

1. Digitizing Financial Reports

This section provides an overview of issues related to the digitization of financial reports. Everything is a tradeoff. This information helps professional accountants think about digital.

Many things seem to be going digital¹. The dawn of the era of digital financial reporting has arrived. Adaptation is the rule of human existence, not the exception².

Digital technology has become an integral part of society and culture. If you have a camera, it is likely to be digital. Driving your car, you likely refer to your digital navigation system as opposed to those maps in your glove box. 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 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. This section lays out the vision of digital financial reporting and why professional accountants need to play a role in the process of digitizing financial reports.

1.1. Understanding the Problem and the Solution

In promoting XBRL-based digital financial reporting specifically; and more generally new modern approaches to accounting, reporting, auditing, and analysis in a digital environment in general; we first have to make a case that some sort of problem exists, show that a solution to that problem is available, and show that the solution brings overwhelming benefits beyond the cost of change and cost of ongoing use and maintenance of the new solution.

A general purpose financial report is a high-fidelity, high-resolution, high-quality information exchange mechanism. The report is a compendium of complex logical information required by statutory requirements and regulatory rules plus whatever management of an economic entity wants to voluntarily disclose. The report represents quantitative and qualitative information about the financial condition and financial performance of an economic entity. There are a number of different financial reporting schemes³: US GAAP, IFRS, IPSAS, GAS, FAS, FRF for SMEs, etc.

Financial reports are not uniform. Financial reports are not forms, they have variability. This consciously allowed variability is an essential, characteristic trait of robust reporting schemes such as US GAAP, IFRS, and others. This allowed variability contributes to the richness, high-fidelity, and high-resolution of reported financial information that is unique to an industry sector, a style of reporting, or an

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 Nick Tasler, *Stop Using the Excuse "Organizational Change Is Hard"*, Harvard Business Review, <https://hbr.org/2017/07/stop-using-the-excuse-organizational-change-is-hard>

³ *Comparison of Financial Reporting Schemes High Level Concepts*, <http://xbrl.azurewebsites.net/2018/Library/ReportingSchemes-2018-12-30.pdf>

economic entity. This variability is a feature of such reporting schemes. Different reporting styles, different subtotals used to aggregate details, and using some specific approach given a set of allowed alternatives are examples of variability. Variability does not mean “arbitrary” or “random”. There are known identifiable patterns.

Consider this scenario: Two public companies, A and B, each have knowledge about their financial position and financial performance. They must communicate their knowledge to an investor who is making investment decisions which will make use of the combined information so as to draw some conclusions. All three parties are using a common set of basic logical principles (facts known to be true, deductive reasoning, inductive reasoning, etc.) and common financial reporting standards (i.e. US GAAP, IFRS, etc.), so they should be able to communicate this information fully, so that any inferences which, say, the investor draws from public company A's input should also be derivable by public company A using basic logical principles and common financial reporting standards, and vice versa; and similarly for the investor and public company B.

This method uses machine-readable business rules to “channel” and therefore control variability, keeping the variability within standard limits and permissible alternatives. That keeps quality where it needs to be. Rules enable things like preventing a user from using a concept meant to represent one thing from unintentionally being used to represent something different. The discipline of describing something in a form a computer algorithm can understand also assists you in understanding the world better; weeding out flaws in your understanding, myths, and misconceptions about accounting and reporting standards.

Thinking of this scenario it is easy to begin to see the “sweet spot” of XBRL’s capabilities which are:

- **Exchange of rich, complex, high-fidelity information:** The information exchange transaction type for which XBRL was designed is rich, complex, and high-fidelity information as contrast to a simple information transaction of low fidelity.
- **Zero to very low tolerance for error:** As accountants say, information must “tick and tie” and “cross cast and foot.” There should be no mathematical or logical inconsistencies, contradictions, or other such anomalies within a financial report. XBRL has a lot of expressive power.
- **Information variability, flexibility, reconfigurability:** XBRL was intentionally designed to handle the variability of financial reporting. A financial report is not a rigid form. Information reported might not be uniform. But that is not to say the information does not follow patterns and is arbitrary and random. For example, various intermediate concepts (subtotals) might be used to summarize basic concepts. XBRL offers flexibility where flexibility is necessary. But this variability must be controlled and managed to keep reports within permissible boundaries.

Let’s be clear about the terms we are using and the need for low to zero tolerance for error. Specifically, let’s be clear about the following definitions:

- **Reliability** is about getting consistent results each time an activity is repeated.

- **Accuracy** is about identifying the correct target. Accuracy relates to correctness in all details; conformity or correspondence to fact or given quality, condition; deviating within acceptable limits from a standard. Accuracy means with no loss of resolution or fidelity of what the sender wishes to communicate and no introduction of false knowledge or misinterpretation of communicated information.
- **Precision** is the closeness of repeated measurements to one another. Precision involves choosing the right equipment and using that equipment properly. Precise readings are not necessarily accurate. A faulty piece of equipment or incorrectly used equipment may give precise readings (all repeated values are close together) but inaccurate (not correct) results.
- **Fidelity** relates to the exactness or loyal adherence of facts and details with which something is copied or reproduced. Fidelity relates to the faithful representation of the facts and circumstances represented within a financial report properly reflect, without distortion, reality. High fidelity is when the reproduction (a financial report) with little distortion, provides a result very similar to the original (reality of economic entity and environment in which the economic entity operates).
- **Integrity** is the quality or condition of being whole or undivided; completeness, entirety, unbroken state, uncorrupt. Integrity means that not only is each piece of a financial report correct but all the pieces of the financial report fit together correctly, all things considered.
- **Resolution** relates to the amount of detail that you can see. The greater the resolution, the greater the clarity.
- **Completeness** relates to having all necessary or normal parts, components, elements, or steps; entire.
- **Correctness** relates to freedom from error; in accordance with fact or truth; right, proper.
- **Consistency** relates to being compatible or in agreement with itself or with some group; coherent, uniform, steady. Holding true in a group, compatible, not contradictory.

Consider the notion of XBRL as a high-fidelity knowledge media⁴. Just like word-of-mouth, a book, or a video; XBRL enables some knowledge bearer to impart knowledge on some knowledge receiver using some knowledge media. **XBRL is a high-fidelity knowledge media.**

In their book *Blown to Bits*⁵, Philip Evans and Thomas S. Wurster point out the new economics of information. In the past, you could have reach or richness, but typically not both at the same time. The internet completely changed this economic equation. **Reach** is access to information. **Richness** relates to quantity, timeliness, accuracy and variety (fidelity, resolution) of information. Word of mouth tends to be the richest information, but the reach can be lower. Books have excellent reach, but less richness. With XBRL you can have excellent reach and richness.

⁴ Understanding that XBRL is a Knowledge Media,
<http://xbrl.squarespace.com/journal/2017/1/16/understanding-that-xbrl-is-a-knowledge-media.html>

⁵ Philip Evans and Thomas S. Wurster, *Blown to Bits*, <https://www.amazon.com/Blown-Bits-Economics-Information-Transforms/dp/087584877X>

Considering all of the above, there are two key ideas here to highlight:

- First, as applied to financial reporting, the task is to communicate a rich set of financial information of an economic entity with high-fidelity, high-resolution, and near perfect accuracy and reliability.
- Second, each knowledge media has advantages and disadvantages so the choice of medium matters.

Let us borrow an idea from the philosopher Albert Borgman⁶. Suppose that what we are trying to communicate is a symphony. To communicate that symphony; we can choose to use sheet music of the symphony, a recording of the symphony put onto a CD, an MPEG4 file which has an audio and video recording of the symphony performance, or a music critic's review of a performance of the symphony.

It takes specific and different skills to communicate the symphony in each medium and consequently to ingest the symphony represented in a particular medium. The easiest digestion is to drop a CD into a CD player and then simply listening to the music of the symphony. Reading the sheet music of the symphony requires more skill.

Which media has perfect fidelity? Which has the least loss of resolution? Is it the sheet music? Maybe a recorded performance of an elementary school orchestra? Well, that depends.

Thankfully, with regard to financial reports we have an easier situation. Society has spent hundreds of years working through the details and have reached general agreement on standard concepts to describe the financial position and financial performance of an economic entity. Particularly over the past hundred years with the rise of standard reporting schemes such as US GAAP, UK GAAP, and International Financial Reporting Standards (IFRS). Almost every economic entity has a staff of persons dedicated to producing financial reports based on such standards. There are also persons who wish to receive and utilize these reports who understand those standards and therefore the meaning of the information conveyed by the financial reports.

We now have a "new media" that is better suited in this digital age to the task than the "old media" of paper-based reports or what amounts to e-paper such as PDF or HTML files. With structured formats such as XBRL it is easier for machine-based processes to work with reported financial information effectively.

XBRL is an information encoding language, a new media, well-suited to the task of transferring financial information between people and systems in a digital environment.

In a perfect world, computers would perform the translation of a financial report from the human-readable representation into a machine-readable and more importantly a machine-understandable representation. Likewise, computers on the receiving end would ingest this reported information in a way that brings desired value to the people who wish to understand and use that information. In this perfect world, neither creator nor consumer of the information should need to get involved in this translation process from human-readable to machine-readable information and

⁶ Albert Borgman, *Holding on to Reality*,
<https://www.press.uchicago.edu/ucp/books/book/chicago/H/bo3640475.html>

back again. Therefore, to them, the choice of syntax and the complexity or simplicity of the information model shouldn't really matter. It should just work.

From the point of view of these stakeholders, their fundamental interests, perceptions, positions, and risks are straight forward and rather easy to describe:

- Will the medium allow me to express the information that I wish to express?
- Can I find the information that I am looking for at the level of detail that I need in the financial report?
- Can I compare information between periods of an economic entity or between economic entities as of some period?
- Can I do all this safely, reliably, predictably, over and over again without error?

How all this works should be left to technical specialists who are skilled in engineering processes and can, in fact, make such a system work reliably. After all, we have put man on the moon. Clearly there are many technologies that have been made to work, expressing information within a financial report is rather easy by comparison.

Yet we do need professional accountants, financial analysts, regulators, investors, and other less technical stakeholders of a domain to communicate what they might need from such a system.

But we don't want financial people reviewing a technical architecture of a taxonomy or ontology to determine if that architecture is best suited to meet the needs of the domain. They simply are not qualified to have an opinion.

We want financial professionals to review how the system performs and to provide an opinion as to whether a system meets their needs or not. So, there does need to be an ability for business domain professionals that have a problem and the technical professionals that understand how to solve that problem to communicate. Both groups of business and technical stakeholders tend to have an innate understanding of logic. Logic is the basis for communications between these two groups of stakeholders.

Sadly, software today which is used in such a system is not yet good enough so financial professionals cannot understand, or even believe or comprehend how such a system could possibly even work. And the reasons software is not good enough yet are not a mystery. One of the primary reasons that no such software yet exists is the lack of a well-suited information model that can be represented in XBRL. And so, it is difficult to have software that utilizes such a model when the model does not yet even exist.

Another reason such software does not exist is that XBRL is under-utilized generally because XBRL is poorly understood. A third reason such software does not exist is that the metadata that would drive such software and make it work appropriately has not been created yet because people tend to not understand XBRL and that it actually provides the means to represent that needed metadata.

XBRL is an ontology-like thing⁷ that has capabilities far beyond the belief or comprehension of most business professionals and technical professionals. There exists a “which came first, the chicken or the egg” type of a situation.

Now we begin to see the need for some sort of methodology. A methodology can help illuminate the structure of a financial report. With that methodology, some method for making the promise of XBRL-based digital financial reporting a reality can be created, tested, and it can be determined if the system is meeting the needs of system stakeholders.

Once you read the method, you can decide if the method might work. Even better, if you use software that employs this method and you are happy with how the software works; that will help you understand why the method might be rather useful.

1.2. 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.

But these formats are little more than “e-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 meaning⁸. This machine-readable information makes it easy for software applications to be created that take advantage of the ability to interact with the information so that such software applications can assist humans in performing some work tasks.

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 *understanding* 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.

⁷ *Enhanced Description of an Ontology-like Thing*,
<http://xbrl.squarespace.com/journal/2019/7/19/enhanced-description-of-ontology-like-thing.html>

⁸ 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.

Rather, humans augmented by machine capabilities, much like an electronic calculator enabling a human to do math quicker, will empower knowledge workers who know how to leverage the use of those machines.

And although all this may seem like magic, there is no magic 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. Success will be the most likely outcome.

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.

1.3. 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 otherwise 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 understood⁹. 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 readable form¹⁰. 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 rules¹¹ 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.

⁹ How XBRL Works, <https://www.youtube.com/watch?v=nATJBPOITxM>

¹⁰ Comparison of representation structures and relative automation/reasoning capacity, <http://www.xbrlsite.com/2014/Library/ExpressivenessAndReasoningCapacityComparison.jpg>

¹¹ Understanding business rules, <http://xbrl.squarespace.com/journal/2009/10/18/business-rules-what-are-they.html>

- 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 these business rules in books which tend to have gaps, inconsistencies, ambiguities, duplication, etc¹².

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, and 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 models¹³ 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. Complexity¹⁴ 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.

¹² Differentiating Alternatives from Ambiguity in US GAAP, <http://xbrl.squarespace.com/journal/2015/4/22/differentiating-alternatives-from-ambiguity-in-us-gaap.html>

¹³ Financial Report Semantics and Dynamics Theory, <http://xbrl.squarespace.com/fin-report-sem-dyn-theory/>

¹⁴ Beating down complexity, <http://xbrl.squarespace.com/journal/2014/6/14/beating-down-complexity.html>

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.

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.

1.4. 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 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.”

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

1.4.1. 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 are 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.

1.4.2. Digital business reports ends “spread sheet hell”

Business professionals love their spreadsheets. Information technology departments loath spreadsheets¹⁵. 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
- Unsited 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 spreadsheet¹⁶.

1.4.3. 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 Alber¹⁷, *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."

¹⁵ 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>

¹⁶ 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>

¹⁷ *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.

1.4.4. 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.

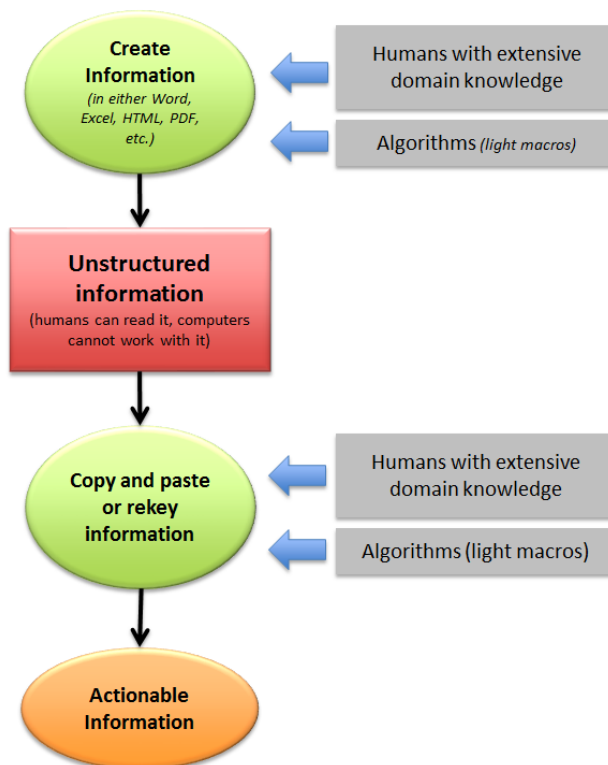
Let me use the external financial statement as an example. Most external financial statements today are created using Microsoft Word. I hear the number 85%. I am not talking about the balance sheet, income statement, and maybe cash flow statement which might be generated from an accounting or ERP system.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

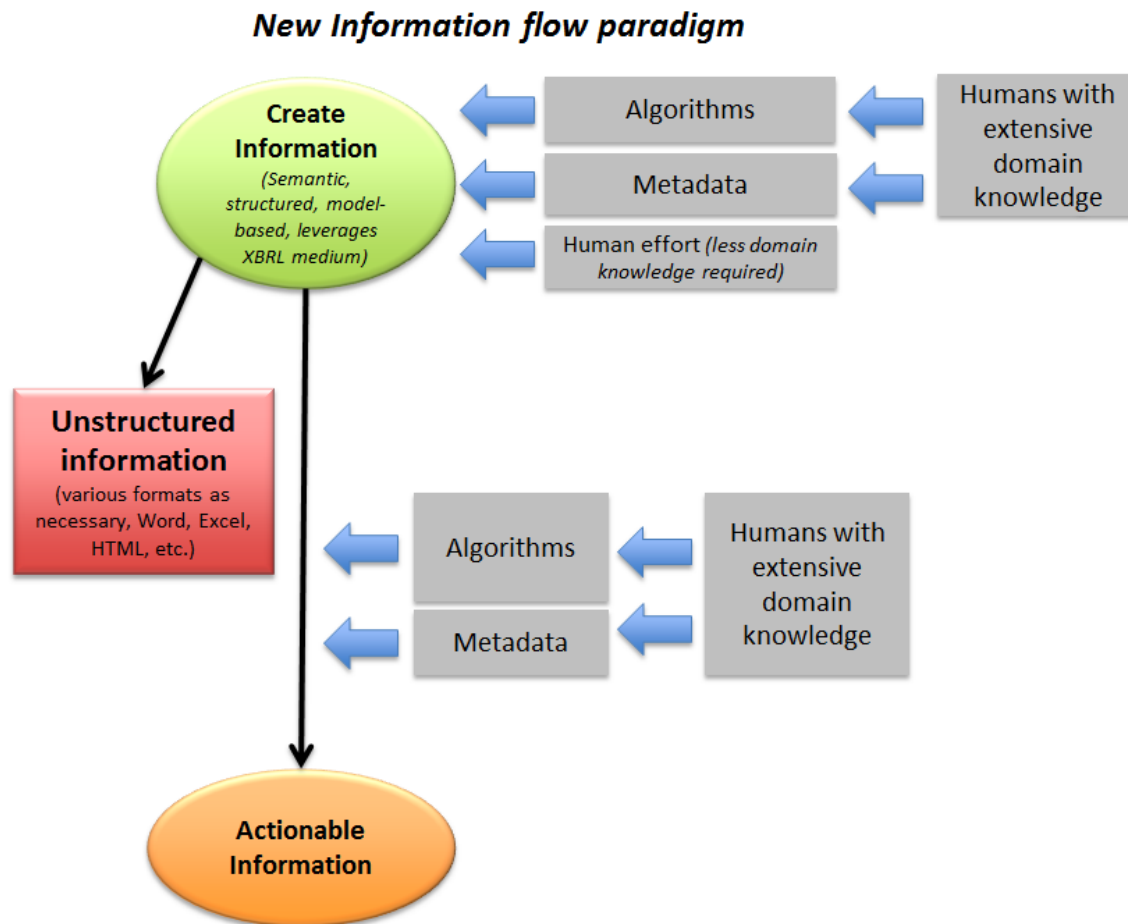
Information flow in past



But what if Word did understand financial statements? Well, Word may 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.

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) machines¹⁸ 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.

The opportunity? Creating algorithms, creating metadata, doing value-added 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.

¹⁸ Numerically controlled machines, http://en.wikipedia.org/wiki/Numerical_control

1.5. 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	
Cash and Due from Banks... 268,231 30	DEPOSITS,..... 468,153.02
\$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 1993 (1)	June 30 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
Liabilities and stockholders' equity		

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	Balance Sheets (USD \$) In Millions, unless otherwise specified		
Document and Entity Information	Current assets:		
Financial Statements	Cash and Cash Equivalents	\$ 6,938	\$ 9,610
Income Statements	Short-term investments (including securities loaned of \$785 and \$1,181)	56,102	43,162
Balance Sheets	Total cash, cash equivalents, and short-term investments	63,040	52,772
Balance Sheets (Parenthetical)	Accounts receivable, net of allowance for doubtful accounts of \$389 and \$333	15,780	14,987
Cash Flows Statements	Inventories	1,137	1,372
Stockholders' Equity Statements	Deferred income taxes	2,035	2,467
Notes to Financial Statements	Other	3,092	3,320
Accounting Policies	Total current assets	85,084	74,918
Notes Tables	Property and equipment, net of accumulated depreciation of \$10,962 and \$9,829	8,269	8,162
Notes Details	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
	Current liabilities:		

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.

But the report above is still static in nature. Since the information that makes up the report is digital, a report can be dynamically reconfigured and represented by different software applications, the report can be “pivoted” similar to an Excel pivot table, detailed information that makes up the report can be leveraged and worked with, etc. Here is an example of a dynamic software tool for interacting with a digital financial report:

Component: (Network and Table)

Network: 100040 - Statement - BALANCE SHEETS

Table: Statement [Table]

Reporting Entity [Axis]: 0000789019 <http://www.sec.gov/CIK>

Unit [Axis]: USD

Period [Axis]: 2017-06-30

Statement [Line Items]	2017-06-30	2016-06-30
Assets		
Current assets:		
Cash and cash equivalents	7,663,000,000	6,510,000,000
Short-term investments (including securities loaned of \$3,694 and \$204)	125,318,000,000	106,730,000,000
Total cash, cash equivalents, and short-term investments	132,981,000,000	113,240,000,000
Accounts receivable, net of allowance for doubtful accounts	19,792,000,000	18,277,000,000
Inventories	2,181,000,000	2,251,000,000
Other	4,897,000,000	5,892,000,000
Total current assets	159,851,000,000	139,660,000,000
Property and equipment, net of accumulated depreciation of \$74.179 and \$19.800	23,734,000,000	18,356,000,000
Equity and other investments	6,023,000,000	10,431,000,000
Goodwill		
Intangible assets, net		
Other long-term assets		
Liabilities and stockholders' equity		
Current liabilities:		
Accounts payable		
Short-term debt		

Fact Characteristics and Properties

Properties	Occurrences	To Do
Reporting Entity	0000789019	http://www.sec.gov/CIK
Period	2017-06-30	
Legal Entity [Axis]	Entity [Domain]	
Concept	Cash Cash Equivalents And Short Term Investments	
Fact Value	132981000000	
Units	iso4217:USD	
Decimals (rounding)	-6	

Finally, analysis of report information can be automated. A simple comparison tool¹⁹ can be created in, say Excel, which extracts information from XBRL-based financial reports.

¹⁹ Simple comparison tool, <http://xbrlsite.azurewebsites.net/2018/Campaign/Validation/Comparisons.zip>

	A	B	J	K	L	M	N	O
		Compare All In List Spreadsheet						
1								
2								
3								
4								
5	#	Entity Registrant Name	Balance Sheet Date	Income Statement Start Period (Year to Date)	Assets	Current Assets	Noncurrent Assets	Liabilities
6	1	MICROSOFT CORPORATION	2017-12-31	2017-07-01	249,097,000,000	161,031,000,000	88,066,000,000	153,450,000,000
7	2	MICROSOFT CORPORATION	2017-09-30	2016-07-01	241,086,000,000	159,851,000,000	81,235,000,000	168,692,000,000
8	3	MICROSOFT CORPORATION	2017-06-30	2016-07-01	225,017,000,000	146,313,000,000	78,704,000,000	155,288,000,000
9	4	MICROSOFT CORPORATION	2017-03-31	2016-07-01	224,610,000,000	144,949,000,000	79,661,000,000	155,801,000,000
10	5	MICROSOFT CORPORATION	2016-12-31	2016-07-01	212,524,000,000	157,909,000,000	54,615,000,000	142,152,000,000
11	6	MICROSOFT CORPORATION	2016-09-30	2015-07-01	193,634,000,000	139,660,000,000	54,034,000,000	121,697,000,000
12	7	MICROSOFT CORPORATION	2016-06-30	2015-07-01	181,869,000,000	128,421,000,000	53,448,000,000	107,063,000,000
13	8	MICROSOFT CORPORATION	2016-03-31	2015-07-01	180,098,000,000	127,812,000,000	52,286,000,000	103,318,000,000
14	9	MICROSOFT CORPORATION	2015-12-31	2015-07-01	172,896,000,000	121,656,000,000	51,240,000,000	95,451,000,000
15	10	MICROSOFT CORPORATION	2015-09-30	2014-07-01	176,223,000,000	124,712,000,000	51,511,000,000	96,140,000,000
16	11	MICROSOFT CORPORATION	2015-06-30	2014-07-01	176,683,000,000	118,398,000,000	58,285,000,000	86,551,000,000
17	12	MICROSOFT CORPORATION	2015-03-31	2014-07-01	174,848,000,000	116,362,000,000	58,486,000,000	82,969,000,000
18	13	MICROSOFT CORPORATION	2014-12-31	2014-07-01	169,656,000,000	112,439,000,000	57,217,000,000	79,486,000,000
19	14	MICROSOFT CORPORATION	2014-09-30	2013-07-01	172,384,000,000	114,246,000,000	58,138,000,000	82,600,000,000
20	15	MICROSOFT CORPORATION	2014-06-30	2013-07-01	156,119,000,000	109,006,000,000	47,113,000,000	68,695,000,000
21	16	MICROSOFT CORPORATION	2014-03-31	2013-07-01	153,543,000,000	106,870,000,000	46,673,000,000	68,443,000,000
22	17	MICROSOFT CORPORATION	2013-12-31	2013-07-01	142,348,000,000	99,450,000,000	42,898,000,000	60,707,000,000
23	18	MICROSOFT CORPORATION	2013-09-30	2012-07-01	142,431,000,000	101,466,000,000	40,965,000,000	63,487,000,000
24	19	MICROSOFT CORPORATION	2013-06-30	2012-07-01	134,105,000,000	93,524,000,000	40,581,000,000	57,417,000,000
25	20	MICROSOFT CORPORATION	2013-03-31	2012-07-01	128,683,000,000	89,574,000,000	39,109,000,000	56,107,000,000
26	21	MICROSOFT CORPORATION	2012-12-31	2012-07-01	121,876,000,000	84,051,000,000	37,825,000,000	53,040,000,000
27	22	MICROSOFT CORP	2012-09-30	2011-07-01	121,271,000,000	85,084,000,000	36,187,000,000	54,908,000,000
28	23	MICROSOFT CORP	2012-06-30	2011-07-01	118,010,000,000	76,860,000,000	41,150,000,000	49,351,000,000
29	24	MICROSOFT CORP	2012-03-31	2011-07-01	112,243,000,000	72,513,000,000	39,730,000,000	48,122,000,000
30	25	MICROSOFT CORP	2011-12-31	2011-07-01	107,415,000,000	75,271,000,000	32,144,000,000	48,024,000,000
31	26	MICROSOFT CORP	2011-09-30	2010-07-01	108,704,000,000	74,918,000,000	33,786,000,000	51,621,000,000
32	27	MICROSOFT CORP	2011-06-30	2010-07-01	99,727,000,000	66,263,000,000	33,464,000,000	46,275,000,000
33	28	MICROSOFT CORP	2011-03-31	2010-07-01	92,306,000,000	59,684,000,000	32,622,000,000	43,825,000,000
34	29	MICROSOFT CORP	2010-12-31	2010-07-01	91,540,000,000	59,581,000,000	31,959,000,000	44,598,000,000
35	30	MICROSOFT CORP	2010-09-30	2009-07-01	86,113,000,000	55,676,000,000	30,437,000,000	39,938,000,000
36	31	MICROSOFT CORP	2010-06-30	2009-07-01	84,910,000,000	54,518,000,000	30,392,000,000	39,200,000,000
37	32	MICROSOFT CORP	2010-03-31	2009-07-01	82,096,000,000	52,487,000,000	29,609,000,000	37,813,000,000
38	33	MICROSOFT	2009-12-31	2009-07-01	81,632,000,000	52,394,000,000	29,381,000,000	37,469,000,000

1.6. 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.

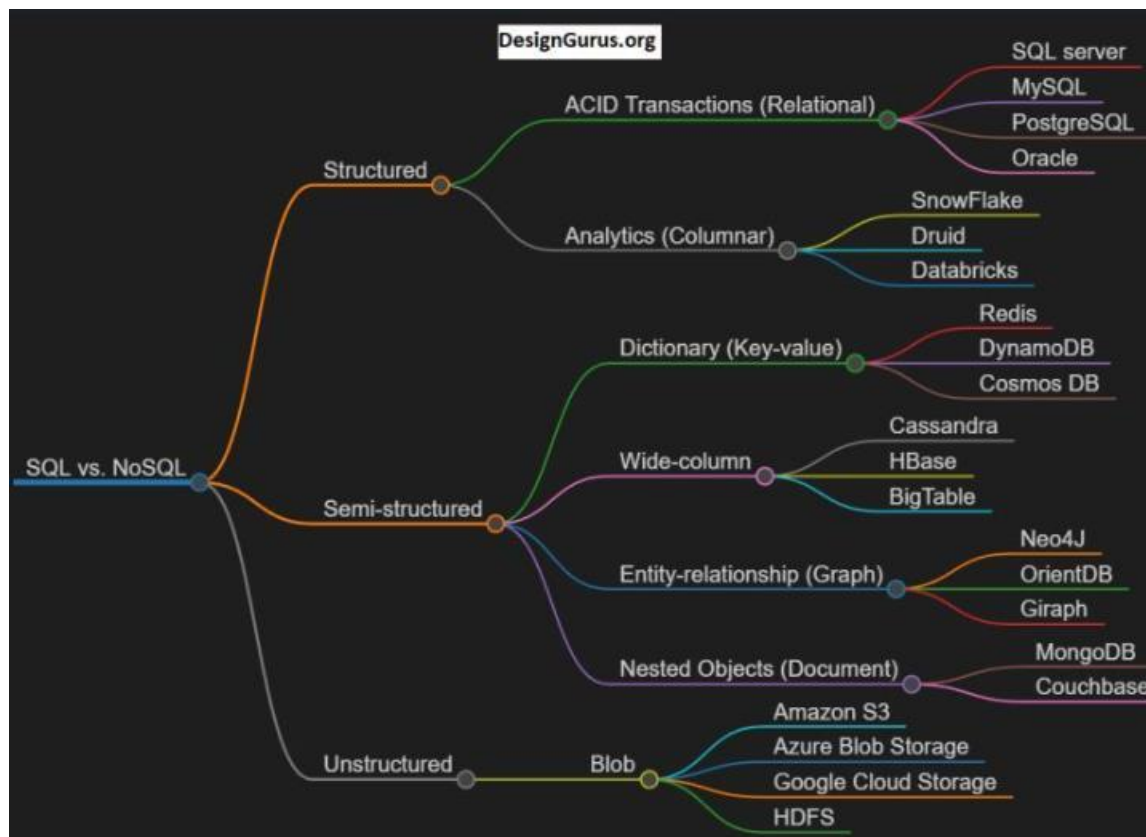
As we will discuss in a later section, **cognitive computing** is the simulation or mimicking of human thought processes in a computerized model. Cognitive computing will make semantic-oriented, model-based digital financial reporting work. We explain how in the section *Introduction to Knowledge Engineering for Professional Accountants*²⁰.

²⁰ *Introduction to Knowledge Engineering for Professional Accountants*,
http://xbrl.azurewebsites.net/2017/IntelligentDigitalFinancialReporting/Part01_Chapter02.3_KnowledgeEngineeringBasicsForProfessionalAccountants.pdf

1.7. Putting Financial Report Information in Database

Effectively, a financial report is a knowledge graph. That knowledge graph could be in only human readable form such as a document, it could be in machine readable form such as the global standard XBRL, and the machine readable form can be convertible into human readable form.

Possible options for storing the knowledge graph of financial report information are shown by this tree of the different types of data and databases²¹:



Fundamentally, information can be structured, semi-structured, or unstructured. Today, financial reports are structured; but they are structured for the presentation of information. More on all this as we progress.

1.8. XBRL is a Global Standard Knowledge Media

The role of standards tends to be misunderstood and often under appreciated. Standards make things easier. There are many different standards such as intermodal shipping containers²², universal product codes, the metric system, JPEG photo format, MPEG audio format, etc.

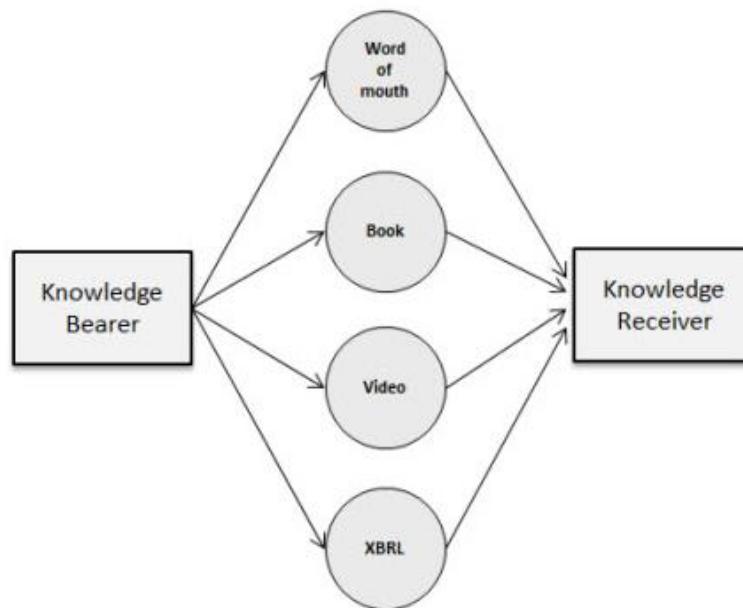
²¹ LinkedIn, Alex Weng, Post, https://www.linkedin.com/posts/mengyaowang11_datascience-mlops-bigdata-activity-6999484937644986369-Fmr1/

²² Wikipedia, *Intermodal shipping container*, https://en.wikipedia.org/wiki/Intermodal_container#Specifications

Simply put, standards make things easier for users.

XBRL is a global standard knowledge media²³. In order to make use of a knowledge media effectively, the following three conditions must be satisfied:

1. **Easy for knowledge bearer to represent information:** The effort and difficulty required for the knowledge bearer to successfully formulate the knowledge in the medium must be as low as possible.
2. **Clear, consistent meaning:** The meaning conveyed by the knowledge bearer to the knowledge receiver must be clear and easily followed by human beings and be consistent between different software applications. The result cannot be a "black box" or a guessing game and users of the information should not be able to derive different knowledge simply by using a different software application.
3. **High-quality information representation:** The form in which the knowledge is represented to the receiver must be as good as possible. The quality must be high whether the knowledge receiver is a human-being or an automated machine-based process. Sigma level 6 is a good benchmark, 99.99966% accuracy.



1.9. SEC primes the pump

About 12,000 companies submit their financial statements 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 using XBRL. Approximately 9,000 banks submit their financial statements to the Federal Deposit Insurance Corporation (FDIC)

²³ Understanding that XBRL is a Knowledge Media,
<http://xbml.squarespace.com/journal/2017/1/16/understanding-that-xbml-is-a-knowledge-media.html>

digitally using XBRL. 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. And the overwhelming evidence indicates that this transition will succeed.

1.10. 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. Professional accountants need to play a role in transitioning to digital.

1.10.1. 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.

1.10.2. 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 professional 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 filer 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 unbundle 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.

1.10.3. 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.

1.11. 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.

1.12. 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.

1.13. 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, artificial intelligence, 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, Blackline, Workiva, Trintech and Longview Solutions. There are likely many others.

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 by public companies.

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.

1.14. 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*²⁴ 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?

It is time to get ready for digital accounting, reporting, and auditing²⁵. Consider this information communicated by the AICPA:

²⁴ *FASB sees flexibility, relevance as cures to disclosure overload*,
<http://www.journalofaccountancy.com/news/2012/sep/20126364.html>

²⁵ *Getting Ready for the Digital Age of Accounting, Reporting and Auditing: a Guide for Professional Accountants*,
<http://xbrlsite.azurewebsites.net/2017/Library/GettingReadyForTheDigitalAgeOfAccounting.pdf>

AICPA News Update: "Technology has undoubtedly been the catalyst for change throughout history. But today, this change is happening faster than ever before. The world will look very different in a few years - and the accounting profession is no exception. Artificial intelligence, blockchain and other technologies are poised to reshape the accounting landscape, and we need to be ready."

Journal of Accountancy: "Technology is poised to transform the accounting profession. Artificial intelligence, robotics, and blockchain are on the verge of automating many traditional core CPA tasks. The profession is at a critical moment, one from which it will emerge in a far different form."

The future of financial reporting is digital financial reporting.