17. Analysis and Comparison of Digital Financial Reports

The ultimate test as to whether a digital financial report is properly created is its utility in terms of being analyzed and/or compared. After all, prudence dictates that making use of XBRL-based financial information should not be a guessing game. Rather, using the information should be safe, reliable, predictable, and repeatable.

This section uses the example of XBRL-based public company financial reports in order to discuss the use and analysis of digital financial reports. This section places no judgments as to what should be comparable. That is up to the financial reporting supply chain. This section is about what is necessary for use and comparability to occur. Decisions as to where comparability should exist are questions 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 videos of one analysis software application which leverages XBRL as an example of the possibilities enabled by digital financial reporting:

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

17.1. 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, the creator of the financial report.

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 has inefficiencies which can be improved using automated machine-based processes to help perform analysis.

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.
There are two different parts to analysis of information: (1) obtaining reported facts and (2) interpretation of reported facts. Machine-readable XBRL-based digital financial reports are about providing those facts using automated processes, rather than through rekeying information. That is the focus. The story told by the economic entity reporting the facts and the story understood by the analyst consuming the facts would be the same. A fact is a fact. How analysts interpret the facts is up to each individual analyst.

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 if you understand how to look.

### 17.2. Repository of machine-readable facts

The purpose of this section is to set your perspective and expectations. Imagine a machine-readable repository of information. Imagine that you want to query that repository and get the value of two concepts for every economic entity in that repository: Assets and Liabilities and Equity. In order to extract that information from any XBRL-based financial report using a machine-based process the following process needs to be followed:

1. Software MUST locate each report you want to query. You want to be sure you have the correct report. For example, if a report is amended, you need the most current report.

2. The report MUST be valid XBRL technical syntax. If the technical syntax is invalid, you may or may not get the correct results.

3. Software MUST locate the appropriate reporting units (currency). In the case of public company financial reports, 99% of entities report using US Dollars. However, 1% use other currencies as the reporting units.

4. Software MUST appropriately identify the root reporting entity in the report, we don’t want business segment information. Generally, this is the consolidated entity but it could be a parent holding company or some other accounting entity.

5. Software MUST appropriately locate the current balance sheet date. Generally you want information about the current balance sheet data and not the prior balance sheet, both are provided in the same report.

6. Software MUST find the appropriate US GAAP concept used to express Assets which is us-gaap:Assets.

7. Software MUST find appropriate US GAAP concept for Liabilities and Equity. This is a little harder because there are multiple possible concepts: us-gaap:LiabilitiesAndStockholdersEquity or us-gaap:LiabilitiesAndPartnersCapital.

8. Software MUST check the returned information to assure that it is consistent with what is expected, the business domain rule that “Assets = Liabilities and Equity”.

That is an overview of the workflow/process to obtain a basic set of information from the repository of XBRL-based public company financial filings. And here are the
results of that query for every financial report from the SEC EDGAR system of XBRL-based public company financial reports:

<table>
<thead>
<tr>
<th>XBRL Entity</th>
<th>Legal Entity</th>
<th>Fiscal Period</th>
<th>Fiscal Year</th>
<th>Assets</th>
<th>Liabilities and Equity</th>
<th>Units</th>
<th>Difference in Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>All CIK numbers</td>
<td>Root economic entity</td>
<td>FY 2001</td>
<td>280</td>
<td>280</td>
<td>iso4217:USD</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>All CIK numbers</td>
<td>Root economic entity</td>
<td>FY 2009</td>
<td>31,586,555,000</td>
<td>31,586,555,000</td>
<td>iso4217:USD</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>All CIK numbers</td>
<td>Root economic entity</td>
<td>FY 2010</td>
<td>33,921,516,000</td>
<td>33,921,516,000</td>
<td>iso4217:CAD</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>All CIK numbers</td>
<td>Root economic entity</td>
<td>FY 2010</td>
<td>8,889,200,000</td>
<td>8,889,200,000</td>
<td>iso4217:GBP</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>All CIK numbers</td>
<td>Root economic entity</td>
<td>FY 2011</td>
<td>33,235,444,505,755</td>
<td>33,235,444,505,755</td>
<td>iso4217:USD</td>
<td>30,096,907,876</td>
<td></td>
</tr>
<tr>
<td>All CIK numbers</td>
<td>Root economic entity</td>
<td>FY 2011</td>
<td>45,216,467</td>
<td>45,216,467</td>
<td>iso4217:AUD</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>All CIK numbers</td>
<td>Root economic entity</td>
<td>FY 2011</td>
<td>110,855,000</td>
<td>110,855,000</td>
<td>iso4217:BRL</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>All CIK numbers</td>
<td>Root economic entity</td>
<td>FY 2011</td>
<td>28,708,716,218</td>
<td>28,708,716,218</td>
<td>iso4217:CAD</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>All CIK numbers</td>
<td>Root economic entity</td>
<td>FY 2011</td>
<td>1,226,733,000</td>
<td>1,226,733,000</td>
<td>iso4217:EUR</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>All CIK numbers</td>
<td>Root economic entity</td>
<td>FY 2011</td>
<td>7,938,800,000</td>
<td>7,938,800,000</td>
<td>iso4217:GBP</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>All CIK numbers</td>
<td>Root economic entity</td>
<td>FY 2011</td>
<td>1,565,000</td>
<td>1,565,000</td>
<td>iso4217:ILS</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>All CIK numbers</td>
<td>Root economic entity</td>
<td>FY 2011</td>
<td>48,595,324,516,234</td>
<td>48,185,765,878,111</td>
<td>iso4217:USD</td>
<td>(225,560,456,123)</td>
<td></td>
</tr>
<tr>
<td>All CIK numbers</td>
<td>Root economic entity</td>
<td>FY 2012</td>
<td>49,086,850</td>
<td>49,086,850</td>
<td>iso4217:AUD</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>All CIK numbers</td>
<td>Root economic entity</td>
<td>FY 2012</td>
<td>32,470,151,538</td>
<td>32,470,151,538</td>
<td>iso4217:CAD</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>All CIK numbers</td>
<td>Root economic entity</td>
<td>FY 2012</td>
<td>1,203,490,000</td>
<td>1,203,490,000</td>
<td>iso4217:EUR</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>All CIK numbers</td>
<td>Root economic entity</td>
<td>FY 2012</td>
<td>10,504,300,000</td>
<td>10,504,300,000</td>
<td>iso4217:GBP</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>All CIK numbers</td>
<td>Root economic entity</td>
<td>FY 2012</td>
<td>47,493,211,088,244</td>
<td>47,307,285,874,940</td>
<td>iso4217:USD</td>
<td>(105,925,231,304)</td>
<td></td>
</tr>
<tr>
<td>All CIK numbers</td>
<td>Root economic entity</td>
<td>FY 2013</td>
<td>54,642,443</td>
<td>54,642,443</td>
<td>iso4217:AUD</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>All CIK numbers</td>
<td>Root economic entity</td>
<td>FY 2013</td>
<td>39,919,403,835</td>
<td>39,919,403,835</td>
<td>iso4217:CAD</td>
<td>(77,197)</td>
<td></td>
</tr>
<tr>
<td>All CIK numbers</td>
<td>Root economic entity</td>
<td>FY 2013</td>
<td>13,120,000</td>
<td>13,120,000</td>
<td>iso4217:EUR</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>All CIK numbers</td>
<td>Root economic entity</td>
<td>FY 2013</td>
<td>48,909,115,940,692</td>
<td>48,735,740,980,825</td>
<td>iso4217:USD</td>
<td>(175,374,060,877)</td>
<td></td>
</tr>
<tr>
<td>All CIK numbers</td>
<td>Root economic entity</td>
<td>FY 2014</td>
<td>342,495,648,881</td>
<td>342,495,648,881</td>
<td>iso4217:USD</td>
<td>(558,760,878,825)</td>
<td></td>
</tr>
</tbody>
</table>

The results\(^\text{185}\) show that most of the balance sheets balance, \textit{Assets = Liabilities and Equity}. Some are inconsistent with what you would expect. The total inconsistency is .3% which is not too bad. However, the information needs to be 100% consistent in order to not get humans involved to figure out exactly what is causing the inconsistencies.

What needs to be considered when querying other facts from a repository works in exactly the same way as this basic query.

### 17.3. Comparing fundamental accounting concepts

Professional accountants understand that economic entities have many similarities in how they report information and they also have differences. As explained in the section Understanding Fundamental Accounting Concepts and Report Frames, some reporting entities provide a classified balance sheet and other reporting entities provide an unclassified balance sheet. It is impossible to compare at the level of current and noncurrent assets and liabilities if such a breakdown of information does not exist. However, a comparison can still be made at the level of assets and liabilities and equity as this high level is provided by both entities.

Every general purpose financial report is comparable to all other reports at a very high level. For example, every economic entity reports assets, liabilities, equity, revenues, net income (loss), net cash flow, and so forth.

Economic entities are directly comparable to other economic entities if each entity reports using the same style of reporting. For example, if current assets, current

\(^\text{185}\) Query and results provided by SECXBRL.info which is a commercial software application, see [http://app.secxbrl.info/](http://app.secxbrl.info/)
liabilities, gross profit, operating income (loss), and other such information is explicitly provided; then the information is directly comparable. Even if some information is not explicitly provided, such as total noncurrent assets or total noncurrent liabilities, financial information is still comparable many times information which is not explicitly provided can be imputed based on other explicitly provided information. For example, if assets is reported and current assets is reported; the value of noncurrent assets can be safely imputed because the relationship between assets, current assets, and noncurrent assets is well established to be assets = current assets + noncurrent assets.

And so for arguments sake, imagine that you had an economic entity which explicitly reported some specific set of facts and other facts could be imputed using well established and agreed upon relations of other financial facts as is shown below:

<table>
<thead>
<tr>
<th>General Information</th>
<th>ABC Company, Inc.</th>
<th>Reported</th>
<th>DE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entity Registration Name</td>
<td>123456789012</td>
<td>Reported</td>
<td>DE</td>
</tr>
<tr>
<td>Entity File Category</td>
<td>Large Accelerated Filer</td>
<td>Reported</td>
<td>DE</td>
</tr>
<tr>
<td>Trading Symbol</td>
<td>abc</td>
<td>Reported</td>
<td>DE</td>
</tr>
<tr>
<td>Fiscal Year End</td>
<td>2022</td>
<td>Reported</td>
<td>DE</td>
</tr>
<tr>
<td>Fiscal Period</td>
<td>12-12-22</td>
<td>Reported</td>
<td>DE</td>
</tr>
<tr>
<td>Document Type</td>
<td>10-K</td>
<td>Reported</td>
<td>DE</td>
</tr>
<tr>
<td>Balance Sheet Date</td>
<td>2022-12-31</td>
<td>Reported</td>
<td>DE</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Balance Sheet</th>
<th>Classified</th>
<th>123456789012</th>
<th>Reported</th>
<th>DE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Assets of classified balance sheet</td>
<td>10,000,000</td>
<td>Reported</td>
<td>DE</td>
<td></td>
</tr>
<tr>
<td>Noncurrent assets of classified balance sheet</td>
<td>50,000,000</td>
<td>Reported</td>
<td>DE</td>
<td></td>
</tr>
<tr>
<td>Assets</td>
<td>60,000,000</td>
<td>Reported</td>
<td>DE</td>
<td></td>
</tr>
<tr>
<td>Current Liabilities of classified balance sheet</td>
<td>10,000,000</td>
<td>Reported</td>
<td>DE</td>
<td></td>
</tr>
<tr>
<td>Noncurrent Liabilities of classified balance sheet</td>
<td>50,000,000</td>
<td>Reported</td>
<td>DE</td>
<td></td>
</tr>
<tr>
<td>Liabilities</td>
<td>60,000,000</td>
<td>Reported</td>
<td>DE</td>
<td></td>
</tr>
<tr>
<td>Commitments and contingencies</td>
<td>0</td>
<td>Reported</td>
<td>DE</td>
<td></td>
</tr>
<tr>
<td>Equity Accountable to Parent</td>
<td>10,000,000</td>
<td>Reported</td>
<td>DE</td>
<td></td>
</tr>
<tr>
<td>Equity Attributable to Noncontrolling Interest</td>
<td>0</td>
<td>Reported</td>
<td>DE</td>
<td></td>
</tr>
<tr>
<td>Equity</td>
<td>10,000,000</td>
<td>Reported</td>
<td>DE</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Income Statement</th>
<th>Multi-step</th>
<th>123456789012</th>
<th>Reported</th>
<th>DE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenue (single-step alternative)</td>
<td>10,000,000</td>
<td>Reported</td>
<td>DE</td>
<td></td>
</tr>
<tr>
<td>Costs of Revenue (single-step alternative)</td>
<td>5,000,000</td>
<td>Reported</td>
<td>DE</td>
<td></td>
</tr>
<tr>
<td>Operating Expenses (single-step alternative)</td>
<td>5,000,000</td>
<td>Reported</td>
<td>DE</td>
<td></td>
</tr>
<tr>
<td>Other Operating Income (Loss) (single-step alternative)</td>
<td>0</td>
<td>Reported</td>
<td>DE</td>
<td></td>
</tr>
<tr>
<td>Operating Income (Loss) (single-step alternative)</td>
<td>0</td>
<td>Reported</td>
<td>DE</td>
<td></td>
</tr>
<tr>
<td>Other Income (Loss) (single-step alternative)</td>
<td>0</td>
<td>Reported</td>
<td>DE</td>
<td></td>
</tr>
<tr>
<td>Costs of Financial Services (single-step alternative)</td>
<td>5,000,000</td>
<td>Reported</td>
<td>DE</td>
<td></td>
</tr>
</tbody>
</table>

And imagine that an analyst desired to compare that economic entity against several other economic entities which reported exactly the same facts explicitly or that each of the unreported facts could be safely and reliably imputed using well established relations between explicitly reported facts.

And so imagine that you had the following set of economic entities which some analyst desired to compare and all of the facts which were explicitly provided or safely and reliability imputed as is shown below:
Now, imagine that you sent five different software applications to gather that information from the repository of information which you are using. Would you expect the results obtained by each of the five different software applications to be identical?

Of course you would expect the results to be identical. If the results were not identical, that would mean that different software vendors used different information extraction algorithms to extract information from a repository of financial reports. And of course, one would expect different software working against the exact same digital financial reports would yield exactly the same query results.

Prudence dictates that using financial information from a digital financial report not be a guessing game. It is only through conscious effort that the specific control mechanisms can be put in place to realize this intent.

The goal is a system that works safely, reliably, predictably, repeatedly, effectively, and efficiently.

How is that achieved?

17.4. Description and verification are two sides of the same coin

Description of the information within some repository of machine-readable financial information and verification of the consistency of a financial report are two sides of the same coin. In order to make use of reported financial information safely, reliably, and predictably; the information cannot be correct 95%, or 98%, or 99% of the time. The information must be consistent with expectations 100% of the time for automated reuse of information to work. Whenever information is not consistent with expectations, then a human needs to get involved in order to determine the nature of the inconsistency.

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When you consider that a digital financial report contains hundreds or perhaps even thousands of reported facts and those facts have relations to other facts; the only way digital financial reporting could work is for machines to also help verify the consistency of financial reports against the description of what is expected.

As of this writing, XBRL-based financial reports submitted by public companies to the SEC were 63.2% consistent with expectations related to a set of 51 fundamental accounting concepts and 22 relations between those concepts. Consistency with these basic relations has been improving month after month and eventually all inconsistencies will be resolved. Ultimately, not only 51 facts and 22 relations will be tested for quality but rather tens of thousands of facts and relations between facts will be used to make using financial information reported digitally work safely.

17.5. Financial reporting analysis use cases

These are the general use cases for making use of information reported in XBRL-based public company financial reports provided to the SEC or elsewhere:

- **Analysis of a single report.** Analysis of one financial report from one reporting entity.

- **Time series analysis for a reporting entity.** Two or more financial reports from the same reporting entity.

- **Comparative analysis across reporting entities.** Two or more financial reports from different reporting entities using different subsets of information.

- **Ratio analysis.** An analysis of a single report, a time series analysis, or a comparative analysis using ratios.

17.6. Two approaches to comparing information

In order for a machine such as a computer to compare information, the information must be identifiable by the machine. A machine must be able to identify and then address what information the business user desires to work with. There are two general approaches to addressing information and thus enabling a comparison:

- **Top down or explicit identity/address.** Using a top down approach some explicitly known identity is used to identify some reported fact or a set of facts which someone desires to compare. For example, the name of the fact such as us-gaap:Assets, or the name of some table such as us-gaap:BalanceSheet, or the name of a disclosure such as us-gaap:LongTermDebtMaturitiesTextBlock could be used as the way to identify what is being compared.

- **Bottom up or implicitly derive identity/address.** Using a bottom up approach, the characteristics or concepts contained within the set of a component are used to identify the item one desires to compare. Another term for this approach is prototype theory which we will explain in a moment.

Basically, the easy way identify something is to explicitly give that thing a name and then use that name to identify and then go grab that thing. But if that identifier is

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no provided, then one needs to resort to other means of identifying the things you might wish to compare.

17.7. Top down or explicit identity/address comparison

Suppose that you wanted to compare some specific disclosure of two or more public companies that report to the SEC. How would you do that? Say perhaps that you wanted to compare the agricultural policy of each entity. Below you can see this comparison for 5 such reporting entities:

Reporting entity #1:

China Ginseng Holdings Inc | 2013 | FY | ****

Ginseng Crops
The Company uses the full absorption costing method to value in Ginseng crops. Included in crop costs are seeds, labor, applicable overhead including depreciation, and supplies. Common costs are allocated in each period based upon the total number of hectares under cultivation during the period.

The carrying value of the Ginseng crops is reviewed on a regular basis for any impairment in value using management’s best estimate as to expected future market values, yields and costs to harvest. Costs accumulated on the acres expected to be harvested during the next fiscal year have been classified as a current asset.

Reporting entity #2:

FRESH DEL MONTE PRODUCE INC | 2013 | FY | ****

Growing Crops
Expenditures on pineapple, melon and non-tropical fruit growing crops are valued at the lower of cost or market and are deferred and charged to cost of products sold when the related crop is harvested and sold. The deferred growing costs included in inventories in our Consolidated Balance Sheets consist primarily of land preparation, cultivation, irrigation and fertilization costs. Expenditures related to banana crops are expensed in the year incurred due to the continuous nature of the crop.

Reporting entity #3:

HOMEFED CORP | 2013 | FY | ****

Farming Revenues and Expenses – Income from farming related activities at the Rampage property are recognized when grapes are sold, and expenses from farming related activities are recognized when incurred.


Reporting entity #4:

**S&W Seed Co | 2013 | FY | **

**Crop Production Costs**

Expenditures on crop production costs are valued at the lower of cost or market and are deferred and charged to cost of products sold when the related crop is harvested and sold. The deferred crop production costs included in the consolidated balance sheets consist primarily of the cost of plants and the transplanting, stand establishment costs, intermediate life irrigation equipment and land amendments and preparation. Crop production costs are estimated to have useful lives of three to five years depending on the crop and nature of the expenditure and are amortized to growing crop inventory each year over the estimated life of the crop.

Components of crop production costs are:

<table>
<thead>
<tr>
<th></th>
<th>June 30, 2013</th>
<th>June 30, 2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steria</td>
<td></td>
<td>$925,460</td>
</tr>
<tr>
<td>Alfalfa seed production</td>
<td>1,497,605</td>
<td>73,031</td>
</tr>
<tr>
<td>Alfalfa hay</td>
<td>$4,924</td>
<td>40,067</td>
</tr>
<tr>
<td>Wheat and triticale</td>
<td></td>
<td>41,720</td>
</tr>
<tr>
<td><strong>Total crop production costs, net</strong></td>
<td><strong>$1,582,599</strong></td>
<td><strong>$1,098,292</strong></td>
</tr>
</tbody>
</table>

Notice that each reporting entity used the US GAAP XBRL Taxonomy concept *us-gaap:AgriculturePolicyPolicyTextBlock* to report this information. That concept is directly identifiable using the name of the concept.

Now, suppose you wanted to compare the document and entity information reported by each reporting entity. How would you identify that part of a financial report?

Every reporting entity is required to report a specific set of document and entity information, so it exists in every financial report. We will look at only two reporting entities and that will provide all that we need in order to explain our point.189

How would you identify the pieces above as representing what we are referring to as the document and entity information report fragment of the public company financial report? Notice the information used to identify the network circled for each reporting entity. By chance, the network label is exactly the same for these two reporting entities.
entities. However, that cannot be used to identify the report fragment because that label is not required and many other reporting entities do not use that label. The network identifier is different for each reporting entity. So, how would you address the report fragment in order to grab that specific report fragment, the document and entity information, which is required to be reported by every reporting entity?

There are no unique handles at the report fragment or report component level.

Basically, XBRL-based public company financial reports cannot be compared top down because every network is unique for each reporting entity, [Table]s are not required and can be used to identify different report components and are not guaranteed to be unique, and there are no other such “handles” which can be used to grab the pieces one desires to compare.

And so, a top down approach is not possible when trying to compare XBRL-based public company financial reports. Therefore, a bottom up approach needs to be employed.

17.8. Bottom up or implicitly derive identity/address: fundamentals of Prototype Theory

There are two perspectives which can be used 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.” This is the top down approach.
- 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 what is known to be 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.

17.8.1. Issues identifying components within XBRL-based public company financial reports

As we pointed out, XBRL-based public company financial reports provide no top level foundation for comparability, no “handles” as they are sometimes referred to. Two possible candidates for these handles which could serve as a basis for comparison are networks and [Table]s.

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190 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.
If you examine the networks of each XBRL-based public company financial report submitted to the SEC you quickly realize that each defines its own networks and no two networks in XBRL-based public company financial reports are the same. This is per SEC XBRL filing rules. A reporting entity does use the same network, in fact reporting entities are required by EFM rules to use the same network identifier, to identify the same component across all their financial reports. But this does no help someone trying to compare two reports of different reporting entities to identify the same thing, such as the document and entity information report fragment, in order to compare them.

That rules out networks as a candidate for providing a basis of comparison.

Another candidate is the [Table]. However the [Table] is ruled out because [Table]s 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 and often also used in disclosures. Other [Table]s are used multiple times within the US GAAP taxonomy and define different sets of information. Finally, [Table]s are not required for every report fragment or component.

17.8.2. Other issues

Looking at this situation from the bottom up, there are approximately 15,000 concepts within the US GAAP XBRL 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 Networks or [Table]s which are too few, most time not identifiable as [Table]s are many times implicit and have no explicit handle to grab onto.

17.8.3. Looking deeper in to XBRL-based public company financial reports

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 XBRL Taxonomy which is used to disclose nonmonetary transactions. This is the network 840000 – Disclosure – Nonmonetary Transactions\(^\text{191}\):

\(^{191}\) You can view this in the US GAAP XBRL Taxonomy here, [http://xbrlview.fasb.org/yeti/resources/yeti-gwt/Yeti.jsp#tax~(id~156*v~3912)\text{lnet~(a~3063*l~749)}]lang~(code~en-us)\text{rq~(rq~32*p~12)}
Look at the fragment of the US GAAP XBRL Taxonomy above which is used to represent the disclosure of nonmonetary transactions and consider the following:

- A reporting must report their nonmonetary transaction disclosure information at two levels: block tagged or detailed tagged. If the information is block tagged, the concept *Details of Nonmonetary Transactions [Table Text Block]* would be used. If the information were detailed tagged a filer would use some combination of concepts within the set of *Nonmonetary Transaction [Line Items]*. Per SEC filing rules, both of these should exist in a financial report as the Level 3 Text Block and the Level 4 Detailed disclosure. The Level 1 Text Block may or may not exist, depending upon where the reporting entity puts this disclosure.

- 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 XBRL-based report; 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 the nonmonetary transactions disclosure. As such, you really don’t need the *Nonmonetary Transactions [Table]* explicitly identified. However, if that [Table] did exist, it is highly probable that it would be used with the nonmonetary transactions disclosure.

- The [Axis] *Nonmonetary Transaction Type [Axis]* is used in only one place and for one thing in the US GAAP XBRL 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 always be present. For example, this component would make little sense without the concept 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 reporting entity. Some base set of information will always exist, it will always be logical based on financial reporting disclosure requirements and logic.

• 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 which would always include the concept Nonmonetary Transaction, Amount of Barter Transaction or perhaps Nonmonetary Transaction, Fair Value Not Determinable.

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 network label or identifier. The only thing which is necessary to use this approach is a prototype of what you call the component you desire to work with and a unique name which is used to identify that piece which serves as the addressable handle 192.

17.8.4. Prototypes for creation and analysis are the same

These prototypes are useful for not only analysis but also for creation of XBRL-based financial reports. 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 XBRL 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 XBRL Taxonomy into smaller pieces, it is much easier to see the components and the prototypes 193.

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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, consider this view where disclosures are organized into topic.194

Approximately 1000 disclosures were identified within the US GAAP XBRL Taxonomy. Each disclosure has a prototype which is used to identify and serve as a machine-readable signature for the disclosure.

17.8.5. Exemplar theory and prototype theory

Prototype theory\(^{195}\) is one way of identifying something by its components. Another approach is exemplar theory\(^{196}\). With prototype theory you generally have only one prototype. With exemplar theory you can have multiple prototypes for the same thing\(^{197}\).

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 XBRL-based public company financial reports.

17.8.6. Public company XBRL-based financial reports are the ultimate exemplars

Public company XBRL-based financial reports are the ultimate exemplars. The screen shot below shows a partial comparison of the Level 3 Text block and Level 4 Detailed disclosure for the components of property, plant, and equipment across public company XBRL-based financial reports\(^{198}\):

The above comparison was created manually in order to discover the prototype. Once the prototype is created, then the prototype can be used in order to discover other disclosures which follow this same pattern.

This process can be useful for two purposes. First, it helps discover the prototype and exemplars of good disclosures. Second, it points out either inconsistencies if XBRL-based financial reports or important subtleties and nuances which could really be other different disclosures. Observing disclosures and discussions by accounting professionals will yield the answer to the question of which it is: an inconsistency or a subtlety/nuance.

The screen shot below shows an organization of the disclosures, prototypes, and exemplars in human-readable form. But realize that the same information is


\(^{197}\) Prototype and Exemplar Theories of Concepts, [http://courses.umass.edu/psy315/prototype.html](http://courses.umass.edu/psy315/prototype.html)

\(^{198}\) See the analysis of the disclosure PropertyPlantAndEquipmentNetByTypeRollUp, [http://www.xbrlsite.com/2014/Reference/PropertyPlantAndEquipmentNetByTypeRollUp.pdf](http://www.xbrlsite.com/2014/Reference/PropertyPlantAndEquipmentNetByTypeRollUp.pdf)
available in machine-readable form. This machine-readable information servers as metadata to both describe and verify consistency against disclosures.

17.9. Commercially available analysis products

There are many different commercial software applications which make use of XBRL-based financial information reported by public companies to the SEC and available from the EDGAR system. These software applications take different approaches and different things can be learned from different applications.

Few of these applications leverage all that there is to leverage from the structured nature of the information. In no particular order, below are three software tools which are worth exploring in detail.

17.9.1. 28msec SECXBRL.info

As mentioned earlier, 28msec provides a free repository of public company financial information reported by public companies to the SEC via its SECXBRL.info repository. Financial information is available for the DOW 30 companies with no signup at all. You can sign up for free and get access to all reported information. An API is provided. For those willing to roll up their sleeves and get their hands a little dirty, there is a lot that can be learned about where digital financial reporting and more generally digital business reporting is going.

17.9.2. XBRL Cloud

XBRL Cloud mainly focuses on validation services for public companies that provide XBRL-based financial reports to the SEC. However, XBRL Cloud offers an API also.

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199 28msec, http://www.28.io/

200 SECXBRL.info, http://app.secxbrl.info/

201 XBRL Cloud EDGAR Dashboard, https://edgardashboard.xbrlcloud.com/edgar-dashboard/
That API, the EDGAR Report Information Web Service\textsuperscript{202}, is unfortunately not publically available. But, the API is rather inexpensive. If you are serious about learning about digital financial reporting, paying for the API is worth the price.

XBRL Cloud provides some of the best renderings of XBRL-based information.

\textbf{17.9.3. FinDynamics XBRL Analyst}

XBRL Analyst is described as “XBRL Analyst delivers real-time financial data to Excel” by its creator FinDynamics\textsuperscript{203}. XBRL Analyst is an Excel plugin. A free trial is available which allows you to explore the software before you purchase it. An API is also available.

\begin{footnotesize}
\begin{enumerate}
\item \textsuperscript{202} XBRL Cloud Edgar Report Information Web Service, \url{https://www.xbrlcloud.com/home/edgar-report-information/eridev.html}
\item \textsuperscript{203} FinDynamics, \url{https://findynamics.com/}
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