The Value of Standardization of Business Rules

By Ellen Gottesdiener and Jim Bruce

Business rules are the foundation of any business, and standardizing their fundamentals – their definitions and relationships – is essential for supporting complex operations. Keeping a consistency at a higher level of abstraction is key to ensuring accurate and complete tracking.

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Business rules concerning the life cycle of products and materials at a global manufacturer producing consumer products (referred to in this article as the Company) are embedded in over 140 applications. These applications are founded on structural business rules which define such business objects and component objects as: raw material, chemical material, final consumer product, etc. These myriad systems, in combination, give life to the operations of the business, from purchasing to manufacturing bulk product to forming, filling and finishing products ready to be shipped to consumers.

However, as with most large enterprises, portions of these structural business rules were built over the past 25 years at different times, in different places, in different vertical applications and therefore in inconsistent ways. Although the systems are highly verified, ensuring complete and accurate tracking of specific items, there is inconsistency at the higher level of abstraction.

A consumer product is an object type, with many subtypes and components parts. These types comprise the most basic part of the corporate value chain - acquiring, producing, packaging, and distributing the Company's consumer products. Depending on the stage of development, a product at the company may be referenced with different terms, codes and abbreviations. The reason is that fundamental business rules were never standardized.

Defining Business Rules

The term, business rule has different meanings for both business and IT professionals. Within IT, 'business rules' can have different connotations depending on whether the perspective is 'data-oriented', 'object-oriented' or 'expert system-oriented.' Businesspeople understand business rules to be the meanings of things, how they are interrelated and processing constraints around any object of the business.

A business rule is "a statement that defines or constrains some aspect of the business. It is intended to assert business structure or to control or influence the behavior of the business" (see Reference 1). These business rules are represented by IT analysts and designers in structural models of the applications, in such forms as class diagrams and supplemented by behavioral models (e.g. state and process/activity/workflow diagrams).

Structural rules are modeled as terms (nouns and their meaning) and facts (the attributes, associations, types,
aggregations amongst the terms). In any business, business rules become embedded in a variety of ways: through structure of the underlying models of an application, in procedural logic, in the manual workflow, in paper systems and in human memory.

Making the Case

Executive management at the Company believed that establishing commonality and maintaining consistency in the automated systems and human procedures that revolve around these fundamental business rules – terms and facts connecting them - would yield benefits. With approximately 33,000 unique products and over 5300 SKU's (stock keeping units), it had become cumbersome to efficiently identify the same object types in the same manner in over 150 locations across the globe.

Today, standardizing the rules around products and materials has become a key infrastructure program – called MaPS (Material & Product Standardization). At press time, migration activities are underway. How do you make a business case for standardizing these fundamental business rules? At this company, the answer was to do an Economic Value Added (EVA) analysis.

Business Decision-making

Business rules standardization would require many IT-related as well as business process costs. Complicating the decision is the fact that it is extremely difficult to quantify the business value and return on investment (ROI) for IT projects. Nevertheless, executive management decided that the project was intuitively right. In fact, they had agreed twice in the past to analyze this aspect of the business, allowing IT to lead the effort using the top-down IT methodology known as Information Engineering. Both of these efforts, after much time and expense, yielded nice models of the data and process, but no change to systems or business procedures. Nevertheless, executives had strong intuition that greater efficiency and decision-making would be self evident once business rules were normalized across the enterprise.

Project Purpose

With strong business sponsorship and sound IT project management in place, a project was commissioned to "establish information management practices and mechanisms which will ensure that products and materials are identified uniquely and consistently across the entire enterprise". Three key projects within the MaPS program were defined: establish standardize business rules and governance for those rules, establish a technical infrastructure through a reference database to support the rules and migrate applications to the standard rules.

The business case was made by first standardizing the structural business rules with business domain experts, validating those rules using business scenarios, conducting a

detailed financial analysis using the ROI (return on investment) approach know as Economic Value Added, then obtaining executive approval (see Figure 1).

Starting with the end in mind, a corporate set of standard business rules would be implemented in all systems which 'touch' products and materials. To maintain and enforce those business rules, business rules stewardship would be established. Therefore, the first step was to defining the business rules – terms and connections among them (also referred to as terms and facts) -- for all data requirements dealing with materials and products.

Road to Business Rules Definition

To accomplish this goal, the Company held a series of intense facilitated workshops, involving a cross-functional team of business experts representing the different aspects of the material and product value chain were held. This was much more difficult than anticipated, as it required viewing product and material rules across the whole global enterprise. This in turn required a large breadth of business knowledge, which no single person possessed. Thus, the cross-functional team was critical to defining the business rules.

In follow-up meetings, the rules were finalized, tested with business scenarios generated in the workshop, and validated by a wider group of key business experts who run the operations that use these business rules on a global basis.

The next step was to put a dollar value on the massive effort required to make it all happen, including the business benefits, using an economic-based tool for decision-making.

A Decision-Making Framework

The decision-making framework combined solid business insight based upon devising scenarios (stories) for the improved state of the business, a visual map of benefits and costs called an influence diagram, and the ROI approach called Economic Value Added.

The process of establishing that framework is described in Figure 2. Key to the process was involving the decision-makers in the Steering Committee in validating the model.

Developing the EVA Model

The business intuition portion of the framework involved a series of meetings with key business experts who could 'tell a story' of what, from their perspective of the manufacturing value chain, would be the benefits and gains for standardizing business rules. These benefits were clustered into key groups, called 'influences'. For example, reductions in packaging design and distribution chain development costs due to improved data quality (standardization) and decision making, was clustered into a grouping with other benefits called Supply Chain Design & Analysis. The costs of tracking what are in

fact identical finished product items and improvements in forecasting which are lost because of non-standard tracking were mapped to a cluster called Improved Planning. Examples of other major clusters on the influence map included: Distribution Efficiency, Procurement, Reduced Capital Assets, Avoided IT Costs, Managing the Product Portfolio. The costs on the influence map, mostly devised by the IT project team, included Integration Costs, Support Costs, IT Costs to Implement, Business Costs to Implement.

These stories were devised in small group meetings with the business experts, an IT person coordinating the cost justification process and an expert in 'decision sciences' who understood complex financial modeling techniques, including EVA. These meetings resulted in revisions to a visual model of costs and benefits that had been developed during the project's kickoff. Each of these influencing groupings - both costs and benefits - were further decomposed with high, expectedmedium and low valuesnumbers or percentages. These values would be used in testing the validity of the analysis (figure 3).

Economic value added is an approach to ROI which evaluates the an investment opportunity by calculating the ROI in terms of all the economic components of the business enterprise, capital expenditures, human resources, plant and equipment as well as other financial aspects. This is derived by starting with a cash-adjusted operating profit and subtracting the cost of the capital needed to produce the earnings (see sidebar 2, "Calculating EVA"). The details underlying the bottom line EVA, in this case $165 mm over 15 years (a positive EVA) was contained in a series of complex spreadsheets designed by the financial modeling
expert. The net present value (NPV) (see sidebar 3, "NPV") for each of the benefits/saving elements on the influence diagram, along with the costs was calculated. The Cash flow portion of the EVA (e.g. income, depreciation, capital expenditure, change in working capital, and NPV of cash flow) was applied as part of the EVA calculation itself.

Validating the EVA

In order to build confidence in the model, it was important to address challenges to the analysis: what if the business case numbers were above or below the expected values provided in the model? The only way to build confidence in them was to honestly model the potential of variability. This was done by analyzing each influencing factor, e.g. procurement, inventory reduction, distribution efficiency, etc. The impact of the high and low values of each factor was graphed on tornado diagram to visualize how the variability of each factor
impacted the projects expected gains.

Financial risk analysis was done for the project to understand the impact of some 82 risk scenarios using a decision tree to understand the probability of achieving the financial gains. This analysis was represented visually in, a Risk/Reward graph. This graph showed that, despite the high risk of project failure (45%), the rewards could yield a probablized value of $192.7 mm.

The testing of the EVA model proved critical. It helped identify factors which had large impact on the expected EVA, which helped the team to refine and readjust the factors which were crucial to the overall accuracy of the analysis. The worst case still showed a positive EVA, and this was important in gaining management and steering committee acceptance of the analysis. Having the uncertainty ranges and evaluating all of the possible outcomes around that uncertainty was very important in verifying the expected outcome. It also demonstrated to the decision-makers that we had done more than a "pie in the sky" evaluation.

These analytical tools showed the MaPS steering committee and executive sponsors the true story – the project's risk rewards, benefits and costs. This and other subtle adjustments to the financial models gave senior management the confidence to make a decision to proceed with the project. The decision to continue the project was based on hard data gathered from business experts and validated using proven analytical methods. This is certainly a clearer and more supportable decision than justifying such a significant project based on the intuition of senior management.

Conclusion

Business rules are the most atomic elements of any business. Capturing and standardizing the most fundamental of such rules - definitions and their relationships - is necessary for supporting the complex operations of any business. As such, business rules standardization is a core element of the automated infrastructure of any enterprise.

Businesses are challenged with quantifying the ROI of such endeavors in order to make sound, risk-aware business decisions. By using key business experts to understand the concrete benefits of such an effort within a financial modeling framework, the Company. now understands the costs, benefits and risks of business rules standardization and has made a decision to implement the business rules standardization effort.

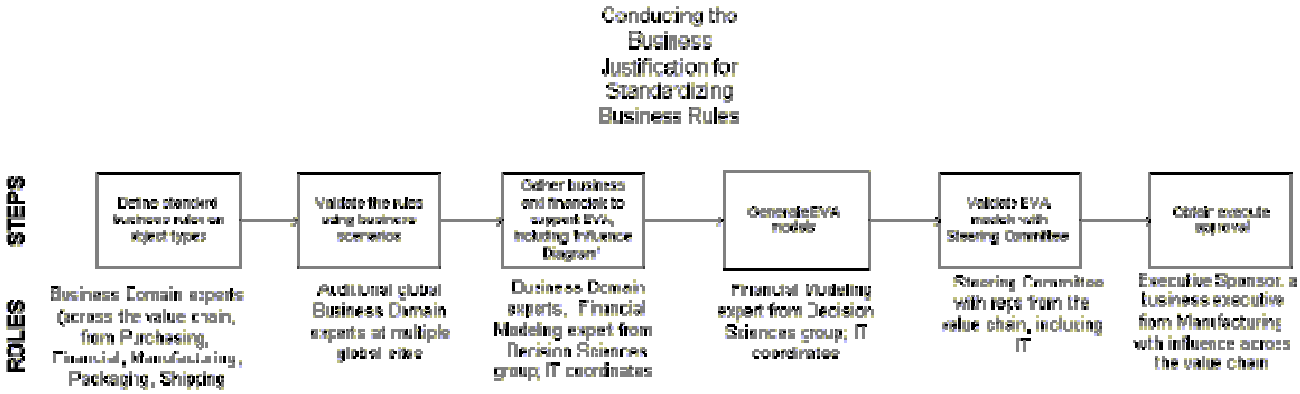
References:

1 Guide Business Rule Project, Guide Business Rules Project, Final Report, 11/95. Go to: http://www.businessrulesgroup.org/

Figures:

1: "Conducting the Business Justification for Standardizing Business rules"

Figure 1


Conducing the Business Justification for Standardizing Business Rules
STEPS
Define standard business rules on object types
Validate the rules using business scenarios
Gather business and financials to support EVA, including 'Influence Diagram'
Generate EVA models
Validate EVA models with Steering Committee
Obtain/ execute approval
ROLES
Business Domain experts (across the value chain, from Purchasing, Financial, Manufacturing, Packaging, Shipping
Additional global Business Domain experts at multiple global sites
Business Domain experts, Financial Modeling expert from Decision Sciences group; IT coordinates
Financial Modeling expert from Decision Sciences group; IT coordinates
Steering Committee with reps from the value chain, including IT
Executive Sponsor, a business executive from Manufacturing with influence across the value chain

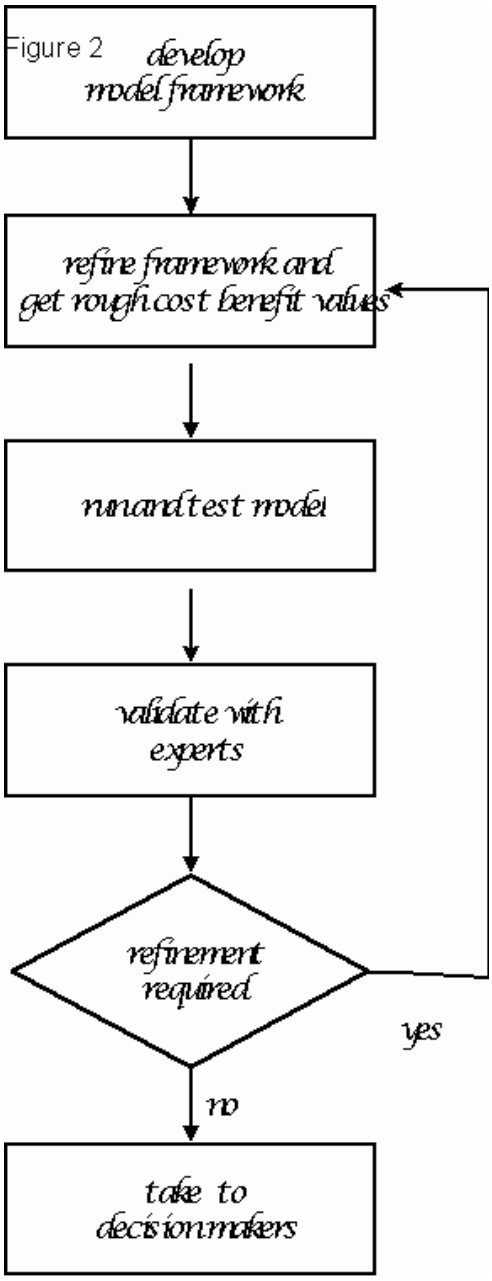
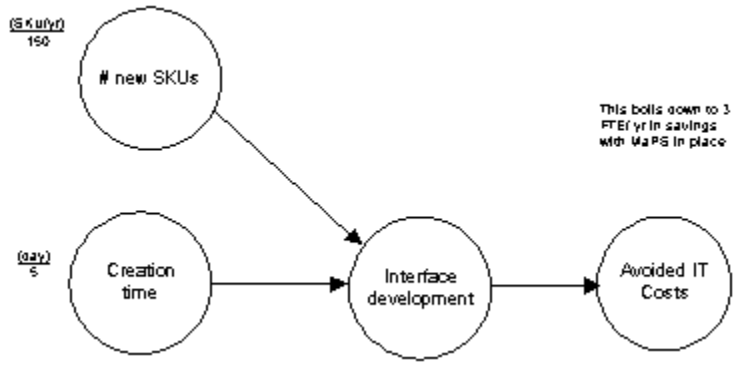


Figure 2

3. Influence diagram portion: "Avoided IT Costs"

Breakout of Avoided IT Costs



Sidebars:

Business Rule Tutorial

Business rules are the fundamental, underlying constraints and policies of a business. They define or constrain behavior, and are therefore core to any business.

When a business rule statement is elicited from a businessperson, however, it is often worded in ambiguous, non-rigorous ways. In such a situation, each business rule statement may actually decompose into numerous discrete business rules.

Commercial enterprises are comprised of thousands of combinations of such rules, which work at an operational level running the business. Business rules define and control the lifecycle of products and services and the supporting infrastructure.

Consider this: remove business rules from business process. What is left? Mere workflow rules (who does what, sequence and concurrency). Business rules direct how enterprises buy, create, sell, cultivate, conform, employ, manufacture, research, report, and plan. As such, they are the core of the enterprise.

A business rule is independent of the modeling paradigm or technical platform. A rule is defined and owned by business people. To summarize, business rule are:

- Declarative (i.e. non-procedural);
- Atomic (indivisible yet inclusive);
- Expressed in natural language;
- Distinct, independent constructs;
- Business, not technology, oriented;
- Business, not technology, owned;

2. Calculating EVA:

Economic Value Added is calculated as follows:

EVA = NOPAT - Capital Charge

NOPAT = net operating profit after taxes, derived as:

Sales - Cost of Products Sold - Operating Expenses - Taxes

Capital Charge = Capital Employed x Cost of Capital (company specific percentage)

3. NPV = Net Present Value, or the present value of future returns (discounted at the cost of capital) - present value of the cost of the investment. NPV is the current value of future cash flows discounted.

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