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Contents

Introduction	7
Piotr Bednarek, Rolf Brühl, Michael Hanzlick: Long-range planning and cross-cultural research. A literature review / Planowanie długookresowe i badania międzykulturowe. Przegląd literatury	9
Agnieszka Bieńkowska, Zygmunt Kral, Anna Zabłocka-Kluczka: Responsibility centres in strategic controlling / O ośrodkach odpowiedzialności w controllingu strategicznym	21
Maciej Ciołek: The lean thinking in overhead cost-cutting / <i>Lean thinking</i> w cięciu kosztów ogólnych.....	34
Joanna Dyczkowska: Do annual reports communicate strategic issues? Insight into reporting practices of high-tech companies / Czy raporty roczne komunikują kwestie strategiczne? Wgląd w praktyki sprawozdawcze spółek wysokich technologii	47
Tomasz Dyczkowski: Towards an NGO performance model / W kierunku modelu dokonań w organizacjach pozarządowych	65
Zdzisław Kes, Krzysztof Nowosielski: The process of cost assignment in a local railway company providing passenger transportation services. A case study / Proces alokacji kosztów w regionalnym przedsiębiorstwie świadczącym usługi pasażerskiego transport kolejowego	86
Petra Kroffin: Value-based management and value reporting. Impact of value reporting on investment decisions and company value perception / Zarządzanie wartością a raportowanie o wartości. Wpływ raportowania wartości na decyzje inwestycyjne i postrzeganie wartości przedsiębiorstwa.....	99
Sylvia Łęgowik-Świącik, Marcin Stępień, Sylwia Kowalska, Małgorzata Łęgowik-Malolepsza: Efficiency of the heat market enterprise management process in terms of the concept of the cost of capital / Efektywność procesu zarządzania przedsiębiorstw rynku ciepła w świetle koncepcji kosztu kapitału	115
Edward Nowak: Cost control and its role in controlling company operation / Kontrola kosztów i jej rola w controllingu działalności przedsiębiorstwa	125
Marta Nowak: Cultural determinants of accounting, performance management and costs problems. A view from the Polish perspective using G. Hofstede's and GLOBE culture dimensions / Kulturowe determinanty problemów dotyczących rachunkowości, zarządzania dokonaniaми oraz kosztów. Spojrzenie z polskiej perspektywy z wykorzystaniem wymiarów kultur G. Hofstede'a oraz GLOBE	134

Jari Paranko, Petri Huhtala: Productivity measurement at the factory level / Pomiar produktywności na poziomie wydziału produkcyjnego.....	150
Ülle Päril, Rodney Koyte, Salme Näsi: Examining middle managers mediating role in MCS implementation / Badanie pośredniczącej roli menedżerów średniego szczebla we wdrażaniu systemów controllingu	164
Michał Pietrzak, Piotr Pietrzak: The problem of performance measurement at public universities / Problem pomiaru efektywności w publicznym szkolnictwie wyższym.....	191
Anita Reizinger-Ducsai: Bankruptcy prediction and financial statements. The reliability of a financial statement for the purpose of modelling / Predykcja bankructwa a sprawozdania finansowe. Wiarygodność sprawozdań finansowych dla potrzeb modelowania	202
Ricardo Luiz Sichel: Intellectual property. Its relevance for the management control / Prawa własności intelektualnej. Ich znaczenie dla controllingu ...	214

Introduction

Contemporary management control and reporting both face challenges. Consequently, a new and more sophisticated scientific approach is needed. From one point of view, interdisciplinary studies and theories are necessary. From another point of view, empirical research and practical issues call for a more specific and specialized approach. This complexity is reflected by the content of this book, which covers topics that emerge from present world's complexity. Therefore, the authors focus on ever-important issues (such as the strategic approach and its support by management control and reporting, survival of companies), and more modern issues (e.g. cultural aspects, measurement and reporting adjusted to branches, spheres and organizations and specific issues of management control and reporting).

The strategic approach to managerial control and financial statements and their role for company's survival is presented in papers by J. Dyczkowska (who addresses the question whether annual reports communicate strategic issues and focuses her study on reporting practices of high-tech companies), A. Bieńkowska, Z. Kral, A. Zabłocka-Kluczka (who explain the role of responsibility centers in strategic controlling), P. Kroflin (who explores the value-based management and management reporting examining impacts of value reporting on investment decisions and company value perception) and A. Reizinger-Ducsai (who discusses bankruptcy prediction and financial statements). The problems of management control and reporting and their adjustment to specific conditions and organizations are undertaken by T. Dyczkowski (who introduces his NGO performance model), Z. Kes and K. Nowosielski (who present the case study of the process of cost assignment in a local railway company providing passenger transportation services), S. Łęgowik-Świącik, M. Stępień, S. Kowalska and M. Łęgowik-Małolepsza (who analyse the efficiency of the heat market enterprise management process in terms of the concept of the cost of capital), and M. Pietrzak and P. Pietrzak (who discuss the problem of performance measurement in the public higher education). The cultural aspect of managerial control and reporting is explored in papers written by M. Nowak (who presents cultural determinants of accounting, performance management and costs problems showing the issue from Polish perspective using G. Hofstede and GLOBE cultural dimensions) and P. Bednarek, R. Brühl and M. Hanzlick (who provide a literature overview of planning and cross-cultural research). The specific problems and concepts of managerial control and reporting are investigated by M. Ciołek (who discusses the lean thinking and overhead costs), E. Nowak (who analyses the role of costs control role in controlling company operation), Ü. Päril, R. Koyte,

S. Näsi (who examine middle managers' mediating role in MCS implementation), R.L. Sichel (who discusses the relevance of intellectual property for management control), J. Paranko and P. Huhtala (who analyse the productivity measurement at the factory level).

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THE PROCESS OF COST ASSIGNMENT IN A LOCAL RAILWAY COMPANY PROVIDING PASSENGER TRANSPORTATION SERVICES. A CASE STUDY

PROCES ALOKACJI KOSZTÓW W REGIONALNYM PRZEDSIĘBIROSTWIE ŚWIADCZĄCYM USŁUGI PASAŻERSKIEGO TRANSPORTU KOLEJOWEGO

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Summary: The aim of this article is to present the process of cost assignment in a local railway company providing passenger transportation services. The undertaken research is of an explorative and descriptive nature. A case study and an inductive analysis constitute the assumed research methods. In the later parts of the article, the idea of a cost assignment process is explained, unified terms are proposed and different types of cost assignment processes are identified. Simple allocation (SA), referring to a cost assignment to a singular cost object and complex allocation (CA), for cost assignment to multiple cost objects are indicated. Also, simple reallocation (SR) is pointed out for a situation in which the cost of one object moves to another, as well as complex reallocation (CR), for a situation in which each cost of one object is divided between several objects. On the basis of that, an attempt to describe the cost assignment process on an exemplary enterprise has been made. Cost objects have been identified in the structure of the researched company and an outline of the operating costs assignment process has been presented and described.

Keywords: cost accounting, cost assignment, railway transportation services.

Streszczenie: Celem artykułu jest prezentacja procesu alokacji kosztów w pasażerskim transporcie kolejowym na przykładzie regionalnej spółki transportowej. Podjęte prace badawcze mają charakter eksploracyjno-deskryptywny. Jako metodę badawczą przyjęto studium przypadku oraz analizę indukcyjną. W kolejnych częściach artykułu wyjaśniono istotę procesu rozliczeniowego oraz zaproponowano jednolite nazewnictwo i zidentyfikowano rodzaje procesu alokacji kosztów. Wskazano na prostą alokację (SA) polegającą na przypisaniu kosztu do pojedynczego obiektu kosztu i złożoną alokację (CA) dla sytuacji przypisania kosztu do wielu obiektów. Dodatkowo wskazano na prostą realokację (SR) dla sytuacji, w której koszty jednego obiektu są przypisywane do innego obiektu, oraz złożoną realokację (CR), wykorzystującą operacje matematyczne do podziału kosztów danego obiektu na inne obiekty. Na tej podstawie dokonano próby opisanego procesu rozliczania kosztów w przykładowej spół-

ce. Zidentyfikowano obiekty kosztowe w strukturze badanego podmiotu oraz przedstawiono i opisano schemat procesu rozliczania kosztów działalności operacyjnej.

Słowa kluczowe: rachunek kosztów, rozliczanie kosztów, usługi pasażerskiego transportu kolejowego.

1. Introduction

The authors of The Global Competitiveness Index 2014–2015 report state that a country's infrastructure constitutes the second out of twelve pillars of its competitiveness. They write that a vast and efficient infrastructure is crucial to ensure an efficient functioning of its economy because it is an important factor determining the location of business activity as well as the types of activities or sectors which can expand within a given country. A well-developed infrastructure has a significant influence on the economic growth and also on decreasing income inequality and levels of poverty in a society [*The Global Competitiveness Report 2014–2015* 2015, p. 5]. Although, railway is one of the elements of the infrastructure, its role results from many factors. W. Paprocki includes here: temporal and spatial availability of the railway transportation, the increase of the quality of railway services, the decrease of costs and the correctness of railway transportation pricing [Paprocki 2003]. This is where the importance of cost issues in railway transportation enterprises in Poland stems from.

The cost accounting process of transportation services constitutes an important issue brought up in professional literature. Rarely, however, this research focuses on passenger railway transportation utilizing the case study of a specific company (compare [Gawlik, Kryzia, Uberman 2013]).

The authors of this study hypothesize that the increase of railway's importance for the Polish infrastructure is dependent on, among other things, the increase of the quality of cost information provided by accounting systems of railway transportation companies. One of the elements of this system is the process of cost assignment including direct and indirect cost assigning to relevant objects. The process provides information necessary in, e.g., unit costing, setting the selling price of tickets as well as in planning and control processes.

The aim of this article is to present the cost assignment process that exists in a railway company providing passenger transportation services. The process is adjusted to the needs of management which, under the current conditions of how the railway market functions in Poland, is interested in increasing the efficiency of company's activities and learning about the operating costs in regards to business units, railway vehicles or tracks. Taking the available professional literature into consideration, the research presented results can fill in the gaps in and expand its content.

A case study and an inductive analysis constitute the assumed research methods. A local railway company providing passenger transportation services is the subject of the study.

The article is organized in the following way. In the introduction, the essence of the cost assignment process is explained, the aim of the article and the assumed methods are formed. In the second part, a theoretical approach to the process of the cost assignment that refers to the cost accounting literature is presented. The role of the cost assignment in decision-making processes undertaken in the company is indicated. In the next point, research methods used by the authors are presented. Finally, a detailed description of the cost assignment process in the studied company is provided. The article ends with a summary, where the authors focus on the most important elements of the matter at hand, on the related areas of knowledge and further possible direction of research.

2. The essence of the cost assignment and its role in a decision-making process

Cost assignment is one of the stages of calculation. It means that the way of cost assigning ought to be conformable with its aims. However, apart from the issues connected with unit costing, the problem of control, which also influences the form of, e.g. allocating algorithms, should be taken into consideration. The understanding of the assignment process requires: indicating which costs play a part in this process, what the essence of the very process is, what objects can be charged with costs, and first and foremost, what the particular cost driver is. In order to organize these pieces of information, the authors undertook a review of both Polish and international literature raising the topic of costs accounting and presented unified term specifying the assignment of costs to objects.

The cost accounting process requires many transformations of cost information. The place for the cost allocation on the drivers within the logistics accounting system is indicated by R. Kowalak [Kowalak, Biernacki 2010, p. 72]. The number of transformations as well as the methodology of cost assignment result from the non-homogeneousness of the cost categories, the diversity of economic activities and a multitude of objects as isolated according to a specified unit criterium for which it is needed to gather and set costs in the cost system [Nowak 2016, p. 72]. The mentioned author, as the basis for object classification, considers the following criteria: generic, subjective, functional, process, product (i.a. work effects), distributive and temporal. An equally broad view of the object to which costs are assigned is presented by the authors of the Cost Accounting book [Horngren, Datar, Foster 2006, p. 98]. According to them, it is “anything, for which a measurement of cost is desired.” Cost objects, in order to be used in the management information system, are charged with various costs in the accounting process in multiple ways. The basic classification influencing the form of this process is the division into direct and indirect as well as simple and complex costs.

Direct costs are usually defined as elements that can be assigned to the cost driver directly on the basis of documents or measurements (compare [Rayburn 1993, p. 22; Sobańska 2003, pp. 62–63]). Indirect costs, on the other hand, cannot be referred directly to the drivers or it is unprofitable. The driver is understood here as the effect of work; however, for the purpose of this article it is necessary to look at it from a broader perspective and specify it as any cost object defined as mentioned above. What this means is that the type of relation between a cost and a cost object determines this classification. What is more, the direct costs are, by definition, already allocated to a cost object (there is no need to account them), whereas indirect costs have to be subjected to mathematical operations aiming at dividing and assigning them to specific objects.

Simple costs concern amounts devoid of any internal structure and complex costs can consist of simple as well as other complex costs. This means that the latter category is based on information on simple costs; hence, from the perspective of the assignment process, complex costs will always be accounted after the stage concerning the registration of the value of resources used in the cost objects' range. It is worth noting that the type of costs can be subject to assignment to objects in a direct or indirect manner.

The issues concerning the cost accounting process have been considered by many different authors for a long time. K. Sawicki, while describing the systematic cost accounting, indicated the following stages of the accounting process: primary cost aggregation (the division of costs according to their types), simple costs transformation to the cost object system and cost transformation from the cost object system to the calculation system [Sawicki 1996, p. 42]). It has to be noted that the cost object system is associated here with the cost centre (CC) and the calculation system is associated with cost drivers. According to the author, CC refers to an organizational unit or realized function and the drivers constitute ultimate or transitional effects of the activity to which costs can be allocated [Sawicki 1996, pp.104–105]. A. Jurgowa, in the context of cost accounting in the decision-making process, uses the terms *division and allocation* [Jarugowa, Sobańska, Sawicki 1994, p. 33]. J. Matuszewicz, instead of using the *assignment process* term, uses the *cost recording on accounts and allocation process* term. This process is composed of four stages. The first one concerns “the initial simple cost recording” [Matuszewicz 1995, p. 36], where, based on the primary or secondary documents, the costs are located onto accounts by type. The following stages concern allocating costs into: periods, CC, work effects. The term *allocating* is tantamount to *dividing*.

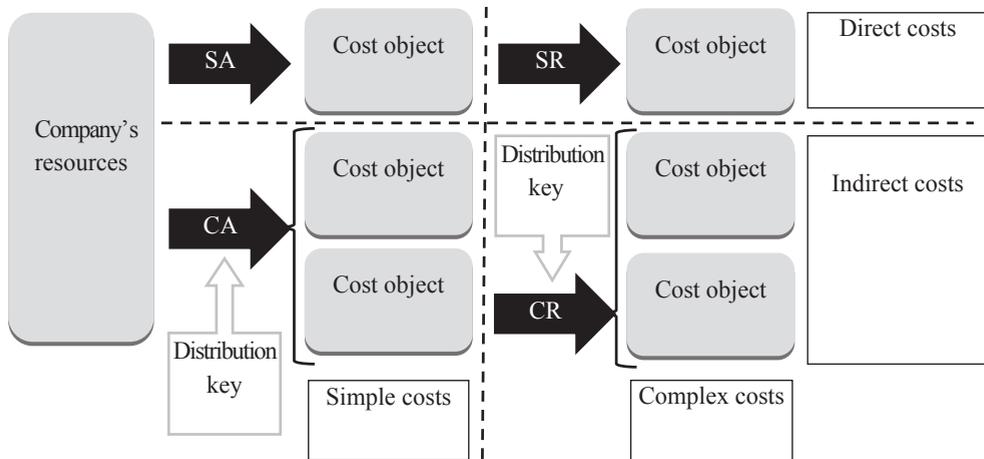
While analyzing the available Polish literature, one can notice that two categories are juxtaposed: simple cost accounting and simple cost allocation to an object. Due to the different ways of approaching these costs, it is worth specifying them. They are as follows:

- simple costs assigned directly to an object (e.g. allocating the amortization of a vehicle used by the transport department,

- simple costs assigned to several objects (e.g. dividing the rent for office space occupied by the accounting and the personnel departments by means of distribution keys).

The literature in English often contains this way of approaching the topic of recording and accounting. The authors of the cost accounting book divide the process of cost assignment to objects into two types: direct cost tracing to objects and indirect cost allocation to objects [Horngren, Datar, Foster 2006, p. 28]. Therefore, the idea of allocation mentioned in the previous paragraph is tantamount to the assignment term.

An approach proposed by Świdarska [2002, pp. 1–6] constitutes an expansion of the idea expressed here. The author sees two types (stages) of assigning procedures. The first one is related to the simple cost allocation, those that are generated in relation to the using up of company's resources. These costs can be assigned to a cost object directly or indirectly by means of a distribution key. The second one is connected with the necessity to map the relations between individual cost objects. This procedure relates to the transfer of costs from one object to another or other objects. Just as in the first case, the assigning of costs can be done in a direct or an indirect way by means of a distribution key.



Legend: SA – simple allocation, CA – complex allocation, SR – simple reallocation, CR – complex allocation.

Figure 1. Cost assignment diagram

Source: own elaboration.

Due to the necessity to apply unified terms, the authors of this paper have proposed to adopt the name *cost assignment* including four elements (see Figure 1, presenting, in a schematic way, all these issues):

1. Simple allocation (SA): it refers to a cost assignment to a singular cost object (on the basis of documentation or measurements).

2. Complex allocation (CA): for cost assignment to multiple cost objects (which requires mathematical distribution procedures).

3. Simple reallocation (SR): for a situation in which the cost of one object moves to another one.

4. Complex reallocation (CR): for a situation in which each cost of one object is divided between several objects (which requires mathematical distribution procedures).

An example of SA that appears on the first stage (related to simple costs) can be the use of office material by the employees of the accounting department. As for CA, an example can be the amortization of the building where two support departments are located. These costs can be allocated on the basis of the area each of these departments occupies.

A second-stage SR example (connected with complex costs) is relating the costs of a workstation of a train driver to the costs of the railway vehicle. The CR will take place here in the case of a distribution of the service department's costs between its clients according to working hours.

According to the authors, the correct relation of costs to the structure of cost objects adjusted to the management needs allows for improvement of the planning and control processes. Owing to that fact, managing a company, in many cases, will be conditioned upon the quality of the assignment process. Obviously, CA and CR require vast amounts of data connected to the necessity to apply adequate distribution keys. Moreover, the efficiency of data processing for the management needs will depend on the use of appropriate recording and accounting systems.

3. Research methods

The authors of this paper aim at presenting the cost assignment process based on the example of a local company providing passenger railway transportation. In order to respect the privacy of the participating company, as well as the respondents, they are not identified by their real names.

Taking this aim and the observed gaps in the literature into consideration, the present research can be described as qualitative research of an explorative and descriptive nature. A single case study method was chosen as the research approach. The authors have assumed that it is a good research method in the above-mentioned case due to the following facts (compare [Benbasat, Goldstein, Mead 1987, pp. 369–386; Yin 2002, pp. 1–15]):

- the main focus was on the contemporary phenomenon of cost assignment within a real-life context of a Polish railway company,
- the scientific research is at its early, exploratory stage,
- no manipulation into the functioning of the subject company or any events took place.

The case study research was conducted by means of the following procedure:

1. Preparing the research.
2. Collecting data.
3. Analyzing the collected data.

In the first step of the procedure, a list of all the required internal documents and of the people representing the researched company that can be a source of information concerning the process of cost accounting was prepared. The list of documents included, among others:

- chart of accounts,
- instructions concerning the cost evidence (accounting policy) and cost accounting,
- lists of cost objects identified in the subject's structure,
- general information concerning the researched company, including the organizational rules and yearly reports.

The list of administrative employees who were indicated as participants of the cost accounting process included: Financial and Organizational Director and his subordinates: Head of the Financial and Controlling Department and Head Accountant.

Data collecting was performed via a focused group interview with the aforementioned employees. The meetings took place in the period between October and December 2015 at the company's premises. During the meetings, access was granted to the required printed and electronic documents, as mentioned in the list of information requirements. A number of notes were also made on the basis of the conducted interviews. Cost procedures carried out as a part the company's information system constituted an additional, useful source of data.

The data analysis was conducted after the study had been finished. Due to the qualitative nature of the study, the work focused predominantly on identifying and describing the elements of the cost accounting process. Its internal architecture, types of input and results as well as cost objects specified in the resource structure of the researched company were described.

4. Characteristic of the studied company

The presented company was founded in 2007 by the Regional Council of one of Polish voivodeships. The sole shareholder of the Company is the Marshal's Office. The primary aim of the company is to provide passengers with railway transportation services within the voivodeship area. The main object of the company's economic activity is, simultaneously, the biggest source of its income. The main plan regulating the company's activities is the train timetable prepared by the Marshal's Office. The company owns as well as rents railway vehicles, electric and with internal combustion engines, by means of which it services routes on several lines. The main part of the rolling stock has been renovated and is based on Polish products of such brands as PESA and NEWAG.

The organizational structure was designed in such a way that would include the management's specialization and have an arrangement typical of functional

structures. The basic elements of the organizational structure of the company include organizational cells distinguished into departments, offices and independent Positions. There are three supervisory divisions overseen by Department Directors in the company and they include:

- financial and organizational division where basic managerial and decision-making related processes are made in the organizational and financial area as well as where coordination of the actions of individual organizational cells and independent positions takes place;
- technical division which constitutes the center for the realization of the company's operational processes, including: use and organization of transport and the maintenance of the rolling stock. The following cells function within this division: Teams of Engine Drivers Technical Service Team, Controller Team, Warehouse, including the spare parts and fuel warehouse, Dispatch;
- sales division, where sales and marketing processes are carried out via such cells as Sales Department, Marketing Team, Analysis Team, Conductor and Train Guard Team, Customer Service and Box Office Team.

Due to the constant development of the company, the number of employees rose from about 100 to over 500 positions in 2015. The groups that are the biggest professional groups and that also generate the highest total cost are: engine drivers and their assistants, sales division employees directly involved with the transport realization (conductors) and the employees of the technical support (servicemen and controllers). These three groups constituted nearly 70% of the workforce at the time of the study.

The cost structure of the company, based on the 2014 report, is as follows:

- 37% – costs of external services including, mainly the costs of access to the railway infrastructure and train inspections and external service,
- 32% – personal costs (salaries with derivatives),
- 19% – material and energy use costs, where fuel and traction energy accounted for the majority of the costs,
- 8% – amortization,
- 4% – miscellaneous costs.

The company runs full accounting in accordance to the Accounting Act dated 29 September 1994 (Poland's Journal of Laws 2005, item 330 as amended). The records of costs in the company's accounting system are kept in a generic system (class 4), which is used for cost tracing. Until 2014, a functional-subject system had been used in the company (class 5), which was used to gather information on operation and service costs of the rolling stock, organizational cells costs, sales costs and general management costs. Owing to the fact that the account system in the class 5 did not meet the informational need of the management, it was terminated at the end of 2014. In its place, a solution was introduced allowing for an out-of-record cost assignment by means of using class 4, cost division mechanisms and an advanced cost object system (class 5 equivalent). Moreover, class 6 account is used to service

cost transactions as part of the inter-period allocation. Details of this solution are explained in the next section.

5. The process of cost assignment in the researched company

The cost assignment process used in the researched company since 2015 is based on three main elements:

1. An index of codified (labeled in a systematic way with special descriptors) cost objects which is serviced by the controllers.
2. Class 4 account plan functioning as part of the recording financial-accounting system, which is serviced by accounting teams aided by the Simple ERP application.
3. Aliquot and allocation keys library serviced by controlling teams.

Point 1. An advanced cost object system is utilized in the company, which allows for cost assignment across job positions, organizational cells, rolling stock, cars and railway lines. Table 1 depicts the list of object groups which were distinguished using typical cost accounting terms, that is, cost centers (CC) and cost drivers (CD) according to K. Sawicki's definition presented in Section 2 [Sawicki 1996, p. 42]. Every identified object is given its own unique descriptor generated according to the formula: *group symbol – number*.

Table 1. List of cost object groups used in the studied company

No.	Group symbol	Description	Classification in the functional-calculation system*
1	I	Railway lines	CD
2	II	Electric railway vehicles	CC
3	III	Internal combustion engine railway vehicles	CC
4	IV	Service vehicles	CC
5	V	Administrative stuff	CC
6	VI	Service employees	CC
7	VII	Engine drivers and assistants	CC
8	VIII	Technical Controllers	CC
9	IX	Conductors	CC
10	X	General management departments and independent positions	CC

* Legend: CD – cost driver, CC – cost center.

Source: based on the company's documentation.

An appropriate instruction specifies the way in which the object descriptors should be put in cost documents concerning the operating activities of the company. The

instruction is in effect in all the cells of the company that process cost documents. The Controlling Department employees make sure that the object lists are up-to-date and input all the necessary modifications into them.

Point 2. Class 4 of the cost accounts is an internally complex construct which supports the process of cost assignment and enables a detailed analysis of these costs. The records on the accounts by a type of cost are specified on analytical accounts. Every accounting document (external, internal), such as an invoice for the purchase of services or GIN (goods issued notes) or PO (posting order) document the value of which is categorized as operational costs is primarily labeled with an appropriate cost object descriptor. For this purpose, special assignment stamp and description form field in the transactional system are used. This way, the information concerning the cost's position in the object system is sent to the information system of the company at the very beginning of its processing.

Figure 2 depicts a schematic diagram for the processing of information concerning the operational costs in the information system of the company. Cost tracing onto a singular cost object (on the basis of documentation or measurements) is labeled with SA and SR symbols, the cost assignment onto multiple cost objects is labeled with CA and CR symbols.

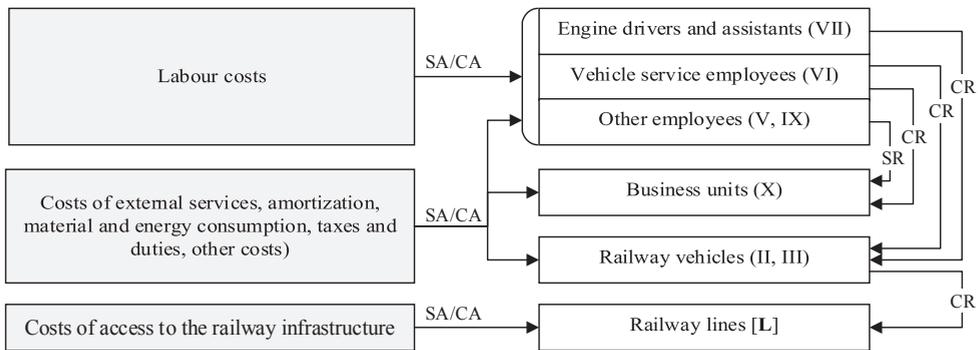


Figure 2. Diagram of cost assignment in the company

Source: based on the company's documentation.

Point 3. For the simple cost items, the value of which cannot be referred directly onto a specific object, the system of cost distribution key is used. Such items are labeled with the division descriptor (D-nn) and then assigned out of financial-accounting system to objects after the end of the month. In case of cost items reallocated between cost objects appropriate distribution keys are used based on the actual and contractual values.

The process of cost assignment employed in the company constitutes a set of automated activities run in a specified sequence which is activated in monthly intervals. The controller's task is to gather all the required input data for the process before

it is activated which include: ledger records, the list of objects appropriate for the given month, the value of cost allocation base. The process of cost assignment was depicted in Figure 3.

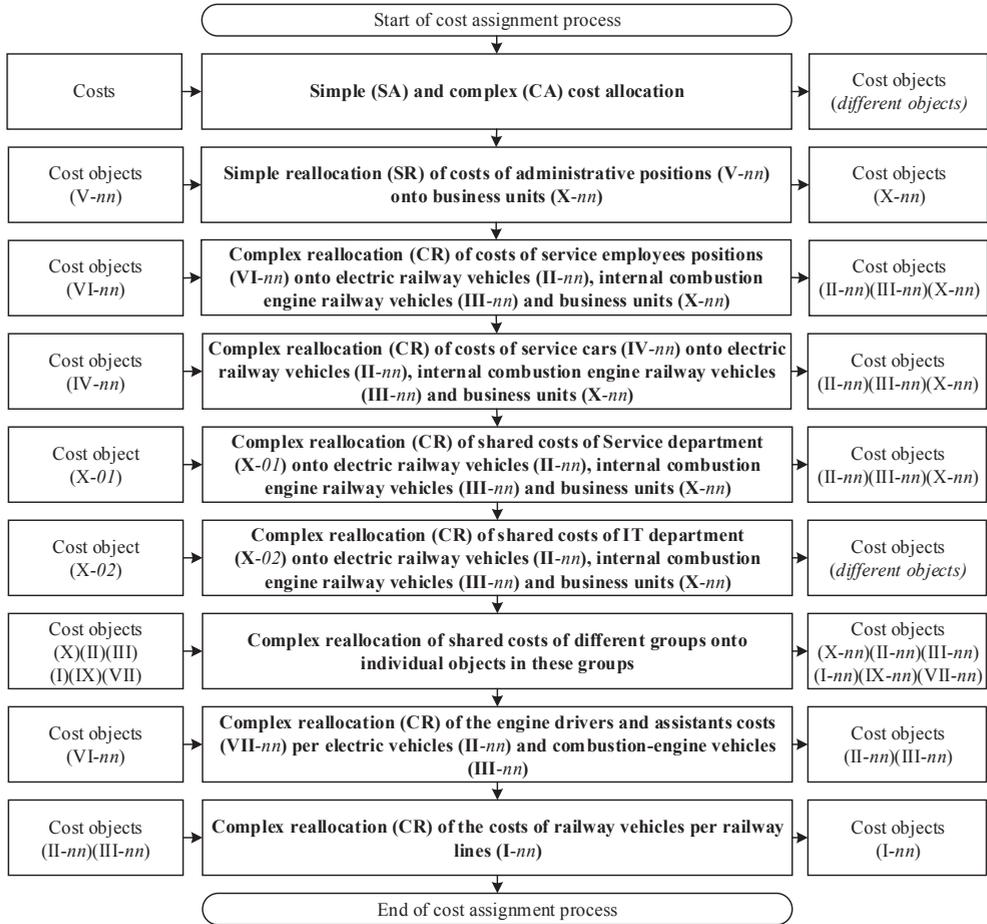


Figure 3. Diagram of the cost assignment process in the researched company

Source: based on the company’s documentation.

The first event in the process of cost assignment is the SA and CA of cost to the objects. The vast majority of simple costs has the nature of direct costs and is assigned directly to an object. So, it is a situation of simple cost allocation – SA, which is comparable with the term *cost tracing* (compare [Horngren, Datar, Foster 2006]). In the case of items where division is necessary, e.g. in the case of the rent for office buildings, an appropriate automated assignment procedure is applied. The last situation is called complex allocation.

In the next step of the process, the costs of the administrative positions (V-*nn*) are assigned onto organizational cells (X-*nn*). This action leads to cost aggregation in the system corresponding to the organizational structure.

The third action in the process is the complex cost allocation (CR) of the service employee's positions (VI-*nn*) onto the electric vehicles (II-*nn*) and internal-combustion vehicles (III-*nn*), as well as organizational cells (X-*nn*). Timesheets of the service employees work provide the division keys in this case. The detailed time register is generated based on the shift reports created by shift managers.

Three further steps are performed on a similar basis, namely, service cars costs accounting (IV-*nn*, on the basis of the mileage register), indirect costs accounting of services (X-01, on the basis of working hours of the service employees), IT department costs accounting (X-02, on the basis of the order register in the cross-section of internal customers).

In the next step the complex reallocation (CR) of common object groups' costs (X)(II)(III)(I)(IX)(VII), e.g., multifunctional office equipment operation costs from several departments or engine driver team operating room costs is performed. The accounting of these costs has an agreed upon character and is based on the direct costs of target objects.

In the last two steps of the process, the complex reallocating (CR) of engine drivers and their assistants costs (VI-*nn*) per electric vehicles (II-*nn*) and combustion-engine vehicles (III-*nn*) takes place together with the accounting of the costs of these vehicles per railway line (I-*nn*). The register of performed operational work taken from the GPS of these vehicles that are fitted with appropriate equipment constitutes the basis for this accounting together with an analogous register prepared by the dispatch employees for the vehicles not fitted with GPS.

6. Conclusion

Cost accounting serves a very important role in the accounting system of the researched railway passenger transportation company. On multiple occasions during the course of the research, the company's management stressed the importance of a correctly run recording and accounting of the costs for management processes including financial planning, budgeting, reporting and cost calculating. A mindful building of a cost reference object structure determines the functionality of the cost accounting system and allows for an effective management of the company. In addition to that, a full standardization of the cost assignment process as well as its integration with the existing information system and its automatization result in a significant reduction of the process' duration as well as in calculation error avoidance.

Despite the sophistication of the introduced solutions there exists a possibility of expanding the cost assignment process functioning in the company with further accounting actions consisting in, e.g. a division of costs of the technical division per

vehicle and railway line. The existing IT environment, as well as a high economic awareness of the management staff facilitates pro-developmental actions in the area of cost accounting.

In the light of the observed gaps in the literature in reference to the cost accounting of railway transport and the specificity and complexity of such companies, further research work is necessary, especially the one done on the basis of quantitative data. According to the authors, the areas that require special attention are the calculation processes as well as planning and control processes that are realized in companies similar in type to the research one.

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