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Managerial accounting in the implementation of deliverology using the example of Ukraine

Abstract

The article is devoted towards the application of managerial accounting for deliverology development at the local government level in countries and comparing them to the stage of fiscal decentralisation implementation in Ukraine. The aim of the article is to show how the application of the managerial accounting approach in the public sector can contribute to the introduction of deliverology at the local level using Ukraine as an example. The methodology is based on the application of Difference in Difference method for the implementation of deliverology at the local government level. It has been proved that the use of multi-criteria decision-making methods in the analysis of the performance of budget programmes at the local level will contribute to the improvement of public services delivery. The main contribution of this study is to provide the basis for developing recommendations for the use of a single or uniform standard of electronic databases on regional development indicators and local budgets. This will help to ensure operational control over deviations of actual indicators from planned ones, as well as identify regions where local authorities are using resources inefficiently.

Keywords

managerial accounting | new public management | local budgeting | performance indicators | deliverology | process-driven problem solving | Difference in Difference method

JEL Codes

M48, R50, R51

1 Introduction

Managerial accounting has long been a key factor in business development, but in the public sector the issues of managerial accounting are not often discussed by researchers. However, the need for managerial accounting in the public sector is almost as important as in business. First, it is a question of managing resources based on performance indicators. Secondly, as in business, the public sector needs to identify budget deviations and their causes in a timely manner to make quick decisions. Brown and Sprohge (1987) have written about the importance of applying managerial accounting in the public sector way back in 1987. Most often, the need to apply managerial accounting tools arises in the area of education and health services. In fact, these services mostly utilise the money collected from tax payers and their amount

and quality of services are key topics during elections (Agyemang, 2004; Aidemark, 2001). In fact, one of the key areas of management accounting in the public sector is the quality of services provided to citizens and the efficiency of such services. That is why deliverology is one of the most important objects of managerial accounting in the public sector.

Deliverology ideas were first introduced by former Prime Minister of UK Tony Blair's office to ensure that election promises were honoured. The main components of deliverology are setting goals that are based on previously stated priorities, evaluating target indicators, and using dedicated feedback channels to monitor the achievement of goals. This approach has proven effective in public administration not only in the national level, but also in the sub-national level (Cleary, 2007; Freeguard & Gold, 2015).

Deliverology is, in fact, a citizen-centred approach. In addition, it is a performance-based approach that requires transparency and accountability. The implementation of this approach requires the organisation to work with massive volumes of information, which cannot be organised without the use of information technology (IT). Information technologies help to reduce the cost of database development, updating, analysis and monitoring of data for stakeholders, and so on.

This approach is partly used in post-communist countries, as the need for it is much higher due to higher risks of corruption, including political corruption (Fedosov & Paientko, 2018; Fedosov & Paientko, 2019). It should be noted that there is no single approach to the development of deliverology, as the process of deliverology implementation is influenced by the institutional environment, the legal and regulatory framework, and the economic condition of the country.

The prerequisites for local development in Ukraine emerged after the consolidation of mid-term budget planning and amendments to the Budget Code in 2019 (Budget Code, 2010). The amendments to the Budget Law consolidated typical forms of local budgets and organised the consolidation of tasks of local authorities. Deliverology ensures that planning for budget expenditures is not only decentralised but also focussed on achieving national strategic objectives. It should be noted that implementation of deliverology at the local level in Ukraine is slow as there are no common standards for the provision of primary information, its analysis and disclosure.

Deliverology is focussed on maximising the efficiency of resources used and to deliver public services efficiently. Therefore, the implementation of deliverology principles is impossible without the use of managerial accounting tools. First, it concerns about the control of deviations of indicators of budget programmes from the planned ones. Secondly, it concerns about the identification of causes of deviations.

It should be noted that the idea of deliverology is relatively new; there isn't so many studies on its implementation. Existing research is devoted to deliverology in general or to the implementation of deliverology in developed countries. Our research focusses on the implementation of deliverology at the local level in countries that do not have sufficient experience in fiscal decentralisation.

The aim of the article is to show how the application of a managerial accounting approach in the public sector can contribute to the introduction of deliverology at the local level using Ukraine as an example.

This study is to demonstrate the application of managerial accounting tools at the local government level. The results of the study will be interesting for scholars and practitioners who work on the problems of improving the efficiency of budget programmes in developing countries, especially in post-communist countries.

The article is organised as follows: the literary review of the investigated problem is conducted in the second section. The third section describes the research methodology. The fourth section displays the main results of the study. The fifth section is devoted to the discussion and synthesis of the results. The sixth section presents findings and prospects for further research.

2 Literature review

The role of managerial accounting in the public sector is considered mainly from the point of view of ensuring efficient use of taxpayer funds (Bjornenak, 2000; ter Bogt & van Helden, 2000). de Bruijn and van Helden (2006) emphasise the need to use performance management in the public sector. This enables not only to evaluate the effective use of financial resources allocated to public services, but also increases the level of accountability of government. By observing the dynamics of performance management indicators, it would be easier for citizens to understand the performance of government authorities.

Cavalluzzo and Ittner (2004) and Jarvinen (2009) discuss the peculiarities and intricacies of the implementation of new approaches to public sector management and the role of managerial accounting in achieving new objectives of public sector management. Assessment of the effectiveness of public service delivery in education and healthcare requires trust and exchange of information, which requires trust-based management patterns and the trust-based managerial accounting. At the same time, the institutional administration should be market-oriented and have a formal control. This can be problematic, as formal control can be a threat to trust. Therefore, performance control in the public sector

should be implemented for monitoring performance indicators through a defined mechanism.

Many recent publications (Aidt, Veiga F., & Veiga L., 2010; Alford & O'Flynn, 2012; Majette, 2019; Da Veiga & Major, 2019; Ouda & Klischewski, 2019) also focus on the effectiveness of the delivery of public services to citizens, especially in the context of election promises made by politicians. In fact, the interest in managing public sector functioning effectively has contributed to the development of a new approach or mechanism in public management, namely deliverology.

According to Watkins (2013), deliverology is defined by many researchers as a control system that ensures maximum success. Success is achieved through an approach that closely links expected results to current activities (Watkins, 2013; Bald, 2016). At the same time, current results are continuously monitored to improve the actions of the implementers. It should be noted that this approach requires working with massive data, processing and analysing them continuously. Rapid response to changes in performance indicators allows timely adjustment of tactics to achieve the set objectives.

Deliverology is seen by many researchers as an approach to improving public administration (Barber, 2008), Barber, M., Kihn, P., & Moffit, A. (2011b). Gash, Hallsworth, Ismail, and Paun (2008) believe that improving the quality of public administration is achieved through clear goal-setting and rigorous monitoring. The achievement of objectives is often linked to providing adequate quality public services. Therefore, timely information on the current state of affairs is needed to achieve the stated outcomes.

Bouchal, Kidson, Norris, and Rutter (2014) argue that the implementation of deliverology contributes to social justice. This outcome is achieved by increasing government accountability, both at the central and local levels. Publishing the information on the funds received and the results of their use appropriately helps to reduce the risks of the inefficient use of taxpayers' funds.

Some researchers compare deliverology in the public sector with performance-based management in the business sector. They believe the complete focus on results alone contributes the effectiveness of government (Box, 1999; Boyne, 2002). Many scholars have also studied the impact of deliverology on improving the quality of education, health care (Barber, 2017), and government cost effectiveness

(Shepherd, 2018). The most recent publications, for example, Birch, Jacob, and Baby-Bouchard (2019); Haws (2018); Jakobsen, Baekgaard, Moynihan, and van Loon (2018) discuss the role of deliverology in delivering on election promises and increasing government accountability. In other words, the role of deliverology is increasing, and in the future the need to implement this approach in the public sector will increase.

The implementation of deliverology requires the active application of managerial accounting principles. First, it involves the field of budgeting, determination of performance indicators, identification of reasons for deviations from targets, and development of new solutions. This part of the problem is not covered adequately in research publications.

Thus, Alonso, Clifton, and Diaz-Fuentes (2011) emphasise the need to implement new approaches in public management, including decentralisation. Blum, Manning, and Srivastava (2012) discuss the possibility of applying a problem-solving approach in public management. The necessity of evaluating the quality of services provided by the state, that is, to use a performance-based approach, is described in an article by Holt and Manning (2014).

It should be noted that management accounting approaches in the development of deliverology will differ from country to country. As Andrews (2008) notes, the concept of good management can vary. A similar idea is outlined by Booth (2014), which answers a number of questions about why management approaches that have been successful in some countries is not working in others. This is often due not only to economic conditions but also to institutional differences among countries. If you consider Europe as an example, it will be clear that lot of differences will exist between post-communist countries and countries that have never experienced a communist regime in the implementation of managerial accounting approaches in public administration .

Many researchers point to the fact that the application of managerial accounting tools in public management depends on the institutional environment of a particular country. Similarly, the implementation of deliverology depends on the specifics of the public sector development. Therefore, there is a need to supplement existing research with case-studies both on individual countries and their groups which are already used for the research.

3 Methodology

The research methodology is based on qualitative and quantitative methods. Quantitative methods were used to describe the implementation of deliverology principles in the work of local authorities, as well as to determine performance indicators of budget programmes.

The performance indicators in the selected budget programmes are designed for public services delegated by the central to the local level within the framework of public functions, such as provision of public goods in the field of education, health care and social protection. Since Ukraine consumes a lot of energy resources, energy savings indicators are envisaged as targets in the budget programmes of local authorities in the recent years.

Quantitative methods are used to develop an algorithm for collecting data on indicators, as well as to calculate performance indicators. Information on the implementation of budget programmes is posted on the official websites of local authorities. It should be noted that information is posted in different formats complicating its systematisation. Part of the budgets and reports on their implementation are presented in excel format, while the remaining part is presented in pdf format. We have developed programming code using R software for automatic reading of both formats. The programming code allows us to automatically load the necessary data and process them further using R.

The calculations were done in R software. The Difference in Difference (DID) method was used to calculate the indicators. DID is usually implemented as an interaction term between time and treatment group dummy variables in a regression model.

$$Y = \beta_0 + \beta_1 * [\text{Time}] + \beta_2 * [\text{Intervention}] + \beta_3 * [\text{Time} * \text{Intervention}] + \beta_4 * [\text{Covariates}] + \varepsilon.$$

The package contains tools for computing average treatment effect parameters in DID models for more than two periods, with variation in treatment timing across individuals, and where the DID assumption possibly holds on covariates on conditional basis.

4 Results

4.1. Deliverology and managerial accounting at the local government level

A key aspect of local government effectiveness is to provide public services with appropriate quality to taxpayers. One of the important factors in ensuring local government performance is to raise awareness among all actors in the supply chain of such services about their results and costs.

The founders of the deliverology Barber et al (2011a, 2011b) identified three key components of the approach:

1. Centralising decisions to a small group highly skilled professionals to provide a systematic approach.
2. Gathering reliable and relevant performance data to determine goals and trajectories for achieving them.
3. Establishing daily implementation of the chosen concept (Barber et al., 2011a, 2011b).

To implement deliverology at the local government level, standard budget programmes should be established first. Then uniform standard should be developed for implementing the budget programmes in all regions so that reporting information or results obtained from all regions can be compared. It is possible to draw conclusions about the efficiency of local government bodies using such information. In addition, employing uniform standard will allow timely identification of reasons for deviations of actual indicators from planned ones.

Further development of a constantly updated information system to gather the information on planned and actual indicators of performance of budgetary programmes is necessary. This information system should be uniform in all local governments so that information on the implementation of budget programmes is collected, processed and published in a standard format. The system should make possible the accumulation of data for several years and analysis of their dynamics.

The initial information should be presented in fields such as the following:

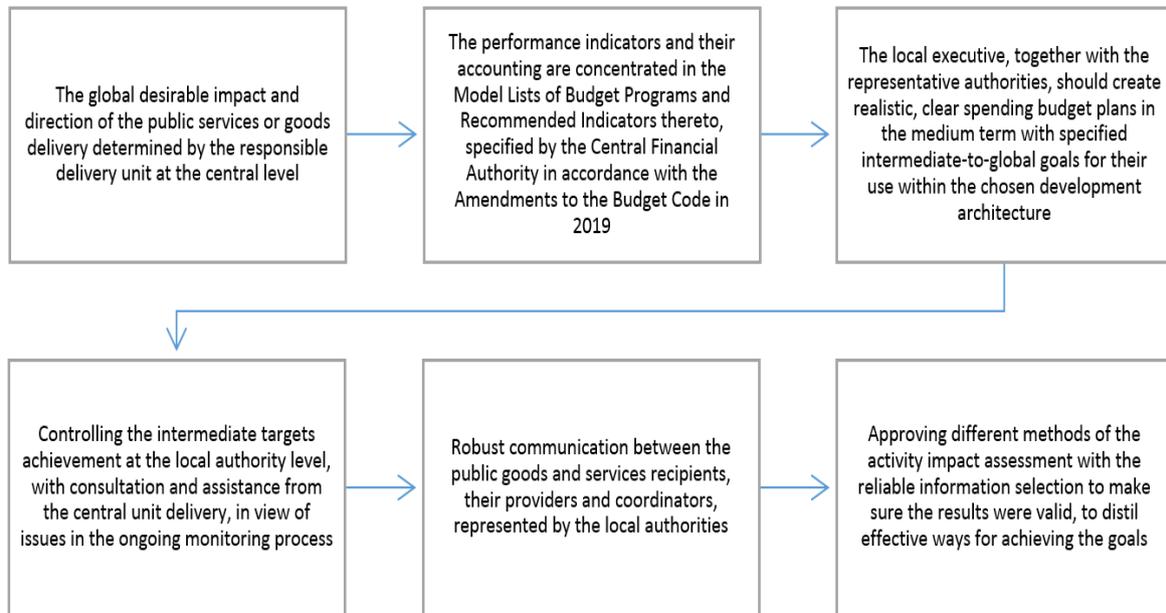


Fig. 1. Deliverology stages at the local level. *Source:* Developed by authors based on Barber (2008, 2011, 2017).

1. By groups of indicators of implementation of local budgets (expenses in absolute value, product/service, indicators of efficiency and effectiveness).
2. By functions of budget programmes.

Currently, in Ukraine the first step in the creation of a complex information system namely, the data portal of the 'Open Budget' system has been created. Information on local budgets is now stored in a data repository, which could be updated timely with new data whenever available. The original information is displayed on a special website (openbudget.gov.ua), but efforts should be made to show results separately in a graphical form and sample data analysis be available upon request of a particular user.

Coordination of information exchange in deliverology can be achieved by providing information to different user groups. For example, Storto (2014) suggests to use a 'cognitive user system'. The idea is public officials need information that helps to generate ways to implement country and local government policies. First, it means compliance with targets, implementation of strategic criteria, and selection of indicators with grouping of administrative units or budgets, etc. so that a dynamic form is obtained. For analysts and researchers, information can be provided from primary sources grouped according to common criteria: period, type of budget, cost objectives, planned and actual indicators.

For ordinary citizens the information should be summarised in graphical form with necessary details and maximum transparency. Most citizens want to understand how the taxes they pay are used. They want to ensure that the local government effectively uses the financial resources that are at its disposal. With the availability of such a service, citizens can easily see the quality of public services in their region and beyond. According to Barber et al. (2011a, b), the evaluation of the beneficiaries of public services and goods is an integral and important part before the end of the service cycle. According to Barton (2006) the use of the steps described in Figure 1 will enable to enhance the public sector accountability.

Based on users' information needs, deliverology at the local level should be organised as shown in Figure 1.

Possible difficulties for establishing credible performance indicators for the public goods and services provided in Ukraine are:

1. Qualitative indicators of budget programmes measure the result of the activity of the performer, but not the ultimate objective achievement.
2. According to the volumes of information the accumulation of results will happen and so it is reasonable to consider a future system to handle large data in the public sector (Bouckaert & Halligan, 2008; Lægreid, Roness, & Rubecksen, 2008).

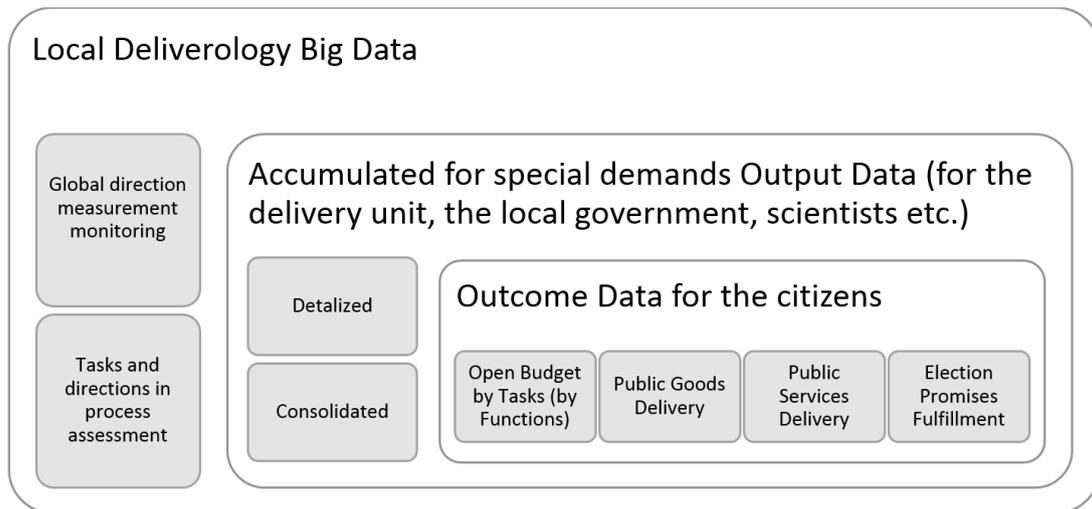


Fig. 2. Local deliverology Big Data system. *Source:* Developed by authors based on Bouckaert and Halligan (2008) and Læg Reid, Roness, and Rubecksen (2008).

The general scheme of the Big Data system construction at the local government level is shown in Figure 2.

Big Data system for local deliverology should be implemented in at least two aspects.

1. The first part is constructing a framework with indicators for the general monitoring of policy implementation, development indicators, and forecast trends for available resources in the region. The system's use of these indicators is aimed to attain maximum objectivity and automatically to determine deviations. This part includes, for example, indicators such as employment, average official income, number of employees in the public sector with the projected amount of taxes paid by them and other similar indicators. This part should also include indicators of the real estate tax base, the amount and cost of energy consumed, the level of infrastructure development, its depreciation, cost and profitability, and other indicators. The problem in Ukrainian governance, in particular, is the role of a forecasting tool that simulates a desired result that is far from reality. This leads to the fact that plans based on such forecasts cannot be implemented in practice. After implementation of deliverology, in which the dynamics of key indicators are built into forecasts and are displayed in the system of indicators would indicate that the forecasts could be realised using IT tools. Thus, the central government and local authorities can come to an understanding easily in providing services as well as the provisions in the budget

legislation from 2020. Taxpayers will be able to understand the real business environment.

2. The second part consists of consolidation of information in the form of standard dashboards and detailed individual data sets based upon the type of services for analysis. This part has the primary task not to standardise but report precisely the completeness and consistency of collected data on services. Further information received by IT specialists from people and authorities will provide an environment so that everything is analysed appropriately and comprehensively.

The role of managerial accounting is, first, to ensure operational control over deviations of actual indicators attained during the implementation budget programmes from planned ones. The second is to receive constant feedback from the beneficiaries of services rendered, so they, considering this information, may make decisions regarding any deviations in the indicators of budget programme implementation.

4.2. Simulation of results

The full application of managerial accounting approaches in the public sector requires the development of appropriate software. The software must allow timely collection of data, their processing and publication in the required format. Since it is impossible to show in one article how this idea can be applied to all indicators of budget programme

Table 1: Performance indicators of the local budget programmes for the energy saving task

The effectiveness – utility consumption level	The norm indicator (for the whole country or in a particular region)	Indicator accomplished in the budget programme for the period 1	Indicator accomplished in the budget programme for the period 2
Heat supply (H), Gcal per 1 m ³ of heated space	N _h	H ₁	H ₂
Electricity (E), kWh/m ²	N _e	E ₁	E ₂
Water supply (W), cubic metres per square metre	N _g	W ₁	W ₂
Efficiency (Quality) – the level of savings	Cost savings for a specific region or the country	Accomplished in the budget programme for the period 1	Accomplished in the budget programme for the period 2
The level of heat supply saving (H),%	NE	EH ₁	EH ₂
The level of electricity saving (E),%	NE	EE ₁	EE ₂
The level of water supply saving (G),%	NE	EW ₁	EW ₂

Source: Developed by authors.

implementation, only energy efficiency indicators as an example will be shown in this article. This is due to the fact that energy efficiency is one of the key indicators for assessing the performance of local authorities in Ukraine.

Some performance indicators from typical passports of the local budget programme, related to the energy saving task by the executing agency, are presented in Table 1.

These indicators are used to assess outcomes of individual budget entities. They allow a comparison of the results of local government energy efficiency policies with and without energy saving measures by regions.

The 'DID' method described in Wooldridge (2009) was used to estimate the difference in energy saving indicators across regions. The DID method allows the budget programme implementer to compare homogeneous metrics in the service group over a number of years and measure the results of the energy efficiency policy. The DID shows how the energy consumption of each producer changes over time in different regions. It differentiates regions with different approaches over time to account for their impact on typical changes in indicators. Differences in a group of indicators for a particular task of budget programmes under this method aggravate problems in indicating the efficiency of consumption or saving of

consumed public utilities between regions. Estimates of consumption by regions may indicate the presence or absence of changes in the dynamics of energy efficiency. Interpretation of the results will depend on the goals and conditions of the utility company. A country's specific norm or efficiency indicator for any region, for which an assessment of efficiency and quality of utility consumption has shown optimal results, can be considered as a benchmark for using this method.

Therefore, it is necessary to compare the changes in dynamics between the first and second periods in the activities of local public companies in Regions A and B with the optimal energy-saving results in Administrative Territory C, which in this case is adopted as 'normative'. For example, Regions A and B declare that they implement energy efficiency policies, while Region C uses energy in the usual way. It is necessary to determine whether Region C shows the best projected energy saving results or overestimates the efficiency targets in order to get the best cost savings in its budget programmes.

The adapted sequence of formulas for the calculation is as follows:

Table 2: DID method results in the energy saving calculation

Group number	DID in the effectiveness 2016-2017	DID in the efficiency 2016-2017	DID in the effectiveness 2017-2018	DID in the efficiency 2017-2018
1. Heat	0.6	5.5	0.3	5.6
2. Heat	2.2	2.5	2.6	2.5
3. Heat	0.9	7.0	1.4	7.2
4. Heat	1.0	3.9	1.1	3.8
1. Electricity	6.1	8.7	5.9	10.7
2. Electricity	3.4	7.5	2.2	7.6
3. Electricity	6.8	9.1	6.7	15.1
4. Electricity	8.8	11.6	9.7	14.5
1. Water	0.05	2.8	0.06	3.4
2. Water	0.07	5.2	0.13	8.2
3. Water	0.02	4.4	0.02	3.7
4. Water	0.08	2.9	0.09	3.8

Source: Calculated by authors.

$$\Delta u_A = (I_1 - I_2) - (N_1 - N_2).$$

$$\Delta u_B = (I_1 - I_2) - (N_1 - N_2).$$

$$P_{(AB)} = [\Delta u_A] - [\Delta u_B].$$

where 1 and 2 – periods when the performance indicators done,

A and B – finally comparable regions,

I – the performance indicator within a certain group,

N – the indicator of a comparable certain group from the standard (neutral) region C.

Instead of manually calculating the four means and their difference-in-differences, it is possible to estimate the *difference-in-differences* estimator and its statistical properties by running a regression that includes indicator variables for *treatment* and *after* and their interaction term (Callaway & Sant'Anna, 2018). As stated in the section Methodology, for the automatization of calculations the package DID was used in R.

A sample of indicators of nine regions of Ukraine was created for analysis. Eight of them were compared with the ninth 'normal' region in terms of consumption of selected utilities after the implementation of the budget programmes of 2016–2018. For periods before

2016, the reports are available only for the city of Kyiv. Therefore, calculations for earlier periods have not been performed.

The results of the calculations are presented in Table 2.

The results of the analysis showed that electricity consumption is characterised by significant deviations. Therefore, for local authorities electricity consumption should be a priority for further evaluation.

The performance indicators that are assessed in local public services are consistent with the level of social orientation of the territory (average salary, emigration, etc.). Local governments need such an assessment in order to discuss a centralised approach to service delivery, with the implementation of the most reasonable and cost-effective solutions. Local government leaders should not, at present, simultaneously assess the various options for making such decisions on many variables, because their task is to centralize the service delivery. However, some of the 'top-down' directions are conflicting (e.g., the impact of small school and kindergarten decisions on community well-being), sometimes factors that interfere with the final decision increase or disappear altogether. Therefore, the correctness and effectiveness of the decision depends heavily on the established utility metrics and assessment methods.

Further multi-criteria decision-making methods, in our opinion, will ensure the best assessment in these conditions. They allow the evaluation and analysis of multi-purpose tasks using combinations of different criteria.

5 Discussion

The research results showed that the application of managerial accounting tools for the implementation of deliverology at the local government level is a promising area for further academic research. The implementation of deliverology depends on the characteristics of the institutional environment in a particular country, the degree of fiscal decentralisation and the organisation of public management. All these factors have an impact on the degree of application of managerial accounting tools in public management, and, therefore, on the quality of information on delivery of public services. The peculiarity of deliverology is the difficulty in using group analysis tools for its study. Therefore, cluster analysis can be conducted based on individual case-studies in the future and will be worthwhile. It should be noted that the theoretical aspects of deliverology are actively researched, but there are very few empirical studies. Therefore, our study contributes to the development of empirical research on the application of managerial accounting tools for the development of deliverology at the local level.

It should be noted that the development of deliverology at the local level requires solving of many practical problems. For example, local government accountability must be a part of deliverology. Implementing accountability requires processing, storing, and presenting large amounts of data in a single format. Our study found that this is a challenge for post-communist countries. First, these countries have weak traditions of accountability. Second, these countries often lack the resources to manage such data. Therefore, this study is also a starting point for building local deliverology bag data systems.

6 Conclusion

Applying managerial accounting principles to the local delivery decision making creates several advantages in utilising the performance information. First, the

independence of local government is not violated, but its patronage and accountability are ensured. Second, gathering and analysing performance indicators for a specific period makes possible to estimate quantitative and qualitative composition and adjust it if necessary. Thirdly, the modern multi-criteria decision-making methods are applied to the efficiency metrics and analysed in combination with other economic indicators, and benchmarks will create new opportunities for researchers to formulate the territorial and public policies to optimize the goals of a delivery unit. The proposed in this publication conception based on implemented in the local budget programmes performance indicators. Further data format will be developed according to the delivery unit's needs and scholar's research.

In fact, since 2019 the deliverology approach has been implemented in Ukraine at the local level. Clear regulation for planning local budgets pattern and its maintenance as a continuation of the formalisation of the list of the budget programmes within the specified parameters is a mandatory task for local government officials, and therefore they must interact with relevant Ministry to review expenditures including recounting inter-budgetary subventions—are all the signs of a centralised influence on the local management and setting directions and parameters for calculating expenditures according to the principle 'top-to-down' to provide the public services. Medium-term budget planning with three year forecasts under the central patronage, must include the upper limit of subventions, clear regulation of the management of educational institutions, and in the future, the centralised National Healthcare Service allocating finance to the health care institutions at the local level must know how to calculate the finance needed by the health care institutions at the local level, must be aware of the policies of the centre, and inform the centre of the progress and the consequences of any changes in policies or in finance allocation.

At the same time, it is not necessary to increase the number of performance indicators. Performance indicators can be efficiently utilised only in the case clearly defined targets. In the absence of informational system, the main risk for the local level budget programmes in Ukraine is furthering their formalisation, which will not provide adequate information about either the efficient utilisation of budget funds or effective management. Governing the relevant services for delivery management

needs transparency and clear data to enhance the informational evidence and its possibility of analysis.

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