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RESEARCH ARTICLE

The Relationship between Performance-based Budgeting Characteristics with the Integrated Reporting Approach in the Public Sector

Javad Pourghaffar, Heydar Mohammadzadeh Salteh*
Department of Accounting, Marand Branch, Islamic Azad University, Marand, Iran
Mehdi Zeynali
Department of Accounting, Tabriz Branch, Islamic Azad University, Tabriz, Iran
Sasan Mehrani
Department of Accounting, Faculty of Management, Tehran University, Tehran, Iran
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Abstract

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This research explains the relationship between performance-based budgeting characteristics and the integrated reporting approach in Iran's public sector. This research is applied research in terms of its purpose, quantitative research in terms of methodology, and descriptive and survey research in terms of data collection and analysis. The statistical population includes all experts related to planning and budgeting in the public sector and expert university professors. The determination sampling method is that 250 questionnaires were distributed among the community members and 64 questionnaires were analyzed due to the presence of complete information. Therefore, the data collection tool is a researcher-made questionnaire based on the model provided by Pourghaffar et al. (2021 and 2022) with a 5-point Likert scale. The current research includes 6 hypotheses. SPSS and PLS software and structural equation analysis were used to analyze the hypotheses. The results showed 6 indicators in the hypotheses: legal requirements with the approach of government administration in the style of the private sector, strategic planning system, accounting and auditing system of management performance, information technology infrastructure with the perspective of organizational architecture and integrated systems, attention Human capital and incentive policies, the process approach and process management are directly related to the establishment of performance-based budgeting with an integrated reporting approach in the public sector of Iran. In other words, the government can use these indicators to achieve performance-based budgeting goals.

Keywords:

Performance-based
Budgeting, Integrated
Reporting, Public Sector

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*Corresponding Author:

Heydar Mohammadzadeh Salteh

Email: salteh2008@gmail.com

Tel: 09143160853

ORCID: 0000000253142542

1. Introduction

To propose a definition of performance-based budgeting, It is believed that such a budgeting method has as many definitions as the number of governments that applied it. Each government has its own approach, definition, and different methods for entering performance information into the budgeting process. Different views can be classified within a spectrum of the strictest concepts to the easiest ones, and different types can be placed between these two limits (Schick, 2007). Performance-based budgeting (PBB) has been developed in many countries within the frame of a new administrative mentality based on the performance of the public sector as of the 1980s, which included primary objectives such as increasing the quality of public services, reinforcing decision-making processes by getting more information about the activities of the state and ensuring accountability and fiscal transparency. With the objectives above, governments focused on the effective and productive use of public funding and, within this context, tended toward allocating resources in line with the results reached through goods and services produced rather than information regarding the input in budget processes. Although it does not have only one accepted model in the world, performance-based budgeting, which is defined as a type of budgeting that associates resources with measurable objectives in the widest sense, has found an area of implementation in many developed countries in various forms with its outcome (Erkutlu et al., 2017).

New Zealand and Australia at the end of the 1980s, Canada, Denmark, Finland, France, the Netherlands, Sweden, England and the United States of America in the 1990s and Austria, Germany and Switzerland at the beginning of the 2000s started various management methods based on performance-based budgeting. Among the reasons for turning to the performance-based budgeting system are public financial crises, ineffective use of public resources, increasing the amount and quality of public expenditures, rapid changes in information technology, and the new way of public administration (Bal, 2015).

With the development of democratic systems in the world, public services are performed in line with the needs of society. Accordingly, there has been an increase and variety in demands from administrators directed at public services. The increase in society's expectations for public services has led to an increase in public spending and tax load, which in turn made it imperative to ensure efficiency in the use of resources. Strategic planning-oriented PBB model: The model makes it imperative for public institutions to prepare strategic plans, which constitute the basis of preparing the budgets of public institutions.

Performance agreement-oriented PBB model: In this model, in which it is not imperative to prepare strategic planning in terms of public institutions, performance agreements have to be made with the institution's top executives to maximize the performance of employees.

Budget format PBB model: Unlike the other two models, no document is prepared to measure performance except the budget text in this model. Thus, the budget only has information about performance and allowance. In addition, there is no independent performance report.

Performance programs bring an output and result-oriented budgeting system to the forefront by making performance information available as well as fiscal information in the budget documents and thus bring fiscal transparency and accountability principles into force, which our new public financial administration system depends on (Erkutlu et al., 2017).

Budgeting is a key pillar of policy development and accountability in any country or region. Performance budgeting is the systematic use of information about the outputs and results; and/or impacts of public policies in order to inform, influence and/or determine the level of public funds allocated towards those policies in the budgetary context.

The experience illustrates that performance budgeting can serve a number of purposes:

Transparency: The OECD Recommendation on Budgetary Governance (2015) notes that the systematic use of performance information helps parliament and citizens “to understand not just what is being spent but also what is being bought on behalf of citizens – i.e. what public services are actually being delivered, to what standards of quality and with what levels of efficiency”. Transparency is, in turn, an important underpinning of public trust and assurance regarding how public funds are used.

Accountability: Making explicit the performance objectives and targets helps the public, parliamentarians and senior managers to hold the public administration account for the proper use of public funds and for the achievement of goals.

Efficiency: Consistent, comparable indicators of outputs and impact in different areas, alongside the corresponding financial allocations, can facilitate an assessment of efficiency by reference to benchmarking unit costs and improvements over time.

Evidence-based policy-making: A clear linking of budgets with results and impacts, drawing on findings from different sectors and from comparable countries and regions, helps to lay the basis for an evidence-based approach to policy-making (Downes et al., 2017).

In this regard, budgeting is based on integrated reporting performance. Integrated Reporting (IR) is an innovation in accounting that advocates linking financial and non-financial information in a single report to provide a holistic view of how firms create value. The IR framework, issued at the end of 2013, explains IR, compared with more traditional reporting, as “a more cohesive and efficient approach to corporate reporting that draws on different reporting strands and communicates the full range of factors that materially affect the ability of an organization to create value over time”, to enhance “accountability and stewardship for the broad base of capitals and promote understanding of their interdependencies” (Vesty et al., 2018).

In the present era, reforming the budgeting process and human and financial resources requires significant investment in information technology, particularly management information systems (McNab and Millis, 2003). According to Belfo and Trigo (2013), accounting information systems move towards business process-based accounting. Thus, performance-based budgeting, as an organization's strategic plan, converts measurable data into meaningful information about program outcomes (Melkers and Willoughby, 2001). Using integrated reporting in the public sector with a sustainable development approach improves the responsibility of public sector accountability to respondents (Biondi and Brasi, 2018). Iacuzzi et al. (2020) showed that moving towards integrated reporting and changes in Italian national universities requires integrating thinking and shared value creation in the public sector. Andrews (2004) considers the factors influencing the reform of public sector budgeting structure to performance-based budgeting to include the three elements of ability, acceptance, and authority. In its annual report, the Chartered Institute of Management Accountants (CIMA) has pointed to the tendency of governments to use an integrated reporting approach within the model presented in the internal and external environment. In the intra-organizational dimension, emphasis is placed on operational inputs, processes, strategies and plans, outcomes, and finally on performance management and value creation flow, along with six main capitals, including financial, operational (technical), intellectual, human, natural, social and communicative capital are considered. External factors such as politicians, legislators, stakeholders, and the economy are also considered (CIMA, 2014).

In Iran, governmental organizations can reach such plans based on an integrated reporting approach. Performance-based budgeting with an integrated reporting approach indicates the establishment of all required systems of executive devices in management in the private sector. Therefore, assessing the infrastructural barriers of the country to compete on the international stage

shows that the use of performance-based budgeting is a leading need, the prerequisite of which is integrated reporting. Integrated reporting displays an event in which the performance-based budgeting system can only be applicable in economic environments since the presence of information is the basis of budgeting, and the more accurate and updated the provided information, the more extensive the scope of strategy determination the government national and international competition. According to the issues raised, budgeting and reporting are necessary because information plays a major role in budgeting, and taking into account technological advances and the main need of the present century, which is the century of information, timely reporting using information technology tools, it can provide the grounds for accountability and transparency of the government and legislative institutions against the demands of society. Therefore, governmental organizations are highly recommended to implement this budgeting system (Sarraf, 2019).

2. Literature Review

Some of the national and international literature studies about performance-based budgeting practices and research and the key findings of these are explained below.

In Egili et al.'s (2007), titled "Analysis of Critical Control Points of Strategic Planning Oriented Performance Based Budgeting System: The Applications of Turkey's Public Institutions," a general conclusion was reached that the system may not be effectively applied before the completion of all steps toward the performance-based budgeting within the framework of the results obtained from the critical control points and analysis of public institutions in Turkey.

According to Kim and Park's (2007) study titled "Performance budgeting in Korea," Korea is in the initial stages of implementing performance-based budgeting; it is, therefore, too early to form an assessment. However, it has been concluded that it should be noted that having introduced performance-based budgeting as one component within a broader range of comprehensive reforms has helped to lower resistance and resolve institutional problems.

Jordan and Hackbart's study (2005), titled "The goals and implementation success of State Performance-Based Budgeting," concluded that accountability can be seen as a goal rather than budget allocation, making a stronger foundation for determining performance-based budget success.

In Childir's study titled "An assessment of United Kingdom's Performance Based Budgeting System," since the application of the Public Service Agreement started in England in 1998, a lot of changes have occurred. Each expenditure analysis underwent some changes in terms of its structure. Ever since it began to be applied, the Public Services Agreement framework has guided the government in terms of increases in public expenditures. The Public Services Agreement places importance on focusing on the data that create a problem for those who make use of management inputs and public services, prioritizing public services that should specifically be conducted and providing more flexibility.

Celebi and Kovancilar (2012) stated that the advantages of a performance-based budget system in terms of public fiscal management were effective in being preferred by other countries. However, it was also stated that the system above included some theoretical and practical problems and difficulties within the system's structure.

Badem et al. (2013) concluded that if the performance-based budgeting system is fully applied in Turkey, an awareness of transparency and calling to account will be developed in the society; everyone will evaluate policies and strategic goals, and the performances and policies of top executives in both the government and the public institutions will become questionable. In addition, through PBB, institutions' expenditures will be questioned through performance auditing, and it will be possible to determine whether public resources are used economically and effectively. In Turkey, time, interest, care, raising awareness of questioning in public, and increasing the legal

sanctions are evaluated as needed for full implementation of PBB.

Demokaaan (2015) aimed to ensure fiscal transparency and accountability through performance-based budgeting. Performance-based budgeting, indispensable in popularizing performance-based practices in public administration, is also closely related to many concepts. One of these concepts, strategic planning, contributes to the preparation process of performance-based budgeting through missions that reveal the institution's duties and functions with future visions. Performance programs and indicators reveal the adaptation capacity of an institution to specified strategies. Activity report announcements prepare the basis for a healthy comparison of past and future results.

Karacan and Yazici (2015) stated that the Law No. 5018 brought radical changes in the financial management and control system, the findings, evaluations, and suggestions related to the ownership, coordination, role of the parliament, capacity, calendar, reporting, and budget connections in Turkey undergone during the 10 years. They stated that the public management sector is a sector where the outputs and results are seen in the long term. They also added that the best practices are experienced for many years in planning and nearly 30 years in management and PBB. As a result, when the best practices and other applications in the world are considered, they concluded that we can be optimistic about the future of the PBB in Turkey.

Ciubotaru and Hincuy (2016) stated that the analysis of performance indicators shows the linkages between the policies, budgeting, and budgeting performance in compliance with European principles in this area.

Bogsnes (2016) believes that with the advancement of technology and the integration of other sciences, the evolution of the budgeting system seems vital. This requires applying a performance-based budgeting system with an integrated reporting approach. As a result, budgeting, one of the organization's management systems, is not the only way to allocate resources optimally. Still, in this system, employees, managers, stakeholders, the organizational environment, and various cultural, political and environmental factors play a role. They present a complex set to the decision-maker.

Mirzaei Nasirabad et al. (2021) showed that the cost of education and research services was calculated with a process approach. In addition to calculating the cost of school services, the cost of 384 processes was also calculated. The necessary suggestions on process management, cost reduction, and creating a performance-based budgeting system with an integrated reporting approach were also calculated.

Pourghaffar et al. (2022) by analyzing the data, 133 initial codes for timely performance-based budgeting were identified, 38 codes in the main categories of causal conditions, 35 codes in the context, 15 codes in the interventionist section, 4 central phenomenon codes, 21 codes in Strategies and 20 codes in consequences. Finally, based on the codes extracted from the interviews, a performance-based budgeting model with a real time reporting approach was presented using the grounded theory.

Pourghaffar et al. (2021) showed; In terms of environmental factors; Legal requirements, political acceptance and rules and regulations (transparency and accountability), reform of the structure and duties of the program and budget organization and attention to social and communication capital in terms of human factors; Motivational and managerial policies and organizational factors; Existence of a comprehensive database, infrastructure and information technology (such as organizational design and the existence of integrated systems with an integrated reporting approach) from the perspective of information technology, elimination of valueless activities, value- chain reform, optimal use of organizational resources from a process perspective and the establishment of strategic planning system, accounting and auditing system (management performance and from the point of view of performance planning and management, it is the main effective factors in establishing real time reporting performance-based budgeting.

Mirzaei Nasirabad et al. (2020) dealt with the documentation of 384 faculty processes with the BPMN2 approach using DPTSCO software. This applied research performed standard process timing using fuzzy logic and compared it with real-time and unused capacity calculation. Further, mechanizing standardized processes in the future provides the groundwork for implementing processes with an integrated approach.

Mehrani et al. (2018) reviewed the role of accountants in the performance-based budgeting system. The statistical tests on four indicators (including structure, rules and regulations, financial oversight and government management) showed that with the implementation of the new budgeting system, the necessary changes should be made in the role of the accountants of the executive organizations.

Daneshmand and Sanati (2016) presented new terms such as business process management, mobile devices, cloud computing, business intelligence, enterprise architecture, and organizational systems integration as the challenges of real-time reporting in accounting information systems.

In a comparative study of performance-based budgeting in Iran and Canada, Babajani and Osta (2015), due to the similar conditions of these two countries, consider the lack of relationship between strategic plans of organizations with performance-based budgeting, lack of a strong trustee to use this budgeting method, environmental and political factors, lack of strategy and systemic thinking and weakness in factors related to human resource systems as the main factors of non-use of performance-based budgeting.

Larry (2014) introduced business process management, cloud computing, mobile devices, business intelligence, and organizational systems integration as real-time reporting components.

Abbasi and Ahmadi (2012) examined the IT infrastructure for establishing performance-based budgeting. The results of their study indicated that the more IT infrastructure is developed, the easier the process of establishing performance-based budgeting will be.

Azar et al. (2010) pointed out that several factors are involved in successfully implementing performance-based budgeting, among which the scientific and technical capacity of employees and personnel to implement, information technology, supporting laws and regulations, and legislators' willingness to implement are more important.

Compared to previous studies, the main innovation in this research is using the structural equation method to explain 28 effective indicators of performance-based budgeting with an integrated reporting approach in Iran's public sector.

3. Research Methodology

This research is applied research in terms of its purpose, qualitative and quantitative research in terms of methodology, and descriptive and survey research in terms of data collection and analysis. The statistical population includes all experts related to planning and budgeting in the public sector and expert university professors. The determination sampling method is that 250 questionnaires were distributed among the community members and 64 questionnaires were analyzed due to the presence of complete information. Therefore, the data collection tool is a researcher-made questionnaire based on the model provided by Pourghaffar et al. (2021 and 2022) with a 5-point Likert scale. The current research includes 6 hypotheses. SPSS and PLS software and structural equation analysis were used to analyze the hypotheses.

It should be noted that the primary basis of this research is qualitative and the grounded theory method was used to collect data. The 28 variables extracted from the interviews conducted with

experts were the basis of the questionnaire design. In the second stage, after completing the questionnaires, using exploratory factor analysis, indicators affecting performance-based budgeting were identified with an integrated reporting approach. Finally, in this article, which is quantitative research, the structural equation test was used to explain the relationship between performance-based budgeting indicators and an integrated reporting approach in Iran's public sector. Therefore, 6 hypotheses were designed to test and explain the relationship between the observed and latent variables. Finally, this article used the structural equation method to explain the relationship between the indicators affecting performance-based budgeting and an integrated reporting approach. The 6 hypotheses have been designed according to the result of exploratory factor analysis with high weights of these factors. The 6 hypotheses selected for the test are based on the weights obtained from the exploratory factor analysis method. Therefore, it is necessary to formulate at least 6 hypotheses using the structural equations method to achieve the research objectives.

3.1 Hypotheses

1- Legal requirements with the approach of government administration in the private sector style are among the factors affecting integrated performance-based budgeting.

2- Paying attention to human capital and incentive policies are effective factors in performance-based budgeting on time.

3- Information technology infrastructures based on enterprise architecture and integrated systems are effective factors in integrated performance-based budgeting.

4- Process attitude and process management are effective factors in integrated performance-based budgeting.

5- A strategic planning system is one of the effective factors in integrated performance-based budgeting.

6- The accounting and auditing system of management performance is one of the factors affecting integrated performance-based budgeting.

4. Findings

To formulate the above hypotheses, the following concepts were identified according to the studies of [Pourghaffar et al. \(2021 and 2022\)](#) and formed the basis of the questionnaire questions.

Table 1. Performance-based budgeting factors with an integrated reporting approach

Sub-categories	Concepts	Sub-categories	Concepts	Sub-categories	Concepts	Sub-categories	Concepts
Enterprise Architecture	Preparing a customized integrated map for each device	Auditing and accounting system	Re-engineering of processes	Performance-based budgeting with an integrated reporting approach	Lack of financial audit system	Performance-based budgeting with an integrated reporting approach	integrated and automated performance-based budgeting
	Implementing enterprise architecture		Designing processes fitting duties		Lack of performance auditing		integrated performance management
	Using an adaptive architecture project		Documentation of business processes		Strengthening the public sector accrual accounting system		Expenditure real time management
	Preparing enterprise architecture map		Standardization of processes		Modeling based on modern public sector management		Real time cost
	The architecture of strategic plans		Allocating resources to processes		Organizational culture		Creating a unified data bank
Corporate governance programs	Preparing organizational map	Process-orientation	Changing hierarchical structure into a process-based structure	Managers' policies and attitudes	Observing the effects of optimal allocation on outputs	business intelligence	Establishing and strengthening IT-based auditing
	Eliminating valueless processes		Preparing modules appropriate to the processes		macro policies of the fifth plan		Generating real time information system
	Good governance		Using custom integrated modules for processes		Annual and long-term planning		Using cloud computing space
	Changing the performance-based budgeting process by the PBO		Using activity-based costing		Managers' belief in changing the current situation		Using mobile applications
	Increasing the accuracy of revenue identification and collection		Modifying value chain		Reforming accounting system		Automated and real time registrations
Organizational and group structure	Flexible management		Software problems in executive organs		Using real time systems		Moving towards the smart treasury
	The need for teamwork and multi-skilled people		Creating infrastructures and tools		Failure of the traditional bargaining system		Using business intelligence

	Using the participation of different specialities	Infrastructure and information technology and technical and communication problems	Modernizing reporting and budgeting	Systemic and strategic thought	Creating enterprise integration systems	
	Lack of support from program and budget experts		Modernizing tax systems	Considering available means	Creating a comprehensive treasury system	
	Lack of attention to training human resources		Centralized transparency system of other government revenues	Realistic attitude toward the establishment	Using integrated systems	
Human resources	Employing unmotivated people in the budget sections of the organs		Lack of intelligent systems for identifying government assets	Failure to set up a costing system	Systemic attitude	Preparing real time system maps
	Failure to use expert human resources		Lack of interaction between the man and subcategories			
	Lack of commitment and belief of employees in planning		Imposition of budget and development laws on performance budgeting	Formal attention to the costing system	Increasing the speed of organizations' response to environmental changes	
Monitoring	The weak monitoring role of program and budget	requirements	The emphasis of the Organization for Economic Cooperation and Development	Cost calculating	Lack of accounting relationship with the final cost	Transparency of the activities of organizations and reduction of corruption
	Lack of objectivity in operational supervision		Changing the approach of regulatory bodies to performance auditing			
	The superiority of financial auditing and compliance over performance auditing		Strict implementation of upstream laws and monitoring their implementation	Paying attention to the micro and macro levels of the organization		

The researchers designed a questionnaire according to the studies of [Pourghaffar et al. \(2021 and 2022\)](#) with 28 items to identify the key factors and provided them to the research population

according to the mentioned factors. The views of four respondents, who were experts, and the views of supervisors and consultants were used to evaluate the validity of the research questions. In the present study, Cronbach's alpha was calculated to determine the reliability of the questionnaire, and its value (0.859) was obtained. The closer the Cronbach's alpha index is to one, the greater the internal correlation between the questionnaires and, as a result, the more homogeneous the questions.

After the descriptive analysis of the data, the inferential analysis was conducted. In inferential analysis, research hypotheses are evaluated and tested.

4.1 Confirmatory factor analysis of research variables

Before performing any analysis on the collected data and statistical inference, the reliability and validity of the measurement tool must first be ensured. Cronbach's alpha test measured the reliability of the questionnaire. The test results showed that the questionnaire was reliable and accurate. There are various methods to assess the validity; the confirmatory factor analysis test has been used in this study. In performing factor analysis, it must be ensured that the available data can be contracted for analysis. In other words, is the number of data required for factor analysis appropriate? For this purpose, the KMO index and Bartlett test were used.

Table 2. KMO and Bartlett test for questionnaire questions

KMO test		0.670
	χ^2	760.855
Bartlett's test	Degree of freedom	378
	Sig	0.000

Based on these two tests, the data are suitable for factor analysis when the KMO index is more than (0.6) and close to one, and the sig Bartlett test is less than (0.05). The output of these tests is presented in the following tables.

According to Table 2, the value of the KMO index is 0.670 (more than 0.6), so the number of samples (number of respondents) is sufficient for factor analysis. Further, the sig value of the Bartlett test is less than 0.05, which indicates that factor analysis is appropriate to identify the structure of the factor model and the assumption that the correlation matrix is known is rejected.

In exploratory factor analysis, the principal component method is used to extract the factors, and the Varimax method is used to rotate the factors by Kaiser normalization. Their commonalities extraction is the criteria for deciding whether to survive or exclude questionnaire questions from factor analysis. Thus, if the value of the extracted share of each question is less than (0.5), we exclude that question from factor analysis. Further, the criterion for deciding on the classification of

questions is the specific values higher than (1) and the factor scores higher than (0.4). The results of the exploratory analysis test are shown in Tables (2) and (3). In order to show in which factor each questionnaire question is located, the most common factor of that question is specified with a different color in the exploratory factor analysis tables.

4.2 Exploratory factor analysis of the questionnaire

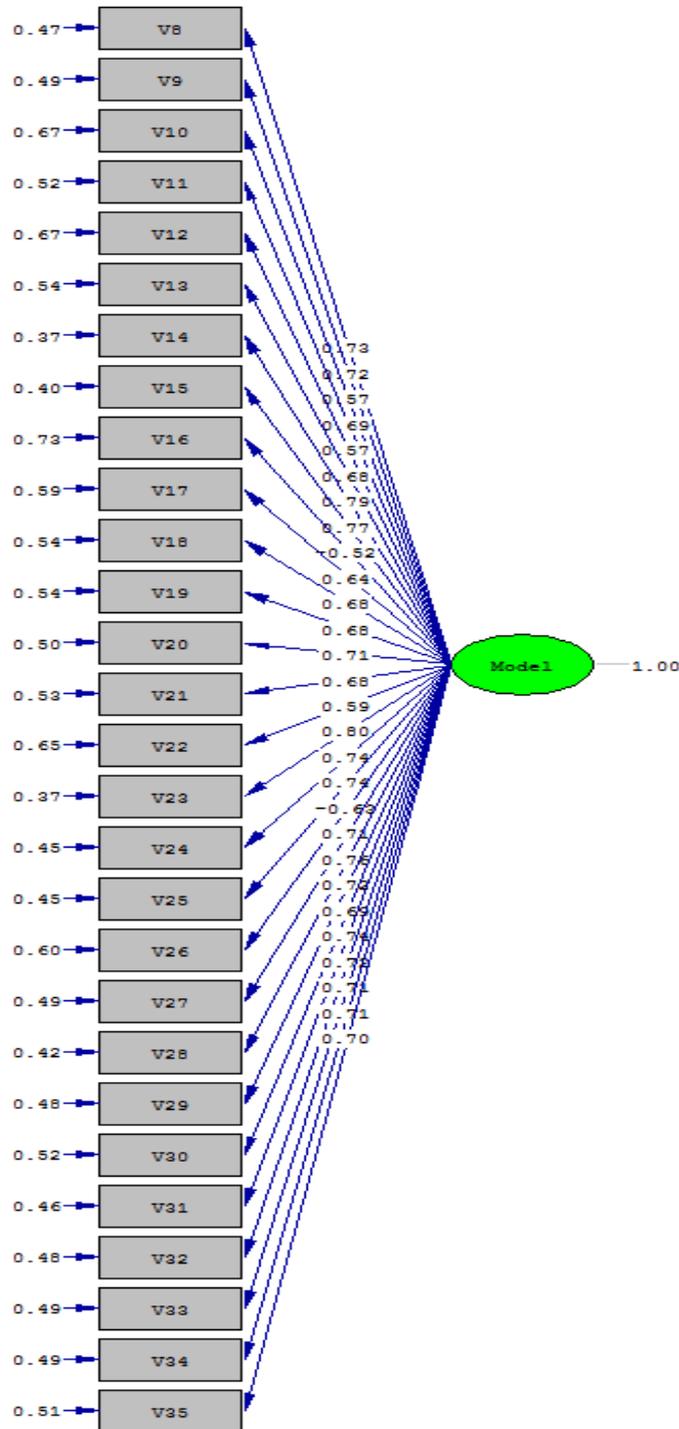
Table 3. Matrix of rotated factors with principal component analysis method and varimax rotation method with Questionnaire Kaiser normalization

Questions	1 st factor	2 nd factor	3 rd factor	4 th factor	5 th factor	6 th factor	Commonalities extraction
1	0.425	0.202	0.458	0.074	0.162	0.026	0.463
2	0.654	0.081	0.029	0.161	-0.075	0.126	0.482
3	0.461	-0.300	0.399	0.317	-0.011	0.131	0.580
4	0.516	0.098	0.466	-0.005	0.240	-0.170	0.579
5	0.189	-0.050	0.115	0.197	0.788	0.074	0.717
6	0.026	0.056	0.411	0.147	0.164	0.601	0.583
7	0.346	0.341	0.081	0.192	0.273	0.410	0.523
8	0.258	0.582	0.133	0.112	0.341	0.125	0.568
9	-0.094	0.411	0.018	-0.054	0.769	0.143	0.793
10	0.585	0.337	0.116	-0.040	0.130	-0.242	0.546
11	0.247	0.127	0.065	0.649	0.156	0.195	0.566
12	0.089	0.303	0.101	0.774	-0.128	0.067	0.730
13	0.026	0.342	0.233	0.715	0.236	-0.071	0.745
14	0.372	0.355	0.206	0.165	0.221	-0.200	0.423
15	0.035	-0.119	0.710	0.305	0.202	0.054	0.657
16	0.173	0.366	0.530	0.223	0.115	-0.168	0.536
17	0.236	0.798	0.012	0.189	0.013	0.061	0.731
18	0.505	0.397	0.075	0.176	0.053	0.208	0.495
19	0.244	0.062	0.065	0.027	0.089	0.784	0.691
20	0.561	-0.056	0.118	0.222	0.307	0.203	0.517
21	0.654	0.238	0.145	0.034	-0.123	0.352	0.645
22	0.703	0.273	0.099	0.102	0.196	0.029	0.628
23	0.680	0.138	0.051	-0.068	-0.127	0.453	0.710
24	0.107	0.250	0.729	-0.059	-0.193	0.181	0.679
25	0.110	0.525	-0.061	0.453	0.226	-0.067	0.553
26	0.111	0.058	0.774	-0.002	0.039	0.229	0.668
27	0.034	0.591	0.377	0.327	-0.096	0.054	0.612
28	0.264	0.574	0.123	0.172	0.029	0.178	0.477

According to Table 3, the extracted subscriptions for all questions are more than (0.5), and no questionnaire question should be left out. According to the table, six factors with a specific value higher than one have been extracted, and all questions related to this variable are included in these six factors. Further, concerning the factor loads of the questions, each question has the most factor in the predetermined factor. Thus, each question measures exactly the factor it was designed for, so the questions have the necessary validity.

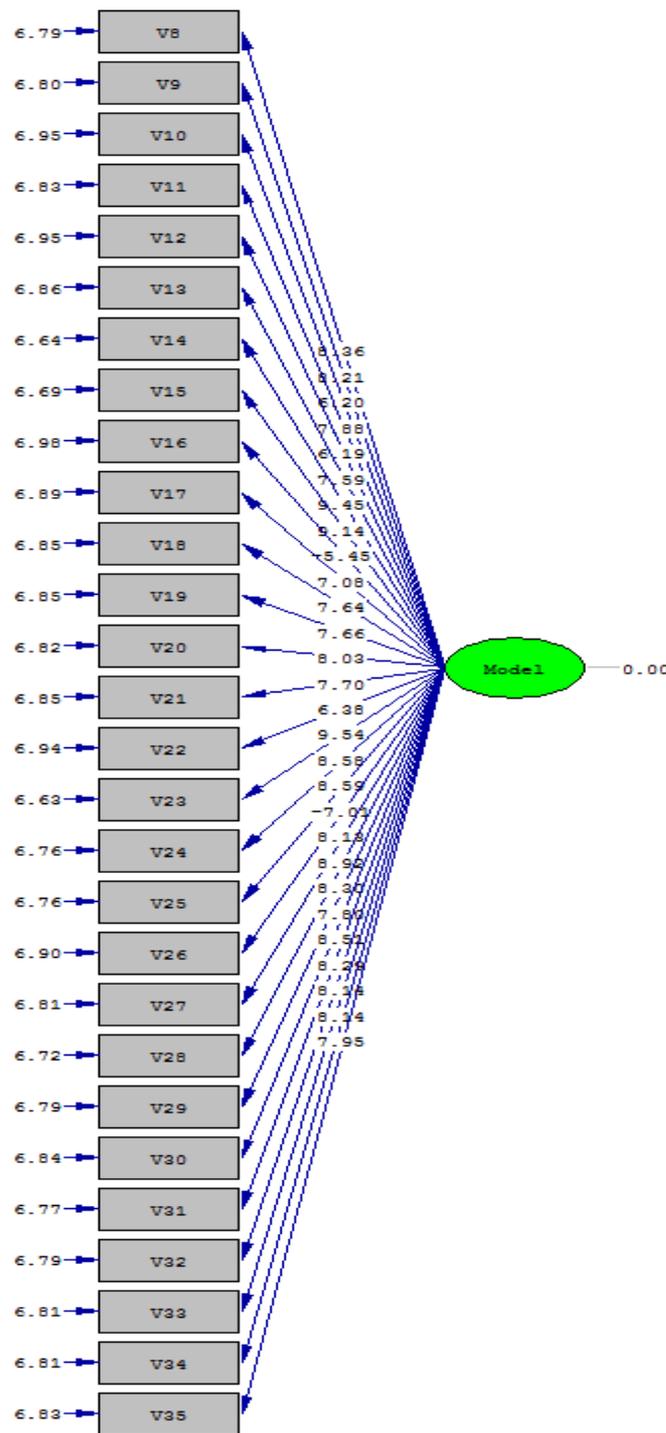
4.3 Measurement pattern

The diagrams in the following section show the model of the dimensions of factor analysis in a standard and meaningful way.



Chi-Square=875.25, df=350, P-value=0.00000, RMSEA=0.073

Figure 1. Model for measuring the dimensions of factor analysis using factor analysis in standard mode



Chi-Square=875.25, df=350, P-value=0.00000, RMSEA=0.073

Figure 2. Model for measuring the dimensions of factor analysis using factor analysis in a significance mode

4.4 Hypothesis testing using structured linear equations

After determining the measurement models to evaluate the research model, the research hypotheses were tested using the structural equation model. The test results of the hypotheses are reflected in the graph.

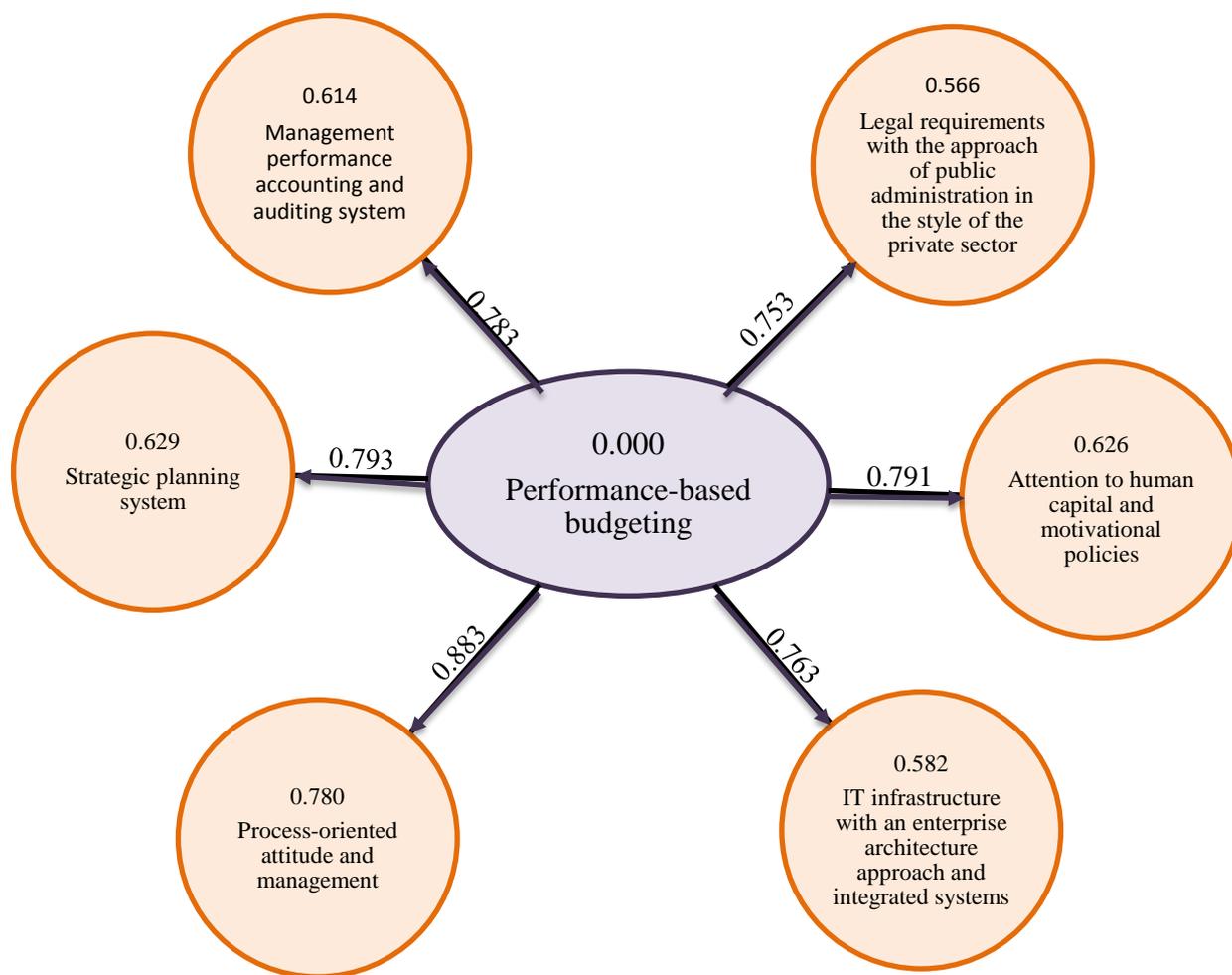


Figure 3. Measurement of the general model and the results of the hypotheses in the standard mode

4.5 Hypotheses reliability, validity and fitting

Cronbach's alpha and combined reliability were used to measure reliability, convergent validity was used to measure validity, and the GOF index was used to measure model fit:

Table 4. Cronbach's alpha coefficients

	AVE	Composite Reliability	Cronbach Alpha	GOF
Legal requirements with the approach of public administration in the style of the private sector	0.557	0.806	0.799	0.490
Strategic planning system	0.544	0.822	0.706	
Performance-based budgeting	0.593	0.918	0.908	
Attention to human capital and motivational policies	0.553	0.799	0.784	
Management performance accounting and auditing system	0.578	0.781	0.721	
IT infrastructure with an enterprise architecture approach and integrated systems	0.578	0.818	0.719	
Process-oriented attitude and management	0.514	0.773	0.730	

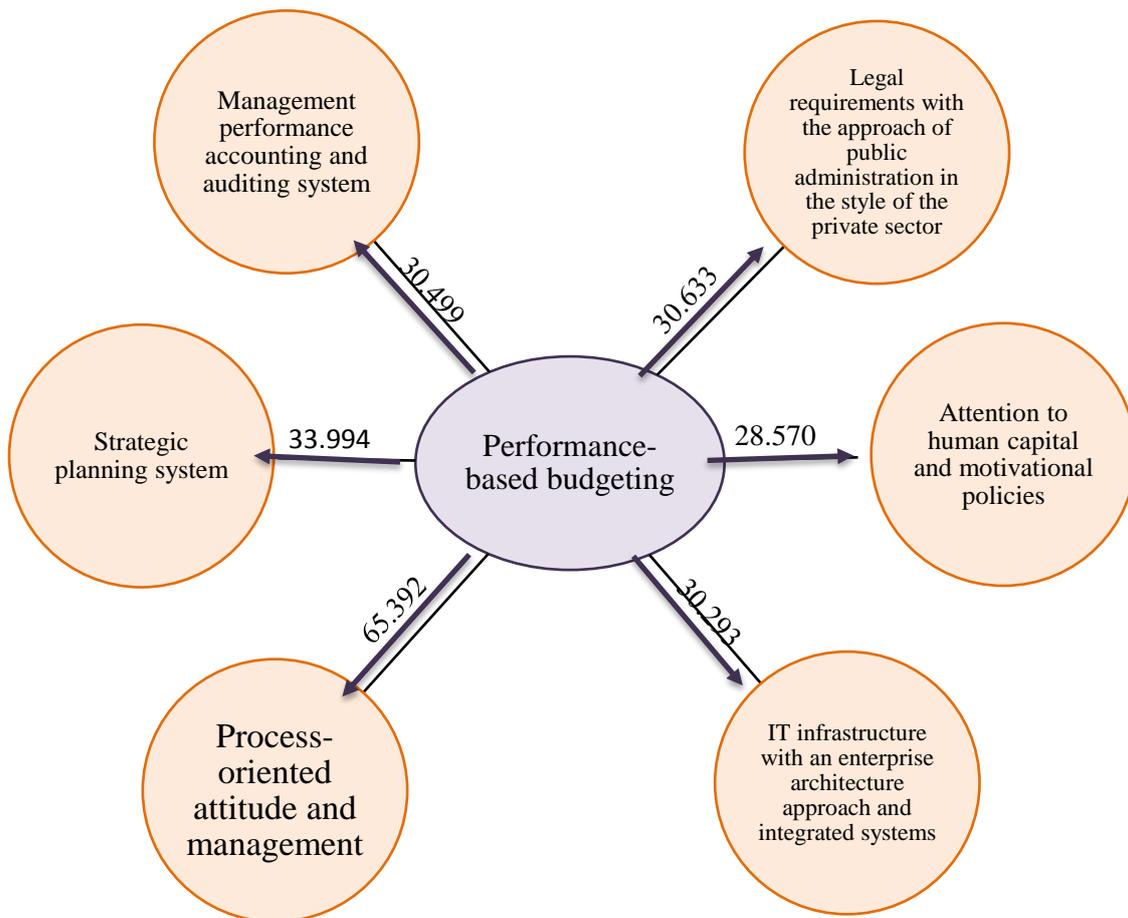


Figure 4. Measurement of the general model and the results of the hypotheses in a significance mode

- A Cronbach's alpha value above 0.7 indicates acceptable reliability.
- If the CR value for each structure is above 0.7, it indicates the appropriate internal stability for the measurement model.
- A value of AVE above 0.5 indicates acceptable convergent validity.
- Considering the three values of 0.01, 0.25 and 0.36 as weak, medium and strong for GOF, the result of 0.49 indicates a strong fit of the model.

The following table summarizes the significance coefficient and the results of the hypotheses.

Table 5. Results of hypotheses

Hypothesis	Result
1- Legal requirements with the approach of government administration in the private sector style are among the factors affecting integrated performance-based budgeting.	Confirmed
2- Paying attention to human capital and incentive policies are effective factors in performance-based budgeting on time.	Confirmed
3- Information technology infrastructures based on enterprise architecture and integrated systems are effective factors in integrated performance-based budgeting.	Confirmed
4- Process attitude and process management are effective factors in integrated performance-based budgeting.	Confirmed
5- A strategic planning system is one of the effective factors in integrated performance-based budgeting.	Confirmed
6- The accounting and auditing system of management performance is one of the factors affecting integrated performance-based budgeting.	Confirmed

1. Hypothesis No. 1 of the study claimed that legal requirements with the approach of public administration in the style of the private sector are one of the factors affecting integrated performance-based budgeting. Statistical analysis shows that according to Table 5, the significance of the path between the two variables is greater than 1.96, so this hypothesis is confirmed. On the other hand, because the significant number obtained is positive, this effect is direct.

2. Hypothesis 2 of the study claimed that attention to human capital and incentive policies affect integrated performance-based budgeting. According to Table 5, the statistical analysis shows a significant path between the two variables is greater than 1.96. Hence this hypothesis is confirmed. On the other hand, because the significant number obtained is positive, this effect is direct.

3. Hypothesis No. 3 of the study claimed that information technology infrastructure with an enterprise architecture approach and integrated systems is one of the factors affecting integrated performance-based budgeting. The statistical analysis, Table 5, shows that the significant number of paths between the two variables is greater than 1.96, confirming this hypothesis. On the other hand, because the significant number obtained is positive, this effect is direct.

4. Hypothesis No. 4 of the study claimed that process attitude and process management affect integrated performance-based budgeting. The statistical analysis shows that according to Table 5, a significant number of paths between the two variables is greater than 1.96; hence this hypothesis is confirmed. On the other hand, because the significant number obtained is positive, this effect is direct.

5. In Hypothesis No. 5 of the study, it was claimed that the strategic planning system is one of the factors affecting integrated performance-based budgeting. The statistical analysis shows that according to Table 5, a significant number of paths between the two variables is greater than 1.96; hence this hypothesis is confirmed. On the other hand, because the significant number obtained is positive, this effect is direct.

6. Hypothesis No. 6 of the study claimed that the accounting and auditing system of management performance is one of the factors affecting integrated performance-based budgeting. The statistical analysis shows that according to Table 5, a significant number of paths between the two variables is greater than 1.96; hence this hypothesis is confirmed. On the other hand, because the significant number obtained is positive, this effect is direct.

5. Conclusion

A performance-based budgeting system as a subsystem of management system for results seeks to prioritize government expenditures optimally and improve the effectiveness and efficiency of budgetary resources by strengthening the link between executive organizations' credits and performance. According to the International Monetary Fund, performance-based budgeting refers to the methods and mechanisms that strengthen the link between credit allocated to executive organizations and their outputs and outcomes through performance information in resource allocation. In other words, the performance-based budgeting system uses financial performance information (cost of activities and services) and non-financial performance information (performance indicators of programs and activities) to link budget and results. The results of this research are consistent with the findings of Belfo and Trigo (2013), Daneshmand and Sanati (2016), and Larry (2014). A strategic management system and attention to managing organizational processes and mechanizing them with the organizational architecture approach are effective factors in timely performance budgeting, leading to a reliable platform for establishing performance-based budgeting. In this paper, using the grounded theory, 28 determinants of performance based-budgeting on the integrated reporting have been extracted as a qualitative. Then the structural equation modeling method was applied to estimate the relationship between 28 observed and latent

variables (performance-based Budgeting on the Integrated Reporting Approach) as a quantitative.

Paying attention to human capital and incentive policies is another important factor in establishing performance-based budgeting by monitoring resources and expenditures and guiding them to achieve efficiency and effectiveness. According to studies and expert opinions, comprehensive databases should be designed and used to prepare performance-based budgets so that resources and expenditures can be controlled and thus monitored; one of the integrated financial systems relies on preparing organizational plans and organizational architecture. The following important factor that should be considered with comprehensive information systems is the attention to information technology infrastructure, which is the role of cloud computing. Further, the development of IT-based tools such as business intelligence and mobile devices should be considered to establish performance-based budgeting. In this regard, value-added activities and value chain modification should be identified if necessary. Legal requirements with the approach of public administration in the style of the private sector are one of the effective factors that have emphasized the country's laws as follows in the field of establishing performance-based budgeting with an integrated reporting approach:

- the circular of electronic government and emphasis on enterprise architecture
- General policies of the administrative system announced by the Supreme Leader and emphasis on streamlining and smartening processes
- Paragraph C of Article 7 of the Law on the Sixth Five-Year Development Plan
- Executive instructions for performance-based budgeting attached to the annual budget directives
- Executive regulations for the realization of e-government approved by the Supreme Administrative Council
- Regulations of Article 16 of the Civil Service Law and paragraph C of Note 19 of 2021/1400 Budget Circular

Laws should also be codified in order to value social capital, including the important role of human beings in the budget process and communication conditions, which requires the motivational policies of managers instead of punitive policies, and managers should provide the necessary conditions to encourage subordinates. However, it is noteworthy to pay attention to the accounting and auditing system in the current situation of Iran, which is one of the factors affecting government management in the style of the private sector and the establishment of performance-based budgeting, implementation and establishment of accrual accounting and performance-based auditing. Accrual accounting is the basis for determining the cost of activities in the public sector. Moreover, the performance-based auditing system provides the ground for better establishing a performance-based budgeting system, emphasizing outcomes and outputs instead of inputs.

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