REENGINEERING BUSINESS REPORTING: CREATING A TEST BED FOR TECHNOLOGY DRIVEN REPORTING

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REENGINEERING BUSINESS REPORTING: CREATING A TEST BED FOR TECHNOLOGY DRIVEN REPORTING

Building on the work originally done for the Enhanced Business Reporting consortium of the AICPA, this paper develops a test bed for innovation in business reporting. As with flying test beds in aviation, the object is to explore the impact of new technologies and techniques rather than to create a product intended for immediate implementation. The starting point of our analysis is that if the financial reporting system was being built from scratch today, it would look very different, taking into account fundamental changes in the two drivers of financial reporting: First, the dominance of market making by professional investors, which includes such intermediaries as pension and mutual funds, which is how most ordinary individuals interact with the market; Second, the reduction in the variable costs of disclosures to technology-enabled firms, while time taking a broader view of the cost of reporting to include the opportunity cost to the firm from faulty disclosures and the cost to professional investors of having to extract the data they need from statements that were not designed for their needs. Taken together, the consequence of these two changes is that a system being designed today has to rethink the entire process by which financial data held by the firm is translated into decision relevant information by users. This process takes place both within the firm and outside of it, with a handover of financial statements taking place at the boundary between the firm and its users. Given these changes it is time to ask whether the location of that handover boundary point is still appropriate: whether the firm should continue to aggregate and condense information extensively before releasing it, or whether sophisticated users would prefer to have access to more information in closer to its raw format so that they can manipulate and aggregate it as they see fit. Based on this conceptual model we discuss the building blocks of a 21st century reporting system and the technical architecture needed to implement it. It is our hope that this paper will help create an open source test bed that will develop new ways to measure, manage and communicate firm performance in the 21st century.

Keywords: Financial reporting, GAAP, AIS, business measurement.

1. Introduction

1.1 Creating a Test Bed for Innovation

There is a long history in aviation of creating flying test beds: aircraft that provides the means to test new and emerging technologies, but which are not intended to go into mass production. For example, NASA's X-29 plane explored the use of advanced composites in aircraft construction, a unique forward-swept wing and a computerized fly-by-wire flight control system, amongst other innovations.[1] The forward swept wing was the aircraft's most noticeable feature, with the odd shape promising unprecedented maneuverability and high speed. The problem with this design, however, is that it makes the aircraft exceptionally prone to instability in flight and it only avoids crashing because much of the flying is done by a computer which makes necessary continuous adjustments of the plane's controls to keep it stable—a process that no human pilot could accomplish in time.

Figure 1: X-29 Test Bed

The concept of a test bed for emerging technologies is exactly what we are attempting to do with this project to reengineer financial reporting. And as with any test bed, the aim of this project is not the creation of a system of financial reporting that can or should be implemented in practice as is, but rather, to explore the role that the information technology can play in shaping the nature and characteristics of financial reporting. The analogy to the X-29 also arises from the fact that the kind

[1] http://www.nasa.gov/centers/dryden/news/FactSheets/FS-008-DFRC.html.

of reporting system we envisage cannot exist without that technology, both because it is the means by which firms in the digital economy create value and because it provides the capability for measuring and communicating that value.

1.2 Improving Financial Reporting

Throughout the history of accounting there have been initiatives to update or change the basis of financial accounting, no more so than in the last few years, after scandals such as those at Enron and WorldCom shook public confidence in financial reporting. To pick but a few of the more prominent examples, the CICA undertook its *Canadian Performance Reporting Initiative* that distinguished measuring and reporting "value creation" from "value realization", the latter, it is argued, being the focus of the current system of accounting.[2] The IASB and the FASB are currently undertaking a major initiative to jointly develop an improved conceptual framework for financial reporting, building on the earlier FASB's *Concepts Statements* and the IASB's *Framework for the Preparation and Presentation of Financial Statements*.[3] This process will necessitate re-examining some of the thorniest issues that have faced accountants from the very beginning of the profession, such as the definition and scope of earnings, the basis for the valuation of assets and the impact of uncertainty. Meanwhile the CFA Institute has just released its *Comprehensive Business Reporting Model* that proposes changes to the accounting system that is specifically aimed at meeting the needs of investors.[4]

All these projects, and the many others before and ongoing, take as their starting point the perceived inability of the current financial reporting paradigm to adequately measure firm performance and capture firm value, as reflected most notably in the increasing importance of intangible assets and the subsequent rise in the market to book ratio. While these efforts vary in the degree of change they promote and in their underlying reporting models (EVA in the Canadian model, for instance), their differences are really ones of emphasis. Few have suggested wholesale changes to the way in which markets obtain financial information, such as moving away from the current system of quarterly and audited annual financial statements, with the focus more on incremental improvement than a total rethink.

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[2] http://www.insight-mag.com/insight/03/09/col-2-pt-1-AcquiringMinds.asp.
[3] http://www.iasb.org/uploaded_files/documents/8_63_fw-sum.pdf; http://www.fasb.org/st/#cons; http://www.iasb.org/uploaded_files/documents/8_63_fw-sum.pdf.
[4] http://www.cfainstitute.org/centre/cmp/BusinessReportingModel.html.

What has been lacking, in particular, is an examination of the role that technology has had on dramatically transforming the 21st century business, especially large Fortune 500 firms—beginning with PC's in the 1980s to Enterprise Resource Planning Systems (ERP) such as SAP in the 1990s and the panoply of digital technologies that make up the networked, real time firm of today's "flat economy".[5] The problems these changes pose for financial reporting are well known, with, for example, SEC Commissioner Cynthia A. Glassman recently stating in a talk on "Complexity in Financial Reporting and Disclosure Regulation" that: *"The current questions about the ability of our accounting and reporting framework to communicate meaningful information to investors arise, in part, because the economy continues to evolve at a rapid pace, while reporting standards and mechanisms are in a 'catch-up' mode. Globalization and the emergence of new economies and capital markets have increased dramatically. Advances in technology, including the emergence of the Internet, faster and more ubiquitous communication and other technological developments, have changed the way companies do business, as well as changing the types of financial arrangements and instruments that businesses utilize. As the business world has become more complex, so have financial reports and accounting standards."*[6] And yet, as in this speech by Commissioner Glassman, the discussion inevitably returns to familiar problems in financial accounting and after having raised the issue, fails to consider the role of technology not just as a source of problems for financial reporting, but also as a solution.

The project we propose here is to complement these other initiatives on reforming financial reporting by a particular focus on the capabilities of technology to transform the reporting process: by creating a test bed which can be used to examine new and different technologies for measuring and communicating firm performance that can subsequently be incorporated into a comprehensive new model of business reporting, along with the best ideas from the various other initiatives that stand the test of time.

1.3 The "Galileo" Project

The most direct predecessor of this project is the Enhanced Business Reporting Consortium (EBRC), which defines itself as a *consortium of stakeholders collaborating to improve the quality, integrity, and transparency of information used for decision-making in a cost effective, time efficient manner.*[7] The EBRC is the successor to the Special Committee for the Enhanced Business Reporting Model, also called the

[5] Friedman (2005). See also The Economist, Survey on the Real Time Economy, January 31st, 2002.
[6] http://www.sec.gov/news/speech/2006/spch060806cag.htm.
[7] http://www.ebr360.org/.

Starr Committee after its chairman Michael Starr from Grant Thornton, which was created by the AICPA in response to the collapse of Enron and Arthur Andersen in 2000.

That committee re-examined the proposals presented in the early nineties by another special committee, the Jenkins Committee.[8] Despite the fact that its chairman, Ed Jenkins, subsequently headed the FASB, only a very small subset of the Jenkins Committee recommendations were put into practice, one reason being that the late 1990s bull market made its concerns about the adequacy of GAAP seem excessive. What the Starr committee would really have liked to have determined was whether the malfeasance crisis could have been avoided if the improvements to financial accounting and reporting suggested in the Jenkins report had been implemented. But since that question is essentially unanswerable, the lesson the committee took away from the fate of the Jenkins recommendations was that the accounting profession by itself did not have the authority or the ability to create a new reporting model, regardless of how good its proposals were. Given the enormous societal consequences of changing the reporting system, bringing about substantive change requires the cooperation of a much broader set of stakeholders in the financial reporting process, and bringing them on board was the rationale for transforming the EBR committee into the Enhanced Business Reporting Consortium. The enhanced business reporting model consists of five elements that are meant to give rise to a more useful and robust system of financial reporting:

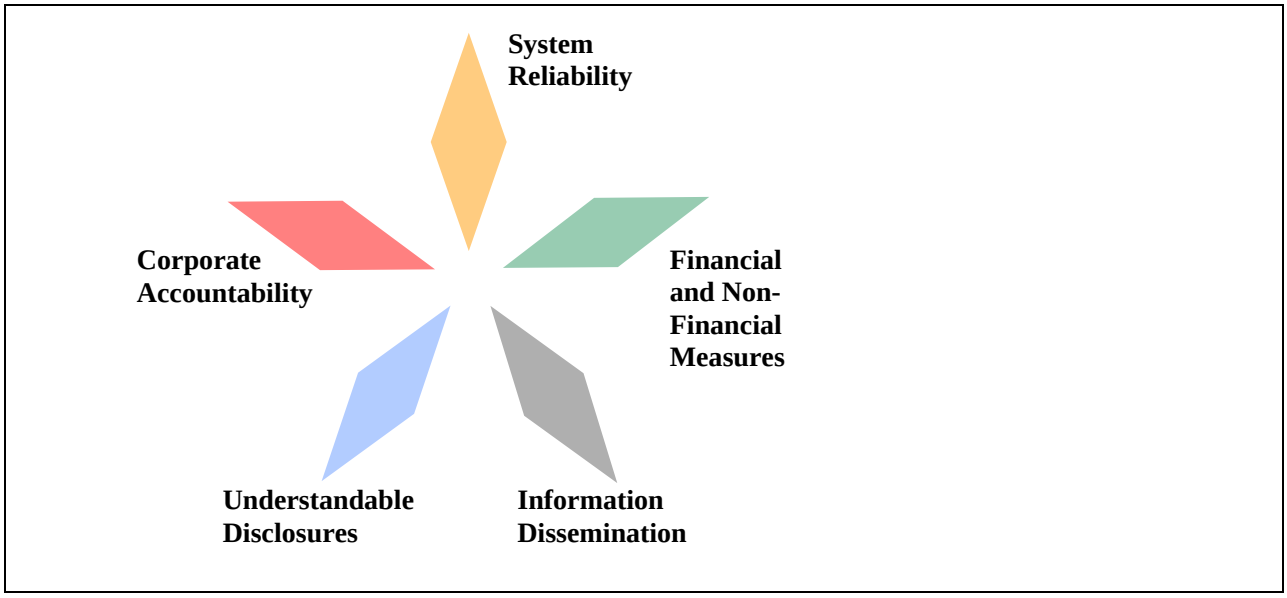

Figure 2: Components of EBRC Model

[8] http://www.nysscpa.org/cpajournal/old/14476941.htm.

To help guide the EBRC, the Public Company Taskforce of the Star committee created a set of sample reports that illustrate the kinds of enhanced disclosures that it feels are necessary and useful for complex organizations in today's information economy.[9] By design, most of these sample reports were not especially "radical". The Starr Committee self imposed mandate was developing a structure for voluntary disclosures that "enhanced" the coverage of the statuary annual income statement and balance sheet, as opposed to questioning the underpinnings of those reports themselves, such as the continued relevance of GAAP.[10] As Paul Herring, the chair of the Public Company Task Force wrote during the process that created the sample reports: *"Formats that follow outlines that are already in general use in the business information supply chain are likely to gain faster acceptance than those that are new… We will explore potential enhancements to the existing financial reporting format but will not consider wholesale re-structuring of the financial statements."* The incremental approach of the EBR process is justified in terms of change management, although as the failure of the Jenkins Committee indicates, caution is by itself no guarantee of acceptance.

The committee did commission one project, known by its internal code name "Galileo", that was by design meant to push the envelope of possible changes to the reporting system. As the EBRC states on its website: *"While [the other sample reports] present ideas that are potential enhancements to existing reporting, the 'Galileo' sample report presents ideas that are further departures from current practice."* The basis of Galileo was the question: What would a reporting system would look like if it was designed from scratch for 21st century firms using 21st century tools for a 21st century audience? It is that emphasis which drives the inevitable focus on technology, because it is technology and all its consequences that define business today.

The other sample reports do not ignore technology, but restrict its use largely for the presentation of reports in a web based rather than paper format. But Galileo went further by not just using it as a medium for communication, but by making the assumption that a new reporting system must logically arise from that IT foundation of the firm and its management.

1.3 Towards an Open Source Solution

The objective of this paper is to help launch an initiative into technology driven business reporting, and to do so in a way that makes use of the characteristics of the information age economy to create an environment for the development of the concept. What we have in mind is

[9] http://www.ebr360.org/ContentPage.aspx?ContentPageId=27.
[10] For this reason the consortium changed its name to "Enhanced" Business Reporting from "New" Business Reporting.

the equivalent of the "open source" development model, of which UNIX is the most prominent example, and which stands in contrast to changes in the standard reporting model which have always been led by bodies "authorized" to do so, such as the FASB or the IASB. As EBRC experience demonstrated, such parties are subject to political constraints that constrain the scope of innovation. Of course, the danger is that a radical approach would fail in translating ideas, however innovative, into action. But, again, a more constrained approach has also had little to show for it, and given that one of the characteristics of the 21st century economy is that it is a highly efficient marketplace for ideas, our hope is that the strength of the ideas for business reporting which a new approach might generate will serve as its own endogenous form of change management.

It must be emphasized that this paper does not provide a definitive model of business reporting. Doing so would defeat the purpose of creating an open source community, even if it were possible for one paper to accomplish the creation of a new system of reporting by itself in the first place. Rather, building on the Galileo work originally done for the EBR consortium, this paper puts forward one set of ideas and visions with that hope that this will begin a process that will create a shared effort on reengineering business reporting from a technology perspective. Our intention here is to lay out some of the larger forces that will shape any new business reporting model and to describe a general framework to organize the thinking of this nascent movement. What this paper really is intended to do is to invite the participation of all those who feel that we can and must do better in the way in which we measure, manage and communicate firm performance in the 21st century.

We begin by going over the well known shortcomings of the existing reporting system. Section 3 then discusses the changes in the fundamental drivers of financial reporting and draws out the implications they have on the characteristics of a 21st century reporting system. Section 4 puts forward the building blocks of a test bed that will help develop that system. These building blocks are intended to serve as the foundations upon which a collaborative effort can be initiated to develop the reporting system. Section 5 offers concluding comments.

2. The Underlying Problems of Business Reporting

The need for drastic change in financial reporting has been recognized by many. When launching the CFA's recommendations for reforming financial reporting to better serve the needs of shareholders, Rebecca T. McEnally, CFA, Ph.D., project director of the Comprehensive Business

Reporting Model and director of the Capital Markets Policy Group for the CFA Centre stated: *"As businesses develop new products and services, the financial reporting model must keep pace to ensure that financial statements are relevant, clear, accurate, and complete. Investors worldwide are too often in the dark about the true value of companies because accounting practices fail to reflect the economics of today's business operations."*[11] Even blunter was Senator Carl Levin, who condemned *"the fiction that corporate financial statements had become: companies technically were in compliance with accounting rules, yet their financial statements were hiding huge debts and other liabilities."*

There are numerous lists of problems in the current financial reporting system. The measurement and implications on earnings and valuation of intangible assets tops most of those lists, followed by accounting for derivatives and consolidations.[12] The perennial issues of accounting for leases, revenue recognition and non-cash compensation remain, while some problems, such as the recognition of uncertainty and the extent to which relevance should trump reliability have dogged accounting since its very inception.[13] Since such issues have been discussed ad nauseum elsewhere, from academic papers to Senate hearings, it would be redundant for us to repeat them here. What is useful, though, is to step back and understand the fundamental basis of financial reporting.

Financial reporting would not be needed if all internal and external stakeholders in the firm shared the same information about how the firm has performed in the past and had similar expectations as to how it will perform in the future. In reality, those within the firm are inevitably in a better position to know its state than those stakeholders outside of it. Moreover, the former are not just informationally advantaged, but as managers they can actually shape the firm's future performance. This is the fundamental informational asymmetry that both motivates and bedevils financial reporting, a reflection of the conflict of interest between shareholders who only care about the financial performance of the firm as reflected in its market price, and managers who can directly benefit from exploiting the firm's assets. Other stakeholders in the company, such as employees, creditors, suppliers, customers, local communities, government agencies and so on have their own points of alignment and conflict with management and look to financial statements to obtain information relevant to their particular decisions.

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[11] http://www.cfainstitute.org/aboutus/press/release/05releases/20051024_01.html.
[12] http://www.sec.gov/news/speech/2006/spch060806cag.htm.
[13] http://www.sec.gov/news/speech/spch483.htm.

These informational asymmetry and moral hazard issues add the possibility of deliberately distorted reporting to the already formidable problem of measuring firm performance. Moreover, measuring past firm performance is largely a means towards the end of forecasting future performance, for it is only the future and not the past that affects firm valuation.[14] Clearly managers can affect the degree to which past performance predicts future performance, thus affecting the value of financial reporting.

Adding to these incentive problems are changes in the way in which firms transform capital into returns. Once the main function of the firm was to apply unskilled labor to physical assets, meaning that reporting which concentrated on the disposition of those tangible assets adequately captured firm performance. Indeed, even accuracy in measuring assets could be sacrificed for other goals such as reliability through the doctrine of conservatism without greatly reducing the usefulness of the reports. But firms today create value by the use of such intangible assets as knowledge and the skills of its workers with the result that the relationship between its physical assets and its performance is greatly diminished. This creates two problems: a pure measurement issue of how to account for the presence and role of intangibles and an incentive problem in that this weaker relationship opens up a wider scope for managers to manipulate earnings.[15]

An example of these challenges comes from the decision by Cisco Systems, in May 2001, to write-down its inventory by $2.25 billion, an amount larger than the inventory value in its books.[16] One explanation is that the write-down related to the value of inventories that could be not sold by its suppliers in the value chain where Cisco had a contractual or moral obligation. In particular, during the e-commerce boom Cisco had offered many of its dot-com customers' vendor financing in exchange for sales contracts, while signing contracts itself with downstream suppliers in anticipation of tight demand. These obligations were not reflected anywhere in the financial statements, thus, in hindsight, clearly overstating the firm's profit potential. Of course, even granting these measurement problems, there was also the suspicion that the sheer magnitude of the write-off resulted from the use of the well known tactic of the "big bath", in which if reporting some bad news is unavoidable, then the best of a bad lot is taken advantage of by writing of all other possible bad news in advance in one shot, thereby creating reserves to boost income in the future.

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[14] The CICA performance reporting review specifically addressed this issue.
[15] Lev, 2001. Daum, 2002.
[16] http://money.cnn.com/2001/05/08/news/earns_cisco/.

This example and the difficulty in disentangling its purpose are indicative of the difficulty that users face today with financial reports. This is not an example of fraud, but rather an example of what is arguably a far more compelling problem: the systematic inability of the current financial reporting system to meet the needs of users to understand the ways in which complex organizations perform and to hold their managers accountable.

This example also undermines one of the arguments in support of the current financial reporting system and against changes to that system: the need to maintain comparability and consistency across firms in the ways in which they account. In the case of Cisco, even long established and relatively uncontroversial rules on inventory valuation could not guarantee that different firms will apply those rules in the same way given the underlying ambiguity about what is being measured. This is really an argument for more information disclosure to enable stakeholders to better discern the purpose and meaning of each transaction.

3. A Conceptual Basis for Reengineering Financial Statements

3.1 The Changing Drivers of Financial Reporting

The Concept Statements that underlie the current US financial reporting systems state that *"Financial reporting should provide information that is useful to present and potential investors and creditors and other users in making rational investment, credit, and similar decisions. The information should be comprehensible to those who have a reasonable understanding of business and economic activities and are willing to study the information with reasonable diligence."* [Paragraph 34, Statement of Financial Accounting Concepts No. 1]. That information is communicated principally through the mandated financial statements: *"Financial statements are a central feature of financial reporting. They are a principal means of communicating accounting information to those outside an enterprise."* [Paragraph 6 Statement of Financial Accounting Concepts No. 1].[17]

Of particular significance is how the quality and nature of the information conveyed by those statements is determined: *"Whether at the level of the Board or the individual preparer, the primary criterion of choice between two alternative accounting methods involves asking which method produces the better—that is, the more useful—information. If that question can be answered with reasonable assurance, it is then necessary to ask whether the value of the better information sufficiently exceeds that of the inferior information to justify its extra cost, if any. If a satisfactory answer can again be given, the choice between the alternative methods is clear.*

[17] http://www.fasb.org/pdf/con1.pdf.

The qualities that distinguish 'better' (more useful) information from 'inferior' (less useful) information are primarily the qualities of relevance and reliability, with some other characteristics that those qualities imply. Subject to considerations of cost, the objective of accounting policy decisions is to produce accounting information that is relevant to the purposes to be served and is reliable." [Paragraphs 14 and 15, Statement of Financial Accounting Concepts No. 2].[18]

We have quoted these at length in order to give some context to the issues that face any proposed changes to the financial reporting system. The current joint project of the IASB and the FASB to converge their conceptual statements attempts to deal with some of the shortcomings in these original conceptual statements that have emerged over time. That process is has just begun and it is pointless for us to attempt to replicate or replace it. But it is useful to see at this highest level what drives financial reporting, of which we focus on three issues:

1. The users of financial information and their capabilities. As the quote above indicates, such users are no longer considered to be the unsophisticated "widows and orphans" that apocryphally motivated the passage of the original securities acts in the 1930's, at the height of the Great Depression. But having a "*reasonable understanding of business and economic activities and are willing to study the information with reasonable diligence"* seems to be a rather minimalistic description of the investment bankers, hedge funds, credit rating agencies and institutional investors that dominate financial markets today. A 21st century reporting model would surely give greater prominence to these sophisticated players—and the technology that they utilize to arbitrage even the slightest price discrepancy—that make the market today, as opposed to passive investors who enter the market largely through such intermediaries as mutual and pension funds.

Indeed, while fifty years ago private investors owned over 90% of all shares outstanding of US firms, their stake has plummeted to only around 30% with the share of ownership by such large financial institutions as pension funds and mutual funds having increased in the same time period from under 10% to almost 70%. Moreover, while in decades past such large equity holders had an asset turnover in their portfolios of less than 20% per year, in the last few years that rate has shot up astonishingly to over 90%, which suggests a far more dynamic trading strategy, accompanied by very different informational needs.[19] The issue of how users use information and what form they get it in is intimately connected with the costs of financial reporting.

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[18] http://www.fasb.org/pdf/con2.pdf.
[19] "Individual Investor, RIP", John Bogle, Wall Street Journal, October 3, 2005.

2. The Costs of Financial Information Processing and Reporting. The costs of preparing financial information clearly affected the original focus on the annual financial statements as the "*central feature of financial reporting*". They serve as summary measures of the state of the firm and its performance. Such summarization and condensation inevitably results in a loss of information which cannot be in the best interest of users unless the measure perfectly captures future firm value, or the costs of more detailed information exceed its benefits to users. What is the cost of preparing financial statements? The answer to that question is often complicated by the conflation of the potential cost of reporting in general, and the specific cost of meeting the current financial reporting standards. In other words, the cost induced by such complex standards as those on pensions or derivatives should not be taken as indicative of the cost of meeting any standard, current or proposed.

The fact is that the cost of maintaining and reporting accounting records has fallen dramatically with the development of software and electronic stock keeping. Thus an ERP system such as SAP can generate innumerable reports on a continuous basis without the need for the manual closing and reconciliation of ledgers that used to characterize accounting for much of its history. Data entry is increasingly automated thanks to bar coding and soon, with RFID chips, and the key change accounting software makes is to change data processing and report preparation from a variable to a fixed cost. That fixed cost keeps decreasing thanks to Moore's Law, the rise of manufacturing in China and the various other factors that have made IT so much more cost effective in the last few years, and which accountants can take advantage of.

It is also important to put the costs of disclosure against two other costs: the first is the opportunity cost when faulty disclosures harm the company, for example, by increasing its cost of capital.

Users of the information will be able to retrieve information in multiple formats. Conceptually, we see two potential approaches, namely, XBRL type of reports and user driven reports. Using the framework of XBRL it is possible to facilitate numerous types of reports that can efficiently be parsed by computers. Alternatively, custom reports could be generated by users by gaining access to the specialized reporting data warehouse. The utilization of technology expands and improves the representational capabilities of business reporting. The characteristics of these reports will be driven by the overall goal of providing context for the information provided: Figure shows a three dimensional display of sales by month, product and region. The "virtual cube" could be composed of many dimensions (more than the three in Figure) by improved visualization or by the display of multiple tables, for example with a three dimensional cube for each division for the four divisions of a company.

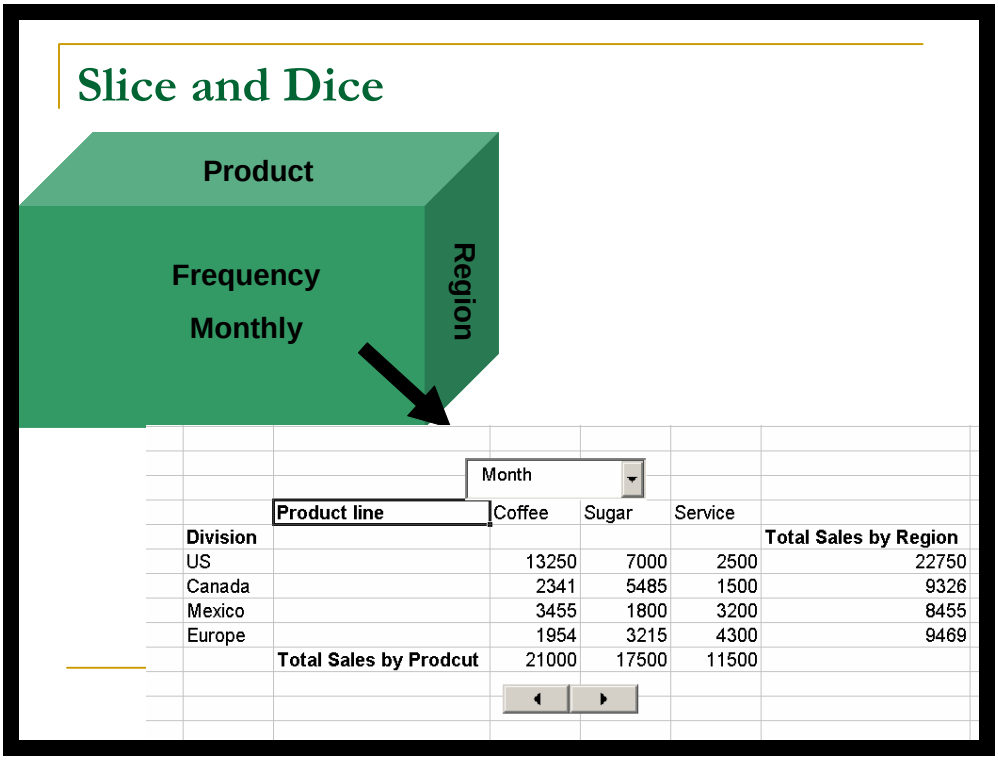

Figure 7: OLAP breakdown of data

Another driver of context is the drill down capability of technology based measurement and reporting. While the basic concepts relative to drill-downs are trivial, their actual capabilities can substantially improve the corporate measurement and disclosure. Drill-downs allow the user to disaggregate information provided as an aggregate. For example yearly sales could be drilled down to sales by month, by division, by product and all the way down to a specific transaction, and this

transaction scrutinized in relation to its contractual terms, timing, levels of approval, and controls. Of course, external users would the extent of this drill down more constrained than for an internal user, as the details of the data begin to impinge on the firm's confidentiality.

Having a drill-down capability in the test bed is the medium to bring about the recalibration of the reporting process discussed above. Traditional reporting is firm driven with all disclosure choice done by the firm's managers. While voluntary disclosures expand on the GAAP minimum, this is nonetheless very much a top down form of reporting in which the user has little choice and the discloser can potentially manipulate reports to support a desired story. The drill-down capabilities, based on the capabilities resulting from implementing BB1, BB2 and BB3, changes the business measurement process by having the firm provide access to a large set of basic data aggregated along key choices that the discloser makes. On the other hand, the user has the option, within the limits of the information made available, and the toolset (e.g. OLAP, stylesheets, spreadsheet downloads, aggregation functions, hyperlinks) to choose a set of views of the business entity not necessarily anticipated by the measured entity. User driven disclosure represents a very different set of premises where the disclosure are context driven, directed to the users' needs and competencies.

The scenarios in the figure below illustrate the kind of context that users would likely find useful if they could obtain access to it.

Objective	**Contexts**
Performance evaluation	• See high level reports of the company • Find the same type of comparable reports • Compute key performance indicators that give early warning and are of easy comparability
Cash flow availability	• See summary cash flow • Identify transactions that should be excluded from cash flow such as pledging of receivables, acceleration of collections, delay in supplier payments • Exclude these out of cash flow • Break cash flow generation by sub-units

	• Exclude /separate cash flows from financial subsidiaries • Extract cash flows from loans and other forms of indirect financing
Malfeasance issues • Round trip transactions • Front-ending on contracts • Inappropriate capitalization	• Drilling down into transactions using analytical filtering- e.g. large transactions, end of quarter transactions, transactions with certain partners • Identifying the nature of transactions through their documentation • Tying transactions to their documentation
Malfeasance issues II • Burying results into mergers • Reasons for a big bang	• Separating sub-entity results • Clearly identifying inter sub-entity activity • Drilling down to details and support of reserves
Evaluating performance of subsidiaries and related entities	• Cut business reports by segments • Look at segments as individual entities, apply analytics to compensate for consolidation effects • Have access to these consolidation effects
Understanding regional markets	• Cut business report by segments • Cut segments by region • Obtain results by region and by product

Figure 8: Context based user driven disclosure

Allied to drilldowns is the power of the hyperlinks. With Web technology objects can be linked through Web addresses of other objects. Hyperlink technology allows for linking objects of different nature and this addressing can be used for establishing, delimiting and determining different types of relationships. For example, XBRL instance documents can be pointed towards the taxonomies that define data relationships, Web pages can incorporate links to related pages, and transactions can be hyperlinked to remote databases bases with supporting documents, all in the interests of providing as rich a context as possible for users to utilize to the extent that they need and can absorb.

BB 5: "Auditability" must be an inherent characteristic of a business reporting system

The only meaningful reports are credible ones and the basis of credibility in business is independent assurance. Hence the ability to audit financial information has to be built in to the financial reporting system, rather than having the auditor as a literally external inspector of the system's final output. Continuous auditing must be incorporated into the firm's management control infrastructure from which external reports are extracted. From the data level upwards there must be assurance that information flows throughout the firm are secure and accurate. In particular, with less preprocessing of information and more disaggregate being released for users to manipulate as they see fit, data level assurance will become essential. In other words, as reporting expands beyond the mandated financial statements, so must the scope and reach of auditing.

Technical architecture to implement BB4 in test bed:

There is an intensive research program into continuous auditing and its relationship with continuous reporting (Alles et al 2002, 2004, 2006). May ERP systems already have audit capability built in and independent software products such as Approva and ACL Caseware are now entering the market. But much work needs to be done on the mechanisms for integrating control monitoring and data assurance into the information infrastructure of the firm that supports both continuous auditing and financial reporting.

BB 6: The business reporting test bed is a process and not an outcome

This is more a philosophy than a building block, but it is listed as one because it is something that needs to be always kept in mind. A test bed is a means towards and end and not an end in itself. It is not expected to be put into practice as is but to serve as a device to experiment with new technologies and techniques that can be migrated into practice through a change management process. In addition to technical development substantial education and evolution must happen for radical proposals to gain acceptance, such as BB2. It needs to be kept in mind that change that seems glacial going forward often looks dramatic in hindsight. For example, web-based reporting, a product of the nineties would not have been even conceivable even twenty years earlier but it is now part of the basic skills of the majority of information users and presents undeniable improvement over the traditional paper based model. The lesson is that any new reporting model must be dynamic, with deliberate built in obsolescence, so that it is continually updated as technology changes. It is precisely because no such mechanism is associated with the existing

reporting system that there has been great difficulty in changing it in response to technological advances.

6. Conclusion

In this paper we issue a call to take a fresh approach towards the business reporting model to make it compatible with the 21st century information age economy. As technology is the driver of that economy, so it is the fundamental basis of the new reporting system, both as a tool for measurement and communication of firm performance and conceptually, in helping shape expectations for what is possible in a reporting system. Applying the lessons from earlier technology implementations, the best outcomes arise when processes are changes to match the capabilities of the technology rather than using technology to simply existing processes. Hence we argue that the kind of piece meal change proposed to the reporting system over the last few years will not result in truly innovative improvements. Instead what is needed is a collaborative effort to create a test bed for experimenting with change to the business reporting model, without preconceptions or constraints, so that it is truly of the 21st century.

1. Alles, M.A., Kogan, A. and M.A. Vasarhelyi, 2002. Feasibility and Economics of Continuous Assurance, Auditing: A Journal of Theory and Practice, Vol. 21, No. 1, pp. 125-138, March.
2. Alles, M.A., Kogan, A. and M.A. Vasarhelyi, 2004. Restoring Auditor Credibility: Tertiary Monitoring and Logging of Continuous Assurance Systems. International Journal of Accounting Information Systems, Vol. 5, No. 2, pp. 183-202, June.
3. Alles, M.A., Kogan, A. and M.A. Vasarhelyi, 2006. 2. Continuous Monitoring of Business Process Controls: A Pilot Implementation of a Continuous Auditing System at Siemens. International Journal of Accounting Information Systems, Vol. 7, pp. 137-161.
4. Botosan, C. 1997. Disclosure Level and the Cost of Capital. The Accounting Review. Vol. 72, No. 3, pp. 323–349.
5. CFA Institute. 2005. A Comprehensive Business Reporting Model: Financial Reporting for Investors.
6. Daum, J. 2002. Intangible Assets and Value Creation. John Wiley & Sons.

7. Davenport, T.H. and J.E. Short, 1990. The New Industrial Engineering: Information Technology and Business Process Redesign. *Sloan Management Review*, 11 – 27, Summer.
8. Friedman, T. 2005. The World is Flat: A Brief History of the 21st Century. Farrar Straus Giroux.
9. Greenstein, M.L. and M.A. Vasarhelyi, 2002. Electronic Commerce: Security, Risk Management, and Control, McGraw Hill.
10. Hand, J. 1990. A test of the extended functional fixation hypothesis. The Accounting Review. Vol. 65, No. 4, pp. 740-763.
11. Hirst, E. and Hopkins, P. 1998. Comprehensive Income Reporting and Analysts' Valuation Judgments. Journal of Accounting Research. Vol. 36, pp. 47-75.
12. Johnson, H. and Kaplan, R. Relevance Lost: The Rise and Fall of Management Accounting. Harvard Business School Press, 1987.
13. Lev, B. 2001. Intangibles: Management, Measurement, and Reporting. Brookings Institute.
14. Vasarhelyi, M.A. and F. Halper. 1991. The Continuous Audit of Online Systems. Auditing: A Journal of Practice and Theory, 10 (1) 110-12
15. Vasarhelyi, M.A and M.L. Greenstein. 2003. Underlying Principles of the Electronization of Business: A Research Agenda, International Journal of Accounting Information Systems, 49 (2003) pp. 1-25.
16. Vasarhelyi, M.A., Alles, M.A. and A. Kogan, 2004. Principles of Analytic Monitoring for Continuous Assurance. Journal of Emerging Technologies in Accounting, Vol. 1, No. 1, pp. 1-21.