



# SBVR: What is Now Possible and Why?

by Donald Chapin

## What is SBVR?

*Semantics of Business Vocabulary and Business Rules* (SBVR) is the first specification under the Object Management Group's new stream of Model-Driven Business specifications. SBVR is effectively two specifications in one, covering respectively:

- **Business Vocabulary** [*aka ISO 'terminology'*] (*concepts; representations including terms, names, and definitions; definitional rules [aka 'structural rules']; and advices of possibility*) — special purpose language as a cohesive set of interconnected concepts, not just a list of terms and definitions, i.e., as a natural language ontology; and
- **Behaviorial Guidance** (*business policies, operative business rules, and advices of permission*) that governs business actions of an organization.

SBVR Vocabulary is like the content of a natural language dictionary but is different in several ways:

- Concept-centric; not word-centric (meanings are in concept systems),
- Special purpose language only,
- Community and subject field provide the context for meaning,
- Multilingual terms for discrete concepts that span natural languages,
- Non-verbal notations for concepts,
- Formal definitions understood in terms of characteristics with built-in taxonomies (*optional*),
- Defined reference schemes for individual things,
- Formal treatment of roles and aspects (*perspectives*),
- Verb concepts (*subject-verb-object plus, sometimes, preposition-object*) as entries,
- Entries interpretable in formal logic,
- Able to support formal specification of behaviorial guidance.

SBVR provides the basis for business software tools to enable specifying, managing, and interchanging business vocabulary and behaviorial guidance as business assets.

Business software tools that implement SBVR can offer a wide variety of features to enable business staff in any kind of organization to agree definitions across natural languages and organization units, agree terms for those definitions within their language and/or organization unit, and document these and their behavioral guidance in an online database.

Using SBVR-documented Business Vocabulary and Behavioral Guidance enables business staff to think more clearly, use terms consistently to communicate their intended meaning, and create and use behavioral guidance unambiguously.

## What has Changed with the Release of SBVR?

For the past decade IT vendors have been advertising the claim that their particular product or service "bridges from IT to business." (*Note they haven't been saying "from **business to IT.**"*) However, regardless of how valuable their product may have been for some particular purpose, such claims have been empty because a foundational component — the tower of the suspension bridge on the business side — was missing.

When an organization's business vocabulary and behavioral guidance have been documented using tools fully compliant with the business vocabulary part of SBVR and that business vocabulary is being used widely and consistently to create its text documents, then that organization will have built the tower of the suspension bridge on the business side. The best litmus test for this is when an organization's documents are being written with an SBVR authoring tool, like a Microsoft Word add-in, that puts terms and definitions within their context at the writer's fingertips.

A living implementation of SBVR in an organization's use of business vocabulary to create its documents makes it possible for an organization to build a bridge from business to IT and back. SBVR provides the foundational bridge component that has been missing since computers began to be used in organizations in the 1950s.

## What is it about SBVR that Makes the Difference?

A key question that will be asked is "Why does SBVR make it possible to bridge from business to IT when nothing else before actually enabled that?" The answer lies in the four disciplines from which SBVR was synthesized:

- Natural-language and Terminology Science,
- Fact-oriented Modeling in Formal Logic,
- Linguistics,
- Business Consultancy.

It is the *integration* of, and *interplay* among, features taken from these four disciplines, together with the know-how, experience, and existing communities of all four disciplines, that makes the difference and enables SBVR to be, for the first time, the business-side tower for the bridge from business to IT.

### SBVR: Rooted in Natural Language and Human Communication

SBVR is built on the foundation of the ISO terminology science standards, ISO 704:2000 and ISO 1087-1:2000, to provide the bedrock on which the Business Vocabulary tower on the business side of the suspension bridge stands. These standards specify how to structure and document the special-purpose

- concepts (*known by their definitions, which are equivalent across languages*), and
- designations (*terms and names for those concepts in a particular natural language*)

that are shared among the members of the community who talk about a given subject field (*industry, profession, discipline, etc.*). These standards are from ISO Technical Committee 37 "Terminology and other Language & Content Resources" and emerged out of the field of translation many decades ago. They are all about human communication using special purpose language in the context of natural language.

### **SBVR: Adding the Precision of Fact-oriented Modeling Underpinned by Formal Logic**

While concept relations are a key part of the ISO terminology standards, their treatment in those standards is not precise enough to enable business vocabulary and behavioral guidance created under those standards to have an interpretation in formal logics and, therefore, a formal semantics. It is the contribution of fact-oriented semantic models and their solid formal logic credentials that adds the needed precision and formal semantics to the ISO terminology standards. In addition, one of the key objectives of fact-oriented modeling has always been to provide the core formal logic-based constructs required to capture the semantics of some kinds of natural language statements.

Fact-oriented modeling began to be used in the 1970's and was set forth comprehensively in ISO Technical Report TR 9007:1987, "Concepts and Terminology for the Conceptual Schema and the Information Base." Today, fact-oriented modeling is most widely known and practised as Object Role Modeling (ORM), CogNIAM, etc. The contribution from this discipline is what gives SBVR Vocabulary and Behavioral Guidance precise meanings, and enables them to be transformed into IT system designs without losing or changing the business semantics. It also makes it possible to generate OWL (Web Ontology Language) and UML models from a subset of SBVR features, thus enabling business professional to structure and document their own knowledge.

### **SBVR: Connecting Natural Language Grammar with Definitions and Logic Statements**

The third discipline contributing to SBVR is linguistics and, in particular, linguistic annotation of natural language grammar. While SBVR does not include linguistic annotation structures (*these are provided in standards being created by a different subcommittee [SC4] of ISO TC 37*), SBVR does provide an entire clause of semantic formulation constructs that are used to connect linguistic annotation structures to the underlying SBVR fact model structures provided by ISO terminology 'concept relations' and fact-oriented modeling. However, SBVR tools that can structure definitions and statements of behavioral guidance clearly make use of such linguistic annotation technology in addition to implementing SBVR.

These SBVR semantic formulation constructs are adequate to capture the business semantics of the most complicated definitions and behavioral guidance statements, including exceptions to behavioral guidance, in terms of the SBVR Vocabulary with which they are formulated. They are the part of SBVR that enables both definitions and statements of behavioral guidance to be interpreted in formal logic.

### **SBVR: Ensuring Practical Applicability in Organizations**

Where terminology science gave SBVR its foundation, hundreds of collective man-years experience in business consultancy applying vocabulary and business rule approaches to the needs of organizations gave SBVR its practical shape. From the introduction of communities of people sharing concepts and terms as the context of meaning and representation, to SBVR's powerful vocabulary adoption features enabling the reuse of vocabulary wherever it is shared in a wider community, the design of SBVR was always oriented to

practical application that generates value for the organization.

## **SBVR Serves all the Vocabulary Needs of an Organization**

Organizations will not maintain a vocabulary (*aka ISO 'terminology'*) for a given subject field against one standard for translation ... a second version of the same vocabulary against a second standard for text analytics, browse, and search ... a third version of the same vocabulary against a third standard for business rules, etc., etc. Because SBVR is built on ISO 704 and 1087-1, with the added integrity of fact-oriented modeling, SBVR offers the opportunity to provide a terminology database that will serve all the terminology needs of an organization and its IT systems support — not just those for translation or business rules. SBVR provides what is necessary to make multi-use vocabulary management a reality, logistically and economically.

## **Possibilities in the World of Business — SBVR-based Knowledge**

In addition, SBVR Vocabulary and Behavioral Guidance created by the people who shared them, can — when used with SBVR-capable business software tools as an integral part of business activities — provide significant new business benefits by enabling or enhancing these kinds of business activities:

### **Business Integration and Performance Improvement**

Describing business activities *consistently* using SBVR Vocabulary brings to the fore duplicate activities and disconnects within the organization, and between it and its stakeholders. The resolution of these duplications and disconnects leads directly to business integration. Separating SBVR business rules from processes — even at the essential business process level where information artefacts and information processing are abstracted out — adds great flexibility to business process management. Performance measures specified using SBVR Vocabulary can be both provided with accurate data and interpreted accurately. Because documentation can be produced at the necessary quality more quickly and with less cost when using SBVR Vocabulary, products can be moved to manufacturing and to outsourced suppliers more quickly and with less risk.

### **Risk, Governance, and Compliance**

One of the major sources of business risk is not having adequate managerial and regulatory governance in place. Since Sarbanes-Oxley, executives of organizations can go to jail because they cannot demonstrate that they have governance documentation adequately in place. Using SBVR Vocabulary and Behavioral Guidance enables the creation of managerial and regulatory governance documentation that is "not easily misinterpreted," thus reducing risks of their misapplication, both internally and by regulators. Because it removes ambiguity, SBVR enables reuse of behavioral guidance wherever it is relevant. SBVR provides the semantics for SBVR tools to help remove confusion caused by conflicting rules, the time wasting caused by duplicate rules, and the gaps in rules where non-compliance could occur. SBVR also enables the ability to monitor for non-compliance events, which are inherent in SBVR business rules.

### **Globalization/Localization and Translation**

Flexible globalization and precise localization of an organization's products and services — as well as its processes and governance — is enhanced by SBVR concept formation features that are independent of terms and names while being expressible in any natural language. Add to this the clarity of thinking encouraged

by fact-oriented models with a formal semantics and you can deliver localized/translated documentation in the language of the reader, with reduced cost and time delay as well as improved accuracy and more consistent meanings.

## **Communication and Documentation**

Clear business thinking and communication through high-quality document authoring and knowledge creation is a bottom-line result from using SBVR Vocabulary and supporting document-authoring tools. Well-formed documents can be built around well-formed SBVR concepts and concept relations, which provide the clear message, and around well-formed SBVR terms, which enable the clear expression. Such documents are much more quickly and easily understood. Maximized use of industry-standard SBVR Vocabulary provides for the best communication with external stakeholders. Tacit knowledge is also more easily and accurately captured when using the concept formation features of SBVR.

## **Document and Content Index Creation**

SBVR Vocabulary — when used by index-creation software tools — enables semantic indices that cross-reference meanings (concepts and concept relations) and not just arbitrary strings of meaningless characters. Such semantic indices make possible greatly-reduced duplication of effort by making existing work products more easily, quickly, and accurately findable. They provide the business semantics for browsing, searching, and analysing content via meanings — not just meaningless character strings.

## **Training**

One of the first things a good training designer does is to identify and structure the concepts and concept relations that must be learned. This work, which is a major part of training development, is already done in an SBVR Vocabulary. Again SBVR's strengths in concept formation ensure faster, more effective learning and technical mastery, which in turn delivers increased productivity sooner.

## **Business Language–centered Requirements for Information Systems**

Imagine being able to *extract* the bulk of the content for an Information System Requirements Specification from an existing database of SBVR Vocabulary and Behavioral Guidance! That is exactly the possibility that SBVR offers for areas of an organization that have documented their business vocabulary and behavioral guidance using SBVR. Sourced this way, the Requirements Specifications are already in the language used by business people to communicate with each other; the concepts are already structured the way the business people think; and the business rules already state how the business people want the organization to operate.

The part of the Requirements Specification that still has to be decided is then limited to such things as:

- the business facts that are needed to do a task, or by an external stakeholder,
- the business facts that need to be accepted from external stakeholders and dealt with, or remembered for future use,
- decisions about maximum number of instances of things to be recorded,
- non-functional system requirements.

Such business language–centered Requirements Specifications provide IT with all the information it needs to create an information system that thinks and talks the way the business people do, and operates the way

the business people want it to. They provide an objective yardstick for the business to measure how well the proposed/delivered information system actually serves the people who run the organization.

## Possibilities in the World of IT — SBVR-Intelligent Systems

### How SBVR Business Vocabulary (*aka ISO 'Terminology'*) and Behavioral Guidance Relate to IT

SBVR Business Vocabulary and Behavioral Guidance that is created for use in one or more business activities *can then be used as input to design activities for information and software systems*. Leveraging SBVR Business Vocabulary and Behavioral Guidance enables IT to deliver significant new benefits in its support of the business in these IT application areas:

#### Document Browse and Search and Text Analytics

One of the biggest areas of unrealized IT value is in mastering the knowledge and know-how in an organization's vast inventory of text-based content. Witness the rash of recent acquisitions and offers in the search space, both internal search and Internet search. SBVR Vocabulary provides the bedrock on which to build semantic browse and search that is based on meanings — not just arbitrary character strings.

Taxonomies are an essential component of semantic browse and search. The true taxonomy for a subject area is already in an SBVR Vocabulary, inherent in its concept system and intensional definitions. The core taxonomy (*like a normalized relational schema*) can be extracted directly from an SBVR Vocabulary database, and the Browse Directories (*like database views*) can then be built with combinations of those core taxonomy structures.

Text mining and analytics software can receive a large part of its potential intelligence from SBVR Vocabulary. Knowing already-defined SBVR concepts and concept relations greatly increases its ability to spot them in raw text and produce more accurate and insightful text mining results.

Benefits of using SBVR Vocabulary as the business semantics for browse, search, and text analytics include:

- increased personal creativity, lateral thinking, and knowledge discovery;
- greater knowledge sharing and re-use of best practice;
- avoiding otherwise inevitable rework, especially in knowledge-intensive activities; and
- significant, previously unseen, business value from new knowledge, created when implicit relationships and patterns among noun concepts in text are made explicit.

#### Business Intelligence and Data Analytics

Most Business Intelligence software suites now have semantic layers to bridge from the language of the business users to the IT data storage structures. The actual, already-documented language of the business users can be *extracted* from the SBVR Vocabulary database. If the mapping of the SBVR Vocabulary to IT data storage structures has already been modeled, these Business Intelligence semantic layers can be generated.

Using SBVR Vocabulary as the business anchor for the Business Intelligence semantic layers enables business staff to request data using the same language they use to communicate with each other, verbally and in writing.

## **Data Management and Architecture**

SBVR Vocabulary enables reference data reuse and can be used to:

- provide the meanings and their multiple sets of names, codes, and/or other identifiers once, for the whole organization, where that single source can be used for business communication as well as in any IT system;
- provide the business semantics for translating between the different sets of names, codes, and/or other identifiers for the same meaning when passing data from one IT system to another;
- enable a single query to retrieve both structured data and unstructured text if the SBVR Vocabulary is used with both the business intelligence software and semantic browse and search software;
- together with design decisions, generate database and XML schemas;
- create a catalogue of available data that is organized according to the business meanings in the SBVR Vocabulary database; and
- be the basis for validating the quality of stored data.

## **Message-Based Middleware Architecture**

SBVR Vocabulary can be used to specify the semantic content, and ensure the semantic integrity, of messages to provide enterprise application integration and zero latency data integration and maintenance. They can also be used in combinations with IT system design decisions to generate business semantics-based UML and web service interface definitions.

## **Business Process Management Systems**

SBVR operative business rules owned by, and in language of, business staff can be transformed into systems rules that govern the combination of the manual and automated execution of business processes. SBVR Vocabulary provides the link between the data being processed by the activities/tasks of the business process and the rules that govern the executing of the business process.

## **Advanced Intelligence Capabilities**

SBVR Vocabulary can provide the business semantics for Predictive Analytics Rules Engines and Semantic Web Reasoning Engines. These make potential implications of facts from the present — as well as projected facts from possible future scenarios — explicit so they can be taken into account in decision making.

## **Rule-based Application Software Development and Configuration**

Using SBVR Vocabulary provides the business semantics which, when combined with information requirements and system design decisions, can generate screen and report definitions and/or code. SBVR business rules, when combined with system design decisions, can be the basis to generate execution rules for specific operational system rules engines and/or code for methods in business object software components. They also enable the software to directly enforce compliance for the types of rules that are enforceable by IT systems.

## Software Localization

Multilingual SBVR Vocabulary can be the basis for software localization, often in a largely automated way. Because SBVR meanings can be identified by a computer separate from any natural language, a single software linkage to the meanings in an SBVR Vocabulary and Behavioral Guidance database can support screens and reports in any language.

## Reverse Engineering Software to Business Requirements

Using SBVR Vocabulary created and owned by the business professional as the target, reverse engineering tools can reverse all the way back to the actual language used by business staff to communicate to each other. This then provides the basis for forward engineering to IT systems that think and talk the way the business people talk, and operate according to the business rules decided by business people.

## Using SBVR to remove ambiguity from IT system and software models

SBVR Vocabulary capability can also be used to provide formal definitions for UML model elements that are interpretable in formal logics, where the definitions reference the other UML elements in the UML model. This adds a whole new level of precision and meaning to UML models.

## Possibilities in the World of Standards

There is a huge body of existing standard vocabularies (*aka ISO 'terminologies'*), each of which reflects the way a given, profession, discipline, trade, industry, or community thinks and talks about its activities and the things it works with. The SBVR Vocabulary capability can be used to add precision to meanings and concept relations in an existing, standard vocabulary (*aka ISO 'terminology'*) so that they have an unambiguous semantics and can be used to create unambiguous behavioral guidance.

Standards bodies and professional/trade associations can, and in some cases are planning to, make their vocabulary (*aka ISO 'terminology'*) available in a standard way so they can be adopted as part of other SBVR Vocabularies.

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### DONALD CHAPIN



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