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Conceptual Framework for Determinants of Cloud Zero-Based Budgeting Adoption: The Moderating
Role of Government Intervention Policies

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Abstract

Public administration reform was a central element of the response to the crisis of recent years and remains an essential part of building future. Therefore, attainment of economic prosperity was the main goal for all governments. This study aims to provide a conceptual framework that clarify the determinants of cloud zero-based budgeting adoption with the moderating role of government intervention policies. The conceptual framework of this study is constructed based on the previous related theories debate. Contrary to the previous proposed conceptual frameworks, this study investigates factors that may vary within the cloud zero budgeting, besides highlighting the intervention role of the government policies.

Keywords: technological factors, organizational factors, environmental factors, government intervention policies, cloud computing, zero budgeting

1. Introduction

Public administration reform was a central element of the response to the crisis of recent years and remains an essential part of building future. therefore, attainment economic prosperity was the main goal for all governments (Krause, 2015). Public administration reform can be divided into four main areas: civil service reform, which deals with public sector human resources, such as productivity, wages, and benefits. Improving the efficiency and responsiveness of the policy-making system (Zankina, 2020). Reform of the governance mechanism dealing with the laws, institutions and governance structure needed for the implementation of government policies, including new public administration technology as well as the reform of the revenue and expenditure management system in the public sector (UNDP, 2004).

Thomas (2005) suggested a standard formula as a guideline for achieving successful public administration reform. The formula was result-oriented rather than process-oriented. This guideline has also been used to achieve tremendous success in reforming the public administrative sector in New Zealand, owing to transparency,

structures with stated government goals, contestability, the enhancement of accountability, avoidance of capture, congruence of bureaucratic incentives, and the cost-effective use of information (Alam, 2006). According to Sicilia & Steccolini (2017), "Budget is a financial plan of government for a definite period". The planning process for the assessment of revenue and expenditure is referred to as public budget (Khan & Hildreth, 2002).

Earlier studies have shown that the budgeting systems have undergone modern reforms in recent years (Shah, 2007). This could be as a result of the increased need for enhance budget efficiency, performance, and accountability, which has led to a change in budget focused on expenditure and modified cash, to a novel approach that deals on performance, and costs (Lubis et al., 2014; Steger, 2013). Despite this recent trend, the different ways of applying result-oriented budgeting systems are largely dependent on the country's fiscal policies. Thus, governments are increasingly aiming at reforming their existing budget systems, even though there are several challenges that could hinder the acceptability and implementation of such budgeting system (Elizabeth, 2010). According to Carlitz (2013), transparency is one of the main characteristics of an efficient budget system. This has been shown as result of proper spending and development over the last decades. Traditional budgetary method has been shown to be unsuitable in concluding the outcome of the cost, based on the view of results delivered by the public (İpek, 2018). Therefore, modern day budgetary methods become indispensable as they create room for evaluating the position of project results (İpek, 2018). Furthermore, Traditional budgeting model known as (line-item budgeting) which depends on the adoption of expenditure without any consideration or emphasis on the calculation of inputs and impacts resulting therefrom, and on the consequent shortcomings in accountability for effectiveness and productivity in execution, does not provide the executive management with adequate flexibility and power to take advantage of it (Solabomi, 2017).

It was obvious from the start of the reform initiative that the zero-based budget which was set up in the early 1970s, was at the time considered a reform tool (Pyhrr & Corporation, 1977). This modern form of budgeting is intended to shift focus away from incremental budgeting (Shea, 2018). Zero-based budget is a method of organizational planning and budgeting that allows managers to justify their entire budget request in detail from scratch (Sherlekar & Dean, 1980). Therefore, the introduction of zero-based budgeting, which also relates to the need to improve efficiency at the level of government ministries and agencies with a view to increasing revenue generation capacity, is essential to modernize the preparation of the budget in order to achieve the rationalization of public spending and to achieve the desired objectives (Eghe, 2015).

According to the financial law (8) of 1990, the Yemeni government practices a planned budgeting base, which is defined by the financial law (8) as "Comprehensive tables of all revenues assessed to be collected and all expected expenditures to be spent during a financial year. Starting from the year 1990 to 2018, the Yemeni government continued relying on the planned budgeting base to support the country growth and development. Just like many developing countries, Yemen has also undertaken public sector reforms that is also targeted at reforming the budgetary system. Specifically, the Yemeni public sector reform is targeted at implementing and restructuring in four major areas which includes public administration strengthening, budget and financial management reform, public expenditure rationalization, and revenue mobilization and administration (World Bank, 2015). Recommendations adopted from the Yemen Policy Note series report asserted that for the reform to be acceptable, the budget integrity must be considered. It is important to ensure that the basic and necessary controls are all in place to avoid fiscal leakages, to win over and maintain the confidence among pertinent stakeholders and to make effective use of limited resources.

Under the assumption that expenditure precedence will firstly be placed on payments of public servant stipends, thereby obtaining the genuine payroll data and controls will be vital. Commitment to and delivery on fiscal transparency will play an important role in trust and confidence-building measure. Timely release of reliable data about the budget and its prosecution (firstly) will help open doors for public discussion. It will also enable accountability over the distribution and use of public resources for citizens and developmental associates alike.

2. Public Budgeting in Yemen

Yemen's attempts to establish a comprehensive public budgeting system began in the late 1990s with a series of uncoordinated initiatives. They were mainly funded by donors and discussed urgent problems in budget planning, budget implementation, monitoring, and auditing. The idea of introducing an FMIS was discussed in the early

2000s, and a conceptual design was implemented in 2005. The 2005 Action Plan, which covered the years 2005-2008, was largely focused on FMIS implementation planning (Lepain, 2014).

The Plan suffered from a number of weaknesses which explains its failure to substantially improve PFM functions. It was not based on a proper PFM diagnostic and failed to address the issue of budget credibility. For that reason, it did not address such issues as budget integration, fiscal policy coordination, or the decentralization of budget execution functions. Finally, it was not based on a strategic vision of how a PFM system could be developed in Yemen or reform prioritization, this approach did not take stock of the immaturity of the budget preparation process. The same is true of the budget execution module which was developed without proper business process re-engineering, resulting in the multiple rounds of system revision which account for high development costs and the low level of user acceptance. As a consequence, the 2005 Action Plan had limited impact and did not offer a well-accepted framework for donor intervention (the World Bank, 2010).

Overall, there are four main phases in the public budgeting process: preparation and negotiation, approval, implementation and budgetary control. In accordance with Law No. (8) of 1991, Law No. 4 of 2000, its rules of procedure and the guidelines laid down by the MOF on the planning and execution of the budget each year, the design of the budget period in Yemen is carried out (Region & Unit, 2000). Due to the protests of the PFM Modernization Programme, which claimed that any reform in budget execution should be done according to the AFMIS Implementation Plan, “Streamlining Budget Execution” was dropped as an independent aspect (Lepain, 2014).

According to Othman (2015), the preparation, drafting, and approval of the Public Budget can be divided into three stages, which are as follows:

1) The preparation stage, which runs from January to June, includes compiling and preparing economic indicators, Prepare the budget's overall mid-term economic structure, a draft financial plan, and the entire budget cap. A Higher Committee on Budget is being established. Establish a Budgeting Technical Committee. Approval of the overall strategy as well as the tentative budget ceilings to remind units of their agreed indicative ceilings, a budget request circular is being prepared. Chapter One's budget circular is being prepared salaries & wages, establish committees to develop projected budget plans.

2) Preparation for the drafting stage takes place from June to October, and includes: Budget plans for central authority units are being prepared. Budget proposals for central units to be sent to the Ministry of Finance, Budget plans for central units are being discussed with the Ministry of Finance, Budget plans for local units are sent to the MoLA and MoF for revision and to ensure consistency and conformity with relevant standards and instructions, The Ministry of Finance would compile and incorporate the budgets of central and local units into a single document, The budget technical committee presents the Minister of Finance with the final draft of the general budget, sending a budget request for approval to the Budget Higher Committee, presenting a budget request to the Cabinet for approval and discussion, Referring a budget request to the House of Representatives.

3) Endorsement stage (November – December): presenting the public financial statement to parliament at a plenary session in the presence of the Prime Minister and Cabinet members, establish a special committee to review the financial statement and budget proposal completing the Special Committee Report and presenting it to Parliament in a plenary meeting with the Prime Minister and Cabinet members, in compliance with the Constitution, voting on the General Budget plan chapter by chapter. The President of the Republic is authorized to enact legislation concerning budget linking as well as other public budgets.

The budget process necessarily requires policy input both at the beginning, in the form of cabinet-approved sector ceilings, and at the end, in the form of parliamentary debate. Before the beginning of the fiscal year, the executive completes its budget submissions after allowing for two and a half months of budget planning by the line ministries and a full negotiation process. The appropriations are approved by Parliament before the beginning of the fiscal year after the budget measures have been submitted for debate over a two-month period. The budget documents are extensive and address many of the criteria for both effective budgetary supervision and proper implementation guidance. However, parliamentary guidelines are not transparently implemented into the budget, and greater transparency would be accomplished if the approved budget, which represents parliamentary recommendations, were also included in the budget document (World Bank, 2010).

3. Technology, Organization, and Environment (TOE) theory

According to Tornatzky and Fleischer (1990), there are three aspects of the company's context that affect the process by which it adopts and implements innovation: the technological context, the organizational context and the environmental context. The technological context defines all internal and external technologies relevant to the company. It involves current practices within the organization. Organizational context refers to the organization's descriptive indicators, such as scope, size and organizational structure. Environmental context is the arena in which the company operates its business, its industry, its competitors, and its interactions with the government.

4. Innovation of Diffusion Theory

The diffusion of innovation theory interprets how the innovations are taken up into the society. According to innovation resistance theory, the reason that users avoid innovation is because of the difficulties caused by change and the conflicts brought about by innovation. Such barriers can be broken down into functional barriers and psychological barriers. Usage barrier, the value barrier and the risk barrier are part of the functional barrier. Traditional barrier and image barrier are part of the psychological barrier (Sheth, 1989).

Although, The Innovation Diffusion Theory (IDT) was formulated by Rogers (1983) to explain why innovation is important, how innovation can take place, and how innovation can be spread across the population. Rogers defined the diffusion of innovation as a process in which innovation is communicated over time among members of the community through certain channels. The diffusion system is thus based on four main elements: innovation attributes, channels of communication, time and social systems. The innovation decision-making process involves five main phases including knowledge persuasion, decision-making, implementation and confirmation. The level of decision of the potential user to embrace or reject innovation is based on the perception of the attributes of innovation. Rogers identified five essential features of innovation that could influence individual attitudes of adoption including such Testability, Observability, Relative advantage, complexity and compatibility IDT was criticized for not considering the impact of external factors in the decision-making process to implement the innovation (Nehemiah et al., 2017; Mandari, 2017).

5. Public administration reform

More attention has been paid globally to administrative reform. This has been demonstrated in a variety of ways and raises theoretical questions. Depends on the context, the issues have been tackled through various approaches and models (Muhammad Azizuddin, 2000). Public administration reforms have shown that public administration capacity development needs to be addressed at three levels: individual, institutional and societal. PAR can therefore be divided into four main areas: civil service reform, improving the productivity and responsiveness of the policy-making mechanism, reforming the governance machinery dealing with the laws, structures and governance framework required for the implementation of government policies, including new tools for public administration such as e-government and e-government, and expenditure management system (UNDP, 2004).

Therefore, theoretic proposals for administrative reform should also be considered Closely linked to the geography, structures, history and culture of a particular nation state. This will facilitate the better implementation of the reform programs. In order to ensure that the institutions and actions of citizens, it is critical that administrative reform efforts should be 'tailor-made' with a 'strong base for nationalism (Olsen, 2004).

Public Administration Reform can be very comprehensive and include process changes in areas such as organizational structures, decentralization, personnel management, public finance, results-based management, regulatory reforms etc. It can also refer to targeted areas such as organizational structures, decentralization, personnel management, public finance, results-based management, regulatory reforms etc. It can also refer to targeted reforms such as the revision of the civil service statute. (UNDP, 2004).

Philippe (2004) asserts that some of the favorite expressions in modern administrative reform over the past 15 years throughout the world are: user access to administrative documents, quality circles, service projects, centres of responsibility, simplification of procedures, efficiency and productivity, contracting out services and openness (Al-assad, 2013). The major goal of administrative reform is to improve the level of organizational effectiveness of the organization or organizations concerned (Caiden, 1976).

Public financial management reforms PFMR can be defined as a spirit of change aimed at raising financial

awareness of decision-making in the public sector and thus an integral part of the greater reform of the public service (Alkaraan, 2018). The reform of public financial management includes Budgeting system reform, reform of public sector accounting and reform of the auditing system (Ouda & Cairo, 2016). As part of the World Bank and International Monetary Fund packages for economic growth, public sector financial reforms have been implemented in emerging economies in the expectation that implementing more stable financial policies would lead to economic development and eliminate budget deficits (Hopper, 2004).

6. Public budgeting system reform

The reform of the public budgeting system has been defined on the basis of the following criteria: for the medium term and beyond, a stable, sustainable fiscal position should be established. The budget should facilitate the shift of resources to more efficient, higher priority uses. In order to operate efficiently, the budget should promote spending units. The budget should be open to citizens' interests and responsive to them. The budget should ensure transparency in tandem with other financial management strategies for the spending of public funds. Moving from an input based (line-item) budgeting toward an output-based budgeting (Schick, 2004).

Virtually, for the purposes of planning and control, there are four main kinds of budgeting classifications used by every organization's management. That include fixed budgeting, flexible budgeting, and incremental or zero-based budgeting. The classification includes a further type that can be shown in the figure below (Isaac et al., 2015).

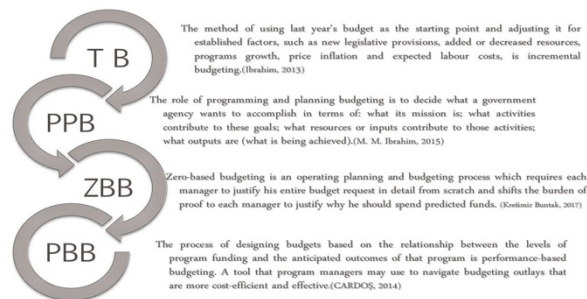


Figure 1: Types of Budgeting

Reform of the public budget; improve the level of development priorities and the basis for decision-making related to the budget; develop and improve procedures for the implementation of the budget; and develop modern public financial management information systems to support the accounting and reporting process (Abdulla mohamed hamoud al-tholaya, 2013).

Recent literature suggests that budget reforms require improvements in the way and method in which the budget is formulated, executed and evaluated in order to enable productivity, efficiency and economy, thus, budget reforms must have a significant impact on the quality of budget management, otherwise they would be unnecessary. The reforms mentioned above reflected both the four phases of the budget cycle (formulation, implementation, execution and evaluation) and the five essential elements of budget management are efficiency effectiveness, discipline transparency and accountability (Ben-Caleb Egbide, 2014). Krause & Philipp (2015) examine the contingent effect of organizational reforms on budgetary adjustments using evidence of 19 years of central government expenditure in Chile. They found that without the new fiscal institutions, the capacity of the Chilean budget office to reallocate depended very strongly on the fiscal environment Second, there is a positive effect of the institutional change on the magnitude of the budgetary changes and on the assumption of allocative. Fourth, Chilean administrative reforms seem to eliminate much of the impact of spending increases on re-allocations. Consequently, public budget reform should be geared towards achieving three objectives: fiscal discipline, allocative efficiency and operational efficiency. Additionally, to that, Egbide et al, (2014) conclude that budget reforms (MTEF and FRA) have not had a significant impact on the quality of budget management (BDISC and FDISC) in Nigeria. however, it was recommended that the government provide leadership and political strength, not only to implement the provisions of the FRA, MTEF and other reforms but also to punish those who are low-circuiting the system to their advantage.

This will go a long way towards enhancing adherence with the reforms and achieving the anticipated improvement in the quality of the nation's budget management.

In other words, reforms are not just intended to enhance fiscal discipline. Another important priority is how to tackle incrementalism and increase allocative efficiency by enhancing the ability of governments to reallocate funds. Much consideration has thus far been given to the impact of institutional reforms on fiscal discipline, but much less to the relationship between institutional change and budget reallocation and surrogate allocation efficiency.

7. Zero based budgeting system

Zero-based budgeting (ZBB) is a technique of budgeting that will justify and authorize all expenses for each new cycle, evaluate the needs and costs of each task within the organization and allocate funds accordingly, irrespective of how much money has previously been budgeted for any particular line item (Pyhrr, 1977). ZBB is a method of organizational planning and budgeting that allows managers to justify their entire budget request in detail from scratch (Sherlekar & Dean, 1980). Therefore, ZBB is a management tool that offers a systematic method for assessing all existing or new operations and initiatives, allows for rational budget reductions and expansions, and allows sources from low to high priority programs to be re-allocated.

The Zero-based budgeting is a budgeting system introduced in the early 1970s by Peter H. Pyhrr.; it was considered at that time as a tool for reform. It was developed at Texas Instruments Inc. during 1969. The process was first adopted in government by Governor Jimmy Carter of Georgia during 1969 (Cowen & Bezick, 1979). Zero Based Budgeting is, according to Kleiner (1977), a management-oriented approach that can be used to strengthen planning, budgeting and organizational decision-making. In addition, it has been described as a planning and budgeting process that requires the manager to justify his entire budget request in detail in scratch form (hence zero-base) and transfers the burden of evidence to each manager to justify why he should spend any money at all. All activities must be analysed in 'decision packets,' which are assessed and rated in order of priority through systematic analysis (Pearson & Michael, 1981). Mukdad Ibrahim (2019) highlighted some steps on the design of zero-based budgeting for public organizations. presented a summary of the principles of zero-based budgeting and a brief comparative analysis.

The primary objective of zero-based budgeting is to reduce the budgetary allocation of public programs efficiently, without loss of quantity and quality of services provided (North-West, 2016). In addition, the effective distribution of limited resources among the different objectives and the definition, evaluation and justification of all planned activities, as well as the alternative strategy for meeting the objectives (Kleiner, 1977). Zero-based budgeting strategic goals are to plan carefully before the budget itself is formulated and to increase the participation of low-level managers in the state's budgetary system. Mukor (2013) and Nnoli, Adeyemi, & Onuora (2016) claimed that ZBB appears to be performance-driven able to detect redundant programs and staff suggesting either realignment, discharge, transfer or redeployment of projects or resources.

In addition to moving the emphasis to future success rather than past failures, (Goodwin, 1970) pointed out that the significant reasons for shifting from traditional budgeting to zero-based budgeting are to make the budgeting process more comprehensive in nature and in practice, to consider the budget as a whole, each item competing for funding with all other items, to inject rational decision making into the budget process, and to eliminate political influence from the budget Process, and use measurement unit, where possible, to explain the amount of expenditure. According to a study conducted by Boyd (1980), The objective was to review the findings of various empirical studies concerned with the applicability of zero-base budgeting in the public sector. The analysis emphasized the need for a rational and structured approach to the problems of budgeting. Political factors also outweigh the factors arising from the cost justification strategy Standardization of forms and documents is required for the assessment, comparison and ranking criteria in light of zero-based budgeting approach. The study was carried out by Almakura (2010) Investigated zero-based budget (ZBB) as a means of effectively controlling government spending while achieving the maximum cost savings needed to carry out the projects. It outlined the benefits and disadvantages of such a budgetary process by dispelling myth and unravelling the disputes surrounding its implementation. It also highlighted the persuasive reasons for the change from traditional budgeting to zero-based budgeting in Nigeria in order to thrive in this rapidly changing period, a new approach to governance, transparency, visibility and efficiency must be developed within the scope of its budgeting process.

Shea (2018) assessed the usefulness of the ZBB procedures, the approach used was qualitative consisting of interviews and a document review. The expenditure analysis was empirical by necessity. The results backed the recommendation on the viability and compatibility of the ZBB approaches for Albuquerque's existing budgeting process. In addition to the benefits of zero-based budgeting, there are also drawbacks, while more traditional budgeting systems such as instrumentalism and programming planning budgeting systems (PPBS) have seen continued popularity and resilience as budgeting systems, zero-based budgeting (ZBB) has regained popularity as governments and public organizations seek to control wasteful spending within their departments. Goodwin (1970) asserted that zero-based budgeting and performance budgeting have several aspects in common. Every system depends heavily on the work measurement units, trying to maximize the working efficiency of the operating units. In addition, performance budgeting focuses on the classification of objects, while zero-based budgeting uses the classification of objects transformed into work measurement units to justify a plan from the ground up. Additionally, performance budgeting usually results in an incremental approach to many of the expenditures and, as a result, is not as comprehensive as zero-based budgeting. Performance budgeting requires very little "why" spending, while zero-based budgeting allows concerted efforts in this direction. Williams et al., (1985) analyzed management expectations of 28 ZBB implementation variables for MBO users and non-MBO users. Results from both univariate and multivariate tests suggested that the implementation of ZBB has not been facilitated by the existence of an MBO program for either lower-level management or upper-level management of ZBB design implementation issues, with the emphasis on matching compatible systemic properties between information subsystems. ZBB design implementation concerns need to be thoroughly re-assessed, with a focus on matching compatible structural properties between information subsystems. McGill (2001) conducted a comparative analysis for given the key difference between zero-based budgeting and performance-based budgeting. Concluded that while zero-based budgeting is carried out by justifying both revenues and expenditures for the accounting period, performance budgeting takes into account inputs and outputs per unit for the purpose of efficient allocation of resources. Zero-based budgeting helps to reduce costs and improve performance by planning costs and revenue for each financial year. Performance budgeting focuses on the efficient allocation of resources zero based budgeting is flexible in response to market changes with careful planning of each expected result, and performance budgeting is commonly used in contexts where the efficient allocation of scarce resources is essential.

Ibrahim Mukdad (2013) provided a comprehensive discussion of the four major budgetary approaches beginning with line-item budgeting, program and output budgeting, programming of the budgeting process and zero-base budgeting pursued a better understanding and experience of each and every approach to budgeting. The study gives strong argument that the solution to any budget problem depends on the nature of the company involved and would therefore require a thorough assessment of its operating environment before it can be enforced. Beredugo et al., (2019) focused on a comparative analysis of zero-based budgeting and incremental government budgeting techniques in Nigeria. Incremental budgeting implementations in Nigeria have seen a variety of wasteful budget expenses that have no rationale or justification. The research examined whether there is a significant difference between the implementation of zero-based budgeting and incremental budgeting methods, the allocation of resources, among others. Two theories were tested using variance analysis and an independent t-test, and it was found that there was a significant difference between them, except for innovative means reducing costs associated with the budget; whereas there are no significant differences between zero-based and incremental budgeting techniques for government performance, it was also recommended that budgeting employees be properly trained in the potential budgetary process to save time and cost. Costs incurred on zero-based techniques should be reduced to be used for economic development rather than for the budgetary procedure.

Recently, certain studies have established factors that are likely to lead to successful application or might be inherent when public organizations are being presented with the concept of zero-based budgeting. The goal of research conducted by Gordon et al., (1984), was to establish specific strategies that could be used to facilitate the implementation of the Zero-Base Budgeting (ZBB) Information System. The findings of the empirical study suggested that organizations could use such strategies to reduce the likelihood of inadequate application of the ZBB as a result of information processing requirements that exceed the efficiency of information processing, for instance; The time frame surrounding the budgeting process could be extended, the budgeting personnel could be increased, incentives could be offered, use standard operating procedures and training efforts.

Chen (1980) cited by Hodlofski (2003) identified nine major factors necessary for the successful implementation of the ZBB. Briefly, have a thorough knowledge of the organization, horizontal and vertical

communication between managers and staff, linking current organizational objectives and objectives to long-term planning, a clear need for the implementation of the ZBB, systematic and well developed procedures designed to meet specific needs, extensive training opportunities for all managers, strong management involvement and commitment, Allocate adequate time and Consider the human factor. Mustapha Ibrahim et al., (2008) demonstrated that Zero-Based Budgeting (ZBB) is seen as an effort to rationally control the size and scope of the government, as well as to address the inflation of the world economy, began to slow down even as government programs increased as a result of fiscal crisis, and the purpose of this study was therefore to ascertain whether the perceived benefits of Zero-Based Budgeting would have a significant impact on the economy. A stratified sampling technique has been used to arrive at a sample. Binary logistic regression was used to predict whether the predictor variable, i.e. perceived benefits, would have significant or no influence on the dependent variable, i.e. the adoption of ZBB. The findings of the study showed that ZBB can be adopted in Brunei State because it would be politically feasible, as well as the perceived benefits are statistically significantly related to the implementation of ZBB in the State. The introduction of administrative reforms and the prioritization of public expenditure projects on the basis of the fundamental principle of the ZBB system is essential.

Mustapha Ibrahim (2017) pointed out that, due to the economic recession encountered in Nigeria and the inability of the existing traditional budgeting model to fulfil the government's economic objectives, ZBB has resurfaced as a central theme of debate. The study aimed at predicting the probability of implementing a zero-based budgeting (ZBB) system in Brunei State. The study considered three predictor variables that were believed to have contributed to its adoption namely viability, capacity to implement and perceive. Data were collected from the primary source when the structured questionnaire was administered. Binary logistic regression was used to examine whether or not the predictor variables have a significant influence on the dependent variable. The findings of the study were able to establish synergies between the adoption of the ZBB and the predictor variables, indicated that it is politically feasible and providing more attractive incentives to reduce costs and prioritize government needs while adding value to the operational efficiency of the budgeting process. As a consequence, feasibility, capacity to incorporate and perceived benefits are individually important predictors of ZBB adoption.

8. Cloud Computing Software as a Service (SaaS)

Software as a service is a distribution model of software in which applications are hosted by a cloud provider and made accessible over the internet to end users. In this model, a third-party cloud provider can contract an independent software vendor to host the application (Palos-sanchez et al., 2017). Software as a service (SaaS) refers to software remotely hosted, developed, managed, and delivered via the internet by a service provider (Cho & Chan, 2015).

A government agency's budgetary operations are centralized using a Public Financial Management (PFM) system integrated with cloud-based software as a service CC-SaaS. Accounting, budgeting, treasury, and auditing activities concerning public funds are carried out by these integrated processes. The PFM Integrated with CC-SaaS framework is vital for the efficient collection, management, and spending of the economy's finances, which helps to boost citizens' trust and quality of life. While each government has its own set of policies and laws, the PFM Integrated with CC-SaaS framework assists the government in delivering effective public services and strategically distributing resources, as well as maintaining the economy's long-term growth (Pimenta & Seco, 2019). Digitalization of transactions, when combined with PFM, will help governments both directly and indirectly. Directly, successful digitalization increases transparency by offering a more accurate audit trail and speeds up simple PFM functions such as payroll processing, reaching the right recipients, accounting, and reporting by allowing for quicker reconciliation of government bank accounts (Gupta et al., 2017). CC-SaaS that increase efficiency and improve PFM and public services will aid government transition. When it comes to sharing data with the public at large, governments' limited IT infrastructure prevents confusion. Streamline the government's procurement and internal processes. Collaborate with other groups and pool tools. Government operations should be automated (Pontes, 2018).

9. Innovation

There are a great number of innovation definitions that are used in academia, industry, government and service

delivery in various fields (Taylor, 2017). Innovation can be described as a concept, process, or object that an individual or other adoption unit perceives as new (Rogers et al., 1995). Hence, it is necessary for this research to have a definition of innovation that is appropriate for the topic and research being conducted. To do this, the concept of innovation used in this study was developed after a review of the literature. Innovation is the successful adoption of new processes, services, products, business models and operating methods that are adopted from other sectors or organizations by which new ideas turn into practical value.

The adoption of innovation is conceived as a mechanism that involves activities that lead to a decision to adopt as well as activities that facilitate the use and continuation of innovation (Rogers et al., 1995). Damanpour (1991) introduced a two-stage innovation adoption, the initiation stage consisting of all activities relating to problem perception, knowledge collection, attitude forming and assessment, and the acquisition of resources leading to the decision to adopt. The stage of implementation consists of all activities and behaviour related to changes in both an innovation and an organization, initial use, and continued use of the innovation as it becomes an organization's regular function. There are different determinants and attributes that facilitate the initiation and implementation stage of the adoption of innovation (Downs & Mohr, 1979).

10. Conceptual framework

Some studies suggest cloud computing adoption model Cloud Computing software as a service (SAAS) using TOE due to the variations inherent in this system and different methodologies, choice of variables, and results. Such is the case of (Nkhoma, 2013) who use data from an IBM survey to find out what factors support or impede cloud computing adoption. (Rahimah et al., 2016) based on a study of previous studies, conduct qualitative research to group a set of important success factors for cloud computing for SMEs. Additionally, for SMEs, (Yazn Alshamaila Savvas Papagiannidis Feng Li, 2013) Conduct an exploratory qualitative analysis of a group of 15 English companies with the goal of defining some key variables in the adoption process, such as relative advantage, complexity, top management support, geographical constraints, compatibility, company size, external IT support, and so on. Consequently, using the TOE framework as a base, (Yang et al., 2015) suggest a model to analyze the implementation of SaaS-based technologies. Adoption was affected by factors such as top management support, relative advantage, simplicity, the ability to customize the app, and competitor and partner pressure.

Scott et al., (2008) indicated that future information innovations must demonstrate an advantage over current resources and that research evidence supporting innovation must be clearly visible. The results also showed that the process of innovation adoption has a social element, and collaborative interactions and discussions can facilitate this process. (Wang, 2018) analyzed the effect of government interference on innovation success in Singapore and Hong Kong, concluding that Singapore is known for its heavy government intervention, while Hong Kong is known for its optimistic non-intervention policy; The comparison reveals that Singapore's development practices were highly influenced by politics and dominated by major players. It uses a difference-in-difference analysis of USPTO patents released by Singapore and Hong Kong to provide more empirical proof of government intervention's effectiveness in increasing the technical benefit and scope of innovation. As a consequence, it is clear. It is therefore obvious that previous empiric studies shed light on the role of the government in innovation.

Over the last two decades, government intervention policies have become more effective and intense in stimulating technological change and innovation (Puett, 1981). Ruslan & Senin (2014) conducted a study to explore the technological factors that could influence SMEs in Malaysia to adopt one of the green innovation methods, and suggested examining the effects of government intervention on the relationship; The study of green innovations adoption have proved that government interventions, especially legislation and regulation, have been found to moderate the relationship between technological determinants and new innovation diffusion. Government intervention has been used as moderator in several studies (Kousar, 2017; Alhnaity, 2018). Prior research has found that government intervention policies in developing countries play an important role in encouraging companies to implement different processing, budgeting, and environmental practices (Alhnaity, 2018). The importance of government support and intervention policies in increasing the acceptance of a range of beneficial inventions, technologies, and services cannot be overstated. For example, researchers discovered that government intervention is a more efficient tool for adopting and implementing effective technologies (Mathew, 2013; Joo et al., 2018; Zhou et al., 2020).

A tendency towards innovation adoption has been marked in recent years to speed up the transition to the digital age. However, there were studies such as Puett (1981) indicated that Intervention by the government grouped into Technology push and pull activities. Technology push encompasses technology advancement actions in which the government is encouraging the development of emerging technologies or changing existing ones. Technology pull involves product attribute measures that impact product innovation, market modification actions that use market incentives to pull technologies across the supply chain. One scenario for optimizing the positive effects of government regulatory activities on enhancing the adoption of innovation is represented by government push and pull intervention combinations. Furthermore, Government intervention policies and legislation can encourage industrial innovators by encouraging major structural changes in product and process technology (Aslhford & Ayers, 2002). While government intervention policies may potentially have major negative effects on innovation if not carefully handled (Xiwei & Xiangdong, 2007). The development of a second phase (Laibin B) of power plants in southern China's Guangdong province is another illustration, highlighting the effect of government intervention on innovation. Administrative innovations, which involve new processes, strategies, and organizational structures, reflect those innovations (Patanakul & Pinto, 2014). Effective adoption of innovation also needs the government Intervention policy that should include the following priorities: providing a strong public research system, having skills and entrepreneurship policies, providing appropriate support and rewarding innovation, providing education, training and intellectual property policies, and having data access policies (Guellec & Paunov, 2018).

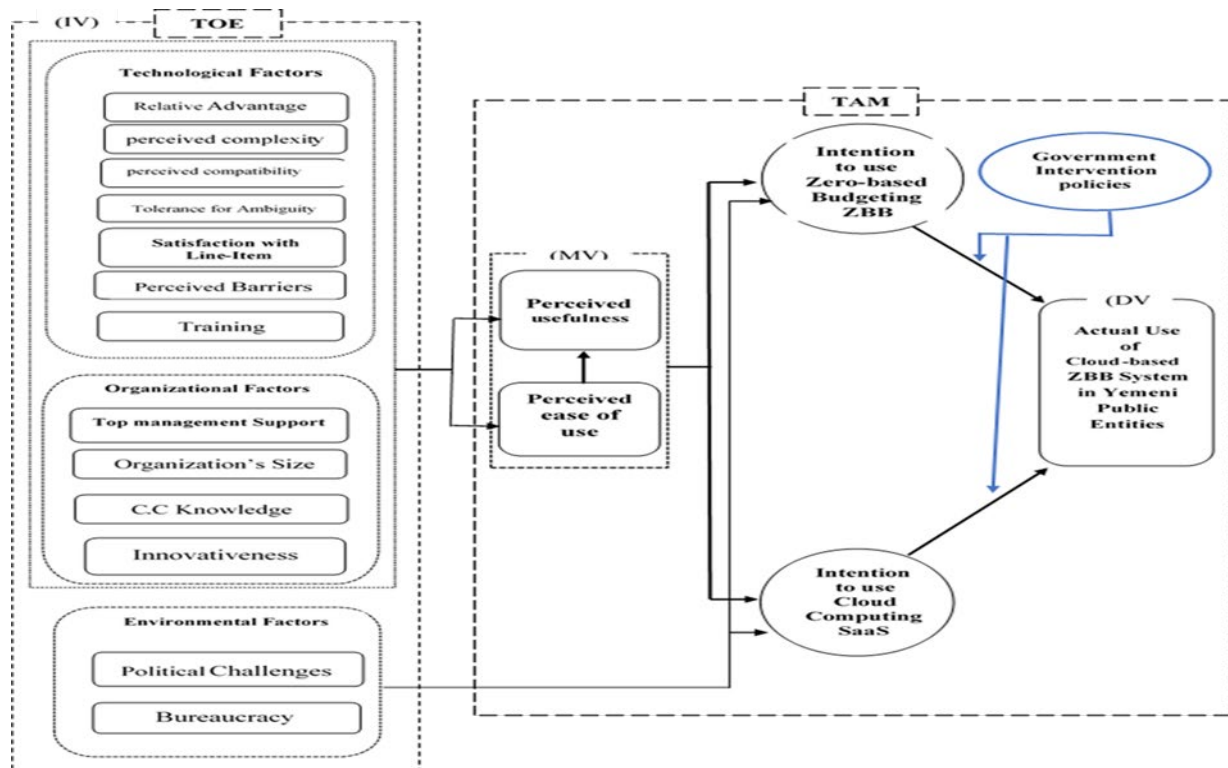
Based on literatures conclusions, government initiatives are obviously one of the most significant factors affecting innovation adoption. However, if we look at the intent of government policies such as subsidies and taxes intensives, we can see that they are intended to speed up the rate of innovation (Joo et al., 2018). As a result, rather than looking at government interventions as one of the factors affecting innovation adoption, this paper will use government intervention policies as a moderator to see whether this construct plays an important role in strengthening or weakening the relationship between TEO factors and zero based budgeting integrated with cloud computing software as a service (SAAS) adoption. in order to Improve the theoretical understanding of researchers and provide them with empirical evidence on how a possible moderator could be government interventions policies.

Furthermore, Prior to the date there is no research examines the moderating effect of governmental interventions toward zero based budgeting integrated with cloud computing software as a service (SAAS) adoption as administrative and technological innovation in Yemen context.

This study will depend on a desktop Method through review of books, articles and research studies related to the subject to form the theoretical framework. TOE is one of the most widespread theoretical structures for innovation adoption. It provides a broad overview of technology adoption and implementation and forecasts the effect of factors influencing innovation decisions. However, some studies combine elements of the TAM model and the TOE method, impacting the perceived ease of use and perceived usefulness of technological and organizational variables and the environment as a consequence (Palos-sanchez et al., 2017).

Furthermore, the current paper has come up to conclude this study with proposing the following conceptual framework as shown in Fig. 2.

External Variables



Sources: Adopted from Qin et al. (2020) and Bryan & Zuva, (2021)

Figure 2: The derivative TAM-TOE Model of Technology

12. Research hypotheses:

The development of hypothesized relationships using strategic models, related theories, and prior empirical literature will clarify the adoption of Zero-based Budgeting (ZBB) integrated with CC. SaaS. As a result, the hypotheses below are an attempt to empirically examine the technology–organization–environment model of government budgeting reform initiatives in Yemeni public bodies, which are as flowing:

H1a: Relative advantage has positive effect on perceived usefulness of Zero-Based Budgeting adoption intention among Yemeni public entities.

H1b: Relative advantage has positive effect on perceived ease of use of Zero-Based Budgeting adoption intention among Yemeni public entities.

H1c: Relative advantage has positive effect on perceived usefulness of cloud computing software as a service (SaaS) adoption intention among Yemeni public entities.

H1d: Relative advantage has positive effect on perceived ease of use of cloud computing software as a service (SaaS) adoption intention among Yemeni public entities.

H2a: Perceived complexity has negative effect on perceived usefulness of Zero-Based Budgeting adoption intention among Yemeni public entities.

H2b: Perceived complexity has negative effect on perceived ease of use of Zero-Based Budgeting adoption intention among Yemeni public entities.

- H2c: Perceived complexity has negative effect on perceived usefulness of cloud computing software as a service (SaaS) adoption intention among Yemeni public entities.
- H2d: Perceived complexity has negative effect on perceived ease of use of cloud computing software as a service (SaaS) adoption intention among Yemeni public entities.
- H3a: Perceived compatibility has positive effect on perceived usefulness of Zero-Based Budgeting adoption intention among Yemeni public entities.
- H3b: Perceived compatibility has positive effect on perceived ease of use of Zero-Based Budgeting adoption intention among Yemeni public entities.
- H3c: Perceived compatibility has positive effect on perceived usefulness of cloud computing software as a service (SaaS) adoption intention among Yemeni public entities.
- H3d: Perceived compatibility has positive effect on perceived ease of use of cloud computing software as a service (SaaS) adoption intention among Yemeni public entities.
- H4a: Tolerance for Ambiguity has positive effect on perceived usefulness of use of Zero-Based Budgeting adoption intention among Yemeni public entities.
- H4b: Tolerance for Ambiguity has positive effect on perceived ease of use of Zero-Based Budgeting adoption intention among Yemeni public entities.
- H4c: Tolerance for Ambiguity has positive effect on perceived usefulness of cloud computing software as a service (SaaS) adoption intention among Yemeni public entities.
- H4d: Tolerance for Ambiguity has positive effect on perceived ease of use of cloud computing software as a service (SaaS) adoption intention among Yemeni public entities.
- H5a: Higher levels of satisfaction with the line-item budgeting method has negative effect on perceived usefulness of Zero-Based Budgeting adoption intention among Yemeni public entities.
- H5b: Higher levels of satisfaction with the line-item budgeting method has negative effect on perceived ease of use of Zero-Based Budgeting adoption intention among Yemeni public entities.
- H6a: Perceived Barriers has negative effect on perceived usefulness of Zero-Based Budgeting adoption intention among Yemeni public entities.
- H6b: Perceived Barriers has negative effect on perceived ease of use of Zero-Based Budgeting adoption intention among Yemeni public entities.
- H6c: Perceived Barriers has negative effect on perceived usefulness of cloud computing software as a service (SaaS) adoption intention among Yemeni public entities.
- H6d: Perceived Barriers has negative effect on perceived ease of use of cloud computing software as a service (SaaS) adoption intention among Yemeni public entities.
- H7a: Training has positive effect on perceived usefulness of Zero-Based Budgeting adoption intention among Yemeni public entities.
- H7b: Training has positive effect on perceived ease of use of Zero-Based Budgeting adoption intention among Yemeni public entities.
- H7c: Training has positive effect on perceived usefulness of cloud computing software as a service (SaaS) adoption intention among Yemeni public entities.
- H7d: Training has positive effect on perceived ease of use of cloud computing software as a service (SaaS) adoption intention among Yemeni public entities.
- H8a: Top management Support has positive effect on perceived usefulness of Zero-Based Budgeting adoption intention among Yemeni public entities.
- H8b: Top management Support has positive effect on perceived ease of use of Zero-Based Budgeting adoption intention among Yemeni public entities.
- H8c: Top management Support has positive effect on perceived usefulness of cloud computing software as a service (SaaS) adoption intention among Yemeni public entities.
- H8d: Top management Support has positive effect on perceived ease of use of cloud computing software as a service (SaaS) adoption intention among Yemeni public entities.
- H9a: Organization's Size has positive effect on perceived usefulness of Zero-Based Budgeting adoption intention among Yemeni public entities.
- H9b: Organization's Size has positive effect on perceived ease of use of Zero-Based Budgeting adoption intention among Yemeni public entities.
- H9c: Organization's Size has positive effect on perceived usefulness of cloud computing software as a service (SaaS) adoption intention among Yemeni public entities.

- H9d: Organization's Size has positive effect on perceived ease of use of cloud computing software as a service (SaaS) adoption intention among Yemeni public entities.
- H10a: Employees' C.C Knowledge has positive effect on perceived usefulness of cloud computing software as a service (SaaS) adoption intention among Yemeni public entities.
- H10b: Employees' C.C Knowledge has positive effect on perceived ease of use of cloud computing software as a service (SaaS) adoption intention among Yemeni public entities.
- H11a: Organizational innovativeness has positive effect on perceived usefulness of Zero-Based Budgeting adoption intention among Yemeni public entities.
- H11b: Organizational innovativeness has positive effect on perceived ease of use of Zero-Based Budgeting adoption intention among Yemeni public entities.
- H11c: Organizational innovativeness has positive effect on perceived usefulness of cloud computing software as a service (SaaS) adoption intention among Yemeni public entities.
- H11d: Organizational innovativeness has positive effect on perceived ease of use of cloud computing software as a service (SaaS) adoption intention among Yemeni public entities.
- H12a: Political challenges has negative effect on the intention to adopt Zero-Based Budgeting among Yemeni public entities.
- H12b: Political challenges has negative effect on the intention to adopt cloud computing software as a service (SaaS) among Yemeni public entities.
- H13a: Bureaucracy has negative effect on the intention to adopt Zero-Based Budgeting among Yemeni public entities.
- H13b: Bureaucracy has negative effect on the intention to adopt cloud computing software as a service (SaaS) among Yemeni public entities.
- H14a: Perceived usefulness has positive effect on the intention to adopt Zero-based Budgeting (ZBB).
- H14b: Perceived usefulness has positive effect on the intention to adopt Cloud Computing SaaS.
- H14c: Perceived usefulness mediates the relationship between technological Factors, organizational factors and the intention to adopt Zero-based Budgeting (ZBB).
- H14d: Perceived usefulness mediates the relationship between technological Factors, organizational factors and the intention to adopt Cloud Computing SaaS.
- H15a: Perceived ease of use has positive effect on perceived usefulness of Zero-Based Budgeting adoption intention among Yemeni public entities.
- H15b: Perceived ease of use has positive effect on perceived usefulness of cloud computing software as a service (SaaS) adoption intention among Yemeni public entities.
- H15c: Perceived ease of use mediates the relationship between technological factors, organizational Factors and the intention to adopt Zero-based Budgeting (ZBB).
- H15d: Perceived ease of use mediates the relationship between technological factors, organizational Factors and the intention to adopt Cloud Computing SaaS.
- H16: Intention to adopt Zero-based Budgeting (ZBB) has positive effect on the implementation of Cloud-based ZBB system in Yemeni public entities.
- H17: Intention to adopt Cloud Computing SaaS has positive effect on the implementation of Cloud-based ZBB system in Yemeni public entities.
- H18a: Government Intervention Policies strengthens the relationship between the adoption of Zero-based Budgeting and the implementation of Cloud-based ZBB system in Yemeni public entities.
- H18b: Government Intervention Policies strengthens the relationship between the adoption of Cloud Computing SaaS and the implementation of Cloud-based ZBB system in Yemeni public entities.

13. Conclusion

The goal of this study is to fill the knowledge gap in the Zero-Based Budgeting System Integrated with the Cloud Computing software as a service (SaaS) area. As discussed earlier, most of the previous zero-based budgeting system studies in the developed counties did not focus on the per-implementation phase. In addition, a variety of zero-based budgeting system studies have been conducted in developing countries in recent years. Nonetheless, no previous study investigates the factors that might affect the adoption of ZBB. This study is therefore an attempt to fill the research gap and to examine the effects of factors such as technological factors, organizational factors, environmental factors, moderating by government intervention polices, on the adoption of the Zero-based Budgeting

System Integrated with the Cloud Computing software as a service (SaaS) among selected Yemeni public entities. To sum it up, this study has come up with a theoretical model that can be applied and implemented in the Yemeni public budgeting system based on zero-based budgeting adoption.

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