A Collaborative
Budget Formulation System:
Concepts and Options

John Moore

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Collaborative Budget Formulation System

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Executive Summary

This report describes a collaborative information management system that can be used as a basis for a collaborative budget formulation system. Concepts and examples of an information system of this type were favourably discussed with representatives of a number of Caribbean nations at a July 18, 2011, SEMCAR[1] IFMIS[2] workshop in Barbados.

"Alfresco" and Microsoft "SharePoint" are two examples of a type of collaborative enterprise information management software developed purposely to be used and administered by non-IT/ICT personnel. Information management products like these can offer many advantages, including rapid, flexible development of new applications by business function professionals with little to no direct support from ICT staff. This helps to bypass issues associated with dependence on scarce IT/ICT support resources.

Although designed to be used and administered by non-IT staff, collaborative software is very powerful and sophisticated. The flexibility and wide range of capabilities typically associated with collaborative software are why it is suggested as a low cost, low risk alternative to expensive, inflexible, single purpose budget formulation systems. Capabilities include collaborative authoring and publication of complex documents such as government budget proposals using office tools already familiar

Unlike single purpose, dedicated budget formulation systems, generalized software such as SharePoint and Alfresco has good potential to cheaply, quickly, and simply automate many other government functions in addition to budget formulation. Potential candidate activities include strategic plans, annual reports, program evaluations, reports to Parliament, and many more, being limited primarily by peoples' imagination. As more and more functions are automated, economies of scale result in lower and lower costs for each additional function.

A major additional benefit of collaboration software is its capability to support project teams and professional communities of practice.[3] The document and knowledge management capabilities inherent in enterprise collaborative software offer good potential to help ensure a common culture and a consistent level of professional understanding. Additional benefits include faster and more uniform training and orientation of new staff to help minimize problems associated with staff turnover.

In an evaluation mission in 2010, no critical shortcomings were discovered that would prevent Alfresco or other similar products from being used effectively in supporting a typical government budget formulation process. However, substantial work and planning remains to be done in order to prepare a complete prototype application for further evaluation.

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[1] Supporting Economic Management in the Caribbean (SEMCAR).

[2] Integrated Financial Management Information System (IFMIS).

[3] A community of practice refers to a group of people who share a common work domain or other interest or characteristic. Other terms include "community of interest", "interest group", and many others.

1.   Introduction

A 2010 CARTAC[4] technical assistance mission resulted in an observation that a low cost iterative approach could be used to develop new budget formulation systems. To keep costs low and allow business function professionals to directly control the project iterations required a technology that did not require direct intervention by ICT staff. Rather, business function professionals need to be able to try different ways of collecting, validating, and disseminating budget information without unnecessary interference by IT staff.

A subsequent product survey identified an enterprise "open source"[5] collaborative software product, Alfresco, as a candidate for further research and evaluation. Alfresco is representative of a genre of collaborative information and process management workflow software. For the purposes of this paper, this genre of collaborative software will be referred to as content management software.[6] A Content Management System (CMS) like Alfresco is optimized to facilitate collaboration among teams of non-IT business function professional staff developing high quality information products in an enterprise-wide broadband network environment.[7] Alfresco and other similar products empower business function personnel to independently create business process workflows and information repositories without the need for direct IT intervention.

Budget formulation is an example of a complex document development process that can benefit from the innovative use of a CMS. That's because the budget formulation process involves activities like composing, editing, organizing, quantifying, and harmonizing elements of government budgets. These activities are often carried out by organizationally and geographically dispersed groups of people contributing to one or more portions of a consolidated document. Also, the process includes multiple levels of technical and policy reviews, edits and approvals, called "workflow," that need to occur dynamically in a managed sequence.

In addition to supporting collaborative development of complex documents, CMS software tends to have other characteristics that make it a desirable choice to support a government budget formulation process, including:

- A CMS based budget formulation system can be relatively simple, inexpensive, and adaptable when compared with other types of budget formulation systems;
- CMS applications can be routinely administered by non-technical staff, thus minimizing dependence on scarce ICT resources;
- Because many CMS software products, including Alfresco, are non-proprietary by design, they leverage and compliment existing ICT investments, thus making them relatively easy to deploy and inexpensive to own;
- Functional control of CMS based applications is rightly seen as residing with the business function community, not with IT/ICT,[8] because the business function community directly controls what/when information and functionality are included in a system and who can use it;

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[4] Caribbean Technical Assistance Center (CARTAC).

[5] Open source software can be a lower cost alternative to commercial software products.

[6] Examples of content management software products include Microsoft SharePoint, Alfresco, IBM Web Content Management, OpenCMS, Atlassian Confluence, and many more.

[7] Friedman, Thomas L., "The World is Flat," Farrar, Straus, and Giroux, 2005. This international best-selling book describes the historical impact of innovations including "Work Flow Software" and "Open-Sourcing".

[8] Computer applications are sometimes erroneously viewed as being the responsibility of an ICT support organization instead of a business function organization; regarded as a case of "the tail wagging the dog".

- The "learning curve" for CMS application users can be low due to integration with familiar software that many government staff already know how to use, such as Microsoft Office or Open Office, as well as common Internet browsers; and
- CMS applications tend to be well supported by the business function community because the broad range of supported information formats facilitates the availability of multi-media objects like online training materials, calendars, electronically searchable reference documents, and much more.

After CMS software is deployed on a government network, it should be the responsibility of the business function community to determine how best to apply it to their business needs. Because this can be done iteratively, in phases determined by business function professionals, it is less important that application requirements be defined in advance, as is often the case with traditional IT/ICT projects. With a CMS, it is possible to routinely try out new ideas, evaluate the results, adjust as needed, and re-deploy as appropriate. The costly, cumbersome task of explaining and justifying business requirements to ICT staff is eliminated. This provides the flexibility to build the software support over time, and also allows the flexibility to change the process from one year to the next.

2. Background - Budget Formulation

Budget formulation systems are among the most challenging of PFM applications in an overall government Integrated Financial Management Information System (IFMIS). This is due to a number of factors, including the fact there is no budget formulation counterpart to generally accepted accounting principles. Therefore:

- Each budget formulation system tends to be somewhat uniquely based on *ad hoc* requirements rather than on widely recognized industry and government standards;

- Local requirements may reflect a high degree of personal preference that can change abruptly with organizational leadership; but, on the other hand,

- Structured accounting system add-ons and rigid budget systems that enforce data consistency among budget and accounting data are not popular because they lack flexibility.

In addition to the challenges listed above, budget formulation systems often struggle with administrative, functional, and workflow issues that differ significantly from an accounting system. For example:

- Access to sensitive budget data needs to be controlled, but the rules regarding who can view and/or modify budget data may need to change dynamically, on a minute-by-minute basis, as the process evolves;

- Budget data often includes large amounts of text, as well as numbers, tables, and other objects imbedded within text, as part of the reporting/publication process; and

- Budget formulation workflow usually follows a completely different track than accounting data.

Given that budget formulation systems need to be nimble and collaborative, Content Management Software (CMS) is seen as a capable, low risk, cost effective way to gain experience and build confidence using sophisticated budget formulation capabilities. For example, a manageable amount of change may be introduced into each new budget cycle over a period of 3-6 years in order to incrementally

achieve objectives and master concepts. In this way, the amount of change introduced with each individual new budget cycle can be limited to what can be accommodated with minimal risk of disruption.

Assuming the availability of a CMS, a collaborative budget formulation prototype can be implemented fairly quickly by trained business function personnel at low cost and low risk. A demonstration prototype may be implemented as a simple proof of concept. It is important to be clear that the prototype should not be expected to have all the features and capabilities that may eventually be included in a mature system. Rather, early prototypes should be viewed as confidence building opportunities. It is also important that first prototypes be perceived as being successful. It can be very damaging for early prototypes to be perceived as failures.

Budget formulation usually follows an annual activity cycle in which each year's iteration of the collaborative budget formulation system should be viewed as an upgrade, with changes resulting from lessons learned and the addition of new features. Each new increment should include a manageable amount of change Modest, manageable, incremental changes are generally best from the perspective of preserving stability and managing risk. Introducing modest incremental changes helps organizations gradually gain maturity without being overwhelmed by too many new changes coming too rapidly.

Careful collection and integration of lessons learned from each major deployment can help ensure that subsequent iterations are increasingly more refined and sophisticated. After the initial CMS based prototype is implemented successfully, subsequent iterations may be carried out with expanded scale (e.g., more ministries and departments) and/or expanded scope (e.g., increasingly advanced budget concepts like program based budgeting and performance budgeting).
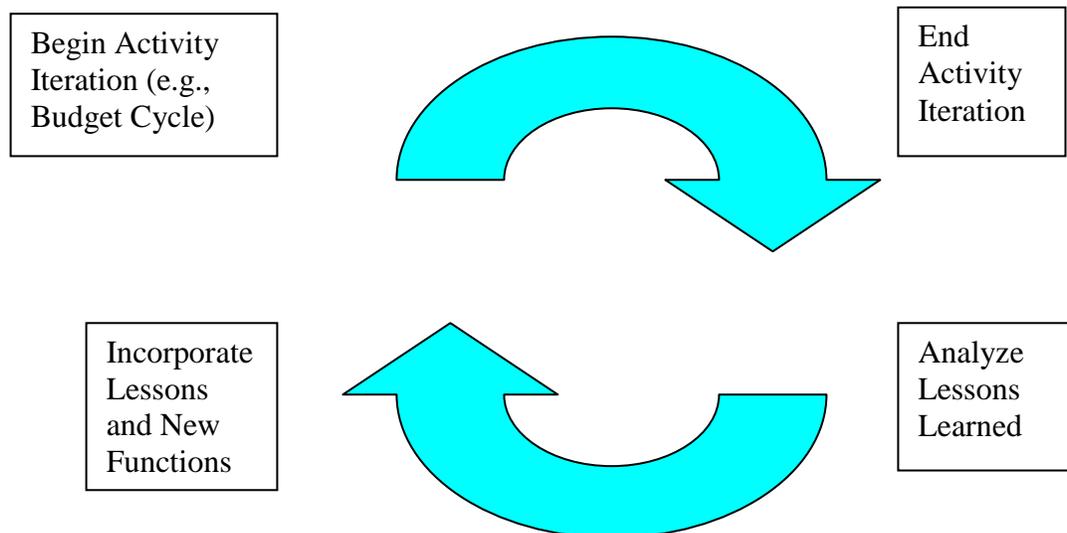
Figure 1: Iterative Activity Cycle

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3. CBFS System Support

In order to help ensure the success of a prototype Collaborative Budget Formulation System (CBFS), it is suggested that a project team be assembled and assigned clear roles and responsibilities well in advance of system deployment. Suggested basic steps for preparing for deployment of the CBFS prototype include the following:

- A project team charter can help make responsibilities clear
- Consider establishing a Service Level Agreement (SLA) with IT support to define expected hours of support and expected response times for CBFS infrastructure
- Develop CBFS training materials and training schedules
- Assemble online reference materials using the CMS software for system users
- Coordinate proposed changes with stakeholders, including policy officials
- Develop data requirements, data collection templates, and reports for status, quality, and analysis
- Activity administrators configure and populate CBFS workspace
- Kick-off the activity
- Monitor status; make mid-course adjustments as needed
- Conduct a final acceptance review of the CBFS end-product(s), and
- Publish completed CBFS end-product(s)

CBFS work team roles and responsibilities include:

- **Project Manager** – Establishes the team charter and objectives for the CBFS, as well as determining the participants and their roles and responsibilities. Works with stakeholders, core team members, administrators and others to define and create data collection templates, reports, and work product contents and formats. Monitors and reports CBFS activity status to ensure quality and timeliness of work products. In general, it would be beneficial for activity managers to be familiar with generally recognized project management terms and concepts.
- **Application Administrator** – Creates and populates CBFS team work spaces, and grants user access privileges for the work spaces. As stages of CBFS activity are completed, administrators may limit user access privileges to keep activities on schedule, enforce discipline, and help ensure data integrity. Administrators should be PFM specialists with CBFS administrator training.
- **Core Team Member** – Core team members include administrators and managers, augmented by subject matter experts and technical specialists as needed. The core work team is responsible for the successful completion of PFM activities. As such, they do whatever is needed to get the job done. Examples include development of CBFS documentation, budget data collection templates, budget reports, and training materials. Trains CBFS users. Ensures that participants have everything needed to complete the budget. As with all core team members, they should not be IT/ICT specialists.
- **Application Users** – Work under the direction, guidance, and training of the core team to create and submit timely and technically consistent budget inputs to the CBFS team work space.

4.   Recommendations – Capacity Building

The same collaborative software that can be used for a Collaborative Budget Formulation System (CBFS) may also be used in many other important ways.[9] In countries where there is no immediate need for a new budget formulation system, it may nonetheless be worthwhile to look at collaborative software in the context of Communities of Practice (CoPs).

From a PFM perspective, a CoP may be viewed as an important capacity building tool for PFM and other government personnel. A CoP can also help to lessen the impact of chronic issues such as staff turnover by making professional knowledge and experience more immediately available to junior personnel. Content management software (CMS) has a number of capabilities that can be used in building and maintaining capacity as follows:

1. **Document and Knowledge Management** – The CMS may be used as a searchable repository for professional documents, including the collaborative development and publication of professional documents. Information in a CMS repository is relatively easy to locate using online search capabilities built into the CMS. Budgets, financial procedures manuals, FMIS user guides, financial reports, and many, many other types of documents can be readily available to all members.

2. **Simultaneous Information Update** – As documents are updated in an online repository, the latest information is immediately available to all. This helps ensure that all members of a community are seeing the same information concurrently. Getting everyone "on the same page" is much more difficult to achieve with paper-based documentation.

3. **Community Event Calendar** – Events can be posted to a community calendar to keep members informed about upcoming training opportunities, events, budget submission deadlines, quarterly close-out dates, and other important dates.

4. **Collaboration/Sharing** – CMS provides a means for people to share business information and ideas. In addition, the collaborative features make it relatively easy for people to work together to produce new government documents and materials.

5. **Project Teams** – Teams of professionals can coordinate their activities to manage a variety of projects. Because coordination and planning can be done online, it is not necessary for team members to be in the same office, building, or even in the same country. Instead, team members and stakeholders can be located at widely dispersed locations around the country or around the world.

6. **Training** – Online training programs and materials may be used routinely to allow diverse groups of people to participate in training programs, earn professional certificates, etc., without the need for expensive travel and inefficient classroom instruction.

7. **Discussion Forum** – Many CMS products include a discussion forum where professionals can publicly share views and ideas for all to see and learn from.

8. **Subscriptions** – Members can "subscribe" to topics on the CMS portal in order to be automatically notified as information is updated without the need to remember to periodically check the site for updates.

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[9] CMS applications are not mutually exclusive. One CMS installation can be used to meet a wide range of needs concurrently. For example, a single CMS system can be used simultaneously for budget formulation, a PFM community of practice, general office automation training, new employee orientation, PFM procedures manual development and maintenance, and many others.

9. **Tailored Views** – A CMS system can be configured by subject matter experts so each professional interest group member sees a view of the CMS portal that is focused on information of interest to them. This makes the portal much more efficient and powerful by focusing peoples' attention on topics that are most likely to be useful to them.

Alfresco and Microsoft SharePoint are two fairly well known examples of collaboration software, sometimes called content management software (CMS). Both of these products are highly scalable for use in medium to large enterprises. Both products are designed to operate on inexpensive, Intel-based commodity hardware. Alfresco offers more flexibility because it can operate on either Microsoft or Linux servers, and it supports multiple relational database management systems. Additional Alfresco related findings include:

1. **Support:** The no-cost version of Alfresco does not include enterprise technical support. However, general Alfresco support resources are available, including:
   a. Commercially available Alfresco manuals;
   b. Context sensitive help documentation included with Alfresco software and augmented by additional information from the Alfresco Website; and
   c. An Internet accessible Alfresco issue tracking knowledge base using Atlassian Jira,[10] a well regarded issues management system.
2. **Training:** Fee based training is available from Alfresco in several formats.[11] However, individuals with access to Alfresco test work space and documentation can teach themselves most of what they need to know in just a few hours through hands-on trial-and-error experimentation.
3. **Technical Feasibility:** Several minor anomalies and inconsistencies were observed in tests conducted on Alfresco, but all were resolved or easily worked around. No critical issues were discovered.
4. **Compatibility:** Alfresco was found to be compatible with current versions of the Internet Explorer and FireFox web browsers, as well as common data formats including MS Word and Excel.
5. **Ease of Use:** Alfresco was found to be fairly easy to work with when standard defaults are accepted.
6. **Conclusion:** Alfresco can be explored and evaluated at low cost with few risks in order to assess its potential for use.

In order to evaluate the utility of a Content Management System, recommendations include:

1. **Budget Formulation Initiative:** Developing a simple, limited prototype of a collaborative budget formulation application is a good, cheap, low risk way to begin.
2. **Build Momentum:** A prototype can be a good way to build confidence and demonstrate success. It is realistic and achievable to do this at low cost and low risk.
3. **Create a Brand:** Choose a readily identifiable name for a prototype system. Example: Collaborative Budget Formulation System (CBFS, pronounce "see-biifs").
4. **Strategic Commitment:** A high performance server and robust business continuity plan will be needed for any CMS software to reliably support essential government functions.
5. **Quality Assurance:** A systematic Quality Assurance (QA) plan and exception handling policies will be needed to ensure the success of a prototype.
6. **Publication:** A government budget document is essentially a complex, highly stylized budget report. Like other budget reports, it should be available on a regular and on demand basis.

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[10] See: http://issues.alfresco.com/jira/secure/IssueNavigator.jspa
[11] See: http://university.alfresco.com/

7. **Document Experiences:** As issues are resolved and lessons are learned, information about the issues should be collected and documented as a resource for the future. At the end of the business cycle, all findings should be carefully archived and analyzed for use in planning the next iteration.

8. **Continue System Evolution:** Each iteration of the system should include evolutionary updates, enhancements, and expanded scope and/or scale.

ANNEX A – Content Management System

A general purpose Content Management System (CMS) could be very useful and economical. The purpose of a general purpose CMS would be to support a broad range of regular and *ad hoc* government document management activities, including functions like budget formulation or *ad hoc* program analysis. A generalized capability can be very much cheaper to own and support than an incompatible collection of unique, single purpose, stand alone systems. For example, the direct cost for annual software license fees associated with a country's FMIS and tax systems can be $500,000 E.C. or more. This is a significant cost that could easily grow out of control as more unique, proprietary systems are added.

Cost – The basic one-year cost of an Alfresco enterprise subscription for 100 client workstation connections is estimated below along with the one-time cost of new server hardware.

Alfresco 1-Year 100 User Subscription	$40,000 E.C.
Server hardware	18,500 E.C.
Total	$58,500 E.C.

While this is a substantial amount, it does not increase significantly when more applications are added. Unlike stand alone, unique systems, adding more applications reduces the cost per application as greater economies of scale are achieved. Further, adding more applications does not place significantly greater demand on IT support resources because incompatible new technology is not being introduced.

Because a CMS system is compatible with existing office software such as Microsoft Office, it can leverage government sunk cost investments in Microsoft Office software. At the same time, a non-proprietary CMS product like Alfresco does not require Microsoft Office. In fact, it can actually facilitate the introduction of less expensive office software alternatives such as Open Office.

Advantages of a CMS system include:

- Provides a consistent, general purpose environment for organizing and managing information in a variety of commonly used formats;
- Once the capabilities and functions of a CMS system are understood, it can be fairly easy for new applications to be added with little need for TA or IT/ICT support;
- Standard approaches to CMS means that automating new government activities can be done quickly, routinely, and systematically;
- Low learning curve due to integration with well known analytical tools like Excel and Word, or Open Office; and
- Activities controlled by business function staff with little need for direct IT support.[12]

Trained administrators will have the authority to set up and control team workspaces, determine which organizations and personnel will have access, and the privileges they will have. As activities and needs change, access privileges can be quickly changed to enforce discipline and ensure data integrity.

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[12] It should be noted that there will be a need for IT support for the server hardware and software. Notionally, technical support for the server hardware and software may be provided by government IT/ICT support. However, the business uses of the collaborative server facility will not in any direct way be determined by IT. IT's function is to maintain the technical integrity and availability of the server and data.

A CMS system may be used to help support a broad range of regular and *ad hoc* PFM activities, including:

- Annual budget formulation
- PSIP project management
- PFM policy formulation
- PFM community management
- PFM system user outreach
- Briefing books/reports for Parliament
- Government transition
- Emergency budget measures
- Budget and economic analysis, including what-if analysis
- PFM change management
- Economic recovery following natural and man-made disasters
- PFM knowledge management, including information archives
- PFM staff development
- Leadership succession planning

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