

XML, XBRL, AND THE FINANCIAL PRINTING INDUSTRY: A CASE STUDY IN COMPETITIVE INTELLIGENCE

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SUMMARY

Extensible Markup Language (XML) and its variant Extensible Business Reporting Language (XBRL) would disrupt the financial printing industry shortly after their standards were first published in the late 1990s and early 2000s. Surviving this disruption required financial printers to innovate. While first-movers do not necessarily have a long-term advantage,¹ the first financial printer to *recognize* the need for innovation would gain more time to prepare and adapt, and so would have an advantage.

This case study will examine how I provided early intelligence on these new technologies to the financial printer Merrill Corporation (now the separate companies Toppan Merrill and Datasite).² We will consider my method of intelligence production, the obstacles I faced, my successes and failures, and my lessons learned. For simplicity, this case study will limit its consideration of competitors to just the first-mover in XBRL among financial printers in the United States, R.R. Donnelley.

Specifically, this study will address:

- How to create an intelligence production system.
- The need for human intelligence sources.
- Examples of successes and failures in my intelligence production system.
- Role-playing as an intelligence tool.
- Getting an emerging threat acknowledged.
- Two requirements for competitive intelligence and its use in decision-making.

Topics discussed:

- XML and XBRL.
- Financial printing.
- Disruptive technology.
- Intelligence production methodology.
- The benefits of being a first-mover on a new technology.

SITUATION

In 1998, the digital text mark-up language XML (Extensible Markup Language) was an indicator of a coming technological disruption in the financial printing industry. The actual disruption would begin with the creation of the special purpose, XML-derived language, XBRL (Extensible Business Markup Language).

What is financial printing?

Financial printing is a highly specialized service necessitated by the special needs of reporting financial information to investors, potential investors, and regulatory agencies. One special need is accuracy, which makes painstaking proofreading a part of financial printing. Proofreading is complicated by the client's attorneys and accountants often making edits close to the deadline for starting the printing presses or for submitting a digital report to a government regulator:

- Any needed edits would require the financial printer to rapidly make the edits and verify their accuracy. To have that flexibility and speed, the financial printer needs to have staff available 24/7.
- Any delay in publication or digital filing could result in significant fines for the client. Any error in the information reported could result in fines and litigation. For the financial printer, there could be liability and reputation damage.

Financial printing also requires secrecy since the information to be reported is not yet public knowledge. Foreknowledge of what would be reported would give an investor an unfair, illegal advantage. For a financial printer, a data breach could lead to a criminal investigation, financial liability, and damage to its reputation.

With the need for **accuracy, flexibility, speed, and secrecy** --- things which could work against each other if not managed well --- financial printing was a premium service for which a premium price was charged.

The biggest change in financial printing of the previous 100 years, other than the introduction of personal computers, had been electronic filing of financial documents with government regulators. In the United States, electronic filing of reports to the U.S. Securities and Exchange Commission (SEC) started in 1995.³ This did not cause a major disruption to the industry, though. Other than a few HTML tags (such as <table>) and a few tags unique to the SEC (such as <name>), these filings could simply be ASCII text. Full HTML formatting (for appearance) was optional.⁴

Given how little their industry had changed in 100 years, the executives of a financial printing company might assume that digital filing had been the last major change for their generation.

Start of my monitoring of XML

In the late 1990s, one of the world's three largest financial printers was Merrill Corporation, the other two being R.R. Donnelley and Bowne & Company.⁵ In September 1998, I was hired by Merrill Corporation to be the Market Research Analyst for their Investment Company Services division. This division provided financial printing services to mutual funds, real estate investment trusts, and similar investment companies.

Prior to working for Merrill Corporation, I had been an intelligence analyst in the US Army, federal law enforcement, and business. My training as an intelligence analyst had taught me that to be surprised was a cardinal sin. Therefore, my early work for my new employer included a search for trends and technologies that would impact my division's financial printing business. That is how I came to discover XML.

What is XML?

XML stands for Extensible Markup Language. XML's purpose is to give semantic meaning to data by wrapping it in machine-readable HTML-like tags. For example, a template with the tags `<price>` and `</price>` would allow price information to be automatically inserted between them, as shown below.

```
<price>5.95</price>
```

A schema would map which XML tags for a document were to be populated from which sources, such as from a specific database table and column. As a result, you could repurpose data from a single source of truth to populate different templates for different purposes. XML could be used to dynamically produce output in different media, such as web, email, and print. Also:

- Even as data changed over time, an XML template using that data would not need to be edited.
- If an XML template should need to be redesigned, it would have no effect on the source data.
- Because a final version of the data was not needed to prepare an XML template or a draft document, data security was significantly improved.
- The content of printed documents, email messages, and web pages could be customized for an individual reader. Individual words, dollar values, paragraphs, images, hyperlinks, and more could all be conditionally populated based on the current or intended reader (depending on the medium).
- Because the XML tags stayed with the document (just as HTML tags do), the recipient of an XML document could logically extract data from that document and save it to a database. A schema would be used to translate each XML tag into where the data should be saved, such as a specific database table and column. This would be especially useful for financial information the recipient might want to track over time or compare to similar information from other sources.
- Because XML was to be an internationally recognized standard, the process of populating templates and extracting data from finished documents could be automated. The only variables in that automation would be what the source (for publishing) or destination (for extraction) should be for each tag.⁶

XML enabled repurposing and customization of content. It also significantly reduced the labor, time, and risk in publishing data accurately. When I learned this, I realized XML would begin to undermine all the reasons the financial printing industry existed. For the same reasons, XML would also disrupt traditional, non-financial printing, which Merrill Corporation and its two major financial printing competitors also offered.

How to provide intelligence on XML?

I started to report to company executives about XML, its potential uses, implications, and news on its continued development. The critical information I was lacking were the specifics and timeline for XML's disruption of the financial printing industry. I was also lacking information on what our competitors were doing with it if anything. Fortunately, my training as an intelligence analyst prepared me to meet that need.

The U.S. Army Military Intelligence approach to meeting an organization's intelligence needs is:

1. Gather the executive's **priority information requirements (PIRs)**. These are their BIG questions.
2. Break those PIRs into smaller questions, called **information requirements (IRs)**.
3. Identify the True/False questions, called **indicators**, whose answers would help answer the IRs that will in turn answer their parent PIRs.

4. Create and implement a collection plan where each indicator has one or more sources assigned to it. For each source, record the criteria to be applied that would reveal the indicator's presence.
5. Repeat these steps regularly and make revisions and additions as needed.⁷

A good collection plan will tell you exactly what to look for, where, with what resources, and to answer which questions. You can execute the plan by yourself or delegate parts of it to others, such as an outside research firm or a colleague attending a trade conference.

I had used this approach with tremendous success a few years earlier in law enforcement for investigations of international heroin smuggling organizations. I had also used it at Nabisco to keep my division informed of developments concerning the cholesterol-lowering food additive Phytrol. I expected to have similar success with it providing intelligence for Merrill Corporation.

OBSTACLES TO PROVIDING INTELLIGENCE SUPPORT

Obstacle #1: Competitive intelligence isolated from executive decision-making

The topics of interest to my division and company included market share, competitor profiles, and news about our customers and competitors. I emailed my information to the short distribution list I had been given. It consisted only of my official supervisor and a few people at or below that level of my division's organizational chart. As I began to report on those subjects, I also began reporting on news about XML and its potential uses for financial and traditional printing. However, unlike other topics, news about XML never elicited a response.

My official supervisor was in another time zone and had delegated my daily supervision (and my hiring) to another Market Research Analyst in a different division. My official supervisor and I had no meetings. Phone conversations were rare (I only recall two). My performance review was only in writing.

My only feedback on my work during my first year, other than my annual performance review, was the infrequent occasion when someone used reply-all to comment on some news or report I had emailed. I therefore worked in isolation from the decision-making process. Other than my own experience and imagination, I had no way to anticipate the strategic intelligence needs of senior executives in my division or company. My counterparts were in the same situation. This was because the role of Market Research Analyst in my company was seen as solely a news reporting service for the Sales and Marketing functions. We were expected to be reactive in our research, limited in our concerns, and confined in our communication. Neither I nor my counterparts were asked to support strategic planning despite the company having no competitive intelligence function other than us. This situation soon had serious consequences.

The first feedback on my XML reporting came in my first job performance review, which consisted of a written document. Although writing that my work on competitors and customers was "first-rate," my official supervisor wrote that I "[go] off on tangents that are irrelevant to our business."⁸ Although the review did not mention which topics were irrelevant, I had to assume my warnings about XML were not reaching my company's senior leadership. As it turned out, this was true and would continue until competitor actions forced an acknowledgment of the threat.

Perhaps it was my military experience that stopped me from "jumping the chain of command" to go past my gatekeeper to higher-level managers in my division. Perhaps it was disbelief that long-time managers in the financial printing industry would fail to acknowledge a disruptive technology when the disruption was explained to them. In any event, the culture simply did not encourage information sharing up the organizational chart and I did not challenge that. In hindsight, I could have helped overcome this obstacle sooner through certain actions. We will consider those possible actions later in this case study.

Obstacle #2: Lack of curiosity and imagination concerning opportunities and threats

As noted earlier, the financial printing industry was defined by the four requirements of **accuracy**, **flexibility**, **speed**, and **secrecy** in financial reporting. Any new technology or other method that would improve one of these aspects would be an opportunity the company should exploit or a threat to be countered if another competitor exploited it first. A company that stood the best chance of surviving and thriving in a disruption to their industry was one that asked two questions frequently:

- “How could **we** reinvent X?”
- “What technology or other development **on the horizon** would disrupt X?”

Ideally, a company would emphasize the first question and use the second question to help answer the first. By taking the initiative on innovation rather than reacting to developments, a company would enjoy several advantages over its competitors:

- More time to achieve the innovation than its reactive competitors.
- Ability to influence or even establish industry standards and customer expectations to its advantage.
- Availability of the best talent, corporate partners, and beta-testers.
- Gaining a potential first-mover advantage in winning market share and the most lucrative customers.

The second question, “What technology or other development **on the horizon** would disrupt X?” not only supports the first question but serves as a back-stop should a research and development team fail to anticipate something new and impactful.

At the time I joined Merrill Corporation, it did not have a dedicated Research & Development function. That would not come until after I left the company. The closest thing at the time I was there was a Custom Solutions group that customized my company’s software offerings for customers. As it turned out, my company’s eventual XML Exploratory Group would originate from Custom Solutions. Until then, no one in the company was asking the questions “How could **we** reinvent X?” or “What is **on the horizon** that would disrupt X?”

To reinvent requires reimagining. Reimagining, as the word suggests, requires imagination. It also requires the curiosity to consider reimagining something in the first place. As evidenced by the dismissal of my XML reports as irrelevant, the requisite imagination and curiosity did not exist in the knowledge gatekeepers that existed between me and the senior leadership of my division and company. Since I and my counterparts were not being asked to research long-range questions like the two above, imagination and curiosity were apparently lacking in management levels above my gatekeepers, as well.

As noted earlier, I, too, suffered from a lack of curiosity and imagination. I did not have the curiosity to find out why my reports on XML were being dismissed as irrelevant. Had I learned why, I might have gained acknowledgement of the threat sooner than I did.

PREPARING THE COLLECTION PLAN FOR XML INTELLIGENCE PRODUCTION

Given my isolation from management and the perceived irrelevance of XML, I had to plan my intelligence collection without executive input. As described earlier, that plan consisted of identifying priority information requirements (big questions) which are then broken into smaller questions. The smaller questions are then broken into true/false questions called indicators. Resources and criteria are then assigned to each indicator. Detecting indicators (i.e., answers of “True”) helps to eventually answer the priority information requirements from which the indicators originated.⁹

The priority information requirements I defined for XML included the questions “What specific uses are there for XML in Merrill’s services?” and “What are our competitors doing with XML?” The smaller questions into which I broke this down (the information requirements, IRs) included these:

- A. What can XML do for producing marketing materials?
- B. What can XML do for producing financial reporting?
- C. Is the U.S. Securities and Exchange Commission interested in XML?
- D. What is Competitor X doing with XML?

I broke these IRs down into indicators for which to monitor. These included:

- For information requirement (A), I identified the indicators “PRINT uses,” “EMAIL uses,” and “WEB uses.”
- For (B), I identified several indicators, all variations on XML plus an aspect of financial printing, such as “XML for investor communications” and “XML for regulatory filing.”
- For (C), I identified indicators that combined “Securities and Exchange Commission” with “XML.”
- For (D), I identified indicators involving individual competitor names in conjunction with “XML” in news reports, trademark applications, patent applications, web domain registrations, job postings, resume mentions, and more. For job posting indicators, I also created indicators of the competitor’s name plus the word “HTML.” This was because XML was so new that any job posting could only reasonably ask for experience with XML’s parent language, HTML.

In my subsequent collection plan, for each indicator, I defined one or more sources to use and the criteria to apply in each. My sources included the now-defunct Copernic web monitoring application, news services that include Dow Jones Factiva, the U.S. Patent and Trademark Office, and Monster.com, to name a few. The usefulness of identifying such specific indicators and assigning resources to each would be demonstrated later when I identified R.R. Donnelley as the first-mover in using this new technology for financial printing.

What about human intelligence in my collection plan? For me to call or email someone involved with XML was too much of a personal risk. While my XML reporting was considered irrelevant, this perceived transgression was a private one, confined to a small distribution group, and consumed only a small portion of my time. For me to contact someone involved with XML would be a public act my management might hear about and could result in my termination. The same lack of executive support made spending money to attend an XML conference or using a research firm impossible. Until I had executive support, human intelligence was not possible.

Had my collection plan been able to include human intelligence sources, I might have learned sooner of the major development in XML’s impact on financial printing: XBRL.

XBRL: THE DISRUPTION BEGINS

It was from monitoring for the indicator “XML for finance” that I discovered in September 1999 the article in the Journal of Accountancy that described a new XML standard for financial reporting being developed by the American Institute of Certified Public Accountants.¹⁰ At the time, the evolving standard was called XFRML (Extensible Financial Reporting Markup Language), but it was later renamed **XBRL** (Extensible Business Reporting Language), by which it is known today.¹¹ Although I still did not know what the timeline was for the coming disruption, I could report that the disruption had begun.

What is XBRL and how was it disruptive to financial printing?

Like its XML parent, XBRL also tags data to provide semantic meaning. The difference was that XBRL was a standard *specifically for business reporting*.¹² A few months after my initial report on XBRL, I had to report that the U.S. Securities and Exchange Commission (SEC) was helping develop the standard.¹³ The timeline for the coming disruption was now even shorter.

Why was XBRL so much more significant to financial printing than its parent standard, XML? The example below will illustrate. In it, the value 1,000,000 is wrapped in tags that define its meaning in precise, universally accepted terms: what is being measured, by which accounting standard (USGAAP), in what currency, with how many decimal places, and in what context:

```
<us-gaap:IncomeLossContinuingOperations contextRef="AsOf2021" unitRef="USD" decimals="INF">1000000</us-gaap:IncomeLossContinuingOperations>
```

From a template, a computer program can read these tags that denote where a value should appear. Using a schema, the computer can then interpret those tags to identify from where the needed value should be pulled. For example, from a particular database's table and column.

For the filer --- the company meeting its regulatory reporting requirements with XBRL --- how would this benefit them? "XBRL can reduce the costs associated with the production of financial reports by 30 percent to 70 percent," the chairman of the XBRL international standards body would later report in 2005.¹⁴

The semantic meaning of that value was recorded in machine-readable language along with the values. In the example above, 1,000,000 is recorded along with the fact that it was the income loss from continuing operations (per US GAAP standards) as of 2021, expressed in U.S. dollars). Both the value and that meaning could then later be easily extracted by the recipient of the document. That recipient could be an investor or a regulatory agency. They could use the extracted data to quickly verify if all the numbers added up correctly. They could quickly compare the data to other sources to verify its accuracy. The uses are endless.

It was the ability to extract information with its semantic meaning that made the governments of the United States and other countries quickly interested in the evolving XBRL standard. If a regulatory or tax agency could extract into a database the information from a company's financial reports, auditing would be much simpler. The interest of governments in the evolving standard meant it would likely become the required format for digital reporting, which is what happened.

Investors, especially institutional investors, would also benefit from XBRL:

- A company's financial performance over time could be easily analyzed.
- Financial information for different companies could be easily compared.
- Information for different industries could be easily compared.

The opportunities for data analysis are why the data aggregation provider, EDGAR Online, was an early member of the XBRL standards body. They had realized they could "leverage XBRL to create additional SEC- based product for our retail, Internet and business-to-business channels."¹⁵ To facilitate that, they would create what would become the leading XBRL preparation software, later used by R.R. Donnelley and, five years later, my own company.¹⁶

To my intelligence distribution group, I reported that XBRL's coming impact on the financial printing industry included:

- Regulatory agencies mandating that their reports be filed using XBRL, forcing financial printers and their customers to adapt.
- Verifying the accuracy of a populated document could be largely automated, comparing the value between a set of tags with the corresponding value back in its source.
- Software products for inserting XBRL tags and mapping them to their data source could be commercialized and sold as stand-alone products.
- Advisory services, both technical and regulatory, could be offered.

All of this was in addition to the general benefits of XML, XBRL's parent language, noted earlier. For the financial printing industry, which had been fundamentally unchanged in a hundred years, it meant it was about to be disrupted by an offshoot of HTML.

UPDATING THE COLLECTION PLAN FOR XBRL

When I became aware of XBRL, I had to update my collection plan for intelligence on this new technology.

Recall that the military intelligence approach is to take an executive's big questions (the **priority information requirement**, PIRs) and break them down into smaller questions (the information requirements, IRs). IRs are in turn broken down into True/False questions (indicators) that can be monitored and researched. Finding "true" for indicators helps answer their parent information requirement, which in turn helps answer the parent priority information requirement.

Consider the PIR "**Which of our competitors will offer XBRL regulatory filing services and when?**" Shown below is an illustration of how I developed my collection plan for this PIR. In general, I created identical IRs and indicators for each of our competitors. Note my inclusion of "HTML" and "XML" in my XBRL indicators just as in the indicators for my earlier XML questions. This was because XBRL, like XML, was so new at the time that few people would be working with it. If you wanted to find talent to work on an XBRL project, you would need to look for experience with XML or even HTML.

Here are examples of how I updated my collection plan to include XBRL:

Info Requirement #1: Is Competitor X preparing in-house XBRL capability?

Examples of indicators:

- Competitor X has job posting seeking skill with HTML and finance.
- Competitor X has job posting seeking skill with XML and finance.
- Competitor X has job posting seeking XBRL skills.
- Employee's resume mentions XML for financial reporting at Competitor X.
- Employee's resume mentions XBRL at Competitor X.

Info Requirement #2: Is Competitor X preparing to market its XBRL offering?

Examples of indicators:

- Competitor X filing trademark with US Patent & Trademark Office related to XBRL.
- Competitor X filing trademark with US Patent & Trademark Office related to XML and finance.
- Competitor X registering web domain name that suggests XBRL filing.

You may have noticed that the indicator “Competitor X registering web domain name that suggests XBRL” is subjective. That is unavoidable since the name of a new XBRL service may not contain the abbreviation “XBRL.” As a result, only the exact appearance of “XBRL” in a new domain name would constitute an immediate True result for this indicator. Any ambiguity would need clarification from another source. This might come from the text in a trademark registration or a job seeker’s resume posted online that referred to the domain name or an operative word in it.

In revising my collection plan to cover XBRL, I did not make a formal connection between competitors launching an XML service and launching an XBRL service (unless the XML service involved financial reporting). I knew, though, that experience with XML would support the eventual launch of services for the much more complex, accounting-related XBRL tagging. Therefore when R.R. Donnelley announced in August 2000 that they were now offering a “XML tagging” service to enable customers to repurpose their digital assets, I noted the implications for XBRL when I reported the news. What R.R. Donnelley executives were saying in their XML announcement was applicable to a future XBRL service as part of their financial printing services:

"This new service demonstrates how R.R. Donnelley leverages new technology to provide customers with integrated communication solutions."

and

"... we are automating and simplifying the process of creating and distributing customers' content -- for both print and Web."¹⁷

COLLECTION PLAN SUCCESS AND FAILURE

Collection plan success: Identification of XBRL first-mover

In May 2000, two months before the XBRL Version 1.0 standard was published,¹⁸ Monster.com published a job posting from R.R. Donnelley. This major financial printing competitor of Merrill was seeking typesetters proficient in HTML and had a securities license or were working toward one. The posting was for multiple positions in each of five cities: Boston, New York, Atlanta, Chicago, and Los Angeles. These were all major financial centers in the United States.

What made this job posting significant was the combination of requirements: a securities license and familiarity with HTML --- for a **typesetting** position. You only need a securities license to sell or advise on investments, not to set type or apply HTML tags to financial documents.¹⁹ However, you *would* need the understanding that comes from earning a securities license to understand the details of investment documents. That understanding would be critical if the tags to be inserted were not HTML for formatting, but XBRL for providing semantic meaning to data in those financial documents. This posting had to be part of creating an XBRL service.

This kind of job posting had been one of my indicators for R.R. Donnelley preparing to offer an XBRL service. In my collection plan, I had defined an indicator of “R.R. Donnelley job posting for HTML and finance.” One of the resources I assigned to it was Monster.com. The criteria for my Monster.com monitoring included jobs mentioning both “Donnelley” and “HTML.” In reviewing the search results Monster.com would email to me, I would look for HTML being mentioned in conjunction with finance topics. I was able to make my discovery of R.R. Donnelley working on XBRL because of the specificity of the indicators in my collection plan, of the sources I assigned to each, and the criteria I applied to each source. Had I not been so thorough in defining my indicators, I could have easily missed or dismissed this job posting.

I had now discovered that among financial printers, R.R. Donnelley was the first-mover in this disruptive new technology. Now I was faced with the question: when would they start offering their XBRL service? I realized then that I had a gap in my collection plan.

Collection plan failure: Not enough questions identified

When I first developed my collection plan, the only indicators I could think of for the question of “when” were seeing a press release from the competitor or hearing second-hand information. I had not considered what obstacles there would be for providers and customers to overcome. Those obstacles might have provided me with indicators for determining how close a competitor was to launching an XBRL service and when. Not having identified the obstacles, I had no good basis for a time estimate or even an event-based schedule of when the launch could be.

To estimate when R.R. Donnelley would launch its XBRL service, I decided that digital typesetting was an analog for an XBRL filing service that did not yet exist anywhere. I then asked someone who knew digital typesetting how long it took to train a new employee. Based on that time, my own experience working with HTML and databases, plus three months to learn the new XBRL standard and do pilot projects, I predicted R.R. Donnelley would launch XBRL services in six months “at the earliest”. That would be October 2000. I then reported the R.R. Donnelly job posting to my intelligence distribution group along with my time estimate and reasoning.

As it turned out, R.R. Donnelley would not file its first U.S. Securities and Exchange Commission document in XBRL until October 2002 --- **two years later** than my “at the earliest” prediction.²⁰ Their first official filing for a paying customer would not be for an **additional three years** after that test filing.²¹ We will shortly consider how my mistake might have been avoided.

Collection plan failure: Not enough indicators identified

Another gap in my collection plan concerned the question of the U.S. Securities and Exchange Commission (SEC) being interested in XML. While I had a question defined for this, I had lacked the imagination to have created an indicator of “SEC **current use** of semantic tags.” This was because XML had been invented due to the need for that semantic meaning --- and the SEC had not adopted XML yet. As a financial printer, my company would have been alerted by the SEC before XML was to be used. Therefore, it had not occurred to me that the SEC might be ahead of its time by already using tags for semantic meaning. Too late to be useful, I discovered the SEC was doing so.

The SEC was already requiring use of a few SEC-invented mark-up tags by anyone filing reports using its Electronic Data Gathering, Analysis, and Retrieval system (EDGAR). Those tags were required so the SEC could easily extract key information from each filing. Those tags included:

```
<IRS-NUMBER>  
<FISCAL-YEAR-END>  
<STATE-OF-INCORPORATION>22
```

I had not discovered these special-purpose tags because they were few and the documents filed on EDGAR were otherwise simple ASCII text or, at most, simplified HTML. Not having any indicators in my collection plan that called for researching EDGAR, I did not. If I had had the imagination to have defined the indicator “SEC **current use** of semantic tags,” I might have discovered the SEC’s special tags. Those tags would have been undeniable proof of the SEC’s interest in tags for semantic meaning and would have pointed to the SEC’s eventual adoption of either XML or XBRL. My lack of imagination in this regard cost me an invaluable piece of evidence in gaining acknowledgement of the coming XML/XBRL disruption.

OBSTACLES OVERCOME

XML/XBRL recognized as a threat

Although my early warnings of XML and XBRL as disruptive technologies were not heeded, my reporting finally did spur my company to action. In May 2000, more than a year and a half after I started reporting on XML, my company formed the XML Exploratory Group. I would learn this several months later.²³ Although I never received confirmation, I believe it was my report of R.R. Donnelley's job posting that same month that forced recognition of XML and XBRL as threats, leading to the exploratory group. In any event, the job posting meant our competitor had already seized the initiative on XML and XBRL. For my company, late to the game, those two technologies were now simply threats to which we would need to respond quickly. At least we were in the game now.

Need for curiosity and imagination is realized

The creation of my company's XML Exploratory Group in May 2000 demonstrated that senior leadership had realized the need for curiosity and imagination. Although I was not invited to participate in or otherwise support the group, the Group's formation confirmed that another obstacle to providing intelligence support had been overcome.

For my part, I had realized my own lapse in curiosity and imagination. In late 2000, my discovery of the SEC's use of special tags for semantic meaning, too late to be of use to me, made me realize the need for indicators that were counter-intuitive. In the case of the SEC's tags, this was the counter-intuitive idea that a government agency might be ahead of its time.

Competitive Intelligence is integrated with executive decision-making

It was also in late 2000 that I got the first confirmation my XML and XBRL reporting was reaching my company's senior executives. This came when the president and CEO of my company emailed me to add him to my distribution list for intelligence reports. It was the first communication I had had with him and one of the rare interactions I had with any senior executive. I now knew my intelligence reports would get to senior leadership.

Shortly before my contact with the president and CEO, I was transferred to the Marketing group of my division. I now reported directly to the head of Marketing, whose office was only a few feet from my desk and with whom I had weekly meetings. This was further evidence that the company was addressing the isolation that had existed between competitive intelligence and executive decision-making.

Despite my exclusion from the XML Exploratory Group, my persistence in reporting on XML had been worthwhile. It had forced the recognition and addressing of three threats: XML/XBRL, the absence of curiosity and imagination in the company, and the isolation of executive decision-making from the competitive intelligence function.

LESSONS LEARNED

How to investigate something that does not yet exist

My gross under-estimation of how long R.R. Donnelley would need to launch an XBRL service ("as early as" October 2000) revealed flaws in how I prepared my collection plan:

- I had not considered the question of "when" in any depth. This was because the technology was new and so had no benchmarks.

- I had no access to human intelligence, so the indicators I might otherwise have defined would not be observable.
- When I finally had to address the question of “when” for R.R. Donnelley, I thought my experience with HTML and databases and what I learned about digital typesetting training were sufficient for an estimate.

I was therefore not able to foresee the obstacles a service provider and its customers would face in adopting XBRL. Those obstacles would result in a delay of more than five years between the publication of Version 1.0 of XBRL and the first official XBRL regulatory filing. While I might not have been able to provide the date when all obstacles would be overcome, a list of those obstacles would have helped to identify indicators of when each was overcome by a competitor and an early-adopting customer. Also, a list of such obstacles would have been useful to my own company when it eventually planned its own XBRL service.

Looking back at this mistake today, I realize my military intelligence training had provided me a means for gaining insight into a situation for which I had no information. That is **role-playing** (called “wargaming” in the Army for obvious reasons).

Role-playing to study the XML/XBRL situation could have looked like this: a group of knowledgeable coworkers would sit at a table and each would represent one aspect of the situation:

- One or two people would represent our two largest competitors.
- One person would represent our company.
- One person would represent our current and potential customers.
- Someone in the company familiar with securities law would represent the Securities & Exchange Commission and regulatory agencies in general.
- One person each from I.T. and digital typesetting would be themselves.
- I would be facilitator.

I would begin the session by briefly introducing XML or XBRL (depending on when in the timeline this role-playing took place) and its value proposition:

- The role-players for our competition and customers would give their feedback on the technology and value proposition.
- The technology role-players would give their feedback on feasibility, hurdles, risks, necessary skills, and what a development plan might look like.
- The legal representative would provide their perspective on what regulatory agencies would think of what was being discussed.
- I would help challenge the answers and facilitate a back-and-forth discussion between the participants.

It is likely that the first such role-playing session would produce more questions than answers, but even that would have had several benefits:

1. For my company’s executives, the opinion of people other than me might have convinced them sooner that XML and XBRL would be disruptive. They might have authorized spending on human intelligence to answer the questions that could not be answered in-house.
2. For Marketing, the questions raised would help compose responses for our salespeople for when customers would eventually inquire about the new technologies.

3. The questions raised would also get Marketing thinking about how to move customers through the adoption process (awareness, interest, evaluation, etc.) for our own offering once we had one.²⁴

Given the slow recognition by my company in acknowledging the disruption posed by XML and XBRL, I might not have found volunteers for all the roles in my hypothetical role-playing exercise. At the very least, I could have conducted the exercise by myself, alternately placing myself in each role. Even that might have closed the gap in my collection plan.

How to make others recognize a threat

My lack of curiosity and imagination concerning why my reports of XML and XBRL elicited no response contributed to the delay in my company acknowledging the threat. While not an excuse, the fact my official supervisor was in another city, had delegated supervisory functions to someone else, and considered much of my reporting “irrelevant,” did not encourage communication. Short of addressing the situation head-on (where the outcome for the problem and my career were uncertain), alternate means of communication would have been useful.

One way, as noted earlier, might have been having people who had management’s ear participate in a role-playing exercise. In other words, I would invite participants based not only on their background, but on their influence. Having such people think about the XML/XBRL situation, hearing the input of others, then sharing their experience with management, might have overcome the cognitive dissonance preventing recognition of the threat.

An additional, direct way to make the threat recognizable, I realize now, would have been by use of analogy. By describing how an earlier new technology disrupted a long-established one, I might have made my company’s executives acknowledge the threat sooner. Although Wikipedia did not exist at the time, it now provides a [list of disruptive technologies and an explanation](#) of why they supplanted what had been.²⁵

Key to gaining acknowledgement of the disruption posed by XML and XBRL would be to find a link between those languages and the financial printing industry. I did not find such a link until news of the development of the XBRL standard in July 2000. As noted earlier, I had failed to discover a link that had been in existence several years: the use by the U.S. Securities and Exchange Commission (SEC) of its own custom tags for semantic meaning.

Had I discovered the SEC tags much sooner, an effective argument by analogy could have been:

1. The Securities and Exchange Commission (SEC) currently requires that EDGAR filings use certain special tags to provide semantic meaning to some of the data. This is to facilitate extraction by the SEC of these important details. Therefore, the SEC would be interested in any new taxonomy that would provide greater semantic meaning to EDGAR filing data and so enable the extraction of more of that data. This is because improved extraction would provide cost savings to the SEC in performing audits and other data analysis.
2. XML is the first attempt to create a universally recognized taxonomy for providing semantic meaning to data.
3. It therefore follows that the SEC would be interested in the development of XML for purposes of providing more semantic meaning to more types of data in its regulatory reports filed digitally.
4. The SEC’s interest in XML is indicated by [some applicable early indication].

--- OR ---

The SEC’s interest in XML would be indicated by the attendance of SEC officials at XML conferences or their participation (in person or in writing) in the development of the XML standard. This could be learned by [suggest human intelligence approach].

5. Because XML tags would enable the SEC to extract more information from digital filings, the SEC would be expected to mandate their use.
6. Competitors R.R. Donnelley and Bowne are already researching XML as evidenced by [summary of their activity].
7. XML also offers opportunities for traditional print services. Many of our competitors are already developing those opportunities [cite examples].
8. Therefore, Merrill Corporation needs to consider how XML could impact both its financial printing and traditional print services.

Point #4 ideally would have consisted of some information proving interest by the SEC (which eventually did appear). If none were available, the alternative would have been to suggest how it could be obtained. For example, I could suggest our contacting people involved with the XML standard and our attending XML conferences. If you will recall, human intelligence sources were not available to me. Describing how they would be useful could have been a way for me to gain approval for them. However, gaining that approval would have been contingent on first getting the threat recognized.

What if all these possible actions and the actions I did take had failed to convince my company's executives? How strident can an intelligence analyst be and for how long before the outcome is termination of employment? Without undeniable proof or new, more open-minded management, there are practical limits to what can be done. The best an intelligence analyst could do in such a bad situation, I believe, is to continue to monitor and report and to research options for the company's eventual response. Once events forced recognition of the threat, there would be an attentive audience for what the intelligence analyst had to report. In my case, this was demonstrated by the president and CEO asking to be on my distribution list.

CONCLUSIONS

Competitive intelligence in the decision-making process

The approach to competitive intelligence described in this paper, based on military intelligence doctrine, works. To use that competitive intelligence in decision-making effectively requires two things:

- **Curiosity and imagination**, both in the analysts and the decision-makers, to consider the question "what could be?" in many varied forms. This includes counter-intuitive forms of that question. Being counter-intuitive, those may be the most difficult questions to define.
- **Direct interaction** between the analysts and the decision-makers:
 - Decision-makers provide their big questions (priority information requirements) and feedback on the intelligence being delivered.
 - The competitive intelligence function has direct access to decision-makers.

Curiosity and imagination for competitive advantage

Imagination might seem antithetical to analysis, but it is not. Consider Henry Ford's apocryphal observation that if he had asked people what they wanted in transportation they would have said faster horses. Had Big Data existed in Ford's time, it might have confirmed a faster-horse preference, but it could not have predicted the replacement of horses. That prediction would have required imagining something that did not exist (the modern automobile industry) based on two things that did exist, but independently (the assembly line and the still-nascent automobile).

Just as it took Ford's imagination to see a possibility, it would take imagination for a competitive intelligence analyst to answer --- and the curiosity to ask --- questions like "What could disrupt our industry?" Similarly, for a decision-maker to recognize the validity and value of the answers to those questions they, too, must have curiosity and imagination. R.R. Donnelley had those two traits and so was able to quickly exploit XML and XBRL for competitive advantage. My company did not develop those two traits until forced by circumstances.

Identify the distinctive aspects of your product or service

When I started in my role as Market Research Analyst, I learned about the financial printing services my division offered. From what I learned, I identified accuracy, flexibility, speed, and secrecy as the distinctives of financial printing. These were the things that made financial printing distinct from traditional print services and were the justification for the premium price charged. Any competitor who found a better way of providing those distinctives would have a competitive advantage. Anything that significantly improved them would be disruptive to the industry. Therefore, to monitor for competitor innovation and industry disruption, you need to (1) know and understand your distinctives and (2) be capable of recognizing those distinctives in something new and unfamiliar. This is how I identified XML and XBRL as disruptive technologies. Being capable of that recognition requires the curiosity and imagination mentioned above.

See a gatekeeper not as an obstacle, but as an opportunity

This may sound pollyannaish, like "when life hands you lemons, make lemonade," but my experience with my initial manager supports this positive view. Since my analysis did not convince my initial manager that XML and XBRL would be disruptive, it would likely not have convinced senior leadership had my early reports been forwarded to them. I should have seen my manager's cognitive dissonance as an opportunity to better frame my argument and an incentive to seek allies. As noted earlier, arguments by analogy, finding "smoking gun" evidence (like the SEC's semantic tags), and gaining allies among potential influencers might have won over my manager. Convincing senior leadership would then have been more likely with a better argument and having my manager as one of my allies.

EPILOGUE: OUTCOMES FOR MERRILL AND ITS COMPETITORS

Below is the timeline for XBRL from when I first reported on its parent XML standard in 1998 until late 2010. I was not a witness to events after January 2001 as I had left Merrill Corporation. This timeline reveals that the year and a half between my first reports of XML and the creation of my company's XML Exploratory Group resulted in a disadvantage my company was not able to overcome.

- **Late 1998:** I begin reporting on XML and its implications for the financial printing industry.
- **September 1999:** First public news of the development of what will become XBRL.²⁶
- **May 2000**
 - R.R. Donnelley indicates they are developing an XBRL service by hiring for multiple typesetting positions requiring HTML and securities knowledge.
 - Merrill Corporation forms XML Exploratory Group.
- **July 2000:** Version 1.0 of the XBRL standard is published.²⁷
- **August 2000:** R.R. Donnelley announces its new XML tagging service.²⁸
- **April 2001:** R.R. Donnelley joins the U.S. XBRL Consortium, the organization developing the USGAAP (U.S. Generally Accepted Accounting Principles) version of XBRL.²⁹ Merrill Corporation will not join until 2004.³⁰
- **October 2002:** In a test, R.R. Donnelley files the first SEC regulatory document in XBRL.³¹

- **February 2004:** Merrill Corporation joins U.S. XBRL Consortium³² --- three years after R.R. Donnelley.
- **April 2005:**
 - **R.R. Donnelley** begins offering XBRL services.³³
 - Competing financial printer **Bowne & Company** begins offering XBRL services.³⁴
- **January 2006:** R.R. Donnelley forms strategic alliance with electronic filing competitor and data aggregator EDGAR Online to offer XBRL document creation and filing services. The alliance combines EDGAR Online's patent-pending XBRL preparation technology with R.R. Donnelley's financial printing and regulatory filing service in an **exclusive** agreement.³⁵ Six years later, R.R. Donnelley acquires EDGAR Online.³⁶
- **November 2006:** Merrill Corporation begins offering XBRL services³⁷ --- more than a year and a half after its top two financial printing competitors.
- **April 2009:** U.S. Securities and Exchange Commission requires XBRL for filing certain reports.³⁸
- **September 2010:** Merrill Corporation forms strategic alliance with XBRL technology provider EDGAR Online to offer XBRL services to mutual funds.³⁹ This alliance comes after EDGAR Online made its five-year exclusive relationship with R.R. Donnelley non-exclusive earlier that year.⁴⁰ Two years later, in 2012, R.R. Donnelley will respond by acquiring EDGAR Online and its technology.⁴¹

More than a year and a half after its two biggest financial printing competitors, Merrill Corporation began offering an XBRL service. Besides letting its competitors seize market share, the delay also meant Merrill had a year and a half less time to prepare for when the SEC mandated XBRL for regulatory filings. This delay could have been avoided if my initial reports in late 1998 had been heeded. Clearly, competitors R.R. Donnelley and Bowne & Company had had the curiosity to discover XML and the imagination to see its potential.

R.R. Donnelley's early recognition and work with XML gave it a commanding lead in the eventual development of XBRL:

- Early recognition of the XML opportunity gave R.R. Donnelley time to learn the new taxonomy, identify obstacles and solutions, and thereby launch XML services before its competitors.
- Those XML services then provided invaluable experience for developing the far more complex XBRL service. This was likely why R.R. Donnelley hired future XBRL technicians (i.e., typesetters with HTML and securities knowledge) **three months before** it launched its simple, non-financial XML tagging service.
- R.R. Donnelley's early interest in XML and XBRL led it to become the first financial printer to join the XBRL Consortium. As a result, they could stay informed on XBRL's development and were positioned to influence that development and maintain that influence.⁴² Any competitor who joined later would be at a disadvantage.
- Because of its early involvement with XBRL, R.R. Donnelley was chosen by the Securities and Exchange Commission to conduct the Commission's test filings.⁴³ This experience gave R.R. Donnelley a competitive advantage in expertise and reputation. It also gave them the bragging rights to having made the first SEC filing in XBRL (albeit in a test).⁴⁴
- R.R. Donnelley's early first-hand experience with XBRL helped them recognize the superiority of the tag-inserting software developed by EDGAR Online. This led to a strategic alliance between R.R. Donnelley and EDGAR Online that remained exclusive for almost five years.⁴⁵ To maintain control of that superior technology, R.R. Donnelley later acquired the company.⁴⁶

R.R. Donnelley's reward for being a first-mover on XBRL was that in 2008 --- before XBRL was mandated by the SEC --- they had **"filed four times more XBRL documents than [their] nearest competitor [my emphasis]."**⁴⁷ In

September 2009, several months after the SEC mandated XBRL for certain reports, R.R. Donnelley had the highest market share for XBRL filings, 34.9% --- **more than twice that of my company**, 16.4%.⁴⁸

Subsequently, R.R. Donnelley was able to acquire the world's largest financial printer (and second largest XBRL provider), competitor Bowne & Company, in 2010.⁴⁹ In 2018, my company, Merrill Corporation, left the financial printing business altogether, concentrating instead on software as a service (SaaS) for secure document sharing.⁵⁰ It sold its printing assets to Japan-based financial printer Toppan Leefung.⁵¹ As for the Securities and Exchange Commission, in 2021 their filings must still be in XBRL. However, the SEC is now transitioning to an enhanced version called [Inline Extensible Business Reporting Language \(iXBRL\)](#).⁵² One wonders what the next disruptive technology will be in the financial printing industry and if executives will heed the early warnings they get from my counterparts.

ENDNOTES

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