# Designing a Data-Centric Universal Architecture for International Assistance

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"Data is not information, information is not knowledge, knowledge is not understanding, understanding is not wisdom."  -  Clifford Sall, American Astronomer

## Abstract

The world of international assistance is at a crossroads. Willingness among practitioners and policy makers to agree on a set of core principles is emerging. At the same time, we now have a technological ability to process vast amounts of data and use analysis as a powerful tool to bring these core principles to bear on improving the effectiveness of programmatic efforts. This nexus of core principles and data-driven analysis represents an excellent opportunity to improve the effectiveness of assistance efforts by using program implementation data to inform future planning and resource requests. Unfortunately, the international community risks missing this incredible opportunity as the ad hoc collection of inefficient public financial management frameworks at the center of current international assistance administration and management suffers from a two-fold problem. One, they are so disparate that interoperability is impossible, and two, efforts are so anachronistic that integrating financial accountability with program performance data is impossible. This combination of ineffectiveness not only undermines the universal participation required for wide ranging analysis of related data, but it also stunts subsequent learning through the comparison of outcomes. The resulting risk is that the very systems of administration and management used to make international assistance possible end up undermining the potential of this new willingness and ability to improve the effectiveness of international assistance.

This paper lays out an alternative: a new conceptual public financial management architecture for the administration and management of international assistance that integrates a performance monitoring and evaluation framework with a public expenditure and accountability framework, including one potential transition modality to implement this new architecture.

## Introduction

A desire to end persistent human suffering motivated creation of the Millennium Development Goals, which were adopted following the Millennium Summit of the United Nations in 2000. Since then there has been a rising tide of efforts to finally eradicate these chronic problems that plague so many vulnerable populations, be they poverty, disease, or a host of other terrible afflictions across less developed countries.

With the passage of time this intensified focus on development has led to improved learning about ways to combat these problems, most notably from the Organization for Economic Cooperation and Development (OECD), with their 2005 Paris Declaration on Aid Effectiveness, which called out the need to improve, "Ownership, Harmonization, Alignment, Results and Mutual Accountability", as well as their 2008 Accra Agenda for Action[2], which aimed to redouble focus on areas that were lagging, such as, "Country ownership, Building more effective and inclusive partnership, and Achieving development results and openly accounting for them." However, not until their 2011 Fourth High Level Forum on Aid Effectiveness[3], was an emphasis placed on the practical issues of how to achieve all of the lofty goals being agreed to, most notably related to transparency. Yet even with that recognition that effectiveness must be part of the aid conversation, no actionable directives were forthcoming; thus we have relegated the international community, both donor and recipient governments, to a future of aid efforts and financing that fail to realize the inherent potential of so much money and so many smart and hard-working people.

But all is not lost. While the international community has been building consensus on what needs to be done and why (even if the "how" remains elusive), the information technology industry and its products have grown apace to an incredibly powerful tool. Today's  technology might only be barely recognizable to the policy makers of 2000. Specifically, there is now something referred to as "Big Data", which is popular short-hand for computing capacity so powerful that it can be used to process data sets on a massive scale. From meteorology to finance to internet search engines, Big Data is changing how we look at analysis, and even how we derive multi-order analysis from existing analysis.  Complementing Big Data is the idea of Open Data, which advocates for the complete accessibility and transparency of all information; an added benefit of this relationship is the updated definitions tailored specifically for the maximization of Big Data. The Open Data Handbook[4] summarizes the most important definitions, which for purposes of this paper are the ideas of Universal Participation and Interoperability:

> Universal Participation: everyone must be able to use, reuse and redistribute - there should be no discrimination against fields of endeavor or against persons or groups. … If you're wondering why it is so important to be clear about what open means and why this definition is used, there's a simple answer: interoperability. Interoperability denotes the ability of diverse systems and organizations to work together (inter-operate). In this case, it is the ability to interoperate - or intermix - different datasets. Interoperability is important because it allows for different components to work together. This ability to componentize and

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[2] http://www.oecd.org/dac/effectiveness/34428351.pdf

[3] http://www.oecd.org/dac/effectiveness/49650173.pdf

[4] http://opendatahandbook.org/en/what-is-open-data/

to 'plug together' components is essential to building large, complex systems. Without interoperability this becomes near impossible …

Universal participation is critical when it comes to the topic of international assistance, and ties directly to the OECD's 2012 Busan Partnership for Effective Development Cooperation, which established agreement to enable, "A global monitoring framework with indicators and common goals that will enable cross-country comparison and foster international accountability.[5]" This explicit identification of the need for a global monitoring framework (i.e.: interoperability) that can be used for comparisons and accountability (i.e.: open data transparency) sets this agreement apart. .

Further development of a system must also take into account the context of open data and interoperability. The Handbook offers further guidance in defining what characteristics might be useful in a global monitoring framework:

> We face a similar situation with regard to data. The core of a "commons" of data (or code) is that one piece of "open" material contained therein can be freely intermixed with other "open" material. This interoperability is absolutely key to realizing the main practical benefits of "openness": the dramatically enhanced ability to combine different datasets together and thereby to develop more and better products and services…

Clearly, systems must speak a common language (across its various nodes) and make related data completely and transparently available to benefit thorough analysis. In an idealistic vacuum, we would create a new global monitoring framework with interoperability that could generate a very high quality and quantity of data (and Big Data would seamlessly consume this information for incredibly powerful analysis and derivative information). But, in an ongoing reality, a new framework is perceived to add more administrative clutter to the field of international assistance – a field that is already littered with ad hoc frameworks from innumerable prior gatherings of the international community, and usually the lack of adequate staff to collect the information means even less bandwidth to do anything useful with what they were able to collect. All too often the result is data proprietary to a particular framework, and the new gap this leaves behind is a proliferation of frameworks that are not interoperable. This is a case where adding framework upon framework only serves to further obscure what goes right and what goes wrong in international assistance programs and projects. So, this call for another framework forces the question, if not one more then what?

## Problem Statement:

The need for an interoperable and open framework is clear based on the lack of adequate effectiveness data available to inform increased efficacy.. Current frameworks offer neither, and what's more, their scope and scale comes nowhere near the quality and

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[5] http://www.oecd.org/dac/effectiveness/Busan%20partnership.pdf

quantity required to make good use of Big Data. Big Data needs a lot of data and no computer can organize data of any quantity without first having a taxonomy programmed into it. So, the necessity for some kind of framework is readily apparent. And, because international organizations are fond of meeting to establish new frameworks, it is also apparent that yet one more is unlikely to make the kind of difference that will leverage the ability of big Data to take advantage of the willingness to support the ideas of Open Data, to begin establishing clarity on what works and what doesn't in formulating ways to tackle big issues like poverty and hunger. The last unasked question remains, what global systems might currently exist that could obviate the need for a new framework, and that could, with some careful modifications, act as the kind of global monitoring framework identified in the 2012 Busan Partnership for Effective Development Cooperation[6], and that exists on a scope and scale suitable for feeding Big Data?

## Existing Systems and Frameworks:

An existing system and framework does exist that, with careful modification, could provide the kind of global monitoring framework needed to support both Open Data and Big Data. This system is called public financial management (PFM). The guiding three principles of good PFM, are that any framework should be transparent, rational, and predictable – all things that are closely aligned to the set of core principles that is emerging among practitioners and policy makers for international assistance. The PFM framework is called the chart of accounts (COA). A 2011 technical manual titled, "Chart of Accounts: A Critical Element of the Public Financial Management Framework", by Julie Cooper and Sailendra Pattanayak, from the Fiscal Affairs Department of the International Monetary Fund, summarizes:

> The chart of accounts (COA) is often considered—in particular, by non-accountants—obscure, if not esoteric, and is often a neglected element of a country's public financial management (PFM) system. Yet, as argued in this note, it is possibly the most critical element or lynchpin of a well-functioning PFM system. The COA, although appears to be just concerned with classifying and recording financial transactions, is critical for effective budget management, including tracking and reporting on budget execution. The structure of the budget—in particular the budget classification—and the COA have a symbiotic relationship. As such, a mistake in designing the COA could have a long lasting impact on the ability of the PFM system to provide required financial information for key decisions.

COAs are typically organized around the Classifications of the Functions of Government (COFOG). The United Nations Statistics Division has prepared a detailed

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[6] http://www.oecd.org/dac/effectiveness/Busan%20partnership.pdf

sample COFOG[7] available for any governments interested in adopting or adapting it for their use. The United Nations Statistics Division recognizes that one COA may not suit the individual needs of every country, and so, "Alternate structures are useful for analytical purposes, if the standard aggregation structure of the classification is not sufficient.[8]" Many countries do use COAs, but because a COA is designed to be a public accounting and expenditure framework, and nothing else, modifications are required before it can serve as a global monitoring framework for purposes mentioned above.

## Transforming the COA into a New Global Framework:

Many countries using a COA for their public accounting and expenditure framework are also using other systems and frameworks to capture program performance and monitoring data. In PFM the two frameworks are usually parallel but not integrated. They are, in a sense, bi-axial insofar as that they are parallel but never structurally intersect. The fact of structural separation by no means prevents the analysis of outcomes where analysis of adequate data can provide useful information. But, to do so requires data collected, analyzed, and understood outside of the COA – the bi-axial structure prevents the natural integrated progression over time of financial inputs that lead to programmatic outputs that are designed to receive outcome metrics. In a world where over a billion people all have individual mobile phone numbers, there is clearly no technical barrier to coding aspects of great granularity related to even the minutest activities that support specific development objectives and global humanitarian goals. But, before there can be a global framework wherein which a single integrated line of code captures all information, from planning and resource request in a country's budget cycle, to execution expenditure into the distant but still time-bound realm of monitoring and evaluation, can be realized, several modifications are required to a typical COA.

Conceptually this transition requires a COA to transform from a bi-axial structure to a co-axial architecture. The newly modified co-axial architecture then needs to be adopted by all countries involved in international assistance. The end result will be called the Universal Chart of Accounts (UCOA), and in the context of this paper, the UCOA for International Assistance (UCOA-IA). There is no strictly technical barrier to employing a full UCOA to all governments of the world. Indeed it would allow for an even more fulsome landscape of data to be available that would be especially useful in tracking the transition of enduring cooperation (i.e., the handover of donor country funded social services to host country funded social services) because the transition over time of financial flows, and the corresponding outcomes metrics of that same period of time could finally be correlated. However, keeping within the context of this paper, it is only the co-axial UCOA-IA that will explored a little further. It is worth noting that a UCOA is scalable but the smaller the size the lesser the economy of scale and the lesser the impact. For the purpose of this paper, and the transition modality it offers, the functional

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[7] http://unstats.un.org/unsd/cr/registry/regcst.asp?Cl=4

[8] http://unstats.un.org/unsd/cr/registry/regat.asp?Lg=1

parameters will hold firm at being implemented for the purpose of administering and managing public funds used for international assistance.

For the purpose of interoperability the UCOA-IA will rely on the COFOG as a well-designed COA structure that can easily serve as a proxy taxonomy for international assistance flows generally, although the addition of special object classifications will likely be necessary that are specific to international assistance activities and contexts, such as with cases of direct budgetary support, humanitarian disasters, faltering fragile states, and the like.

The UCOA-IA integrates a public expenditure and accounting framework with a monitoring and evaluation framework. The two frameworks are interlaced at the coding level so that the code itself binds the two together at the account level. Also it is necessary to take the existing COA and add a mirror version of contra-accounts for each account in the chart. In between the account and the contra-account is a portal, a stint of sorts, which itself is managed like a social impact bond. This is where the money flows out to pay for implementing project A. Already planned is the desired outcome that project A is designed to achieve. This is where all manner of brilliant new methods are used to track progress towards achieving pre-established outcomes. As data is tracked and is analyzed to produce evidence of results obtained, that information is plugged back into the stint where the data eventually fills in the contra-account. And, when the pre-determined period of outcome recording comes to an end it should be apparent what outcome was obtained for a particular expenditure (investment) from this account. And, because it is already an interwoven aspect of how a country manages its business (finances), closing the gap between using evidence and results to inform out-year resource requests, becomes a natural and smooth progression. With some donor countries and some recipient countries using the UCOA-IA, a network begins to take shape that helps increase the value of outcome metrics on out-year budget planning. But the UCOA-IA system reaches its full potential when all countries spending and receiving international assistance are using interoperable and integrated frameworks.

The integration is possible by adding to the COA a mirrored set of "contra-accounts", for each account. Traditionally contra-accounts are where information is recorded that is important context to an accountant, but that is not strictly critical to the accountant for the purposes of presenting a clean legible ledger. It could be considered that the contra-account is a place to record account specific narrative that could be useful in a longer and more detailed written report about transactions. What the UCOA-IA does that is novel is rely heavily on the contra-account as a permanent functional feature of the COA, a time bound collection point for outcome data for a pre-determined period of time. And, because instructions can be written into lines of code similar to the proteins in DNA, the budget process itself becomes self-replicating, not through the time-honored and inefficient process of momentum budgeting, where habit takes precedence, but by following instructions written to require the budget process to reference both the status of on-going similar projects and also prior completed projects.

For the purpose of running pilot tests of the UCOA-IA, it is possible both in a test environment, as well in the real PFM world, to create something called a bridge table that is essentially a complex web of translations between the old structure and the new architecture so information can be "cross-walked" back and forth between the two. However inefficient, this transition methodology may require an additional layer of data collection locations integrated into it something called memorandum accounts, which are the functional equivalent of footnotes to a ledger. The use of memorandum accounts would be terribly inelegant but just the same could be used to cross-reference project monitoring and evaluation performance data in the absence of formal contra-accounts.

## Conclusion:

The time is now to reverse the trajectory of international assistance being doomed to an irrational, unpredictable, and non-transparent eternity; the need is clear for an administrative structure that can be globally unified around a UCOA-IA framework and that exemplifies the principles of good public financial management. Global adoption of this universal chart is a way to transparently track all assistance related financial flows, and has many positive first order external benefits to other high priority areas of foreign reform for the future of development assistance. Designed into the structure of an integrated performance monitoring and evaluation framework with a public expenditure and accountability framework will permit linkages to be drawn from appropriation, through transactions to execution and to output and possibly outcome, all while reducing opportunities for corruption and mismanagement. This is no magic solution to the problem of gathering data to develop evidence that supports improving the effectiveness of aid. But it can go a long way towards insulating policy formulation and program execution from otherwise negative and sometimes arbitrary effects of politics and ideology expressed through the appropriations process, which stands to render useless even the best evidence to justify resource requests for specific activities.

By reforming a government's chart of accounts, and letting the newly formed structure also serve as the administrative and management architecture for international assistance, you can have a solid foundation that will support the bevy of innovative solutions to the execution side issues, all of which can finally work together to improve the effectiveness, and efficiency, of that assistance.

If modern history is any guide, political will for adoption of the UCOA-IA is likely to be spotty at best, at first. But if ancient history is any guide, we have several sources of optimism. Take many, many steps back through the distant annals of history to see how humanity has achieved similar ends against comparably (if not vastly superior) intractable problems. The Code of Hammurabi made predictable the enforcement of social norms with the Babylonian code of ancient Mesopotamian laws, around 1772 BC. Approximately 1500 years later, the Rosetta stone, issued at Memphis in 196 BC on behalf of King Ptolemy V, brought transparency to previously untranslated ancient languages. Approximately 1500 years after that, the Magna Carta, sealed under oath by England's King John, in 1215, brought predictability to the monarch's rule by

articulating a prohibition against arbitrary edicts, helped to lay the groundwork for later constitutional governance. It is against this historical backdrop of enshrining solutions to complex problems through the institutionalization of practical approaches that this paper, approximately 1800 years after the Magna Carta, takes aim in modernity at reforming the foundational document of public financial management, the Chart of Accounts, as a way to reform the future administration and management of foreign assistance.