

# 11. Analysis and Comparison of Digital Financial Reports

The ultimate test as to whether a model-based digital financial report is properly created is its utility in terms of being analyzed and/or compared. This section uses the example of financial reports and more specifically SEC financial filings in order to discuss the use and analysis of model-based digital financial reports. This section places no judgments as to what *should* be comparable. What this section does is shows common types of uses of SEC XBRL financial filings and what is *necessary* for comparability to occur. Decisions as to where comparability should exist is a question which the reporting supply chain participants must answer.

Use of digital financial information should not be equated the techniques used to gather and use information today. Consider the following is a video of one analysis software application which leverages XBRL as an example of the possibilities available:

<http://www.sqlpower.ca/consulting/page/xbrl-analytics>

## 11.1. Change in the analysis paradigm

Today, financial information is a general, pre-canned, static, one-size-fits-all, hard to use let alone reuse report where a reporting entity tells the reader what information is important. The story the financial report tells is from one perspective.

Today, each financial analyst pulls out the facts which that analyst believes are the relevant facts, makes adjustments to the facts reported by the company, and defines their own unique perspective of how that company provides economic value.

Today, the financial information supply chain is inefficient.

Digital financial reports make analysis easier. Digital financial reports changes the fundamental equation making a one-size-fits-all and single perspective unnecessary.

Eventually what digital financial reports offer will change what regulators and standards setters specify what a financial statement looks like and what a financial report contains.

The supply change will be reversed and users of the information will pull the relevant facts which they feel they need, rather than one perspective a broad set of hundreds if not thousands of different perspectives will be available. Analysts will compete at the level of their unique perspective as to the economic value provided by a company. Analysts and other consumers of digital financial information will assemble their own unique reports rather than rely on the pre-canned stories told by the companies themselves. Rather than having one view forced upon you, each consumer of information will find it easier to assimilate their own estimation/judgment as to the viability of a company and the economic value that company provides.

Digital financial reporting will make analysis more efficient, will make information easy to share, will, perhaps, arguably make financial analysis more effective. While all this has yet to be seen, the possibility seems to be within grasp.



## 11.2. Financial reporting analysis use cases

These are the general use cases for information reported in SEC XBRL financial filings:

- **Analysis of a single filing.** Analysis of one financial filing from one filing entity.
- **Time series analysis for a filer.** Two or more financial filings from the same filing entity.
- **Comparative analysis across filers.** Two or more financial filings from different filing entities using different subsets of information.
- **Ratio analysis.** An analysis of a single filing, a time series analysis, or a comparative analysis using ratios.

## 11.3. Two approaches to comparing information

There are two general approaches to enabling a comparison:

- **Top down.** Using a top down approach high level structures are used as the basis for comparison. For example, networks, [Table]s, or components could be used as the basis for comparison.
- **Bottom up.** Using a bottom up approach, the characteristics or concepts contained within a component are used to define the structure being compared. Another term for this approach is prototype theory.

## 11.4. Top down comparison

The following model SEC XBRL financial filing is constructed to be very comparable from both the top down and bottom up approaches:

<http://www.xbrlsite.com/US-GAAP/ReferenceImplementation/Comparison/Index.html>

Notice how the networks and tables can be leveraged in order to compare information across the three digital documents.

SEC XBRL financial filings cannot be compared top down because every network is unique for each filer, components are not consistently identified, [Table]s are not guaranteed unique so they could mean different things, and there are no other such “handles” which can be used to grab the pieces one desires to compare.

## 11.5. Bottom up comparison: fundamentals of Prototype Theory

HINT: This information is inspired by the book *Everything is Miscellaneous: the power of the new digital disorder*, by David Weinberger, chapter 9, pages 173 to 198. That chapter has detailed explanations and reasoning which supports prototype theory.

Fundamentally there are two perspectives to understanding what something is:

- Aristotle’s definition view perspective was that “A thing is a member of a category if it satisfies the definition of the thing.”
- The second perspective, prototype theory, is that we can know what something means even if it can’t be clearly defined and even if its boundaries cannot be sharply drawn; concepts can be clear without having clear



definitions if they're organized around undisputed examples, or prototypes, as Eleanor Rosch the inventor of **prototype theory** calls them.

As an example, one can understand that something is a "chair" by understanding as many properties as possible about the thing you are looking at, looking at the properties of a chair as defined by a prototype (the undisputed example), and then predicting whether the thing you are looking at is a "chair" by comparing the properties you are looking at with the properties of a chair.

By contrast, the definitional view "draws sharp lines" whereas the prototype view works because "things can be sort of, kind of, in a category. Prototype theory relies on our implicit understanding and does not assume that we can even make that understanding explicitly.

#### **11.5.1. Issues identifying components within SEC XBRL financial filings**

SEC XBRL filings provide basically no top level foundation for comparability, no "handles" as they are sometimes referred to. Two candidates as a basis for comparison are networks and [Table]s.

However, each SEC XBRL filing defines its own networks and no two networks are the same per SEC XBRL filing rules. That rules out networks as a basis of comparison. Besides, networks are more presentation mechanisms within SEC XBRL filings, used to put pieces in order and get pieces to render in a specific section of the SEC interactive data viewer.

Within an SEC XBRL filer extension taxonomy, [Table]s could be used for expressing different sets of information. However these are ruled out because [Tables] are not guaranteed unique. For example the "Statement [Table]" is used on the balance sheet, income statement, statement of cash flows, and a number of other statements. Other [Table]s are used multiple times within the US GAAP taxonomy and define different sets of information. One could combine the network and the [Table] to create a unique handle, but then you run into the first problem, the networks cannot help you.

There are other problems with [Table]s. Many "tables" are implied (i.e. they don't physically exist as a [Table]). Another problem is that [Table]s are too big, they contain too many components. There are others, but you can probably get the point already.

#### **11.5.2. Other issues**

Looking at this situation from the bottom up, there are approximately 15,000 concepts within the US GAAP taxonomy, too detailed a perspective for any useful comparison at the individual concept level. There is no middle "level" between the 15,000 concepts which is too granular and too large and the [Table]s which are too few, most time not identifiable as they are implicit and have no explicit handle to grab onto.

To exacerbate this situation, SEC filers can extend the US GAAP taxonomy adding additional networks, explicit [Table]s, implicit tables (i.e. everything within a network which is not within an explicit table is within an unnamed implicit table), [Axis], [Line Items] or concepts, and so forth.

When an SEC XBRL filer expresses their information, they create new networks which are comparable to no other network, they define [Table]s which could be used to



express many different sets of information, tables could be defined implicitly or explicitly, and the [Axis] on each information set have no real pattern.

This problem seems unsolvable.

**11.5.3. Looking deeper in to SEC XBRL financial filings**

If you look deeper into financial filings you realize some things which are quite useful in grabbing handles to allow for meaningful comparisons of information. For example, consider this small fragment of the US GAAP Taxonomy which is used to disclose nonmonetary transactions. This is a the network 840000 – Disclosure – Nonmonetary Transactions which has been remolded:

**Network: Nonmonetary Transactions** (<http://fasb.org/us-gaap/role/disclosure/NonmonetaryTrans>)

Line	Label	Object Class
1	<b>Nonmonetary Transactions</b>	[Network]
2	Nonmonetary Transactions [Abstract]	[Abstract]
3	<b>Nonmonetary Transaction, by Type [Table]</b>	[Table]
4	<b>Legal Entity [Axis]</b>	[Axis]
5	Consolidated Entity [Domain]	[Domain]
6	<b>Nonmonetary Transaction Type [Axis]</b>	[Axis]
7	Nonmonetary Transaction Type [Domain]	[Domain]
8	Receipt of Assets in Satisfaction of Debt [Member]	[Member]
9	Acquisition of Content Rights in Exchange for Future Services [Member]	[Member]
10	Contribution of Nonmonetary Assets to a Not-for-Profit Organization [Member]	[Member]
20	Inventory [Member]	[Member]
21	Goods and Services Exchanged for Equity Instrument [Member]	[Member]
22	<b>Nonmonetary Transaction [Line Items]</b>	[Line Items]
23	Details of Nonmonetary Transactions [Table Text Block]	[Concept] Text Block (HTML)
24	Nonmonetary Transaction [Hierarchy]	[Abstract]
25	Nonmonetary Transaction, Basis of Accounting for Assets Transferred	[Concept] Text/String
26	Nonmonetary Transaction, Name of Counterparty	[Concept] Text/String
27	Nonmonetary Transaction, Gain (Loss) Recognized on Transfer	[Concept] Monetary
28	Nonmonetary Transaction, Amount of Barter Transaction	[Concept] Monetary
29	Nonmonetary Transaction, Fair Value Not Determinable	[Concept] Text/String
30	Nonmonetary Transaction, Gross Operating Revenue Recognized	[Concept] Monetary

Look at the fragment above and consider the following:

- A filer could report their nonmonetary transaction information at two levels: block tagged or detailed tagged. If the information is block tagged, the concept on line 23 would be used, "Details of Nonmonetary Transactions [Table Text Block]". If the information were detailed tagged a filer would use some combination of concepts in the component "Nonmonetary Transaction [Hierarchy]". But either way, the information is the same. The only difference is that one might be block tagged, the other would be detailed tagged.
- The concepts within the "Nonmonetary Transaction [Line Items]" are used nowhere else in the US GAAP Taxonomy. As such, if one sees one or more of these concepts on a fact within an SEC XBRL filing; then one can assume with a high level of confidence that the component which contains one or more of those concepts is highly likely to be a nonmonetary transaction. As such, you really don't need the "Nonmonetary Transactions [Table]" explicitly identified.
- The [Axis] "Nonmonetary Transaction Type [Axis]" is used in only one place and for one thing in the US GAAP taxonomy. As such, that too could be used to identify the disclosure of nonmonetary transactions. Combining both the [Axis] and the concepts increases probability even more.



- Financial reporting rules and logic demand that certain concepts be present. For example, this component would make little sense without the “Nonmonetary Transaction, Amount of Barter Transaction”. In financial reporting rules certain information is always required to be disclosed, certain information is required to be disclosed if a certain event or circumstance occurs during a financial period, certain information is common practice, and certain information is reported at the option of the filer. Some base set of information will always exist, it will always be logical based on financial reporting disclosure requirements and logic. For example, an SEC filer would be highly unlikely to report “Nonmonetary Transaction, Fair Value Not Determined” as the only concept within a nonmonetary transaction.
- If additional required disclosures which expand the base disclosure is presented, if common practice disclosures are provided, or additional optional information is disclosed; it will always exist with that base, supplementing that base disclosure.
- Additional information in the form of XBRL calculations or other business rules enhances the relationships between information within a set of reported information and providing additional clues.

The point of all this is to say that the pieces of a disclosure provide a highly reliable mechanism for discovering the component you are looking for, whatever someone may have called that component. The only thing which is necessary to use this approach is a prototype of what you call the component you desire to work with.

**11.5.4. Prototypes for creation and analysis are the same**

These prototypes are useful for not only analysis but also for creation of SEC XBRL filings. The prototypes serve as examples or templates or stencils; whatever term you might like to call them. These prototypes can be hard to see within the US GAAP Taxonomy because that taxonomy tends to be inconsistent, not uniform, and the appropriate component layer is not clearly identified. However, by reorganizing the US GAAP taxonomy it is much easier to see the components and the prototypes. This URL takes you too such a reorganized version:

<http://www.xbrlsite.com/US-GAAP-2011/Exemplars/Viewer.html>

Look at the networks and tables with which you may be more familiar. But the most interesting pieces is the “Component”. This is an example:

Components (ordered by Component label)	
<a href="#">470000</a> <a href="#">Tms</a>	Accelerated Share Repurchases [Hierarchy]
<a href="#">470000</a> <a href="#">Tms</a>	Accelerated Share Repurchases [Table Text Block]
<a href="#">250000</a> <a href="#">Tms</a>	Accounting Changes and Error Corrections [Hierarchy]
<a href="#">400000</a> <a href="#">Tms</a>	Accounts Payable and Accrued Liabilities [Roll Up]
<a href="#">400000</a> <a href="#">Tms</a>	Accounts Payable and Accrued Liabilities Disclosure [Text Block]
<a href="#">400000</a> <a href="#">Tms</a>	Accounts Payable and Accrued Liabilities, Current [Roll Up]
<a href="#">400000</a> <a href="#">Tms</a>	Accounts Payable and Accrued Liabilities, Current [Roll Up]
<a href="#">400000</a> <a href="#">Tms</a>	Accounts Payable and Accrued Liabilities, Noncurrent [Roll Up]
<a href="#">400000</a> <a href="#">Tms</a>	Accounts Payable, Accrued Liabilities, and Other Liabilities Disclosure, Current [Text Block]
<a href="#">400000</a> <a href="#">Tms</a>	Accounts Payable, Accrued Liabilities, and Other Liabilities Disclosure, Noncurrent [Text Block]



While a flat, alphabetized list may be useful for some things, what is more interesting is that you can reorganize the components any way you choose rather than being locked into one view. For example:

- **TOPIC> Postretirement Pension Costs**
  - **Table> Postemployment Benefits [Table]**
    - [Hierarchy] > Postemployment Benefits [Hierarchy]
    - [Text Block] > Postemployment Benefits Disclosure [Text Block]
    - [Roll Up] > Supplemental Unemployment Benefits [Roll Up]
- **TOPIC> Other Expenses**
  - **Table> Other Income and Expenses Disclosures [Table]**
    - [Roll Up] > Interest and Other Income [Roll Up]
    - [Text Block] > Interest and Other Income [Table Text Block]
    - [Text Block] > Interest and Other Income [Text Block]
    - [Hierarchy] > Other Cost and Expense Disclosure, Operating [Hierarchy]
    - [Hierarchy] > Other Expense Disclosure, Nonoperating [Hierarchy]
    - [Roll Up] > Other Income [Roll Up]
    - [Text Block] > Other Income and Other Expense Disclosure [Text Block]
    - [Hierarchy] > Other Income Disclosure, Nonoperating [Hierarchy]
    - [Roll Up] > Other Nonoperating Income (Expense) [Roll Up]
    - [Text Block] > Schedule of Other Nonoperating Income (Expense) [Table Text Block]
  - **Table> Component of Other Expense, Nonoperating [Table]**
    - [Hierarchy] > Component of Other Expense, Nonoperating [Hierarchy]
    - [Text Block] > Schedule of Other Nonoperating Expense, by Component [Table Text Block]
  - **Table> Component of Other Income, Nonoperating [Table]**
    - [Hierarchy] > Component of Other Income, Nonoperating [Hierarchy]
    - [Text Block] > Schedule of Other Nonoperating Income, by Component [Table Text Block]
  - **Table> Component of Other Operating Cost and Expense [Table]**
    - [Hierarchy] > Component of Operating Other Cost and Expense [Hierarchy]
    - [Text Block] > Schedule of Other Operating Cost and Expense, by Component [Table Text Block]
- **TOPIC> Research and Development Costs**
  - **Table> Research, Development, and Computer Software [Table]**
    - [Roll Up] > Capitalized Computer Software, Net [Roll Up]
    - [Roll Forward] > Movement in Capitalized Computer Software, Net [Roll Forward]
    - [Roll Up] > Research and Development Expense [Roll Up]
    - [Hierarchy] > Research, Development, and Computer Software [Hierarchy]
    - [Text Block] > Research, Development, and Computer Software Disclosure [Text Block]

For the section of the US GAAP Taxonomy which was remodeled, 1104 components were identified. This is the true level at which users interact with the taxonomy to create SEC XBRL financial filings. The network and table level is too high level, but helpful in getting close to what you are looking for and the concepts themselves of which there are about 15,000 is too many to work with.

#### 11.5.5. Exemplar theory and prototype theory

Prototype theory is one way of identifying something by its components. Another approach is exemplar theory. With prototype theory you generally have one prototype. With exemplar theory you can have multiple prototypes for the same thing.

It is not the case that there is only one “undisputed example”, nor does their need to be. For example, there are many different types of balance sheets: classified, unclassified, deposit based operations, insurance based operations, securities based operations, and others for specific industries and financial reporting needs.



However, it is not the case that there are an infinite number of balance sheets. Financial information is not random or infinite in nature.

Specific undisputed examples can be created and even cross referenced with additional information. Another way of saying this is that there is no need to have only one undisputed example for any piece of a financial report. Further, this idea applies to each piece of a financial report and to the full set of pieces which an SEC XBRL filer might create.

It can be hard to understand how to model your SEC XBRL financial filing extension taxonomy by using the US GAAP Taxonomy. Having multiple specific examples can be better. For example, consider this sample of exemplars:

<http://www.xbrlsite.com/US-GAAP-2011/Exemplars/Viewer3.html>

This shows models for:

- A balance sheet with and without a noncontrolling interest.
- An income statement with each of the “steps” you might have including: income from equity method investments, income from discontinued operations, income from noncontrolling interest, extraordinary items, and preferred dividends or other adjustments
- A cash flow statement with or without discontinued options and different approaches for disclosing discontinued options.

Cognitive psychologists have begun to explore the idea that the prototype and exemplar models form two extremes.

#### **11.5.6. For more information about prototype theory**

The following are additional resources which provide information relating to prototype theory:

- [http://en.wikipedia.org/wiki/Prototype\\_theory](http://en.wikipedia.org/wiki/Prototype_theory)
- <http://courses.umass.edu/psy315/prototype.html>
- [http://en.wikipedia.org/wiki/Concept\\_learning](http://en.wikipedia.org/wiki/Concept_learning)

