

Improving Reporting of Infrastructure Assets by Using Standardised Models

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Abstract

The primary aim of the paper is to present the results from a piece of research focused on creation and approbation of a comprehensive approach for reporting infrastructure assets as a specific category of tangible resources. To substantiate and justify the main thesis assuming that there are ways to improve the accounting methodology in the public sector, generalized and systematized results from a specialized survey conducted among first-level budget spending units in Bulgaria are presented. The research topic pertains to the theoretical and practical problems of recognizing and evaluating public infrastructure that is a priority for the public sector accounting system.

Keywords: public infrastructure, International Public Sector Accounting Standards, The Conceptual Framework for General Purpose Financial Reporting by Public Sector Entities, financial reporting

JEL: M41, M48

Introduction¹

The financial and accounting aspects of public sector activities, including public assets management, are of particular scientific and public significance.

The relevance and importance of the topic are determined by the following circumstances:

1. There are no national or international accounting standards for infrastructure assets in the public sector.
2. There are no national professional debates on the subject matter. The authors aim to lay the foundation for discussions with the national regulatory body for the improvement of the regulation of financial accounting in the public sector.
3. In 2021 the Institute of Certified Public Accountants (ICPA) in Bulgaria started a working group on the problems of financial accounting in the public sector. The authors are members of the working group and participants in the process of the legalization and promotion of The Conceptual Framework for General Purpose

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¹ The study is conducted as part of a scientific project, University of National and World Economy (Contract No NID NI-04/2019) the topic of which is "Challenges and projections in the accounting system of public sector enterprises in the process of building standardized models for recognition, accounting and disclosure of infrastructure assets", scientific team lead – prof. Daniela Feschiyan, PhD

Articles

financial Reporting by Public Sector Entities (*the Conceptual Framework*).

The primary goal of the research is to study the opinion of the interested parties about the need for developing a standardised model for accounting and reporting of infrastructure assets and thus lay the foundation for a public discussion of these issues with the participation of the national regulator and academia. Globally, accounting interpretation of fixed tangible assets in public sector entities (PSEs) is outlined in IPSAS 17 *Property, plant and equipment*. The scope of the standard encompasses ((IPSAS 17, para. 2 and 5): property, plant and equipment, weapons system, infrastructure assets and concession assets. The authors believe that this standard, however, is not closely related to public infrastructure. It would be good to implement a specific accounting standard for infrastructure assets which will help users of financial reports to distinguish the information about investments in public infrastructure made by entities. A proof of the inadequacy of applying IPSAS 17 to public infrastructure is the existing tendency towards frequent amendments of the standard in response to existing issues and limitations related to public asset reporting. The ongoing activity of the International Public Sector Accounting Standards Board (IPSASB) aimed at improving public assets reporting (IPSASB, Work Program “Infrastructure Assets, 2019) supports the above said.

The achievement of the primary goal of the research is made possible due to the implementation of the following research tasks:

- a) Identifying the key problems in the organization and the accounting methodology in the PSEs in Bulgaria.
- b) Developing a standardised model for accounting and reporting of infrastructure units as a specific category of fixed tangible assets. The adoption of a new accounting model in the activity of public sector entities in Bulgaria will enhance the efficiency and efficacy of the public policies in the context of public assets utilization.
- c) Conducting a survey among PSEs in Bulgaria – first-level budget spending units focused on problems related to the organization and methodology of accounting and approbation of a standardised model for accounting and reporting of infrastructure assets.

1. Literature review

The scientific research, conducted in Bulgaria, into the issues of standardization of public sector accounting, infrastructure assets in particular, is limited and comes down to proven research theses suggested by Daniela Feschiyan (2018), published in a monograph focused on accounting standardization and the accounting models for fixed tangible assets in the public sector that “Public sector accounting standardization is an objectively necessary, dynamic process which brings about the creation and implementation of widely adopted rules for the regulation of the accounting system, unification of the structure and content of the financial statements and satisfying public needs for reliable information about public finance”. The cited research proves that the lack of standardization in the accounting system of the PSEs in Bulgaria leads to the regulation of accounting by virtue of orders, letters, instructions, among other, which are unclear and chaotic. There is no synchronization and adaptation of the accounting standards that apply to the PSEs

in Bulgaria to the Conceptual Framework. The practice of issuing annual instructions for the preparation of the financial statements of the PSEs has a negative impact.

At the international level the empirical studies conducted over the past decade expose the increased interest in analyzing the evolution of accounting standards in the public sector on accrual basis (Brusca and Condor, 2008; Chan, 2003; Martí, 2006; Christiaens et al., 2015; Schmidhuber, et al., 2022; Farshadfar et al., 2022). According to some studies, IPSASs make a considerable contribution to the harmonization process of public sector accounting at international level (Benito et al., 2007; Brusca and Martínez, 2016). Implementation of IPSASs favorably affects transparency and accountability (Muraina and Dandago, 2020) and helps in controlling corruption in developing countries (Tawiah, 2021). A number of studies aim to support the reforms for improving accountability and transparency of public sector entities through implementing harmonized accounting standards in individual jurisdictions (Chan, 2006; 2008; Manes Rossi et al., 2014; Biondi and Soverchia, 2014; Ismailia et al., 2021).

Another group of authors emphasize the challenges that national governments face after the adoption of IPSAS. Research by Polzer et al. (2021) entitled the *Implementation of the international public sector accounting standards in Europe. Variations on a global theme*, in which the authors focus on the central government level in nine countries (Austria, Estonia, France, Iceland, Poland, Spain, Sweden, Switzerland and UK) with different, administrative traditions, which have implemented IPSAS to different degrees and found **considerable diversity in translated accounting standards**.

A third group of authors believe that some jurisdictions choose not to apply the IPSAS. Research focused on the applicability of IPSAS following Finland's example, conducted in 2012 covering the 2000-2011 period, which emphasizes the negative stance of the government related to the full adoption and implementation of IPSASs. According to Oulasvirta (2012), a strength of the institutional analysis is that it sees accounting cultures and regimes as open systems with permeable interfaces and can thus be well applied to the interplay of international standards and national standards of accounting. International standards have an influence on national public sector accounting regimes and practices even if these standards are not fully and formally accepted in a country.

Another point of interest is the scientific studies conducted by academia and professional organisations which pay special attention to accounting and reporting of public infrastructure:

- a) The article by Lee and Fisher (2004) brings to the fore the importance public infrastructure disclosure has to the improvement of financial reporting in the public sector and to satisfying the needs of users for financial and non-financial information. Analysis is made of the degree of information transparency about infrastructure assets in the financial reports of PSEs by comparing it with the information in the financial reports of the state-owned economic entities.
- b) Analogous research by Wolker and Stewart (2012) emphasizes the need for reporting additional information about the commitments undertaken for future maintenance of infrastructure assets.
- c) A study by Nasir et al. (2010) is focused on accounting and reporting of public

Articles

infrastructure in Canada and confirms the assumption that “Good management of infrastructure assets requires proper accounting and reporting“. The analysis concentrates on the effects of making a distinction of the methods of accounting reporting of infrastructure assets – between financial and managerial.

- d) Ruz Farías (2020) makes an important contribution to public sector accounting research by presenting a new way of recognizing public infrastructure as an asset based on the *control* criterion.
- e) In September 2019, a working meeting was held in Lisbon, Portugal where the IPSASB presented a project suggesting a change in IPSAS 17 (Exposure Draft-ED/78). The project objective is to examine and identify issues stakeholders have when applying IPSAS 17 to infrastructure assets. Informed by this research, the aim is to provide additional guidance on accounting for infrastructure assets. The IPSASB finalized ED 78 in February 2021 and published the document for exposure in April 2021.

IASPS have the characteristics of a conceptual framework for accounting standardization in the public sector. The selection of an adequate budgetary methodology and its upgrading with new accounting models should be in compliance with and harmonized with those applicable in the private sector. In structural terms IASPS are similar to IFRS. They are also similar in terms of content but there are differences stemming from the specificity of the public sector, namely (Feschiyan, 2020):

- a) Lack of profit-oriented financial indicators;

- b) Presence of three main activity evaluation indicators: economy – efficacy – efficiency;
- c) IASPS contain tax revenue standards, concession services standards, long-term financial stability (pension programs payable by the government in the future but formed today);
- d) IFRS include specific parts which apply to the private sector only – earnings per share, share-based payment etc (Feschiyan, 2020).

To close the gap in the regulatory framework and the scholarly research in Bulgaria, the authors present standardized models for the recognition and evaluation of public infrastructure and an empirical study of their applicability.

2. Standardised models for public infrastructure recognition and valuation

In the process of building a standardised model for accounting and reporting of infrastructure assets, this piece of research focuses on the following three fields:

- a) initial recognition and valuation of infrastructure assets model;
- b) subsequent measurement of infrastructure assets in the financial report model;
- c) impairment of infrastructure assets model.

2.1. Initial recognition and valuation of infrastructure assets model

Infrastructure assets are a specific category of tangible resources that calls for their interpretation through the prism of the theoretical definition of assets and in particular of fixed tangible assets. In paragraph 21 of the IASPS 17 - *Property, Plant and Equipment* special attention is devoted to the specific

Articles

characteristics of infrastructure assets that differ from the other fixed tangible assets:

- they are part of system or network;
- they are specialized in nature and have no alternative uses;
- they are immovable;
- they may be subject to constraints on disposal.

The standard includes the following examples of infrastructure assets: road networks, sewage systems, water supply and energy supply systems, communication networks. The absence of broader consideration of infrastructure assets in IASPS 17 - *Property, Plant and Equipment* hampers judgements and decisions that are to be made with a view to ensuring high-quality accounting information that should presumably be helpful for the users of financial statements and a clearer idea about this large group of public sector assets (Daskalov, 2020).

On a national scale, the theoretical definition of fixed tangible assets is provided in National Accounting Standard (NAS) 16 Fixed tangible assets, a standard which applies to PSEs in Bulgaria and similarly interprets the material resources in compliance with the requirements of IPSAS 17 *without analyzing the economic essence of public infrastructure*.

The authors believe that it is necessary to develop a specific national standard for infrastructure assets which sets forth the general rule for defining infrastructure assets pointed out in paragraph 21 of IPSAS 17 amended with national requirements for the recognition of public assets, namely:

- to have the characteristic features of *public goods* which suggests free access and collective use by other subjects;

- the entity should perform functions related to the storage and maintenance of these assets;
- the entity should have restricted access to gaining economic benefit from the utilization of these assets.
- to meet the value threshold set in the accounting policy.

There is no comprehensive concept of valuation of infrastructure assets at the national level and this provides for the diverse practices in place in the public sector. Asset valuation for the PSEs in Bulgaria is an object of legal regulation in the Accounting Act, the National Accounting Standards, applicable for PSEs and the instructions of the Ministry of Finance. The applicable Accounting Act regulates the three possible forms of manifestation of the historical cost without giving specific definitions of the individual valuation bases and their possible manifestation. The version of the General provisions of NAS – applicable for PSEs, does not contain requirements and specific rules for the applicable assets valuation bases. This matter is treated in the individual accounting standards, accounting standard NAS 16. The authors, however, think that this standard is not specifically designed to address public infrastructure.

The lack of methodology in presenting the legal requirements provides for inconsistency in financial reporting of a significant category of non-current assets – the public infrastructure. This gives rise to a risk of heterogeneous reporting of one and the same assets in different PSEs which in turn results in the incommensurability of the information presented in financial statements, on the one hand, and on the other - worsens the reliability of the information for the purpose of initial and subsequent measurement and runs

counter to the fundamental accounting rules, principles and recognized world practices. Furthermore, it should be pointed out that the creation of such assets usually results from agreements reached between the public and the private sector within the so-called public-private partnership. This fact presupposes the need for the provision of publicly accessible information. The qualitative characteristics of useful information determine the types of information that may be most useful for the users of statements. The Fundamental qualitative characteristics in the Conceptual Framework for Financial Reporting of 2010 are relevance and faithful representation (Basheva and Pozharevska, 2019). Accurate and honest presentation overlaps with the faithful representation of the effects from operations, other events and conditions in compliance with the definitions and the criteria for recognizing assets, liabilities, revenue and expenditure, set out in the applicable accounting standards (Markova, 2019).

The adoption of the regulated criteria for asset recognition and valuation in the Conceptual Framework and their practical implementation is the right policy towards improving the regulation of public sector financial accounting in Bulgaria. It is assumed that the valuation of public infrastructure should be conducted within the hybrid accounting model that combines

the two valuation bases and is implemented individually in line with the accounting policy adopted by the PSEs.

2.2. Standardised model for measurement subsequent to initial recognition of infrastructure assets

The selection of an accounting model for subsequent measurement is crucial for the reliability of the aggregated accounting information presented in the annual financial statements. The recommended approach (national methodology) to a subsequent measurement allows only for reducing the initial value – long-term tangible assets are valued by their initial value, reduced with the accumulated depreciation and with the possible impairment loss. In implementing the revaluation model the fair value of the infrastructure asset should be determined regularly to guarantee that the asset's carrying value does not differ significantly from the fair value as of valuation date. The valuable model for recognition of the revaluation of property, plant, facilities and equipment, set up by Vladimir Hristov (2004), is supported.

Table 1 summarizes the similarities and differences that exist between the requirements of National Accounting Standards (NAS) and IPSAS at a subsequent correction in the value of the fixed tangible assets and infrastructure assets in particular:

Table 1. Standardised models for subsequent measurement of fixed tangible assets and infrastructure assets in particular:

Asset categories	Standardised models for subsequent measurement in accordance with the (NAS) applicable for the public sector in Bulgaria	Standardised models for subsequent measurement in accordance with the requirements of IPSAS
<i>Fixed tangible assets</i>	<ol style="list-style-type: none"> 1. Cost model – assets are evaluated based on initial valuation reduced by accrued depreciation and the accumulated impairment loss. The revenue approach is applicable for the accounting recognition of revaluation (revenue decrease). 2. Revaluation model – assets are evaluated by the fair value on the revaluation day reduced with the accumulated depreciation and the possible losses from impairment. The revenue approach (increasing or decreasing revenue) is applicable for the accounting reporting of revaluation. 	<ol style="list-style-type: none"> 1. Cost model – assets are evaluated at initial valuation reduced with the depreciation and the possible losses from impairment 2. Revaluation model – assets are evaluated based on fair value on the impairment day reduced with the accumulated depreciation and possible accumulated impairment losses (creating a reserve from revaluation).
<i>Infrastructure assets</i>	There is no standardized model for measurement subsequent to initial recognition	

Source: NAS 16 Fixed Tangible Assets, p.7.1-7.2 and IASPS 17 Property, Plant and Equipment, p.43-44

The comparative analysis presented in Table 1 shows that there are no significant differences between the two accounting bases in terms of the subsequent measurement in the value of the fixed tangible assets – NAS for PSEs in Bulgaria and the IPSAS. An exception is the implementation of the regulated in IPSAS capital (revaluated) approach to accounting reporting of the revaluation results.

Based on the comparative analysis, a new standardized approach for the subsequent measurement of infrastructure assets is suggested which includes:

- adopting the standardized models for subsequent measurement for fixed tangible assets – cost model and revaluation model (see Table 1);
- implementation of *revenue-expenditure* approach for the purposes of accounting the differences from revaluation.

2.3. Impairment of infrastructure assets model

Globally, the requirements for impairment of non-financial fixed assets and their reporting in the public sector entities are subject to regulation in two accounting standards – IPSAS 21 *Impairment of non-cash-generating assets* and IPSAS 26 *Impairment of cash-generating assets*. In their predominant part infrastructure assets have the characteristic features of *public goods*, which suggests a free access and collective use by other subjects (for example, streets, squares, crossroads, bridges, subways, overpasses, gardens, parks, playgrounds, water facilities, railroads etc.). Following the logic, these assets are not owned by the entity for providing services aimed at generating profit. All that calls for their classification in the group of the assets that do not generate cash flows. We should not underestimate the question about the importance of infrastructure assets generating cash flows – for example, rented out specified parts of

subways or underground stations; trees planted in parks which could be source for logging etc. When recognizing infrastructure assets that do not generate cash flows in the accounting balance of public sector entities, they should be presented as independent entries, separately from the assets generating cash flows. Their differentiation plays an important role when defining the key rules and procedures for impairment and for recognizing losses from impairment.

With reference to the provisions of IPSAS 21 PSEs should carry out checks at least once a year – as of the date of preparing the annual financial report, to establish the existence of a prerequisite for impairment. On the other hand, however, the legal regulation of public sector accounting in Bulgaria sets forth specific guidelines concerning the regularity of estimating impairment of non-financial fixed assets. The impairment of the non-financial fixed assets owned by a state entity is estimated at least once every three years.

According to the international and European accounting standards, the established impairment is subject to reporting and is recognized in either the profit or the loss, it is interpreted as a loss and its value is used to decrease the asset's value.

At national level, the impairment loss is recognized as a reduction in revenue and the authors believe that this approach leads to inaccurate presentation of the economic logic of the operations and processes while estimating impairment.

The generation of accounting information about the size of the impairment is a necessary condition for the improvement of transparency of the financial statements and

the usefulness of the accounting information for reporting purposes and the control of the PSEs. When applying the standard impairment approach, the computation of the two values – the fair value of the infrastructure asset minus the sales costs and its value in use, is not invariably a mandatory condition for determining the asset's recoverable value. In case one of the two amount indicated above exceeds the asset's net book value the latter is assumed to be a recoverable amount. The authors support Vladimir Hristov's thesis about the challenges the PSEs in Bulgaria meet when determining the fair value (2004).

It is believed that the selection of a specific model for recognizing the impairment of infrastructure assets involves the differentiation between the “non-cash-generating assets” category and “cash-generating assets” one. Currently in Bulgaria there is no applicable standardized approach to reporting the impairment of infrastructure assets. The authors suggest the adoption of a new standardized approach for impairment of infrastructure assets, which:

- is based on the philosophy of IPSAS concerning the distinction between the “non-cash-generating assets” category and the “cash-generating assets” category;
- includes the implementation of an “expenditure” approach for the purposes of accounting and reporting of impairment losses;
- introduces the requirement for regularity in conducting checks for the availability of conditions for impairment – at least once a year as of the date of preparing the annual financial report.

3. Empirical study of the applicability of standardized models of accounting, recognition, evaluation and disclosure of infrastructure assets in the PSEs

3.1. Working hypothesis of the study

To substantiate and justify *the main thesis that there are ways to improve accounting reporting of public sector infrastructure assets*, aggregated and structured results from a specialized survey are presented. The aim of the survey is to prove the need for implementing a new standardized approach to recognizing and evaluating infrastructure assets through the identification of the main problems in the organization and the accounting methodology in PSEs in Bulgaria.

The main thesis gives rise to two working hypotheses of the study:

1. *The existing legal framework of public sector accounting in Bulgaria needs improvement in line with the contemporary reporting requirements to guarantee the entity's sustainable development.*
2. *IPSAS and the Conceptual Framework play a leading role for the development and adoption of a standardized model for reporting infrastructure assets in public sector entities in Bulgaria.*

3.2. Research methodology

The study was planned as exhaustive among all first-level budget spending units in Bulgaria. Beyond the scope of the study remain the administration of the National assembly, the Presidency and the Council of Ministers; the legislative system – government organisations that announce an insignificant share of public infrastructure in the total amount of assets. The questionnaire does not include state universities and the PSEs where

in 2012 a specialized empirical research was conducted focused on the existing problems in the organization of accounting in the public sector. The research results are published in the monograph entitled “Standardization of accounting and reporting methods of fixed tangible assets in the public sector”, author prof Daniela Feschiyan, PhD. In October 2021, some 72 questionnaires in total were sent to all central first-level spending units, including ministries (17 questionnaires), agencies and commissions (16 questionnaires), other first level spending units (12 questionnaires) and municipalities – regional centers in Bulgaria (27 questionnaires). Of all sent questionnaires 55 were returned with answers (around 76%) with the predominant number of filled questionnaires being from the ministries – central first-level spending units.

The questionnaire encompasses 12 main questions that are grouped in two fields. An introductory address section is included before the body part containing the main questions, aiming to identify the type of administrative structure and the respondent's job title, age, professional experience and seniority. The survey requires confidentiality. This is why the questionnaires do not explicitly include the name of the respective administrative body. The survey is conducted as an online questionnaire and addresses solely civil servants from the general administration of the respective administrative body, in particular, those working at the Financial and Economic Activities Department at the central first-level spending units. Statistical methods used to solve that task are:

A) Descriptive statistics

- Mean – gauge of the mean value of the indicator;
- absolute values (N) – gauge for defining the number of units;

Articles

- relative values (%) – gauge for defining percentage.

B) Statistical check of hypotheses – this is a probability check which has the following stages:

C) 1. Defining a null (H0) and alternative (H1) hypothesis – the null hypothesis H0 implies lack of a significant connection or difference. Whereas H1 implies the existence of a statistically meaningful connection or difference.

2. Determining the level of significance – all checks will be made with a 5% risk of error ($\alpha = 0,05$) and 95% reliability level.

3. Method selection (statistical criterion) – to check the connection between the questions the Chi-square test is used which is appropriate when the signs are in the weak sector of the scale.

4. Computing the degree of relevance (p-value) – this is the boundary where the null hypothesis is accepted or rejected.

5. Decision making – if the degree of relevance (p-value) is bigger than the accepted at the second stage error (α), the null hypothesis is accepted. If the degree of relevance is lower or equal to the accepted at second stage error, the alternative hypothesis is accepted.

To reach a reliable conclusion, made on the basis of Chi-square analysis, it should be checked whether three important requirements (conditions) for the implementation of this method are met: first, the theoretical values in each box should not be below 1, second, if there are values of the theoretical frequencies that are below 1, they should not be more than 20% of the boxes, third, the size of the sample should be at least 50.

Should it turn out that the check of the hypothesis confirms the connection subject to the check, the strength of the connection will be determined via the Cramer's V coefficient since it is regulated between null and one. It is accepted that:

- When it is between 0 and 0.3, the connection is weak;
- When it is between 0.3 and 0.7, the connection is medium;
- When it is above 0.7, the connection is strong.

The generalized profile of respondents shows that the prevalent part (42%) are experts working at ministries, 28% are in the municipal administration, 17% - experts from agencies and commissions and 13% from other government organisations (fig. 1)

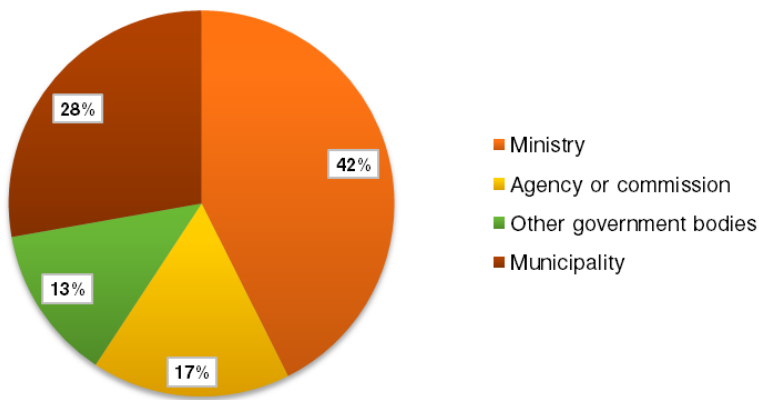


Fig. 1. First-level spending unit

Articles

The distribution of the respondents according to the feature *job title* shows that the highest degree of responsiveness was registered among the respondents from the financial and accounting personnel

(59%). There are fewer questionnaires filled in by the management in the government administration (41%). Figure 2 shows the relative share of respondents according to their job title.

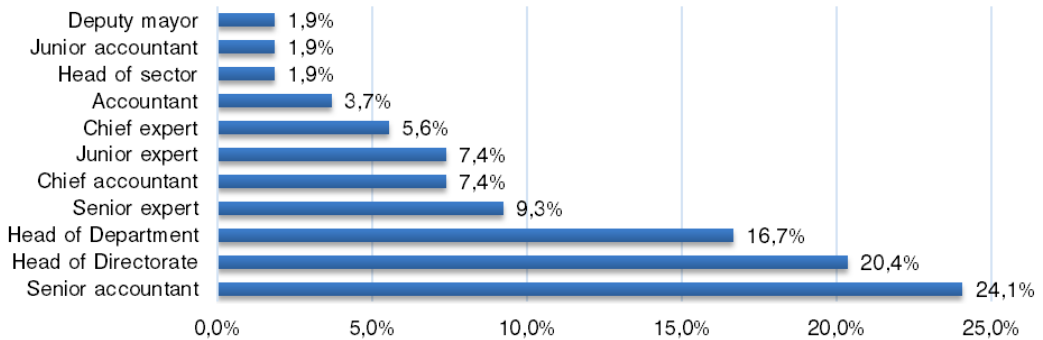


Fig. 2. Respondents' job title

The prevailing share of the experts who participated in the survey has up to 15 years of professional experience and they constitute more than 90% of all participants in the sample. The most experienced, those with

more than 20 years length of service constitute just 3.8%. Structuring the participants in the survey according to *professional experience* in 5-year intervals is illustrated in figure 3.

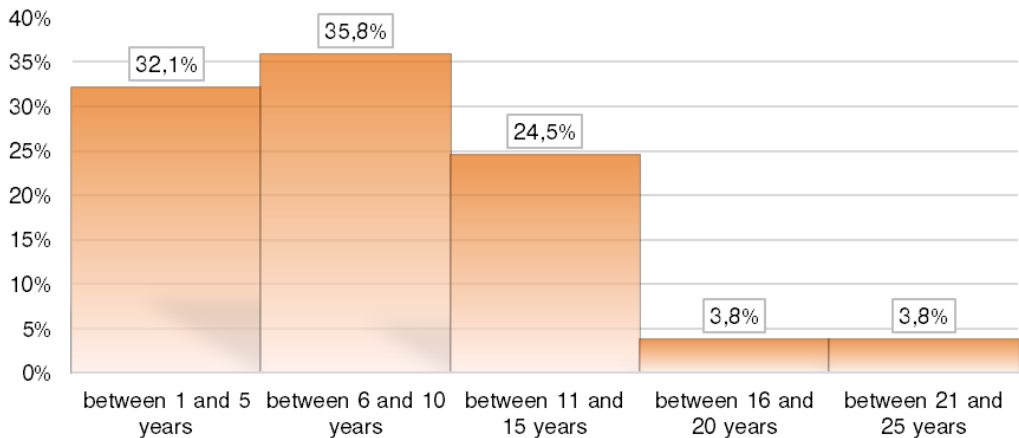


Fig. 3. Professional experience

The last question in the preliminary address section is related to the age group the civil servants who took part in the survey belong to. The generalized profile shows that some 70% are people between 30 and 49 years of

age, while 28% - above 50 years. The share of young specialists is the smallest. Structuring the participants in the survey according to the feature *age* in five-year intervals is shown in figure 4.

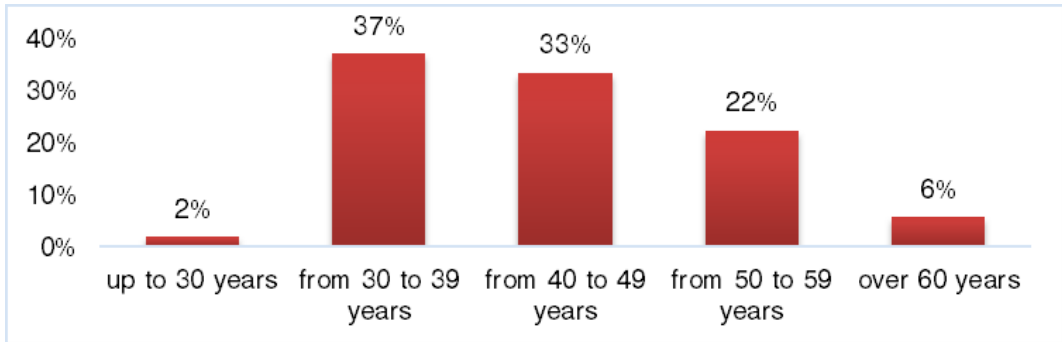


Fig. 4. Age structure of the administrative staff

3.3. Empirical results

The first question in the body part of the survey is *Do you think that the accounting legal framework that functions in Bulgaria meets the contemporary requirements with reference to the activity of the PSEs?*

The accounting standards which are at the base of the accounting activity performed by the PSEs in Bulgaria are the National Accounting Standards (2002), adopted with the Methodology of reporting of the budget units. The standards adopted with the methodological notes drawn by the MoF are not specially drafted for the PSEs and to a certain degree are not consistent with the specificity of their activity. In a number of texts they do not meet the EU's requirements for reporting, statistics and budgeting in the public sector; they deviate from the accounting framework, the principles and concepts of the Methodological guidelines for government financial statistics, issued by the International Monetary Fund and

the International Public Sector Accounting Standards of the International Federation of Accountants (Feschyan,2013). There is need for an update of the 2002 National accounting standards applied by the PSEs to take account of the latest amendments to the National Accounting Standards adopted in 2016 – that apply to business entities.

The results from the survey suggest that more than 70% of the participants express their critical opinion of the issue by voicing doubts about the relevance of the accounting information. The reason pointed out for the negative response is the failure to adapt the national legal regulation to IPSAS requirements, on the one hand, and on the other – the lack of timely update of the accounting standards applicable by the PSEs and their synchronization with the IFRS. The opinion that the legal framework of public sector accounting complies with the contemporary reporting standards is supported by 29.6% of the participants in the survey (fig. 5).

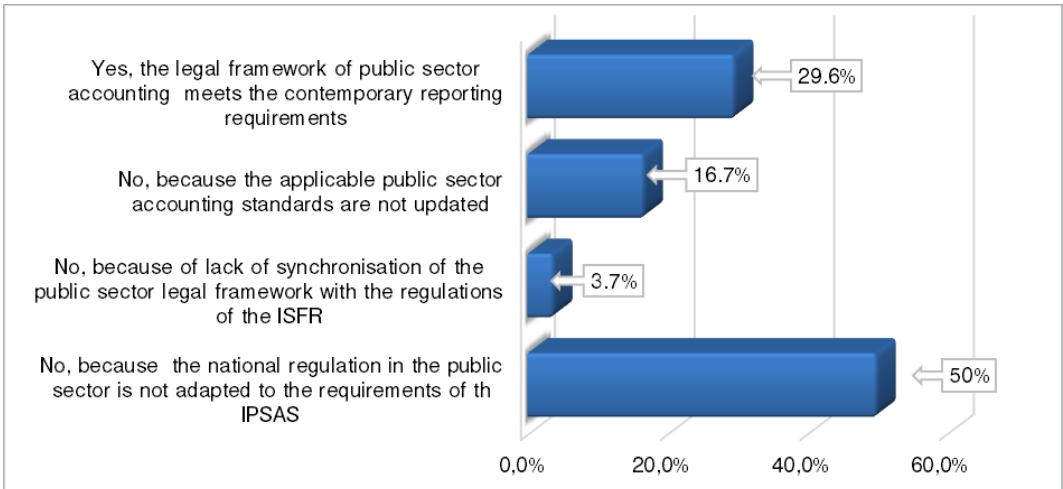


Fig. 5. Do you believe that the effective legal framework of accounting in Bulgaria meets the contemporary requirements for the activity of the PSEs?

The predominant part of respondents (fig.6., 72%) give a positive answer to the question *Do you implement a different budget format?* and firmly support the thesis for a broader implementation of analytical cost reporting in connection with the execution of program budgeting by first-level budget spending units (fig. 7., 7.94%).

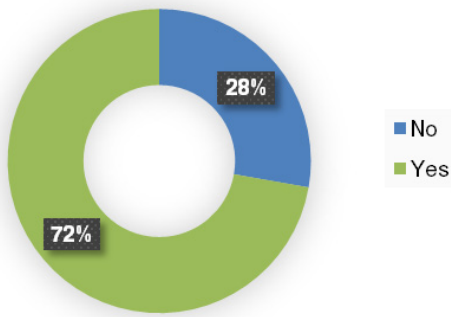


Fig. 6. Do you implement program budgeting?

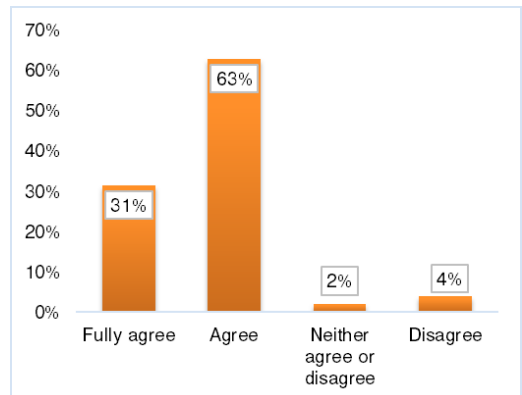


Fig. 7. Do you find it necessary to organize analytical (detailed) reporting for the expenses and revenues for the two criteria – ‘spheres of policies’ and ‘budget programs’?

In connection with the outlined statements and having justified the thesis that there are imperfections in the legal framework regulating public sector accounting, the question that logically arises is how experts assess the need to improve infrastructure assets reporting by implementing standardized models. Actually the answers show that more than 90% of the respondents (fig. 8) fully support the proposed approach and a mere 6% cannot decide yet.

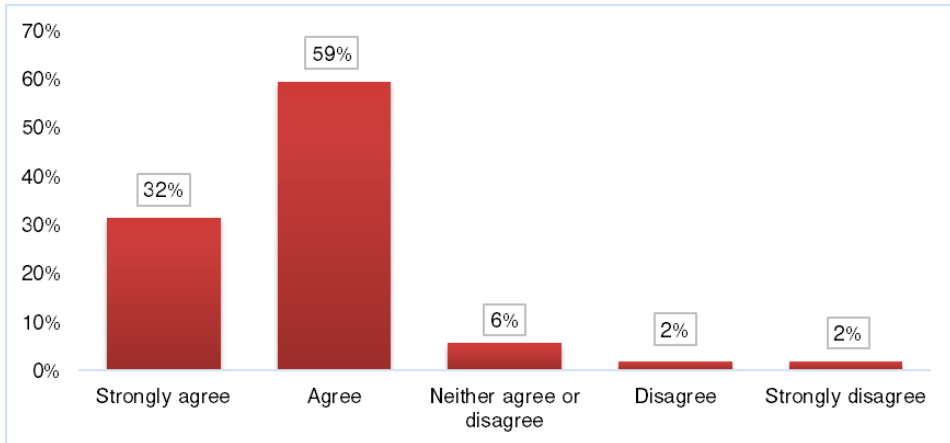


Fig. 8. Do you think there is need for the implementation of a new approach for the accounting treatment of infrastructure assets in the PSEs as a specific category of tangible resources?

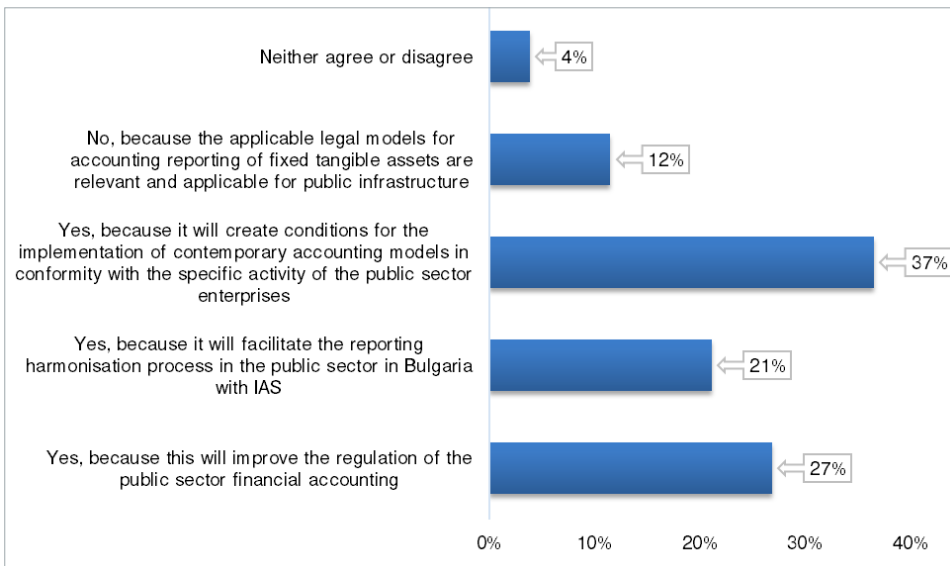


Fig. 9. Is the adoption of IPSAS 17, IPSAS 21 and IPSAS 26 needed?

To support the assumption for implementing a standard model for reporting of infrastructure assets, some 85% of the experts who participated in the survey expressed a positive opinion of the implementation of IPSAS in our country and in particular: IPSAS 17 Property, Plant and Equipment, IPSAS 21 Impairment of Non-Cash-Generating Assets and IPSAS 26

Impairment of Cash-Generating Assets (fig. 9). The benefits of implementing IPSAS in the country according to the respondents are as follows:

- conditions for the implementation of contemporary accounting models in conformity with the specificity of the activity of the PSEs will be created – (37%),

Articles

- the process of harmonizing public sector reporting in Bulgaria with the IAS will be facilitated – (21%),
- the financial accounting regulation in the public sector will be improved – (27%).

Additional details concerning the information about the practical implementation of IPSAS in the country are provided when connecting it with the type of administrative structure and the professional experience of the experts who participated in the survey. The resulting binary distributions are represented in figure 10 and figure 11 respectively.

On the basis of the binary distribution achieved by using χ^2 analysis a statistical analysis can be carried out to study the relationship and the interdependency between the type of administrative structure and the applicability of IPSAS. For the employment of this method there are six stages of checking the hypothesis that have to be implemented. The first stage of the hypothesis check is the defining of the null and alternative hypotheses. The null hypothesis (H0) states that the two variables are independent: there is no statistically significant connection between the type of administrative structure and the evaluation of the degree of concordance of the effective legal framework in Bulgaria with the contemporary reporting requirements. The alternative hypothesis (H1) is the opposite of the null one. It states that the two variables are not independent, i.e. there is a logical correlation between them. The second stage involves defining the risk of error α . As a rule, the socio-economic research involves working with risk of error $\alpha = 0.05$ and we are going to accept that value. The third stage focuses on selection of a criterion for hypothesis

check and computation of the empirical characteristics. The empirical characteristics is recorded as Chi-square Pearson. Fourth stage – defining the type of critical field. With Chi-square analysis it is always one-sided which is due to the theoretical Chi-square distribution. Fifth stage – the respective theoretical characteristics is being determined. At the final, sixth stage, the empirical and theoretical characteristics are compared. Apart from making a comparison between the theoretical and the empirical characteristics, the final conclusion can be reached on the basis of the degree of significance. If it is below the error $\alpha = 0.05$, the null hypothesis is rejected and the alternative one is accepted as true and vice versa. For the purposes of this research we use one of the most common statistical packages of applied computer processing programmes – SPSS.

The following results are arrived at in Output:

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	9,911a	3	,019
Likelihood Ratio	9,681	3	,021
Linear-by-Linear Association	1,866	1	,172
N of Valid Cases	54		

a. 4 cells (50.0%) have expected count less than 5. The minimum expected count is 2.07.

Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	,428	,019
	Cramer's V	,428	,019
N of Valid Cases		54	

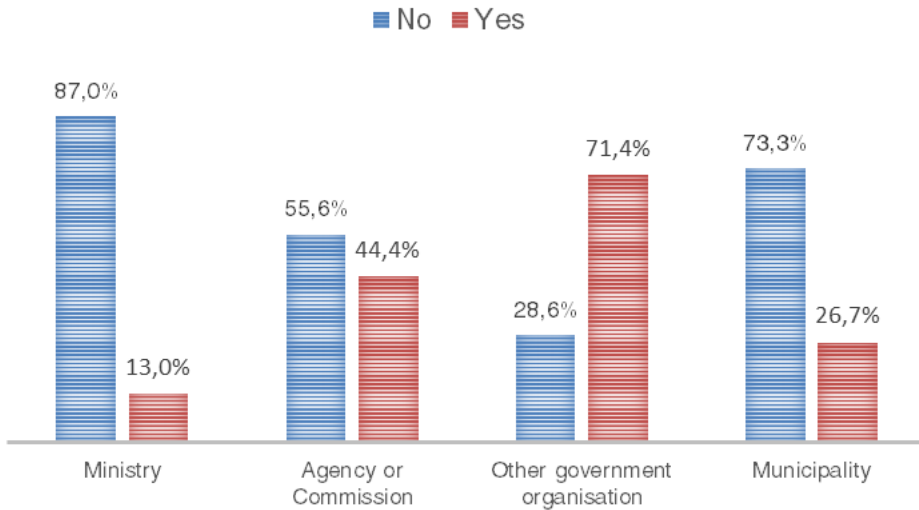


Fig. 10. Binary distribution of the participants according to an evaluation of the degree of compliance of the effective legal framework in Bulgaria with the modern reporting requirements and the type of administrative structure.

The analysis results show that the alternative hypothesis which states that there is a statistically significant relationship between the type of administrative structure and evaluation of the degree of compliance of the effective legal framework in Bulgaria with the contemporary reporting requirements, should be accepted as true. A reason for drawing this conclusion can be found in the degree of significance ($p=1,9\%$), which is lower than the error α (5%). The biggest number of respondents who gave a negative assessment of the relevance of the accounting information and of the non-compliance of the effective legal framework in Bulgaria with the modern reporting requirements, belong to experts from ministries (87%) and the municipal administration (73.3%). Civil servants employed in agencies and commissions are divided almost equally in their evaluation. The opposing opinion is shared by experts from other government organisations (71.4%) who

say that the legal framework of public sector accounting meets the contemporary reporting requirements. The strength of the connection is moderate. These can be stated with 95% probability. Two hypothesis are defined:

- Null hypothesis (H0) – the two variables are independent: there is no statistically significant connection between the professional experience of the experts and their evaluation of the degree of conformity of the effective legal framework in Bulgaria with the contemporary reporting requirements.
- The alternative hypothesis (H1) – the two variables are not independent, i.e. there is a logical connection between professional experience and the evaluations of the experts.

The data from the conducted statistical analysis are presented in the following sequence:

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	12,944a	3	,005
Likelihood Ratio	12,501	3	,006
Linear-by-Linear Association	6,186	1	,013
N of Valid Cases	53		

a. 3 cells (37.5%) have expected count less than 5. The minimum expected count is 1.21.

Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	,494	,005
	Cramer's V	,494	,005
N of Valid Cases		53	

The analysis from the check shows that the degree of significance ($p=0,5\%$) is lower than the error α (5%), which rejects the null hypothesis and accepts as true the alternative hypothesis which states that there is statistically significant connection between

the degree of conformity of the efficient legal framework in Bulgaria with the contemporary reporting requirements and the professional experience of the respondents. The statement that the accounting legal framework in the country does not meet the contemporary reporting requirements is supported by the specialists with the shortest professional experience, distributed in two intervals – with up to 5 years length of service (88.2%) and professional experience between 5 and 10 years (78%) and of the most experienced - with over 15 years length of service. The strength of the connection is again moderate. These conclusions can be claimed with 95% probability.

A more thorough research is achieved by analyzing the information from the joint distribution of the respondents according to the answers to the question of *Are you familiar with the theoretical essence and practical applicability of the regulations set out in the Conceptual?* and the evaluation made by the

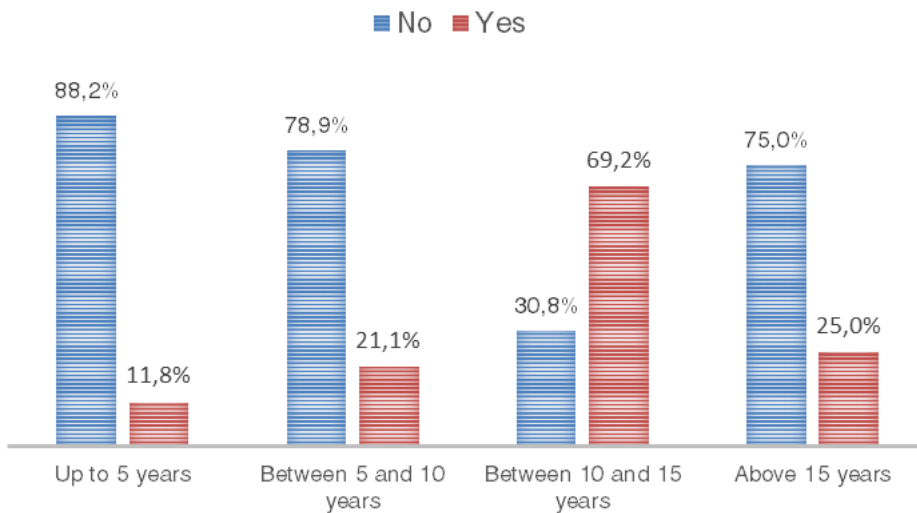


Fig. 11. Binary distribution of the respondents according to the degree of conformity of the effective legal framework in Bulgaria with the contemporary reporting requirements and professional experience.

experts in terms of their practical applicability in the accounting practice at a national level. The relatively low degree of competence of the financial and accounting staff in state

administration (over 50%) concerning the Conceptual Framework is a disturbing fact (fig. 12).

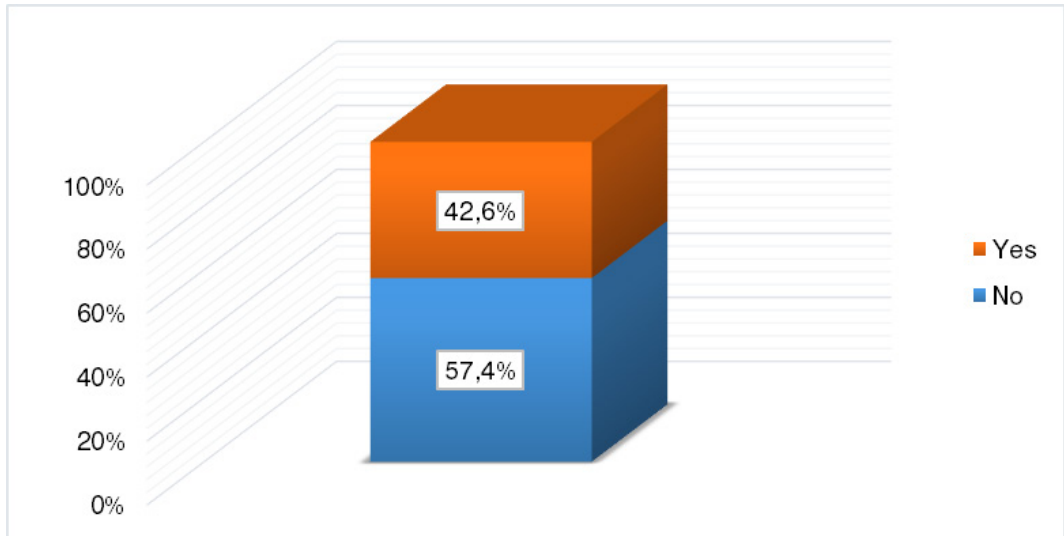


Fig. 12. Are you familiar with the theoretical essence and the practical applicability of the valuation base regulated in the Conceptual Framework?

Irrespective of the low level of awareness among the public administration staff, more than half of the participants in the survey express confidence that the quality of

accounting information can be improved through a complete change of the concept for the valuation of the infrastructure assets (fig. 13).

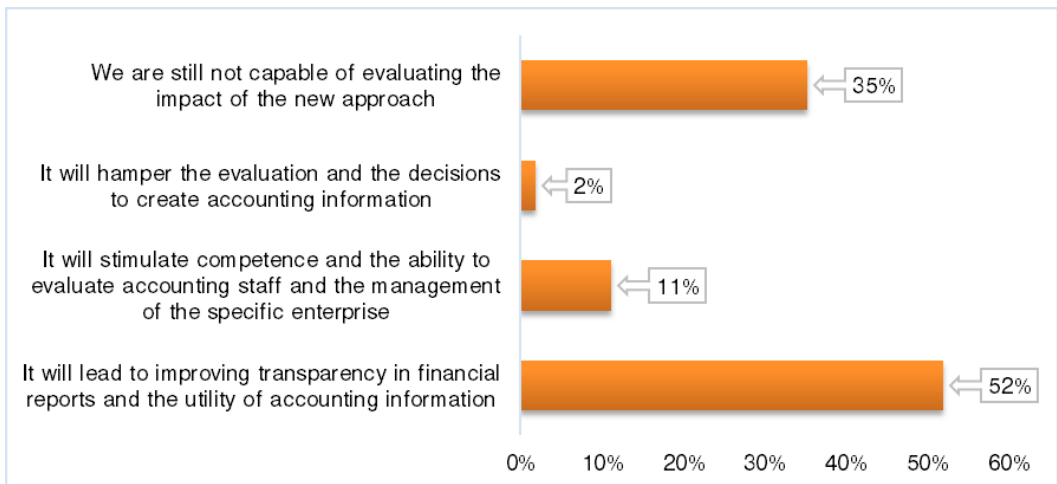


Fig. 13. Evaluation concerning the proposed new model – transferring to a practical implementation of the valuation bases set out in the Conceptual Framework

Connecting the question about the competency of the experts participating in the survey with their affiliation to the respective administrative structure is also of interest, on the one hand, and on the other to the practical implementation of the evaluation bases laid down in the Conceptual Framework. The received binary distributions are presented in figure 14 and figure 15. Two hypotheses are formulated:

-H0: There is no statistically significant connection between the affiliation of the respondents and the professional competence.

H1: There is statistically significant connection between the affiliation of the respondents to the respective structure of the state administration and the professional competence.

The data from the conducted statistical analysis are presented in the following sequence:

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	21,975a	3	,000
Likelihood Ratio	24,327	3	,000
Linear-by-Linear Association	18,521	1	,000
N of Valid Cases	54		

a. 3 cells (37.5%) have expected count less than 5. The minimum expected count is 2.98.

Symmetric Measures

	Value	Approximate Significance
Nominal by Nominal	Phi	,638
	Cramer's V	,638
N of Valid Cases	54	

The results from the analysis show that the alternative hypothesis that states that there is

statistically significant connection between the type of administrative structure and the professional competence of the experts who participated in the survey should be accepted as true. What justifies this conclusion is the degree of significance (($p=0,0$ %), which is lower than the error α (5 %). Two hypotheses are defined:

-H0: There is no statistically significant connection between the professional competence of the experts who participated in the survey and the evaluation of the practical implementation of the Conceptual Framework with reference to evaluation bases.

-H1: There is statistically significant connection between the professional competence of the experts who participated in the survey and the evaluation of the practical implementation of the Conceptual Framework with reference to the evaluation bases.

The data from thee conducted statistical analysis are presented in the following sequence:

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	13,915a	3	,003
Likelihood Ratio	15,725	3	,001
Linear-by-Linear Association	12,217	1	,000
N of Valid Cases	54		

a. 4 cells (50.0%) have expected count less than 5. The minimum expected count is .43.

Symmetric Measures

	Value	Approximate Significance
Nominal by Nominal	Phi	,508
	Cramer's V	,508
N of Valid Cases	54	

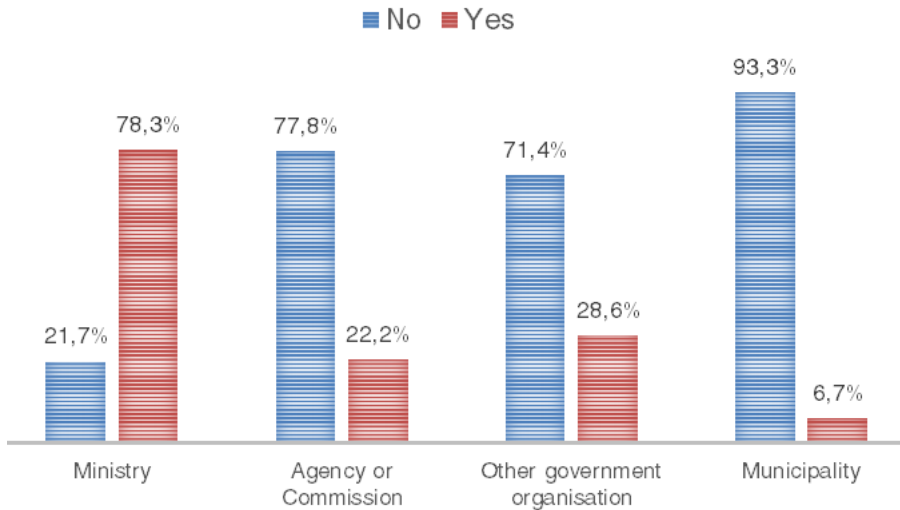


Fig. 14. Binary distribution of the participants according to the degree of awareness concerning the theoretical essence and practical applicability of the Conceptual Framework with reference to valuation bases and the affiliation to the structures of the state administration.

- It will lead to improved transparency of financial report and the usefulness of accounting information
- It will stimulate competency and the ability to evaluate accounting personnel and the management in a particular enterprise
- It will hinder evaluation and the decisions related to creating accounting information
- We are still not capable of evaluating the impact of the new approach

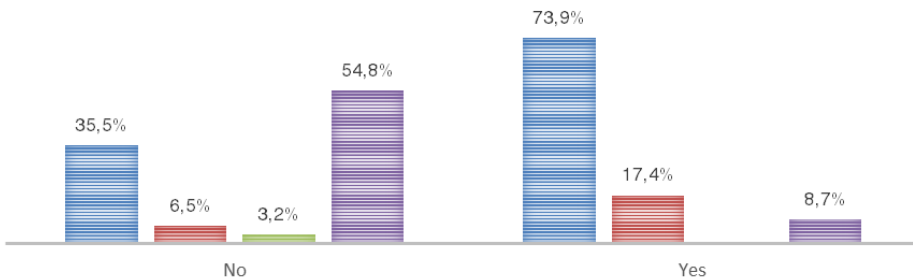


Fig. 15. Binary distribution of the respondents according to their professional competence and evaluation of the practical implementation of the Conceptual Framework with reference to the valuation bases.

The analysis based on the test illustrates that the degree of significance ($p=0,3\%$) is lower than the error α (5%) and the test rejects the null hypothesis and accepts as true the alternative hypothesis which states

that there is statistically significant connection between the professional competence of the experts who participated in the survey and the evaluation of the practical implementation of the Conceptual Framework with reference to

the valuation base. The analysis based on the two binary distributions shows the existence of a favourable trend towards improving the competence of the expert staff, employed in ministries who support the suggested new approach to accounting reporting of public infrastructure. There is the opposite trend - lack of understanding of the Conceptual

Framework, which can be observed among the respondents who are employed in the municipal administration.

The results from the survey definitively prove the need for introducing standardized models for measurement subsequent to initial recognition, impairment and disclosure of infrastructure assets (fig. 16, fig. 17 and fig. 18).

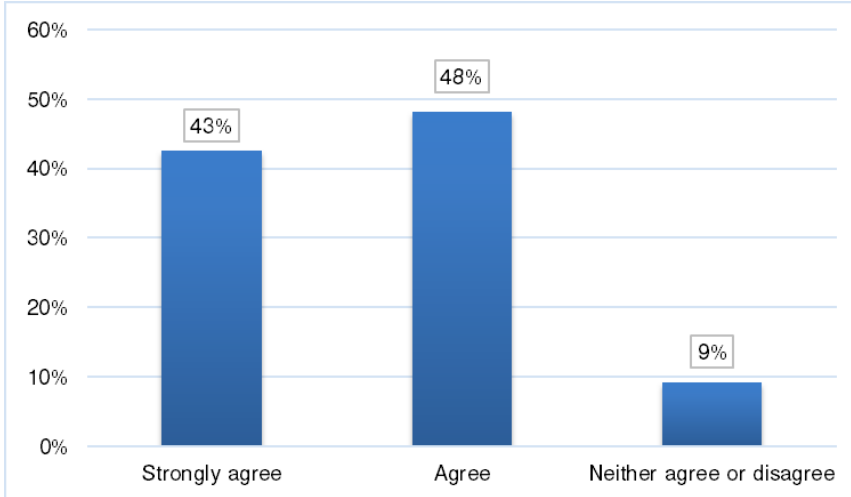


Fig. 16. Is it necessary to implement the “revenue and expenditure” approach for reporting of the differences found in a subsequent measurement of infrastructure assets?

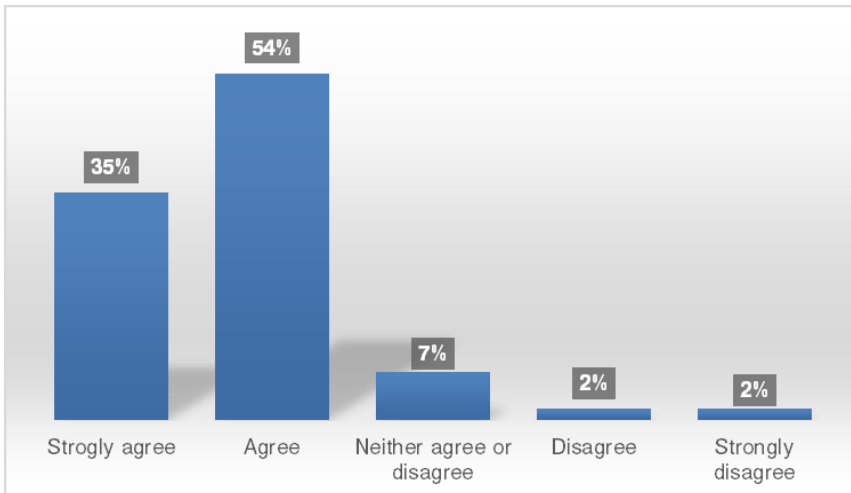


Fig 17. Is it necessary to implement an accounting model for the disclosure of infrastructure assets as an independent entry in the notes to the financial report?

The analysis gets more comprehensive in terms of clarifying the effect of the selection of a specific model for recognizing the impairment of infrastructure assets including the differentiation of the “non-cash generating assets” category from the “cash-generating assets” one. Presently, in the country there is no applicable standardized and legal approach to the reporting of impairment of infrastructure assets. The generation of accounting information about the amount

of impairment of infrastructure assets is a necessary condition for the improvement of transparency of financial statements and the utility of the accounting information for the aims of reporting and the oversight of government entities. The proof that there is need for a new model for impairment of public infrastructure can be found in the positive opinion expressed by the predominant part of the respondents (fig. 18).

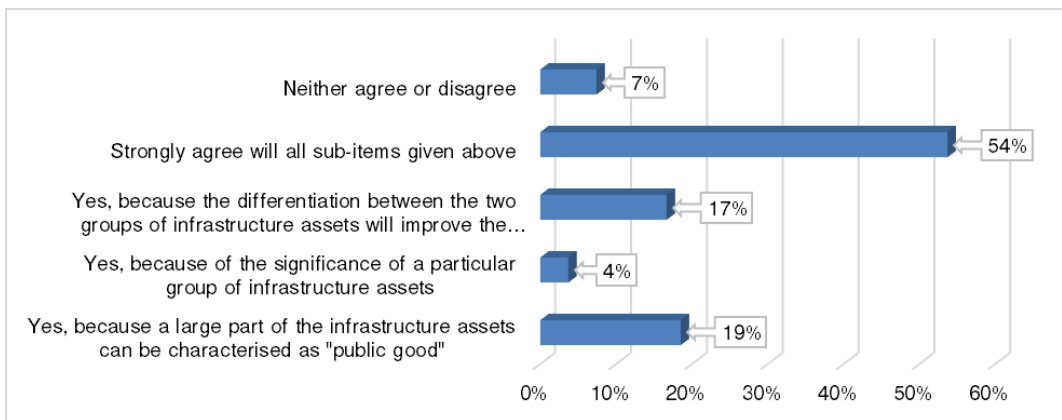


Fig 18. If a new model for impairment of infrastructure assets is introduced in the reporting of the PSEs, do you think that there will be an improvement in the quality of the accounting information?

The last question in the questionnaire is an open-ended question *Please, define the three most significant issues related to accounting and reporting infrastructure assets.* The answers received are summed up and laid out in the following sequence:

- Lack of clear and precise criteria for the differentiation of infrastructure assets for the purpose of accounting reporting by the following features: type, category, location, accessibility and degree of completion.
- Asset differentiation when put into operation and the related depreciation terms.

- Reporting of various projects – working, technical, concept, among other, which can be more than one for a specific infrastructure object.
- Clear and precise criteria for defining the current value of infrastructure assets.
- Lack of specific rules for reporting and cost estimates for major and current repairs of infrastructure assets, including their documentary justification.
- Differentiation of the recognized infrastructure assets into cash-generating ones and non-cash generating.

3.4. Summary and conclusions based on the empirical research

Based on the conducted survey focused on the applicability of IPSAS and the Conceptual Framework and the approbation of a standardized model for accounting and reporting of infrastructure assets the following results can be summarized:

- The main hypothesis is being justified – (according to 70% of the respondents) the legal framework of accounting in Bulgaria does NOT meet the modern requirements to the activity of the public sector entities. A reason for the negative response is the lack of adaptation of the national legal regulation to the requirements of IPSAS, on the one hand, and on the other – the lack of timely update of the accounting standards applied by state entities and their synchronization with the IFRS. The most critical opinion on this issue was expressed by the employees at ministries and municipal administration with between 10 and 15 years of professional experience. The opposite opinion was expressed by the respondents employed in other state organisations, including agencies and commissions that highly rate the level of conformity between public sector regulation and the modern reporting requirements.
- The need for improving accounting and reporting of infrastructure assets through the implementation of standardized models based on the stipulations of IPSAS (85% of the experts who participated in the survey expressed a positive opinion on the topic) is justified.
- The need for practical implementation of the regulated valuation bases in the Conceptual Framework in the national accounting legislation to improve the quality of accounting information (according to the opinion of more than half of the respondents) is confirmed.
- A high relative share of those supporting (over 90% of respondents) the development and adoption of a new approach for subsequent measurement and impairment of infrastructure assets is registered. The approach involves the implementation of:
 - a) *revenue-expenditure* model for the purposes of accounting and reporting the differences from impairment:
 - b) a model for differentiating the *non-cash generating assets* category from the *cash-generating assets* category - while recognizing impairment loss.
- The positive effects of the implementation of IPSAS 17, IPSAS 21 and IPSAS 26 in the national practice are illustrated, namely:
 - a) For improvement of the regulation of financial accounting in the public sector.
 - b) For implementation of contemporary accounting models which are in compliance with the specificity of the activity of the PSEs.
 - c) For facilitating the process of harmonization of reporting in the public sector in Bulgaria with the IPSAS.
- There is a direct proportional dependence between the degree at which the employees in the state administration are informed about the Bulgarian language version of the Conceptual Framework and the critical attitude of employees to public sector accounting regulation. There is a favourable trend toward improving competence of accounting personnel employed in ministries, which justifies the new approach to reporting public

Articles

infrastructure suggested by the authors. The opposite trend – of being uninformed about the Conceptual Framework – can be observed among the respondents employed in the municipal administration.

Conclusion

On the basis of the research presented and the specialized survey that was conducted, the following results, conclusions and assumptions can be made:

1. The public sector accounting standards (international and national) lack detailed guidelines for the accounting interpretation of the infrastructure facilities. They are treated in the standards the way the other fixed tangible assets are despite their complex nature and problems which arise with their initial recognition, subsequent measurement and impairment.
2. The variety, complexity and specificity of infrastructure assets suggests the creation of additional requirements and guidelines in reporting which are reflected in a specific accounting standard. The fact that there is no broader examination of these assets in IPSAS 17 Property, Plant and Equipment, makes it difficult to conduct evaluation and make decisions in order to create good accounting information which should be beneficial for the users of financial reports and to give a clear idea about this large group of public sector assets.
3. The active legal framework of accounting in the public sector in Bulgaria features critical areas which can be overcome by introducing modern standardised models based on the philosophy of IPSAS and the Conceptual Framework for General Purpose Financial Reporting by Public Sector Entities, some of them being:

✓ model for selecting a valuation basis,

- ✓ model for measurement subsequent to initial recognition of public infrastructure,
- ✓ model for impairment of infrastructure assets.

4. Empirical data confirms the benefits of the implementation of the suggested new accounting models in the practice of the public sector in Bulgaria which justifies the main thesis of the authors that there are reserves for improvement of reporting infrastructure assets in the public sector.

The perspectives for future research to be conducted by the authors are related to initiating professional discussions and public debates with the participation of the national regulator, the academia and interested parties – respondents in the survey, devoted to promoting the scientific research results and the projections for their practical application in the accounting system of the public sector enterprises in Bulgaria.

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EMPIRICAL STUDY OF THE APPLICABILITY OF STANDARDIZED MODELS OF ACCOUNTING, RECOGNITION, EVALUATION AND DISCLOSURE OF INFRASTRUCTURE ASSETS IN THE PUBLIC SECTOR ENTITIES (PSEs)

QUESTIONNAIRE

First-level spending unit:

- a) Ministry
- b) Agency or commission
- c) Other government bodies
- d) Municipality

Respondents' job title:

.....

Professional experience:

.....

Age structure of the administrative staff:

- a) up to 30 years
- b) from 30 to 39 years
- c) from 40 to 49 years
- d) from 50 to 59 years
- e) over 60 years

1. Do you believe that the effective legal framework of accounting in Bulgaria meets the contemporary requirements for the activity of the PSEs?

- a) No, because the national regulation in the public sector is not adapted to the requirements of the IPSAS
- b) No, because of lack of synchronisation of the public sector legal framework with the regulations of the ISFR
- c) No, because the applicable public sector accounting standards are not updated
- d) Yes, the legal framework of public sector accounting meets the contemporary reporting requirements

2. Do you implement program budgeting?

- a) Yes (go to question № 3)
- b) No (go to question № 5)

3. Do you implement a system of analytical reporting for the expenses and revenues for the two criteria – 'spheres of policies' and 'budget programs'?

- a) Yes (go to question № 5)
- b) No (go to question № 4)

4. Do you find it necessary to organize analytical (detailed) reporting for the expenses and revenues for the two criteria – 'spheres of policies' and 'budget programs'?

- a) Strongly agree
- b) Agree
- c) Neither agree or disagree
- d) Disagree

5. Do you think there is need for the implementation of a new approach for the accounting treatment of infrastructure assets in the PSEs as a specific category of tangible resources?

- a) Strongly agree
- b) Agree
- c) Neither agree or disagree
- d) Disagree

6. Is the adoption of IPSAS 17 Property, Plant and Equipment, IPSAS 21 Impairment of Non-Cash-Generating Assets and IPSAS 26 Impairment of Cash-Generating Assets needed?

- a) Yes, because it will improve the regulation of the public sector financial accounting
- b) Yes, because it will facilitate the process of harmonisation of public sector reporting in Bulgaria with the IAS

Articles

- c) Yes, because it will create conditions for the implementation of the contemporary accounting models which are in compliance with the specificity of the activity of the public sector enterprises
- d) No, because the applicable legal models for accounting reporting of fixed tangible assets are also applicable for public infrastructure
- e) Neither agree or disagree

7. Are you familiar with the theoretical essence and the practical applicability of the valuation base regulated in the Conceptual Framework for General Purpose Financial Reporting by Public Sector Entities (Conceptual Framework)?

- a) Yes
- b) No

8. Evaluation concerning the proposed new model – transferring to a practical implementation of the valuation bases set out in the Conceptual Framework:

- a) It will lead to improved transparency of financial reports and the usefulness of accounting information
- b) It will stimulate competency and the ability to evaluate accounting staff and the management of the particular enterprises
- c) It will hinder evaluation and the decisions concerning the creation of accounting information
- d) We are still not in a position to evaluate the impact of the new approach

9. Is it necessary to implement the “revenue and expenditure” approach for accounting of the differences in measurement subsequent to initial recognition?

- a) Strongly agree
- b) Agree
- c) Neither agree or disagree
- d) Disagree

10. If a new model for impairment of infrastructure assets (including the differentiation of the “non-cash generating assets” category from the “cash-generating assets” one) is introduced in the reporting of the PSEs, do you think that there will be an improvement in the quality of the accounting information?

- a) Yes, because a large part of the infrastructure assets can be characterised as “public good”
- b) Yes, because of the significance of a particular group of infrastructure assets
- c) Yes, because the differentiation between the two groups of infrastructure assets will improve the transparency of financial reports
- d) Strongly agree will all sub-items given above
- e) Neither agree or disagree

11. Is it necessary to implement an accounting model for the disclosure of infrastructure assets as an independent entry in the notes to the financial report?

- a) Strongly agree
- b) Agree
- c) Neither agree or disagree
- d) Disagree

12. Please, define the three most significant issues related to accounting and reporting infrastructure assets:

- a)
- b)
- c)