1. Digitizing Financial Reports

Many things seem to be going digital[1]. The dawn of the era of digital financial reporting has arrived.

Digital technology has become an integral part of society and culture. If you have a camera, it is likely to be digital. If you are into music, you probably listen to it on your digital music player. You probably record your television programs on your digital video recorder and watch them whenever you want. You are likely to read your digital book on your Kindle or iPad. You probably look up information more on Wikipedia than you do in Encyclopedia Britannica. Internet stores like Amazon.com are changing how we buy, consume and research products. Social networking like Facebook.com and LinkedIn.com are changing how we relate to customers and colleagues. Google changes what we know and how we learn. Blogs change where we get our news from. Groupon has changed the way we think about coupons.

Financial statements too are going digital.

1.1. Understanding the term "digital financial report"

For about the past 100 years or so, financial reporting has been paper-based. It has been only within the last 25 to 30 years that financial reports have been created electronically using a word processor and then printed or saved to an electronic format such as PDF or HTML or simply printed on paper.

The information contained in electronic formats such as PDF and HTML can still only be read by humans. Information is structured for presentation, not meaning.

Digital financial reporting, in contrast, makes this information readable by both humans and computer software applications. Information is structured for meaning[2].

Such help from machines can reduce the time and therefore the costs of creating and consuming financial report information and at the same time improve the quality of a financial report.

With machine readability of financial reports, computer software application can read the reported financial information seemingly *understand* the information. Software can help make sure things like mathematical computations are correct and intact throughout the report. Automated software processes can compare reported information to mandated disclosure requirements and make sure the report creator complied with those requirements. Rather than a disclosure checklist being nothing more than a memory jogger for a manual process, disclosure checklists can be likewise digital and many here-to-for manual processes automated.

Here are some examples of the benefits of a digital financial report:

- Processes can be reliably automated because computers can reliably move information through the workflow. Linking digital financial information together based on the meaning of the information can be much more reliable than trying to link physical locations within spreadsheets, which commonly change.

[1] Digital Isn't Software, It's a Mindset, http://xbrl.squarespace.com/journal/2014/3/18/digital-isnt-software-it-is-a-mindset.html

[2] How XBRL Works video, https://www.youtube.com/watch?v=nATJBPOiTxM

- Ambiguity is reduced because for a computer to make use of the information, that information cannot be ambiguous. Making the information easy for a computer to understand also makes it easier for humans to communicate more effectively.
- Reported information can be easily reconfigured, reformatted and otherwise repurposed without rekeying to suit the specific needs of an analyst, investor, or regulator.
- Software can easily adapt itself to specific reporting scenarios and user preferences because it understands the information it is working with.

This is not to say that humans will no longer be involved in creating or consuming financial reports. Clearly, machines will never be able to exercise judgment, which remains something only humans can do.

And although all this may seem like magic, there is no magic is involved here. Instead, digital financial reporting relies on well-understood information technology practices, agreement on standard technical syntaxes and careful and clear articulation of already agreed-upon financial reporting rules in a form that computers can effectively understand.

Three things are necessary to make financial information, or any information for that matter, understandable by machines.

- First, you need a machine-readable technical syntax. In the case of financial reports, the Extensible Business Reporting Language (XBRL), a global standard format for expressing business information digitally is used.
- Second, you need machine-readable business domain rules (semantics), you need to express the semantics of the domain you want the computer to understand. Semantics has to do with meaning: what are the important things in a business domain, such as financial reporting, and what are the important relations between the things that a computer must understand.
- Third, you need machine-readable workflow rules, you need to express workflow or process rules so that the machines understand the correct protocol for exchanging and otherwise working with the information.

Ultimately, this is what the technical syntax, business domain semantics and process protocols are all about: exchanging information (such as financial information) from one business system to another and both systems correctly and consistently understanding that information in the same way - achieving a common understanding of the information.

The U.S. Securities and Exchange Commission (SEC) is a pioneer in digital financial reporting. In 2009, it mandated that every public company that files financial information with the SEC do so digitally using the XBRL technical syntax. Some business domain semantics have been expressed for both U.S. Generally Accepted Accounting Principles (US GAAP) and International Financial Reporting Standards (IFRS) in the form of XBRL taxonomies.

Digital financial reporting still has a long way to go, however. Just as other business domains such as healthcare work to create process improvements by digitizing medical records, for example, these initiatives take time, money and lots of effort. Plus, these state-of-the-art technologies must be proven to work correctly before business professionals can fully employ them.

For the past 15 years, organizations such as the American Institute of Certified Public Accountants (AICPA), the IFRS Foundation, software vendors and regulators such as the SEC have been working to create and perfect the necessary technical syntax, financial reporting domain semantics and workflow protocols to enable digital financial reporting.

Arguably, the boldest step toward digital financial reporting has been XBRL-based public company financial reporting to the SEC. Because of the nature of US GAAP, the sophistication and complexity of financial reports created by public companies, and the desire to make use of their financial information, this use of digital financial reporting is a real test of its viability.

1.2. Understanding the value proposition of structured information

As was said above, for 100 years or so financial reporting has been paper based. It was only in the last 25 to 30 years that financial reports have been created electronically in a word processor and then printed or saved to an electronic format such as PDF or HTML.

During the age of paper, paper-based spreadsheets were used to summarize, aggregate, or other organize detailed information which made its way to the financial report. Electronic spreadsheets replaced paper-based spreadsheets.

External financial reports can be required to be provided to a regulator such as the Securities and Exchange Commission (SEC), such is the case for public companies. Certain industries comply with the requirements of other regulators such as financial institutions provide financial information to the Federal Deposit Insurance Corporation (FDIC). Private companies provide external financial statements to commercial lending institutions in support of commercial loans. State and local governmental entities provide external financial statements to voters and to lenders who provide bonds and other financing. Not-for-profit entities provide financial statements in support of federal grants. These external financial statements may have different disclosures which are required, but they are all general purpose financial reports. The economic entities or accounting entities which create these general purpose financial reports must comply with specific reporting rules.

The flip side of compliance with the rules and regulations related to external financial reports is noncompliance. Noncompliance is a risk which is managed by those creating external financial reports. Machine-readable rules can help those creating financial reports comply with required reporting rules.

Because, historically, external financial reports were unstructured; there was no other way to ensure compliance then by throwing humans at the problem. Compliance involved humans doing lots of work; all the work really.

When information is structured, something very significant changes. While unstructured information is not understandable by machines such as computers; structured information can be understood[3]. How much can be understood is dependent on the nature of the structure. The richer and more expressive the representation structure, the more information that can be provided in machine

[3] How XBRL Works, https://www.youtube.com/watch?v=nATJBPOiTxM

readable form[4]. The more information provided in machine readable form, the more a machine can understand.

But the structure alone is not enough to provide much value to those creating external financial reports. When computer readable business rules[5] that articulate information about the structured information, very interesting things start to happen.

As I said earlier, humans were the only way to make sure the information of unstructured external financial reports were in compliance (correct, complete, accurate, and consistent).

When information is structured and when a rich set of machine-readable business rules is created, some of the tasks associated with compliance can be moved from manual tasks performed by humans to automated tasks performed by machines. How much which was manual can be automated? That depends on the structure and on the business rules created.

Why turn manual processes into automated processes? Why do auto makers use robots and other machines in the process of creating cars? Automation can be cheaper than humans in many cases. Machines make way fewer mistakes than humans when repetitive tasks are performed. Machines are faster than humans. Machines are more consistent, tolerances are tighter, quality can be better in certain areas.

Can 100% of the process of creating an external financial report be automated and performed by machines? No way. There is a tremendous amount of professional judgment which is required to create an external financial report. Tasks that require human judgment can never be automated. However, there are repetitive, mindless tasks that are also part of the external financial report creation process. Many of those tasks can be automated.

What are the benefits of successfully automating here-to-for manual tasks? This is the value proposition:

- Taking manual processes and automating those processes using structured information and machine readable business rules. This can save time, reduce costs, and improve quality.
- Taking complex tasks which require significant knowledge and reducing the knowledge which is required by having a machine assist the business user, supplementing that human's knowledge.
- Reducing the time needed to create an external financial report.
- Increasing the quality of the external business report by leveraging automation, thus reducing human error by reducing the tasks which humans perform.
- Reducing the risk of noncompliance.
- The discipline and rigor of defining the rules of the financial reporting conceptual framework in machine readable form causes an increase in the clarity of the business rules articulated over the current approach of defining

[4] Comparison of representation structures and relative automation/reasoning capacity, http://www.xbrlsite.com/2014/Library/ExpressivenessAndReasonaingCapacityComparison.jpg

[5] Understanding business rules, http://xbrl.squarespace.com/journal/2009/10/18/business-rules-what-are-they.html

these business rules in books which tend to have gaps, inconsistencies, ambiguities, duplication, etc[6].

Now, if you take current processes, leave those processes in place, and then try and structure information after the a financial report has been created it is very hard to grasp the value of structured information. But if you totally reengineered the process of creating an external financial report, the value is easy to understand.

How many business rules are we talking about? Many thousands potentially. Sound overwhelming? Well, those business rules already exist. They are organized in the brains of the humans who perform those manual processes. A human gets sick, a human finds a new job, knowledge leaves the organization. Machine readable business rules become part of the organization's knowledge base and internal processes. A significant amount of the value is the business rules themselves. Many of these business rules are documented, but documented in forms not readable by machines.

But what if these business rules were readable by both humans and machines?

Business professionals are in control of the metadata and business rules, not information technology departments. Applications are driven by models, metadata, and business rules. Rather than information technology departments hard coding rules which business professionals have to then rely on information technology departments to change when the business environment changes; business professionals reconfigure metadata and change business rules to adapt systems to new business circumstances. This is a new paradigm, machines driven by models and metadata controlled by business professionals.

Business professionals will work with software which has financial disclosure models[7] and financial disclosure processors. These software applications understand the structured information, metadata, and business rules. The software does not force business professionals to deal with the underlying technologies. Complexity[8] is hidden from business professionals by the models and processors.

Which technical syntax is used to structure information and articulate business rules is a secondary consideration. Global standard technical syntaxes are better than proprietary technical syntaxes. More expressive technical syntaxes are better than less expressive technical syntaxes. Internet enabled structured information is better than non-Internet enabled structured information.

Pressing the "Save as XBRL..." button is a secondary consideration. Whether the structured information is used for further analysis is a byproduct of properly creating the structured information. Using the information for analysis has nothing to do with whether structured information has value in the creation process.

If value can be created in the process of creating external financial reports, it is highly likely that value can be created in other domains using the same or similar technologies and techniques.

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[6] Differentiating Alternatives from Ambiguity in US GAAP, http://xbrl.squarespace.com/journal/2015/4/22/differentiating-alternatives-from-ambiguity-in-us-gaap.html

[7] Financial Report Semantics and Dynamics Theory, http://xbrl.squarespace.com/fin-report-sem-dyn-theory/

[8] Beating down complexity, http://xbrl.squarespace.com/journal/2014/6/14/beating-down-complexity.html

But to realize this value the system needs to work. The information created and exchanged to a consumer of the information must have the same meaning to creator and consumer. The system must be reliable and predictable. Processes must be repeatable and safe. This cannot be a guessing game if it is to be useful.

Achieving the value proposition is a choice. All the necessary technology exists.

1.3. Understanding the value proposition of actionable information

In 2008 both the global consultancy Gartner and leading benchmark research and advisory services firm Ventana Research released white papers which described inefficient corporate reporting process which they predicted would change. (See Gartner's *XBRL Will Enhance Corporate Disclosure and Corporate Performance Management* and Ventana's *Selecting the Right XBRL Solution: Addressing Compliance Requirements and Automating the External Reporting Process*.)

This is Ventana's description of the process:

> "Thus, the current close-to-file process is structurally prone to error. It poses a risk that mistakes and misstatements will occur. Most companies deal with this potential for errors and the risks they pose with a brute-force approach, using well-paid professionals (who could be doing more productive things) to check and double-check the documents. This might be a workable approach today, but it becomes increasingly difficult and costly as the amount of required tagging increases."

While being productive tools, spreadsheets, word processor documents, and desktop databases are wreaking havoc on organizations. The large number of spreadsheets, word processing documents, and desktop databases make up the highly manual, time consuming and error prone process they require is the approach of today.

XBRL part of the change, a trend, a paradigm shift toward model-based semantic structured authoring of business reports.

1.3.1.Digital business reports

Business system to business system information exchange is no easy task. Yet achieving this interoperability will result in new cost effective, easy to use, robust, reliable, repeatable, predictable, scalable, secure, auditable, business information exchange across business systems. Some business systems might be internal to your organization, others might be external to your organization.

A business user who has a business information exchange problem could always go to the information technology department and working with the information technology department solve any business information exchange problem. But these solutions care costly.

What if a business user, independent of the information technology department, could solve a business system to business system information exchange problem without having to trouble with the information technology department? That is what digital financial reporting is all about.

1.3.2. Digital business reports ends "spread sheet hell"

Business professionals love their spreadsheets. Information technology departments loth spreadsheets[9]. People point out the flaws of the electronic spreadsheet. For example, this web page points out the following 10 disadvantages of spreadsheets as being:

- Vulnerable to fraud
- Susceptible to trivial human errors
- Difficult to troubleshoot or test
- Obstructive to regulatory compliance
- Unfit for agile business practices
- Not designed for collaborative work
- Hard to consolidate
- Incapable of supporting quick decision making
- Unsuited for business continuity
- Scales poorly

An article published by Government Technology, *XBRL Ends Spreadsheet Hell*, explains how XBRL ended spreadsheet hell for a department within the state of Nevada. Kim Wallin, Nevada's controller says:

> "The goals were timely and accurate data, stronger internal controls, reduced costs, a standardized system of seamless data exchange, business processes and data elements. XBRL met all of those goals."

The article discusses two projects where XBRL was used to supplement what had been done with spreadsheets alone. One project related to the tracking of grants and the other relating to debt collection.

What if there were a new type of spreadsheet? Imagine a semantic spreadsheet[10].

1.3.3. Understanding the term actionable information

Actionable information is information from a trusted source about something that is important to you and once known to you will drive you to take some action.

The following is an example which helps explain what actionable information is by John Alber[11], *Delivering Actionable Information To Front-Line Lawyers*:

> "If a friend tells you that you have something in your teeth, chances are you'll visit a mirror and attend to the problem. That's actionable information. It is information (1) from a trusted source, (2) about something that's important to you, and (3) that, once known to you, will impel you to take action."

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[9] Time for a new take on the electronic spreadsheet, http://xbrl.squarespace.com/journal/2013/8/2/time-for-a-new-take-on-the-electronic-spreadsheet.html

[10] Understanding Cell Stores and NOLAP, the Future of the Spreadsheet, http://xbrl.squarespace.com/journal/2014/11/14/understanding-cell-stores-and-nolap-the-future-of-the-spread.html

[11] *Delivering Actionable Information To Front-Line Lawyers*, http://www.llrx.com/features/actionableinfo.htm

While the article talks about law firms, it has general applicability.

Ask yourself this question. In your organization, how does the mass of information which you have available become actionable? Is that process as efficient and as effective as it could be? If your organization is like most others, chances are that the process involves lots of reports, spreadsheets, re-keying, etc.

1.3.4. Understanding the structured information and metadata opportunity (or threat)

The move to digital financial reporting will cause a number of very significant shifts. One of these shifts relates to how metadata can be employed. This shift is both an opportunity and a threat. Most professional accountants and CPAs don't have a good enough grasp as to what metadata is or the role it plays. Therefore, nor do they understand the side of the shift equation on which they will end up.

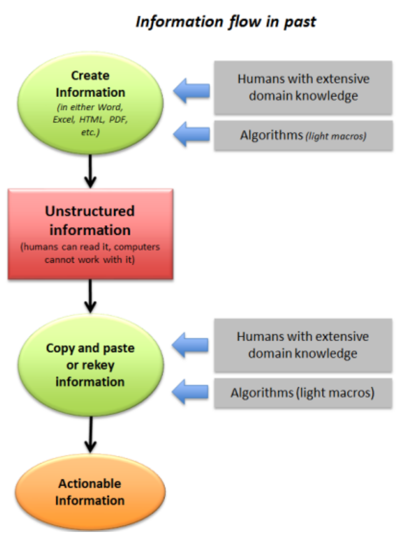
This is what we mean.

Let me use the external financial statement as an example. Most external financial statements today are created using Microsoft Word. I hear the number 85%. I am not talking about the balance sheet, income statement, and maybe cash flow statement which might be generated from an accounting or ERP system. I am talking about a complete external financial statement.

So, how much does Microsoft Word know about financial statements? You are probably thinking that this is a rather odd question; of course Word knows nothing about financial statements. The person creating the financial statement is the one which knows about financial statements; they use their knowledge of financial reporting and US GAAP or IFRS to create a financial statement using Word.

That is exactly the problem. In fact, it is two problems. The first problem is that Word cannot help you create that financial statement and get it correct. The second problem is that once the information is put into Word, because Word does not have any knowledge of the financial information within the financial statement; reusing that information involves humans, usually with domain knowledge, rekeying that information in order to make the information actionable.

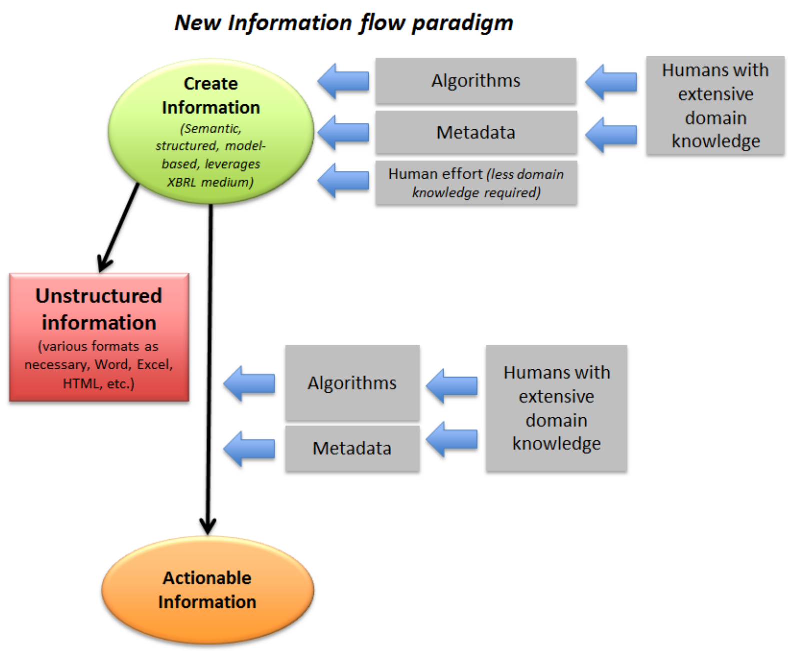
The graphic below shows this has worked in the past (and likely how most people do this today):



But what if Word did understand financial statements? Well, Word my never understand external financial statements, but other applications will. You could get Word to understand financial statements by using its macro language, which is VBA and actually quite powerful, but more likely other applications will be created. And how might a software application understand a financial statement you might ask? The answer is machine-readable structured information and metadata. (To understand that statement is a journey, start here on that journey. This has the complete story. Once you see this in action, you will get it, get it.)

Basically information which you and other know about a domain such as financial reporting will be expressed in a form which a computer can understand. That is what the XBRL medium does; it expresses information in a structured form so a computer can understand it. Additional information, metadata, will be expressed which is helpful in working with that structured information.

Algorithms, or computer programs, will do stuff with that structured information and metadata. Lots of stuff. The graphic below shows this:



So two things will happen. First, who can create information and how they create that information will change dramatically. Because the computer can help the user, a less skilled person can do the work because the human knowledge is now expressed in the metadata. Second, automated reusing the information will become possible.

This will spiral, the possibilities widening and widening as more and more metadata and algorithms are created and employed.

What is the threat? If your skill is memorizing and regurgitating information, this is a threat. If your skill is rekeying information, this is a threat. Basically, think of what numerically controlled (NC) machines[12] did to the manufacturing process. Robots build a lot of stuff today using algorithms and metadata which control the machines which churn out consistent, higher quality output than humans can generally create.

12 Numerically controlled machines, http://en.wikipedia.org/wiki/Numerical_control

The opportunity? Creating algorithms, creating metadata, doing value-add analysis of all that structured, model-based information.

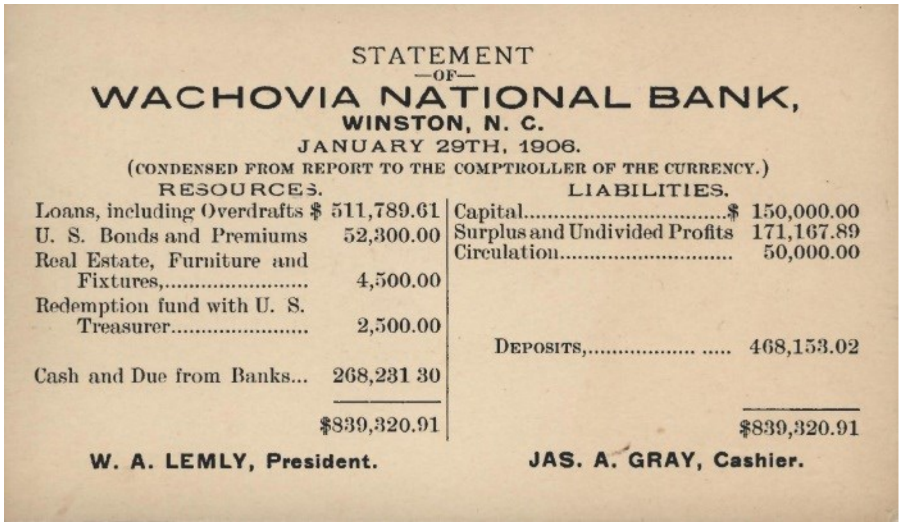
And these opportunities and threats are not limited to external financial reporting, or even financial reporting. These same ideas can be applied to many, many other domains.

1.4. Evolution of financial report mediums

Things change. Below is a summary of the evolution of the financial report. Each of these examples shows a balance sheet.

First we show the annual balance sheet of a State-owned farm in Mesopotamia, drawn-up by the scribe responsible for artisans: detailed account of raw materials and workdays for a basketry workshop. The medium is clay and this balance sheet was created in 2040 BC:

Here we show a 20th century balance sheet of Wachovia National Bank, 1906. The medium is paper.



STATEMENT
—OF—
WACHOVIA NATIONAL BANK,
WINSTON, N. C.
JANUARY 29TH, 1906.
(CONDENSED FROM REPORT TO THE COMPTROLLER OF THE CURRENCY.)

RESOURCES.		LIABILITIES.	
Loans, including Overdrafts	$ 511,789.61	Capital	$ 150,000.00
U. S. Bonds and Premiums	52,300.00	Surplus and Undivided Profits	171,167.89
Real Estate, Furniture and Fixtures,	4,500.00	Circulation	50,000.00
Redemption fund with U. S. Treasurer	2,500.00		
		DEPOSITS,	468,153.02
Cash and Due from Banks...	268,231 30		
	$839,320.91		$839,320.91

W. A. LEMLY, President. JAS. A. GRAY, Cashier.

Next we see a Microsoft balance sheet (fragment), 1994, EDGAR system. (See http://www.sec.gov/Archives/edgar/data/789019/0000950109-94-000252.txt) This is from the early years of the SEC EDGAR system. The medium of this financial report is Structured Generalized Markup Language (SGML):

```
<PAGE>

MICROSOFT CORPORATION

Balance Sheets
(In millions)

<TABLE>
<CAPTION>
                                                    December 31      June 30
                                                      1993(1)         1993
                                                    -----------    -----------
<S>                                                 <C>            <C>
Assets

Current assets:

   Cash and short-term investments                     $2,796         $2,290

   Accounts receivable - net                              460            338

   Inventories                                            130            127

   Other                                                   96             95
                                                       ------         ------
      Total current assets                              3,482          2,850

Property, plant, and equipment - net                      913            867

Other assets                                               91             88
                                                       ------         ------
        Total assets                                   $4,486         $3,805
                                                       ======         ======

Liabilities and stockholders' equity
```

Next we see a Microsoft balance sheet from an SEC filing in 2008 (see http://www.sec.gov/Archives/edgar/data/789019/000119312508089362/d10q.htm) which uses an HTML format:

MICROSOFT CORPORATION

BALANCE SHEETS

(In millions)

	March 31, 2008 (Unaudited)	June 30, 2007(1)
Assets		
Current assets:		
Cash and cash equivalents	$ 11,820	$ 6,111
Short-term investments (including securities pledged as collateral of $2,318 and $2,356)	14,521	17,300
Total cash, cash equivalents, and short-term investments	26,341	23,411
Accounts receivable, net of allowance for doubtful accounts of $147 and $117	9,871	11,338
Inventories	774	1,127
Deferred income taxes	1,721	1,899
Other	2,782	2,393
Total current assets	41,489	40,168
Property and equipment, net	5,516	4,350
Equity and other investments	8,659	10,117
Goodwill	10,346	4,760
Intangible assets, net	1,639	878
Deferred income taxes	1,367	1,389
Other long-term assets	1,731	1,509
Total assets	$ 70,747	$ 63,171

Finally we see a 21st century balance sheet from Microsoft generated by the SEC interactive information viewer, 2012. The medium used to express this financial information is XBRL. The XBRL technical syntax is rendered by the SEC viewer. (see http://www.sec.gov/Archives/edgar/data/789019/000119312512316848/0001193125-12-316848-index.htm)

MICROSOFT CORP (Filer) CIK: 0000789019

Print Document View Excel Document

- Cover
  - Document and Entity Information
- Financial Statements
  - Income Statements
  - Balance Sheets
  - Balance Sheets (Parenthetical)
  - Cash Flows Statements
  - Stockholders' Equity Statements
- Notes to Financial Statements
- Accounting Policies
- Notes Tables
- Notes Details

Balance Sheets (USD $) In Millions, unless otherwise specified	Jun. 30, 2012	Jun. 30, 2011
Current assets:		
Cash and Cash Equivalents	$ 6,938	$ 9,610
Short-term investments (including securities loaned of $785 and $1,181)	56,102	43,162
Total cash, cash equivalents, and short-term investments	63,040	52,772
Accounts receivable, net of allowance for doubtful accounts of $389 and $333	15,780	14,987
Inventories	1,137	1,372
Deferred income taxes	2,035	2,467
Other	3,092	3,320
Total current assets	85,084	74,918
Property and equipment, net of accumulated depreciation of $10,962 and $9,829	8,269	8,162
Equity and Other Investments	9,776	10,865
Goodwill	13,452	12,581
Intangible assets, net	3,170	744
Other long-term assets	1,520	1,434
Total assets	121,271	108,704

There is a significant difference between the earlier financial reports and the new XBRL-based financial report. All versions prior to XBRL were only readable by humans. But the XBRL-based financial report is readable by humans when rendered as above, but also readable by computer software applications.

1.5. Understanding semantic-oriented, model-based digital financial report authoring

Semantic-oriented, model-based digital financial reporting approaches to financial reporting which employ technology to both improve the functionality of the financial report while at the same time reduce the costs of creating financial reports. Further, semantic, model-based digital financial reporting reduces the costs and increases the functionality of analysis of financial and non-financial information contained in those reports.

Understanding what a model-based digital financial report is can best be seen by looking at the evolution of a financial report.

- **Paper and pencil**. When business information is communicated on paper, the nature of the paper medium means that the report can be used by one person at a time, it cannot be changed in any way as it exists in one form, and the nature of the information on the report determines who needs to create that report in order to maintain quality of the information communicated. Photo static copies of paper can be made to improve information distribution.
- **Computer**. Computers and the electronic spreadsheet improve financial reports created using paper and pencil in a number of ways. Information is unstructured, or more correctly structured only for presentation of information within a computer spreadsheet or word processing document. The formats are not standard and therefore cannot be exchanged with others unless they have the same software application as the creator of the information.
- **Electronic**. Taking computer generated financial reports a step further, the output formats can be standardized to say HTML or PDF and, leveraging the internet, distribute that information to anyone on the planet for pennies. While there is significant benefit to electronic distribution of business information, because the information is still unstructured (or more correctly structured for presentation and not meaning), information contained within the reports cannot be reliably reused or analyzed without a human's involvement.
- **Digital**. By digital we mean that the unstructured information is structured for meaning, many times using a global standard format, in some format which gives the information meaning. Because the information has meaning associated with it three things are possible. First, when the information is created software applications can assist in the process because the computer can read the structure and assist those creating such reports. Second, when the information is analyzed humans are not needed to move the information from its creation form into the form used for analysis, computers can use the structure to do that also. Third, rather than locking the created information into one form like paper, computer or electronic formats do, the information can be rendered in any number of forms. Further, within a software

application using the information the information becomes more interactive, much like a pivot table of an electronic spreadsheet.

Semantic-oriented, model-based digital financial reporting is leveraging the structured nature and semantics of the information in order to help business professionals create, reuse, and/or analyze financial information. Order of magnitude improvements in quality and functionality are achieved and significant reductions in cost are experienced. These improvements in quality and functionality and reductions in cost are even greater if all those in the "chain" or creation, use, and reuse each have tools which leverages the digital characteristics described.

But for digital financial reporting to work correctly, information must be interpreted correctly, information must be clear, consistent, logically coherent, and otherwise unambiguous; information about the information must be articulated digitally so that computers can read and therefore use the information and relations correctly. Basically, there is no magic involved in this process. How to achieve these results are in no way mysterious. But, there are certain challenges which must be overcome.

As we will discuss in a later section, **cognitive computing** is the simulation or mimicking of human thought processes in a computerized model. Cognitive computing will make semantic-oriented, model-based digital financial reporting work. We will explain now in the section *Knowledge Engineering for Accounting Professionals*.

1.6. SEC primes the pump

About 12,000 companies submit their financial to the U.S. Securities and Exchange Commission (SEC) using the structured digital format XBRL (eXtensible Business Reporting Language). Over 5,000 mutual funds are submitting their financial reports to the SEC digitally. Approximately 9,000 banks submit their financial statements to the Federal Deposit Insurance Corporation (FDIC) digitally. This trend toward digital financial reporting is gaining momentum as the XBRL digital financial reporting format is being adopted by many different financial reporting channels around the world in Europe, India, China, Japan, Australia, South America, Canada, and many other locations around the world. While the number of digital filers is not known, it is in the millions and rapidly rising.

Yes, the undeniable reality is that financial reporting is going digital.

1.7. Ramifications and unexpected consequences of going digital

Changing to the digital medium has ramifications. Going digital will have expected positive ramifications and likely some unforeseen positive impacts. What needs to also be considered is undesirable negative impacts, particularly unforeseen negative impacts and unexpected consequences.

As pointed out earlier digital financial reporting and electronic financial reporting are not the same thing. Where electronic financial reporting is about transferring what amounts to an electronic version of a paper document from the creator of the document to the user of the document; the electronic document is created in pretty much the same manner as it had been for a hundred years. So, just creating electronic versions of the same documents have limited impact of information reported, more of the impact is distribution of reported information.

Digital financial reporting is different than a paper or electronic financial reporting. A digital financial report can be read and understood, to a degree, by a computer software application. While computers will never replace the judgment of professional accountants, there are many things that computer software can do to assist professional accountants. Processes for creating financial reports and many aspects of auditing will change significantly.

There is a fundamental change when the information is reported digitally. Just like when music is recorded on a CD or DVD or as an MP3, information is lost because something which is analog when converted to something digital tradeoffs are made. For music, the loss of fidelity is imperceptible to most. Some can tell a difference.

The question is, how will the move from paper or electronic to digital financial reports impact reported information and the ability of the consumer of that information to satisfy their needs? While the jury is still out and while all positive and negative impacts are not known; some impacts and related questions do exist.

1.7.1.Presented on the face of the financial statements

When financial reports were designed, they were designed with paper in mind. There are a number of drawbacks to communicating information using paper as the medium. Firstly, information on paper can only be organized one way, usually through the author’s lens. Secondly, the information communicated is constrained by the physical limits of each page of paper. The information presented on paper is two dimensional because the medium has two physical dimensions and rigidly structured in the same one way for all readers. It is only with great effort that authors can use the medium of paper to highlight exceptions, overlapping information, and make all meaning visible and explicit for the reader to absorb with a glance.

However, the world has changed. Not changed in the way that HTML, PDF or electronic paper have changed financial reporting, but changed in the way that we expect to consume music, movies, product ratings, coupons, and financial information. XBRL is referred to as “interactive data” by the SEC for a reason. The XBRL technical standard enables the ability to change the perspective of the information to be dynamic like a Microsoft Excel pivot table, and to have any number of organizations of the information contained within a financial statement.

Practices which were meaningful using the paper medium such as “presented on the face of the financial statements” are irrelevant if there is no face to the financial statements or if everything can be linked to other things and navigating from one spot in a financial statement, the “face”, to another spot such as the disclosures or policies, is easy.

1.7.2.Filling in a box

One of the issues which the financial reporting community will need to address can be demonstrated by looking at the disclosure of significant accounting policies in XBRL-based public company financial filings to the SEC. The issue is a general issue, it relates to many areas of a financial report. There really is no "right" or "wrong" answer, there are just different approaches and each of those approaches has "functionality" which it delivers. You may, or may not, see this as a "change to financial reporting" or a "change in US GAAP". That is not the point of making this information available. The point is to help accountants to understand the issue.

The issue relates to the difference between unstructured information and structured information. With legacy approaches to creating a financial report the information disclosed is basically unstructured and therefore there is no "box" that information must fit into. You can understand "the box" by realizing that when you move from unstructured to structured information, you basically take the unstructured information, structure it in some way (thus creating the box), and you put the information into a box.

The "box" is not good or bad, it is just a box. It is not that unstructured is good and structured is bad; or that structured is good and unstructured is bad. They are just different.

So here is what I mean. If you understand financial reports, then you know that within a financial report, such as within an SEC financial filing, you have to disclose significant accounting policies. If you look at SEC XBRL financial filings (which I have, more info later) you will see that 100% of the 10-K filings disclose significant accounting policies. Reporting rules require this.

But, filers structure this disclosure using XBRL in different ways. Here are the primary ways I see this done (this is looking at only the [Text Block] or (Table) which every SEC filer provides in their SEC XBRL financial filing:

- Significant Accounting Policies (us-gaap:SignificantAccountingPoliciesTextBlock) is used most.
- Basis of Presentation and Significant Accounting Policies (us-gaap:BasisOfPresentationAndSignificantAccountingPoliciesTextBlock) is a distant second
- Business Description and Significant Accounting Policies us-gaap:BusinessDescriptionAndAccountingPoliciesTextBlock) is next
- Basis of Accounting (us-gaap:BasisOfAccounting)
- Organization, Consolidation, Basis of Presentation, Business Description and Accounting Policies (us-gaap:OrganizationConsolidationBasisOfPresentationBusinessDescriptionAndAccountingPoliciesTextBlock)
- Organization, Consolidation and Presentation of Financial Statements Disclosure and Significant Accounting Policies (us-gaap:OrganizationConsolidationAndPresentationOfFinancialStatementsDisclosureAndSignificantAccountingPoliciesTextBlock)

Now, some filers (very few) decide that none of those concepts work for them and decide to create extension concepts. Those are obviously errors and one of the existing concepts should have been used.

But, other filers combine different things together and do feel obliged to create an extension concept and it creating such a concept can be justified. For example, one filers created the concept “Summary of Significant Accounting Policies and Recent Accounting Pronouncements [Text Block]”. They combined two things which both have concepts which exist in the US GAAP Taxonomy; but is this the right thing to do?

That is the issue. Basically, it is possible to come up with all sorts of permutations and combinations of information. Each permutation/combination needs to have a "box" or concept created so that the SEC filer can put the information inside that box. This is the way they have always reported.

But, the filer creating such a concept basically makes comparing information significantly more challenging. You can still do it; you just need to map the filer extension concept to some other concept which is defined to include significant accounting policies.

Or, alternatively, the filer could unbundle the information into the two concepts which exist; separating "Significant accounting policies" and "recent accounting pronouncements" into two separate boxes. This reduces the permutations and combinations.

So, it seems that the spectrum of options is as such:

- Provide lots and lots of permutations and combinations, and still allow a filer to create more permutations and combinations
- Provide lots and lots of permutations and combinations, but DON'T allow the filer to create other possible permutations/combinations
- Require SEC filers to unbundled their disclosures, and also their financial statement line items, into discrete disclosures/line items (i.e. get rid of the bundles)

Like I said, there is not necessarily a right or wrong answer here; it is just a choice which the financial reporting supply chain needs to figure out. What would be good is to understand the pros and cons of each alternative, all things considered.

And I point out again; this is not just an issue with significant accounting policies; it is a general issue for which I am pointing out with this significant accounting policies example.

1.7.3.Dance between implicit and explicit

Paper is a medium. XBRL is a medium. Each medium has different properties and features.

When you create an XBRL-based financial report you basically take all the information you want to report and you put it in what amounts to little boxes or structures. Many people erroneously refer to this process as “tagging” because software makes it seem like you are putting tags on information which exists within some document. But what you are actually doing is constructing a model. You are representing information.

When a human reads a paper financial report, there is a tremendous amount of implied message which gets communicated. Structuring information and expressing that information using a model, effectively digitizing the information, can have both positive and negative impacts. By explicitly structuring the content of a financial report, by having to put everything into some structure, and by articulating how that structure are related to other structures, that financial statement presents become more crystallized. In other words, the financial concepts disclosed in the financial statement become more explicit and the relationships between the financial concepts are made explicit. This results in greater precision in the story that is being told by the financial statement. Explicit information is more ridged.

On the other hand by having to put all the information of a financial report into structures, if not done correctly the desired flow of the report can be lost. Further, humans are quite good at implying important meaning which can be gleaned from a financial report. No computer will ever be able to imply what humans can imply.

Implicit context changes as culture changes. We as professional accountants need to both understand and become masters of the "dance of implicit and explicit" as David Weinberger calls it in his book *Everything is Miscellaneous*. Computers can do a lot for us in terms of rearranging things, providing flexibility, changing the way we relate to a financial statement. Computers also only deal with exactly what they have been told. Computers are not as adept at all at dealing with what has been left unsaid.

Making complex, meaningful financial information explicit can lead to oversimplification and perhaps result in incomplete, inappropriate, and misleading financial information. Professional accountants should be conscious of this possibility, rather than unconscious. The optimal equilibrium in the implicit/explicit trade-off needs to be fleshed out by the accounting profession.

1.8. Mastering the digital medium

In order for digital financial reporting to be adopted accountants will need to master the digital medium. How the digital medium works, the fact that it does in fact work, how to get the digital medium to work appropriately all things considered, what appropriate means, are only some of the things which must be understood.

The move to digital financial reporting will be an evolution. Some financial reporting supply chains will move faster than others. But others will move:

- Private companies
- State and local governmental entities
- Not-for-profits

Collaboration and cooperation between members of the financial reporting supply chain is necessary to make digital financial reporting work.

1.9. Digital financial reporting means change, but to what?

Yet not enough professional accountants are engaged in this conversion process, thinking through the many relevant issues and there is a risk the accounting profession will not get what it desires as a result. The question is, what should moving from paper or electronic paper to digital mean for the public accounting industry and the CPAs/auditors who make up that profession.

Just like the change from film to digital photography meant big changes to what type of cameras were made, the workflow of creating a photograph, and the skills needed to be a photographer; changing to digital financial reporting will mean change.

1.10. Road work ahead: last mile of finance

The trend toward digital financial reporting is an enabler and only part of an even bigger trend. The bigger trend is to use the standardization and other characteristics enabled by having everything in a digital form structured for meaning to make processes better, faster, and cheaper throughout financial reporting. Technologies such as cheap internet access, the free XBRL global standard, mobile/iPad-type information appliances, business process management, business intelligence applications, and many others are converging, enabling financial reporting processes to be overhauled. The digital financial statement is only one small part of this much larger inevitable change.

Information will flow from its point of entry into a system through that entire system and then out again into some other business system, be that system one of a business partner, a government regulator, a financial institution which is providing your business with a line of credit, or other user of your financial information.

It looks like there is road work ahead for the "last mile of finance". In an FSN article, *Tagetik goes head to head with Oracle and Clarity (now IBM) in the 'Last Mile' of Finance* the IBM acquisition of Clarity is hailed as a wakeup call:

> "The IBM deal is a wakeup call to the market – expect to see much activity in this space over the coming year."

I am hearing terms that I have never heard before: Disclosure Management and Collaborative Disclosure Management (CDM). This seems to be a new class of software.

While business intelligence (BI) software was generally used for consuming information, this new class of software is for creating information. Enterprise Performance Management (EPM) seems to be the buzz word for consuming financial information.

Oracle Hyperion Disclosure Management and Oracle Hyperion Financial Close Management work in conjunction with other Oracle EPM applications such as Hyperion Financial Management or can be deployed directly with ERP General Ledger systems. SAP has its offerings for reporting. IBM with their acquisition of Clarity means they are in the game.

Those names you have likely heard before. It seems like every day we get the name of another software product that either can be used to create financial information or consume financial information. Here are some: Information Builders, Tagetik, Quantrix, WebFilings, Trintech and Longview Solutions. There are likely many others.

In 2008 Gartner and Ventana Research white papers described inefficient corporate reporting processes which they predicted would change. (See Gartner's *XBRL Will Enhance Corporate Disclosure and Corporate Performance Management* and Ventana's *Selecting the Right XBRL Solution: Addressing Compliance Requirements and Automating the External Reporting Process*.) This is Ventana's description of the process:

> "Thus, the current close-to-file process is structurally prone to error. It poses a risk that mistakes and misstatements will occur. Most companies deal with this potential for errors and the risks they pose with a brute-force approach, using well-paid professionals (who could be doing more productive things) to check and double-check the documents. This might be a workable approach today, but it becomes increasingly difficult and costly as the amount of required tagging increases."

This large number of spreadsheets and word processing documents and the highly manual, time consuming and error prone process they require is the approach of today. It is like a dirt road. The tools of the future will be more like an interstate freeway.

While external financial reporting and regulatory reporting are paving the way, the change which will occur will impact all financial reporting, not just financial reporting.

XBRL is only part of the change or maybe even call it a trend. We are hearing the term "model based reporting" come up. This is a new way to think about financial reporting. The electronic spreadsheet was a significant improvement over the paper-based spreadsheet. These new tools will be an improvement to the electronic spreadsheet.

So get your hard hats: road work ahead.

1.11. Understand digital financial reporting to remain relevant

Digital financial reporting is here to stay. To remain relevant, professional accountants and other accountants need to adjust their thinking about how to appropriately modify financial reporting to keep up with the digital revolution. The value standardization offers business is undeniable: lower costs, increased leverage, and improved quality. Professional accountants need to better embrace changes which are inevitable to products professional accountants offer and processes professional accountants use to deliver those products. In doing so, professional accountants can continue to contribute to the market, their clients, and their enterprises.

For example, a Journal of Accountancy article *FASB sees flexibility, relevance as cures to disclosure overload*[13] states that the FASB is asking for feedback on whether ordering and formatting should be:

- Flexible and based on relationships of particular items;
- Flexible and based on the importance of particular disclosures; or
- Fixed and uniform.

With technologies such as XBRL which allow financial information to be expressed digitally is there really a need to make a choice? Is this list of options a remnant of thinking using constraints of old paradigms which are no longer applicable in a digital world? Why can't the user of financial information have all three options available and the user can pick which approach is best for them given their preferences and their perceived needs?

[13] *FASB sees flexibility, relevance as cures to disclosure overload*, http://www.journalofaccountancy.com/news/2012/sep/20126364.html