**Uncover the *Truly Maximum* Profit Opportunity of a Prospective M&A Deal**

Reimagining an ***OIS*** as “next generation” M&A financial analysis

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**Abstract:** By elaborating on the relationships between the three analytic modeling capabilities which underpin the author’s previous three *Journal of Corporate Accounting and Finance* articles, it will be demonstrated that an ***Optimized Income Statement (OIS)*** represents a “next generation” financial analysis capability for M&A and private equity portfolio management. (See Reference 1 for the three articles.) The first modeling capability is the existence, ***for the first time,*** of the ***integration*** of two advanced analytic techniques:predictive analytics and a specific prescriptive math programming technique, mixed integer and linear programming (MILP). The second modeling capability is that, since these two techniques have traditionally been applied separately for M&A financial analysis purposes, they have yielded necessarily sub-optimal results. Or, as Principia Cybernetica describes it, “Optimizing each subsystem independently will not, in general, lead to a system optimum.” See Reference 2.

The third modeling capability is that the availability of timely and complete activity-based costing data substantially reduces the cost and time required to implement the MILP portion of the “next generation” ***OIS*** M&A financial analysis.

This article is divided into six sections: 1) Introduction; 2) The Role of Analytics in M&A Transactions; 3) Review of the three current financial M&A analyses relevant to this article; 4) Limitations of current M&A Analytics; 5) How an ***OIS*** addresses these limitations and 6) Conclusions

**Introduction**

This is the fourth in a series of articles the author has recently published in this journal. They, and others to come, constitute a series describing: 1) what the basic ***OIS*** value proposition is including its two key structural elements and, then, 2) additional ways in which an ***OIS*** can be deployed. The first ***OIS*** element is that it is activity-based which is described in the first two articles and the second is that it is demand-driven which is described in the third article.

As both an activity-based and a demand-driven model, ***OIS*** relaxes the traditional income statement assumptions of both a fixed supply chain and a fixed forecast. This allows ***OIS***’s prescriptive solver to answer the question: “What is the best possible outcome (X)?” In ***OIS***’s case this is something never before possible and represents ***OIS***’s basic deployment; developing an income state containing: the 1) ***truly maximally profitable forecast*** and the 2) ***optimally feasible supply chain*** required to make and fulfill the new forecast. (As a reminder, the alternative solver, a descriptive one (sometimes also referred to as scenario analysis or what if analysis) can only answer the necessarily sub-optimal question: “What will the result be if we do X?”)

As described in the Abstract, this article focuses on ***OIS***’ deployment as an M&A and private equity portfolio management application. The next article one will focus on integrating the annual plan with the strategic plan. It will elaborate on the important fact that, until ***OIS,*** all supply chains that have been designed with the prescriptive technique of mixed of integer and linear programming (MILP) for **all** purposes including M&A financial analysis are necessarily sub-optimal because the forecast could only be varied descriptively. That problem has now been solved with ***OIS***. This article will also include how to use other objective functions than profit; specifically economic value and customer life time value.

Follow-on articles include, possibly, ***OIS*** as a solution to the omnichannel problem (See Reference 3 for a description), to the sku proliferation problem (See Reference 4 for a description) and finally how an ***OIS*** contributes to a firm’s share price. (See Reference 5 for a relevant prior article).

**The Role of Analytics in M&A Transactions**

To put analytics in perspective apropos the M&A opportunity the author found the following quote helpful. It is from “M&A Trends report 2014: A Comprehensive Look at the M&A Market.” Deloitte LLP, 2014.

“More than half (58 percent) of corporate respondents use data analytics either in select areas or as a core component of their M&A analysis. The larger the company, the more likely a user of the technology-driven process; more than 70 percent of companies with revenue in excess of one billion said they use analytics either partially or as a mainstay of their transaction analysis.

Companies cited complexity as the chief reason why more than four in 10 don’t deploy analytic technology. Almost one-third of respondents cite d either confidentiality reasons or the unwillingness of the seller to provide information as impediments to the use of data analytics. Other reasons included the time and cost required to undergo analysis.

On the company side, almost one-fourth of respondents — 22 percent — said they are not using data analytics at all, which presents a large opportunity for many companies, says Brian Bird, director, Deloitte & Touche LLP. “Data analytics might appear challenging — complex, time consuming and costly — to companies who haven’t used it before,” Bird said. “But there is and will be a growing opportunity for companies to leverage data, to gain broader insight into their own company and M&A targets, in this rapidly changing area.”

Private equity respondents are heavy users of analytics — with more than one-third saying it’s a core component of their M&A analysis and another 37 percent saying that they use analytics selectively. Private equity firms also rely on data analytics within their existing portfolio companies. Almost 70 percent of private equity respondents said that they use technology-driven analytics as either a core or partial component of their analysis of the companies in their portfolio.

About two-thirds of corporate respondents that deploy analytics said they use the tools mainly to analyze customers and markets. ‘The customer data is easiest to get in a short period of time and certainly helps one understand end markets and pricing,’ Bird said. ‘However, you can generate larger insights by using analytics across the entire supply chain to identify synergies and cost savings opportunities prior.’”

See Reference 6 for the complete the article. The reader’s attention is directed to the Executive Summary which begins: “Over the past 18 months, merger and acquisition (M&A) activity has accelerated meaningfully in the U.S. That trend is poised to continue, if not accelerate, in many industries, among public and private firms and for both corporations and private equity firms…”

Deloitte’s Executive Summary was confirmed by 2014’s M&A results as reported by WilmerHale’s in its article, “2015 M&A Report.” Quoting from the Review:

“Fueled by improvements in macroeconomic conditions, high levels of cash among strategic acquirers and low interest rates, the M&A market produced record or near-record results across most geographies and sectors in 2014.” The article concludes its Outlook section by commenting: “Economic challenges remain, but the above factors encourage favorable expectations for the M&A market over the coming year.” The See Reference 7 for entire report.

**Review of the Three M&A Financial Analytics relevant to this Article**

* Mixed linear and integer programming (MILP) for supply chain network design
* Predictive analytics for marketing response functions
* Activity-based costing and The Fast Track Model for customer and product profitability

**Mixed linear and integer programming (MILP)** The firm, INSIGHT, has seen over the last 30 years its flagship supply chain network design MILP product, SAILS, used in a variety of merger and acquisition analyses. Examples include Exxon’s merger with Mobil (1998), Procter & Gamble’s acquisition of IAMS (1998) and Gillette (2005), Pfizer’s merger with Warner Lambert (1999) and Pharmacia (2002), Kraft’s merger with General Foods (1989) and Kellogg’s acquisition of Keebler (2002).

For those readers interested in the functional details of SAILS, see Reference 8. For an INSIGHT press release on the use of supply chain network design analytics in M&A, see Reference 9.

NOTE: INSIGHT is the firm that integrated predictive analytics into SAILS, creating INSIGHT Enterprise Optimizer. This is the product that creates an ***OIS.***

Another firm using supply chain network design analytics for M&A purposes is LLamasoft. Quoting from its white paper:

“Supply chain design technology enables companies to model their supply chains, evaluate alternatives, optimize the network structure and simulate multiple scenarios in or to predict the resulting operational performance of the merged organizations. There are opportunities to leverage modeling across all stages and types of M&A activity, including pre-merger, post-merger and divestiture/spin-off.” See Reference 10 for the complete white paper.

**Predictive analytics**

In industry today, the use of predictive analytics for developing marketing response functions is referred to as marketing mix modeling (MMM). Quoting Wikipedia, “it is a term of art for the use of statistical analysis such as multivariate regressions on sales and marketing time series data to estimate the impact of various marketing tactics on sales and then forecast the impact of future sets of tactics. It is often used to optimize advertising mix and promotional tactics with respect to sales revenue or profit.”

Similarly, in industry today, the use of predictive analytics for developing sales force response functions for sizing and allocating the sales force budget is referred to as sales resource optimization (SRO). For the remainder of this article, the term marketing-mix modeling (MMM) will be used for applications which size and allocate both expenditures.

Not surprisingly, the application of MMM techniques to M&A as well as private equity portfolio management came to the author’s attention from the web site of one of the most successful MMM firms: ZS Associates. Quoting from its website:

*“Private equity firms increasingly are asking their portfolio companies to generate profitable growth. A key path to such growth is improving sales and marketing effectiveness and efficiency.*

*ZS has helped numerous private equity firms make rapid improvements in the sales and marketing organizations of their portfolio companies, ones that have boosted revenue as much as 20% and made unprofitable businesses profitable in 1-2 years – without having to launch new products or services.*

*ZS’s services help private equity firms:*

* + - * *In due diligence, we can rigorously assess and identify the best growth opportunities and the sales and marketing capabilities of a potential acquisition.*
* *Propel revenue and profits of portfolio companies*
* *Determine the optimal size, territory structure and compensation model for a sales force, and the competencies of sales professionals and sales managers.*
* *Identify, articulate and implement changes to substantially boost sales leads, close rates, and customer retention. Our audits explicitly identify issues, the steps in solving them, and the financial returns of doing so.*
* *Rigorously evaluate the returns on potential sales and marketing investments such as additional sales professionals and new marketing campaigns.*

For more details on marketing-mix modeling analytics, see Reference 11.

**Activity-Based Costing and the Fast track Model**: This author’s introduction to the use of activity-based costing as an analytic tool for M&A analysis was the elegant approach described in “Acquiring Profit Opportunities: A Breakthrough M&A Mode” by Steve Anderson, then Chairman of Acorn Systems and Kevin Prokop, Director, Questor Management, June, 2004. See Reference 12.

Quoting from the article:

*“We have before us a new approach to M&A -never before contemplated. ...We propose a breakthrough approach to mergers and acquisitions.  By using sophisticated Fast Track Profit Models to identify profit opportunities before an acquisition, the acquirer can know the profit improvement opportunities in great detail, up front.”*

What is not made explicit in the quote is that the Fast Track Profit Model is constructed using activity-based costing (ABC) data. From Wikipedia:

*“CIMA (Chartered Institute of Management Accountants) defines ABC as an approach to the costing and monitoring of activities which involves tracing resource consumption and costing final outputs. Resources are assigned to activities, and activities to cost objects based on consumption estimates. The latter utilize cost drivers to attach activity costs to outputs.”*

This allows a much more accurate identification than traditional costing methodologies do of unprofitable products and customers. These can be addressed with a variety of different means including product-related (e.g., eliminate, reprice, redesign, change production processes) and customer-related (e.g., implement minimum order quantities, concede permanent loss customers to competitors). For a more complete list of possible actions, including customer-specific ones, see Reference 13

Mr. Anderson and Acorn Systems extended traditional activity-based costing techniques in two ways which are the bed rock of the M&A analysis approach outlined in their white paper:

1. He developed time-driven activity-based costing. It was popularized in a book of the same name, Harvard Business School Press, 2007 and co-authored with Dr. Robert Kaplan of the Harvard Business School.
2. At Acorn Systems, he participated in the development of ***Fast Track Profit Models***

Again, quoting from the white paper:

*“Time driven activity-based costing, introduced by Mr. Steven Anderson and Dr. Robert Kaplan, is the cornerstone of a new solution that has enabled organizations to build exactly what the private equity world needed. Company overhead and expenses can now be driven intelligently to all customers and products, based on how much time was spent. This gives management a true understanding of profitability drivers.*

*Industry template models, complete with standard process time equations that are easily customizable to an acquisition candidate, create a very accurate model. Building an accurate model is now easy. Time driven models naturally have order and line item cost objects. As a result, pulling standard transaction files is straightforward. MIS is not tasked by custom downloads, and getting data is easier”*

See page 6 of Reference 12 for a comparison of a traditional model and a Fast Track Profit model.

Finally, it is important to understand that the MILP model built for supply chain network design is activity-based. Further, that if activity-based costing data exist, the creation of the MILP portion of the ***OIS*** model is quicker and less expensive than the traditional techniques. This was covered in detail in the author’s first Journal of Corporate Accounting and Finance published in May 2014, titled "Enterprise Master Plan: Next Generation Planning with Activity-based Planning." See Reference 1.

There are a variety of other ways to develop the necessary costing data for an ***OIS***model. They have been used for decades well before the activity-based costing synergy with supply chain network design was unearthed by the article's authors. These other approaches include:

* Accounting: It is the most popular approach to facility data preparation and is based on a detailed analysis of historical cost accounting records
* Statistical Analysis: One of the most difficult challenges faced when analyzing historical facility costs is the segregation of accounts into fixed and variable categories. The statistical approach circumvents this problem because it is completely independent of the nature of individual cost accounts.
* Engineering: Obtain engineering cost estimates for each facility type to be evaluated ensures that the standard costs are divided into fixed and variable components.

For the details of these three approaches, see Reference

**Limitations of current M&A Financial Analytics**

The key imitations of both supply chain network design analytics (i.e., MILP) and MMM applications (i.e., predictive analytics) are that they both yield, necessarily, sub-optimal results even though they both use prescriptive solvers. As a reminder, prescriptive solvers answer the question: “What is the best possible X?” Descriptive solvers, on the other hand, answer the question: “What will happen if we do X?”

This is because, as noted in the Abstract, “Optimizing each subsystem independently will not, in general, lead to a system optimum.” See Reference 2. Elaborating, while supply chain network design applications have a variable supply chain, the forecast is fixed. Conversely, while MMM applications have a variable forecast, the supply chain is fixed.

Also, as a further compromise to financial optimality, MMM applications do not use true profit as the objective function (i.e., that which is being optimized); rather, they use contribution margin (i.e., revenue minus variable product cost).

In the case of activity-based costing analytics, while the objective function is true profit, the analytics are descriptive and, thus, also sub-optimal.

**How an OIS Addresses these Limitations**

See Exhibit 1, below, for a summary of how OIS addresses these limitations.

Exhibit 1

**Conclusions**

**For the *first time, ever*, it is now possible with an *OIS* to calculate the *truly maximum profit* of which an M&A opportunity is capable of generating with an *OIS*. It is also possible to management a portfolio of private equity-held firms more profitably just as it is with any publicly traded firms. See Reference 1.**

**It is also possible to calculate with an *OIS* the *truly maximum economic value or customer life time value* of which an M&A is capable of generating**

**Finally, the implementation is quicker, more efficient and less expensive if activity-based costing data already exists.**

**All of which constitute a “next generation” M&A financial analysis capability.**

Readers interested in more details should contact Jeff Karrenbauer, Glenn Sabin or Alan Dybvig. See below for contact information, below.

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