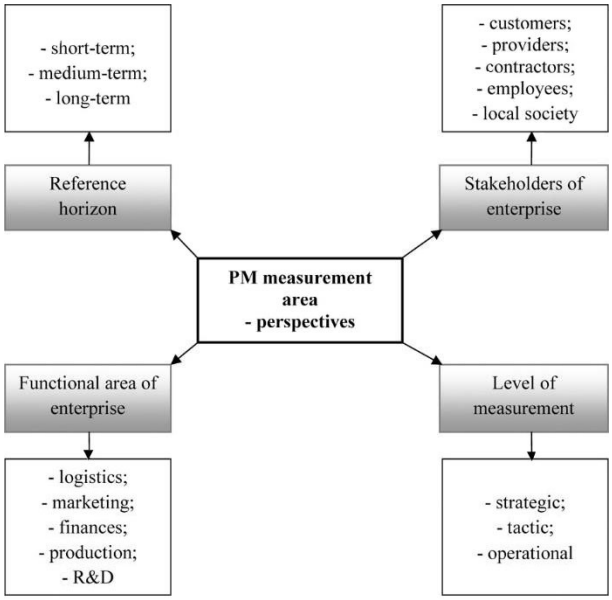

Figure 1. The scope of PM measurement in logistics enterprises - selected perspectives.
Source: own study.

A more detailed description of selected important PM indicators useful for logistics enterprises was presented in relation to the phases of the evolution of the portfolio of concepts and tools used to assess PM (Figure 2). As previously indicated, it is not possible to present all measures and/or instruments that are practicable in logistics business entities for PM reporting. Each company should concentrate on those areas that are crucial to them from the perspective of the nature of conducted business. However, according to the author, some universal spheres of PM reporting, which can form the basis of PM measurement in principle in most entities providing logistics services, can be distinguished. The aforementioned areas are: finances and market value, logistic customer service and sustainable development of the enterprise. Taking into account financial aspects of performance measurement will allow to determine whether the conducted business activity allows to achieve such goals as: increase in the value of sales revenues, minimization of own sales costs and increase in operating cash flows. These three categories form a three-dimensional perspective of assessing the economic efficiency of logistic enterprises, which does not limit the considerations to the indicated factors, but also includes the problems of company growth or shaping its market value. In turn, logistic customer service is considered as essential for the area of shaping a competitive advantage on the market. What's more, the measures of logistic customer service can be selected according to the specific nature of logistic tasks [Kadłubek 2018, p. 43]. While sustainable development of enterprise implies improvement of the financial and property situation of the entity, at the same time strengthening the conditions and quality of its employees and ensuring the improvement of standards related to the protection of the natural environment. The harmonization of actions towards the implementation of certain pre-defined strategic goals must take into account not only the current operating conditions, but also expresses the need to look after the future of the business entity [Misztal 2017, p. 29].

As previously indicated, it is a negative practice to involve too many measures in the reporting of the company's performance. Hence, the measurement tools that holistically refer to the functioning of a logistics company deserve special attention. One of them is the Balanced Scorecard (BSC), adapted for the needs of logistics and using the following options for indicators [Bokor 2008, p. 36]:

1. Financial sphere:
   - profitability: profits, average profits, ROI, ROA;
   - turnover: revenues and their growing rate, average revenues;
   - cost efficiency: costs, average costs, cost ratios;

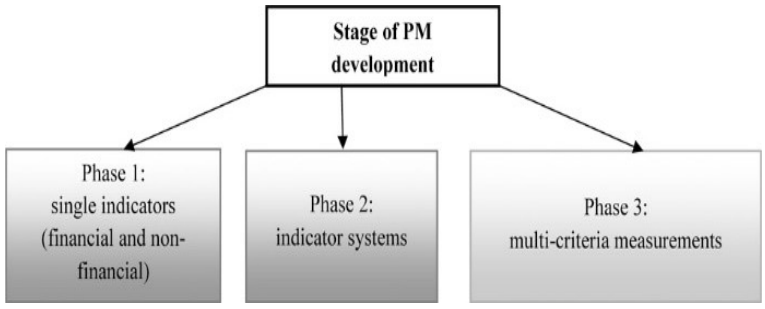

Figure 2. Classification of performance measurement systems from the point of view of their evolution with examples of congruent indicators used for PM reporting

2. Customers sphere:
   - intern client satisfaction: meeting the requirements set by the intern service agreements;
   - customer satisfaction: number of orders and their growing rate, average revenue of a business contract, market share, number of complaints, number of (core) clients and the volume of their turnover, order processing time (flexibility);
3. Internal business process sphere:
   - physical processes: availability of logistics services, capacity utilization, speed of turn-round, logistics performances and their specific costs;
   - disposition processes: efficiency of process organization, reliability of information flows;
4. Learning & development sphere:
   - human resource: productivity of work, ratio of productive working hours, ratio of employees included into performance evaluation schemes, average training costs or time per employees.

The second one is less frequently exhibited in the literature on the subject matter the Synthetic indicator of sustainable development. Its value is determined in accordance with the standardized sum method and it includes the following single measures [Misztal 2017, p. 30-32]:

1. Economic sphere:
   - stimulants: net revenues from total activity; gross financial result, gross turnover profitability rate, value of production, value added;
   - destimulants: cost level indicator from total activity.
2. Social sphere:
   - stimulants: average number of employees based on a contract of employment converted into full-time work, average monthly salary;
   - destimulants: injured in accidents at work;
3. Environmental sphere:
   - destimulants: CO2 emission, nitrous oxide emission, methane emission, hydrofluorocarbon emission, nitric oxide emission, sulphur dioxide emission, ammonia emission, dust emission.

The examples of KPI which are practicable in logistics companies (shown in Figure 2) indicate the broad dimensions of the performance assessment of these enterprises. Determining the value (size) of individual indicators (tools) used in PM reporting does not exhaust their analytical ranges. By stressing the behavioural approach, the important point of reference is the expectations of owners, managers, customers or suppliers, referring to the generated values of individual indicators (which implies the need to examine the difference between the absolute and expected value of a given indicator). Worth considering is also further comparison achieved values (sizes) of the analysed PM indicators with the adopted reference point/benchmarks, e.g. with the value of calculated indicator accounted by market competitors. The final selection of PM indicators, however, requires testing whether all attributes of good KPI are fulfilled [Nita 2009, p.269]. Therefore, it is necessary to: specify the purpose of using the indicator, link the indicator with the company's strategy, define formal form of the measure, designate data sources, set the frequency measurement or people involved in the PM reporting etc.

PHASES: 1 and 2		
Financial area	**Logistic customer service**	**Sustainable development**
- revenues from sales - cost of sales - operating profit/loss - EBIT - net income - operating cash flow - ROA - ROE - ROS - sales growth rate - cost dynamics - share of variable costs in sales revenues - Q-Tobin - Line of Business (LOB) revenues - LOB expenses - P/E ratio - Book value per share - Total comprehensive income per share - Z-score - DuPont	- OTIF - OTIFEF - number of customers - number of new customers - number of regular customers - number of profitable customers - successful contacts – % of successful deals out of the initial offers - number of customer complains - overall customer satisfaction - response time - transparency for a customer - possible types of communication - available types of goods insurance - order size flexibility - timeliness of goods delivery	- level of CO_2 emission - recycling level - solid particles emission - amount of penalties and the total number of non-monetary sanctions for non-compliance with environmental protection regulations - care for animals/children around - taxes to the national treasury - participation in charitable actions - percentage of senior management obtained from the local market - contribution to infrastructure development - number of available work places - staff turnover - % of employees covered by collective agreements - % of employees covered by the training system - % of employees employed in hazardous conditions - use of innovation technologies
PHASE 3		
Financial area	**Logistic customer service**	**Sustainable development**
- Stakeholders Value (SHV) - Economic Value Added (EVA) - Market Value Added (MVA) - Total Shareholders Return (TSR) - Excess Total Shareholder Return (ETSR) - Total Business return (TBR) - Cash Value Added (CVA) - Market Residual Value (MRV) - Value Creation Index (VCI) - Return on Capital Employed (ROCE)	- Customer Lifetime Value (CLV) - Customer Satisfaction Index (CSI)	- Gender Index
Holistic measurements. - Balanced Scorecard (BSC) - Synthetic indicator of sustainable development.		

Source: own study based on: Chae [2009, pp. 422-428]; Buczkowska [2012, pp. 5-19], Krauth et al. [2019, pp. 1-10], Kaplan, Norton [1992, pp. 70-79], Skoczylas, Niemiec [2016, p. 19-164].

3. INTENTIONAL SHAPING OF THE FINANCIAL RESULTS IN LOGISTICS ENTERPRISES – OUTLINE OF THE PROBLEM AND DETECTION TECHNIQUES

The results of economic activity reported in the context of the PM are often the basis for assessing the effectiveness of the management staff of the business entity. This fact implies a potential desire to artificially interfere with the performance of the current period (to be in line with the original assumptions or expectations), even at the expense of undermining the performance of the company in the future. This phenomenon, referred to as real earnings management (REM), is mainly reflected in the financial indicators underlying the short - and medium - term PM. This situation is caused by the fact that the financial result obtained in the company (shaped by the relevant categories of revenues and the corresponding costs) has a direct impact on the possibilities of its development understood as generating new values, such as new products or new sales markets. On the other hand, development becomes the engine of economic growth by increasing sales revenues or additional market share. Hierarchically, the development of a logistics company is a prerequisite for fulfilling the adopted strategy and mission of the company, which in the future will determine the increase in its value [Figure 3].

Figure 3. Directions of assessment of the financial result in logistics companies.
Source: own study based on Krajewski [2012, p.109].

According to Gunny [2010, p. 855-888], REM refers to managing the normal operating activities of companies to adjust earnings according to managers' targets. Therefore, it can be stated that REM consists in skilful timely coordination of implemented economic activities (i.e. their acceleration or postponing) and conscious shaping of the scope of these activities, thanks to which it is possible to directly influence the value of generated cash flows and the financial result of the period. Practices in REM focus mainly on two aspects: manipulation of operating activities that refers to increasing sales, reducing discretionary expenses and increasing the production to avoid reporting losses or recording lower earnings [Roychowdhury 2006, pp. 335-370] and manipulation through investment decisions refers to manipulating earnings through sales of long-term assets and myopic investments in research and development [Belal, Hasnah 2018, p. 445] [Figure 4].

The division of REM techniques allows to indicate, among others, on the validity of a heterogeneous set of actions that distort the categories: company revenues and costs. From the perspective of REM to "classic" techniques of manipulation of financial result of an economic entity can be included [Roychowdhury 2006, p.338-341; Gunny 2005, pp. 5-10]:

a) unusual, unprecedented in earlier reference periods, reduction of the cost level of the period (selling costs, overheads) and expenditures on research and development;
b) intensification of sales of non-current assets at the moment when the level of operating profit is below the forecasted value (even at less favourable prices);
c) increase in sales at the end of the period resulting either from offering abnormal price discounts on manufactured goods, or from the adoption of non-standard (usually very liberal) policies for granting trade credits;
d) overproduction and the use of defensive stock management strategies, which on the one hand is a result of artificially inflated sales at the end of the accounting period (the unit must have "out of stock" ready-made products), and the latter is implied by the fact that individuals wanting to demonstrate the best the financial results seek to present in the financial statements as much as possible the value of production in progress (a specific type of capitalization).
e) limiting any investments in components of the company's fixed assets and striving to minimize depreciation costs.

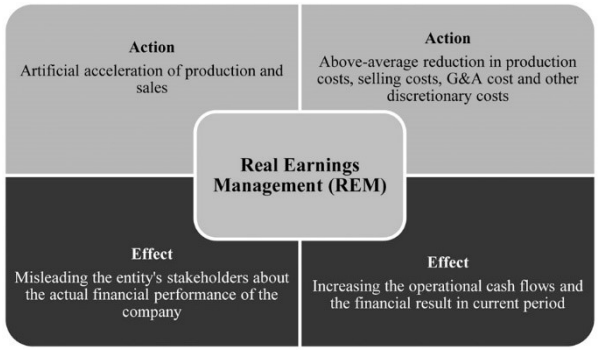

Figure 4. The general approach to REM in logistics enterprise.
Source: own study.

Diagnostic imaging of the size and extent of abnormal deviations from the normal economic activities of logistics companies can be carried out using various econometric models [Dechow et al. 1998, pp. 133-168; Braam et al. 2015, pp. 111-141], describing the scale of intentional shaping of the financial performance through REM.

- abnormal level of cash flow from operations (*OCF_EM*), whose value represents the residual component of the model describing the shaping of operational cash flows using such exogenous variables as: sales revenues and change in sales revenues. It can be represented by the equation:

$$\frac{OCF_{i,t}}{TA_{i,t-1}} = \alpha_1\left(\frac{1}{TA_{i,t-1}}\right) + \alpha_2\left(\frac{REV_{i,t}}{TA_{i,t-1}}\right) + \alpha_3\left(\frac{\Delta REV_{i,t}}{TA_{i,t-1}}\right) + \varepsilon_{i,t}$$

and after appropriate transformations ($\varepsilon_{i,t}$ = *OCF_EM*):

$$OCF\_EM_{i,t} = \frac{OCF_{i,t}}{TA_{i,t-1}} - \left[\alpha_1\left(\frac{1}{TA_{i,t-1}}\right) + \alpha_2\left(\frac{REV_{i,t}}{TA_{i,t-1}}\right) + \alpha_3\left(\frac{\Delta REV_{i,t}}{TA_{i,t-1}}\right)\right]$$

where: $OCF_{i,t}$ - operating cash flows of company *i* in year *t*; $REV_{i,t}$ - sales revenues of company *i* in year *t*; $\Delta REV_{i,t}$ - change in sales revenues of company *i* in year *t*; $TA_{i,t}$ – total assets of company *i* in year *t*; $a_i, i = 0,1, \dots, k$ are specific regression parameters.

- abnormal level of production cost (*PROD_EM*), estimating by using the following equation:

$$\frac{\text{PROD}_{i,t}}{TA_{i,t-1}} = \alpha_0 + \alpha_1\left(\frac{1}{TA_{i,t-1}}\right) + \alpha_2\left(\frac{REV_{i,t}}{TA_{i,t-1}}\right) + \alpha_3\left(\frac{\Delta REV_{i,t}}{TA_{i,t-1}}\right) + \alpha_4\left(\frac{\Delta REV_{i,t-1}}{TA_{i,t-1}}\right) + \varepsilon_{i,t}$$

And in consequence:

$$\text{PROD\_}EM_{i,t} = \frac{PROD_{i,t}}{TA_{i,t-1}} - \left[\alpha_0 + \alpha_1\left(\frac{1}{TA_{i,t-1}}\right) + \alpha_2\left(\frac{REV_{i,t}}{TA_{i,t-1}}\right) + \alpha_3\left(\frac{\Delta REV_{i,t}}{TA_{i,t-1}}\right) + \alpha_4\left(\frac{\Delta REV_{i,t-1}}{TA_{i,t-1}}\right)\right]$$

where: $PROD_{i,t}$ - production costs (including: cost of goods sold and value of goods and materials sold at purchase prices increased by a change in inventories) of company *i* in year *t*; other designations – as above.

- abnormal level of discretionary expenses (*DISC_EM*), calculated as the difference between the forecasted value and the actual value of discretionary costs of the enterprise scaled with the average value of total assets from the previous period:

$$\text{DISC\_}EM_{i,t} = \frac{DISC_{i,t}}{TA_{i,t-1}} - \left[\alpha_1\left(\frac{1}{TA_{i,t-1}}\right) + \alpha_2\left(\frac{\Delta REV_{i,t}}{TA_{i,t-1}}\right) + \alpha_3\left(\frac{REV_{i,t}}{TA_{i,t-1}}\right)\right]$$

At the same time:

$$\text{DISC\_}EM_{i,t} = \frac{DISC_{i,t}}{TA_{i,t-1}} - \left[\alpha_1\left(\frac{1}{TA_{i,t-1}}\right) + \alpha_2\left(\frac{\Delta REV_{i,t}}{TA_{i,t-1}}\right) + \alpha_3\left(\frac{REV_{i,t}}{TA_{i,t-1}}\right)\right]$$

where: $DISC_{i,t}$ – discretionary expenses (equated with: sales costs, general and administrative expenses and research and development expenditures) of company *i* in year *t*; other designations – as above.

Obviously, three above examples of indicators used for REM detection do not directly answer the question whether the management team has committed artificial interference in the value of revenues, costs and, consequently, the financial result and other PM measures based on these economic figures. However, significant deviations of their value in time or space (in relation to medium/average values in the sector) may be an important premise for further analyses regarding the quality of PM, equated with two features, namely: reliability and relevance of reporting performance.

It should also be clearly indicated that the potential use of low motives by the management of the company in terms of deliberate impact on the reported results through REM implies more frequent negative consequences of implementing

these practices (interference with the adopted sales policy and change in the management of property components not directly related to the market conditions of these transformations, regardless of the effect achieved, it directly affects the entity in subsequent periods). What is more, artificial shaping of even the simplest indicator used in PM may be reflected in distorting other measures, reflecting and monitoring key factors of future success and resulting from the vision, mission and strategy of the each market operator. Correct assessment of financial achievements is crucial in that every logistics company acts professionally in order to maximize material benefits, and as an entity remains exclusively in the field of economic phenomena.

3. SUMMARY

The correct analysis of situational conditions of modern logistics companies allows for adjusting the system of measuring achievements to the individualized needs of individual enterprises. Its implementation is challenging that modern logistics can be treated as a multidimensional science and management practice aimed at realizing the varied operational and strategic objectives of the company. It should not be identified only with activities focusing on ensuring physical access to the economic operator's resources in the following dimensions: time, space and efficiency, but also with attention to efficient information flow in the business unit, effective forecasting and planning of the entity and achieving a satisfactory customer service level. What is more, contemporary logistics companies are oriented towards the realization of various economic and social goals and have many stakeholders, each of whom has separate aspirations and demands towards the company. All this significantly hinders the implementation of an effective management system based on performance measurement, monitoring and constant concern for the future of the organization.

The article attempts to look at the problem of PM in a two-faceted manner. First of all, the issue of appropriate selection of such performance indicators was highlighted, which in the most adequate way could reflect the achievements of logistics companies in the information era. It was assumed that the universal spheres of measuring achievements in these economic entities are: finances and market value, logistic customer service and sustainable development of the enterprise. On the other hand, the paper presents three econometric models, based on which it becomes possible to select indicators that critically evaluate the reported performance in financial plane of business activities.

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Michał Comporek
The University of Lodz
michal.comporek@uni.lodz.pl