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Semantics of Business Vocabulary and Business Rules (SBVR), v1.4

Annex K - Mappings and Relationships to Other Initiatives

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Annex K - Mappings and Relationships to Other Initiatives

(informative)

K.1 Mapping to Other Standards and Metamodels

K.1.1 For Rule Representation

There are several existing metamodels for representing rules. Only OWL has become a standard. The scopes of these metamodels differ from SBVR. The discussion in this sub clause gives an overview of the most well-known, their use and characteristics.

- No standard is yet widely used on a commercial basis.
- With respect to rules, these metamodels focus on representation. SBVR focuses on unique, discrete meanings independent of form or representation.
- SBVR includes a Formal Model theory and semantic formulations. There is only partial coverage in other metamodels.
- Uniquely, SBVR provides necessity and obligation formulations, which are critical to the formal representation of business rules.
- SBVR places special emphasis on obligation formulations. In the real world of business activity, people can break such operative business rules, a crucial fact other metamodels do not address.

It is possible to create transformations from SBVR to any of the metamodels or vice versa. Any of the transformations, especially those moving from information systems specifications back to SBVR may require manual input to provide missing semantics or to transform decisions not automatable.

Development of transformations should consider the following points:

Transformation from SBVR to the other metamodels

- A decision should be made how to treat necessity and obligation formulations. One option is to translate these to predicates.
- Some of the non-SBVR representations do not have an equivalent operator for the ‘whether or not’ and ‘equivalence’ operators.
- Some of the non-SBVR representations do not have equivalent operators for quantifiers like ‘each’, ‘some’, ‘at least one’, etc. In that case might be possible to create special predicates or functions to deal with this semantics.

Transformation from other metamodels to SBVR

- The non-SBVR representations can have primitive types or primitive functions that do not exist in SBVR. By extending the SBVR Vocabularies with an additional vocabulary, one can create a mapping from another metamodel to the extended SBVR. SBVR is self-extensible.

Metamodels at the Business Level Used to Talk about Real Business Things – Optimally Conceptualized to be 'Business Friendly' for Business People

Name	Type	Developed by	Used by	Form	Reference
N458 Topic Map Constraint Language	Proposed Standard	ISO/IEC	Topic Maps	document	http://www.isotopicmaps.org/tmcl/tmcl-2005-02-12.html

Topic Map Constraint Language is designed to allow users to constrain any aspect of the topic map data model. TMCL adopts TMQL [Topic Map Query Language] as a means to express both the topic map constructs to be constrained and topic map structures that must exist in order for the constraint to be met.

Development of transformations should consider the following points:

Transformation between SBVR and Topic Map Constraint Language

- The only transformation required, in addition to the generally applicable ones mentioned above, would be where semantics conceptualized into SBVR XMI metamodel constructs differently from the way it is conceptualized into metamodel constructs in Topic Maps as they both talk about real business things in business friendly terms.

Metamodels that can be Used at the Business Level Used to Talk about Real Business Things – Optimally Conceptualized for Logicians and/or Machine Processing Efficiency

Name	Type	Developed by	Used by	Form	Reference
24707 Common Logic	Proposed Standard	ISO	KIF, CGIF, XCL, PSL	Document	www.iso.org
OWL	Standard	W3C	Semantic Web	DTD or XML schema	www.w3c.com

ISO Common Logic is a first order logic language for knowledge interchange. It provides a core semantic framework for logic and the basis for a set of syntactic forms (dialects) all sharing a common semantics. **ISO Common Logic** can also be used at the Information System Specification level to talk about information and information system components as it is a general-purpose first-order predicate logic standard.

OWL is a Web Ontology language. Where earlier languages have been used to develop tools and ontologies for specific user communities (particularly in the sciences and in company-specific e-commerce applications), they were not defined to be compatible with the architecture of the World Wide Web in general, and the Semantic Web in particular.

OWL uses both URIs for naming and the description framework for the Web provided by RDF to add the following capabilities to ontologies:

- Ability to be distributed across many systems
- Scalability to Web needs
- Compatibility with Web standards for accessibility and internationalization
- Openness and extensibility

OWL builds on RDF and RDF Schema and adds more ways to describe properties and classes: among others, relations between classes (e.g., disjointness), cardinality (e.g., “exactly one”), equality, richer typing of properties, characteristics of properties (e.g., symmetry), and enumerated classes.

Development of transformations should consider the following points.

Transformation from SBVR to the above standards

- In general, formal logic-based entries in SBVR-based conceptual schemas and models will be transformable into ISO Common Logic or into OWL.

Transformation from the above standards to SBVR

- Any ISO Common Logic sentences and Owl entries that can be expressed in ISO Common Logics that
  - talk about real business things (and not data about real business things or information system buckets that hold such data), and
  - are limited to the SBVR ‘restricted higher order logic’
    can be transformed into SBVR if the semantic equivalences of different representations and different semantic formulations are provided by the transformation as these are not kept track of in ISO Common Logic.
- Some contents of SBVR-based conceptual schemas and models which do not have counterparts in OWL or ISO Common Logics might need to be provided manually.

Metamodels that Specify Information Systems at the PIM/PSM Levels

Name	Type	Developed by	Used by	Form	Reference
13211 Prolog	Standard	ISO		document	www.iso.org
Production Rules Representation	Proposed Specification	OMG		XMI	www.omg.org
RuleML	Metamodel	Consortium (see reference)	Mandarax, the website contains a list of 40 participants (mostly academics)	DTD	www.ruleml.org
SWRL	Metamodel	DAML		XML Schema	www.daml.org

Proprietary Metamodels					
Name	**Type**	**Developed by**	**Used by**	**Form**	**Reference**
RBML	Metamodel	LibRT	VALENS, Artis, Power	XML Schema	www.librt.com
SRML	Metamodel	Ilog	Ilog Jrules	DTD	www.ilog.com
SRL	Metamodel	Fair Isaac	Blaze Advisor	DTD	www.fairisaac.com
BRML	Metamodel	IBM	IBM CommonRules	XML Schema	www.ibm.com

Development of transformations should consider the following points.

Transformation from SBVR to the above metamodels

- Alignment of SBVR with the above metamodels requires a transform from SBVR whose entries talk about real things in the business to specifications of data about the real business things, and the design specifications for the buckets used to store that data within various components of the information system.

Transformation from the above metamodels to SBVR

- Requires the (re-)introduction, probably manually, of whatever business semantics (or pointers to them) are not within the information systems specifications.

K.1.1.1 For Vocabulary Representation

Today there are several standards and models for representing a vocabulary. It must be noted, however, that none of these provides an adequate extension to formal logics to fully support business rules. The following list gives an overview of the most well-known, their use, and characteristics.

Metamodels at the Business Level Used to Talk about Real Business Things – Optimally Conceptualized to be 'Business Friendly' for Business People

Name	Type	Developed by	Used by	Form	Reference
1087-1, 704-2000, 10241, & 12620 Terminology	Standard	ISO		document	www.iso.org
17115 Health Informatics -- Vocabulary for Terminological Systems	Standard	ISO/DIS		document	www.iso.org
2788 & 5964 Thesaurus	Standard	ISO		document	www.iso.org
12620 & 13250-2 Topic Maps	Standard	ISO		document	www.iso.org
Public Domain De Facto Industry Standard					
ORM	Metamodel	Terry Halpin, et al	Microsoft, Case talk, Infagon		www.orm.net www.demo.nl www.mattic.com/ Infagon.html

- SBVR is based on the **ISO standards 1087-1 and 704-2000** for terminology and information science. These standards describe a methodology but do not provide a product metamodel that can be used to store and interchange business vocabularies.
- **Health Informatics -- Vocabulary for Terminological Systems** supplements the ISO 1087-1 and 704-2000 standards to provide a more formal structuring of terminology. From the standard: "The purpose of this International Standard is to define a set of basic concepts required to describe formal concept representation systems, especially for health sciences, and to describe representation of concepts and characteristics, for use especially in formal computer based concept representation systems. A main motivation is to make it possible to precisely describe content models described in other International Standards."

- **ISO 2788 & 5964 Documentation - Guidelines for the establishment and development of monolingual/ multilingual thesauri** is about creating indexes for books and other documents by identifying the subjects or topics (concepts) discussed in the document. From the standard: "The recommendations set out in this International Standard are intended to ensure consistent practice within a single indexing agency, or between different agencies (for example members of a network)."
- **ISO/IEC 13250 Topic Maps** is about Topics (Concepts) and connections between them (Facts). From the standard: "This International Standard provides a standardized notation for interchangeably representing information about the structure of information resources used to define topics, and the relationships between topics. A set of one or more interrelated documents that employs the notation defined by this International Standard is called a topic map."
- **ORM** is a modeling method originally intended for database design. SBVR is highly influenced by the way ORM defines and verbalizes fact types and facts. Transformations between a vocabulary of SBVR and ORM tools can be established although not all SBVR concepts have an equivalent in ORM.

Development of transformations should consider the following points:

Transformation between SBVR to the above standards

- With the following exceptions the only transformation required, in addition to the generally applicable ones mentioned above, would be where the semantics in SBVR was conceptualized into metamodel constructs differently from the way it was conceptualized into metamodel constructs in Topic Maps as they both talk about real business things in business friendly terms.
    - (except for ORM) none of the above standards are based on formal logics so there will need to be some manual decisions going from them to SBVR. The other direction should be automatic except for constructs not in the SBVR XMI metamodel.
    - Constructs in SBVR not in those standards would be lost.
- ORM is very similar to SBVR so that two-way transformations are minimal. However, SBVR is more comprehensive than ORM so some semantics would be lost going from SBVR and have to be provided manually going to SBVR.

Metamodels at the Business Level Used to Talk about Real Business Things – Optimally Conceptualized for Machine Processing Efficiency

Name	Type	Developed by	Used by	Form	Reference
RDF(S)	Standard	W3C		DTD or XML schema	www.w3c.com
OWL	Standard	W3C		DTD or XML schema	www.w3c.com

- **RDF(S)** not only talks about real business things but also contains pointers (URLs) to the storage locations where information about those business things is kept. Thus RDF(S) also includes mappings across the transformation from the Business Level to the Information System specification levels. RDF(S) does provide a metamodel that can be used to store and interchange business vocabularies. It is expected that lossless bidirectional transformations between SBVR and RDF(S) can be established.
- *OWL Web Ontology Language* is intended to be used when the information contained in documents needs to be processed by applications, as opposed to situations where the content only needs to be presented to humans. OWL can be used to explicitly represent the meaning of terms in vocabularies and the relationships between those terms. This representation of terms and their interrelationships is called an ontology. OWL has more facilities for expressing meaning and semantics than XML, RDF, and RDF-S, and thus OWL goes beyond these languages in its ability to represent machine interpretable content on the Web.

Development of transformations should consider the following points:

Transformation from SBVR to the above standards

- All and only formal logic-based entries in SBVR will be able to be transformed into RDF(S) and/or OWL because both are also mapped to ISO Common Logic.

Transformation from the above standards to SBVR

- Any RDF(S) and Owl entries that can be expressed in ISO Common Logics that
  - talk about real business things (and not data about real business things or information system buckets that hold such data), and
  - are limited to the SBVR 'restricted higher order logic'

  can be transformed into SBVR if the semantic equivalences of different representations and different semantic formulations are provided manually as these are not kept track of in ISO Common Logic.
- All of the vocabulary related entries not part of the SBVR formal logics sub clause will have to be provided manually.

K.1.1.2 Standards for database and system modeling

Today there are several standards and models for representing a database or a systems object model. Most well known and widely used are UML for Object Oriented models and Entity Relationship diagram for relational databases.

A vocabulary that is developed using SBVR may contain representations of concepts and fact types that should also be represented in a database or object model. For those concepts a transformation to UML or Entity Relationship diagrams can be created. Be aware that the SBVR model and a PIM level UML model or ER diagram have a different perspective. That is the reason that not all elements of SBVR may be relevant in a PIM perspective and the PIM model may need to be augmented after a transformation from SBVR.

Metamodels that Specify Information Systems at the PIM/PSM Levels

Name	Type	Developed by	Used by	Form	Reference
11179 Metadata Registry	Standard	ISO/IEC		document	www.iso.org
UML	Specification	OMG		document	www.omg.org
Entity Relationship (CWM)	Specification	OMG		document	www.omg.org

[See K.1.4.2 for description of SBVR mapping to PIM standards, specifications, and models.]

- **ISO/IEC 11179 - Metadata Registries (MDR)** addresses the semantics of data, the representation of data, and the registration of the descriptions of that data. It is through these descriptions that an accurate understanding of the semantics and a useful depiction of the data are found. The purposes of ISO/IEC 11179 are to promote the following:
  - Standard description of data
  - Common understanding of data across organizational elements and between organizations
  - Re-use and standardization of data over time, space, and applications
  - Harmonization and standardization of data within an organization and across organizations
  - Management of the components of data
  - Re-use of the components of data

- **The Unified Modeling Language™ - UML** is an OMG (Object Management Group) specification for modeling application structure, behavior, and architecture.
- **Entity Relationship – CWM (Common Warehouse Metamodel)** - The Common Warehouse Metamodel (CWM™) is a specification that describes metadata interchange among data warehousing, business intelligence, knowledge management, and portal technologies. Entity Relationship (ER) models are used frequently as a means of describing business processes and the data on which they operate. Because of its importance as a design and tool model, the CWM includes a foundational ER model from which individual tool models may derive their specific extensions. Doing so will improve the extent to which ER models can be interchanged between various tooling environments.

Development of transformations should consider the following points:

Transformation from SBVR to the above standards

- Inputs to this transformation are:
  - An extract from an SBVR model that fits the scope of the application software to be designed
  - Additional Business requirements for the application software
- The transformation is effectively the design process of the class-of-platform independent PIM model. It includes, among others, such design choices as:
  - Design of generalized data storage structures (e.g., Hierarchies, Data-driven generalizations)
  - Class / Attribute / Association / Association Class decisions
  - One Concept of a Business Thing implemented in two Attributes
  - Store vs. derive decisions
  - Design of time constructs
  - 'State' implementation design decisions
  - Surrogate Keys design choices

Transformation from the above standards to SBVR

- This is a reverse engineering transformation which is made possible only by adding back in, as part of the transformation process, any SBVR business semantics that were not stored with the model when it was created, and maintained since then.

K.1.1.3 Standards for Business Modeling Vocabularies + Rules

There are a number of standards that provide vocabularies and rules for subjects commonly used to specify in business models the way businesses are to be operated. These standards can be imported into the SBVR XMI metamodel to become general-purpose SBVR Business Vocabularies+Rules.

- Country names and codes (ISO/IEC 3166)
- Dates and times (ISO/IEC 8601)
- Currency codes (ISO/IEC 4217)
- Addresses (ISO/IEC 11180)
- Information and documentation (ISO/IEC 5127)
- Business Agreement Semantic Descriptive Techniques (ISO/IEC 15944)

- Process Specification Language (ISO 18629 series of standards)
- …many others from ISO and other standards bodies

In turn these general-purpose SBVR can be incorporated into business-specific vocabularies.

K.1.2 Use of UML Notation in a Business Context to Represent SBVR Vocabulary Concepts

UML Notation can be used to represent SBVR-based vocabularies. Details of the mapping of SBVR concepts to UML Notation are provided in Annex C.

K.1.3 Reuse of other OMG Standards

This SBVR specification reuses the MOF 2.0, XMI 2.1, and the UML 2 Infrastructure for its model repository and for interchange of SBVR Vocabularies and rules.

K.1.4 Relationship of SBVR with other OMG RFPs

K.1.4.1 SBVR and Business Modeling

SBVR is only one of several BEIDTF initiatives in the business modeling arena. Others include:

Business Process Definition Metamodel (BPDM)

SBVR and BPDM are complementary. SBVR specifies the meaning and representation of Business Vocabulary and Rules. BPDM specifies the use of Business Vocabulary and Rules by various BPDM model elements.

The primary relationship of SBVR and BPDM is the roles Business Rules play in a BPDM. The definition of the relationship between Business Concepts, Business Facts and Business Rules in SBVR and the various model elements in BPDM is scheduled to be called for in a separate RFP, the adoption of whose response will integrate both SBVR and BPDM.

Secondarily, SBVR can be used to provide formal logics-based definitions for all the model elements in BPDM.

Organization Structure Metamodel (OSM)

The initial submission deadline for RFP responses is in November 2005.

Business Rules Management (BRM)

The RFP is being drafted.

SBVR is about the meaning and representation of Business Vocabulary and Rules and only that. BRM focuses on all other information about Business Vocabulary and Rules needed to effectively manage and use them to operate the business and as part of information system requirements. SBVR provides the Business Vocabulary and Rules that are managed by BRM. BRM manages the contents of SBVR.

Business Motivation Model (BMM)

The Business Rules Group (BRG) has been encouraged to submit its Business Motivation Model: *Business Governance in a Volatile World* [BMM][1] to the BEIDTF under the OMG's Request for Comment (RFC) process. This model addresses business goals, strategies, and policies.

1. The BRG released version 1.0 in 2000, entitled *Organizing Business Plans*.

SBVR and BMM are complementary. SBVR adopts the BMM definition of Business Policy, and BMM adopts the SBVR definition of Business Rule.

SBVR and Need for Integration among Business Modeling Specifications

These BEIDTF developments are related. For example, BPDM and SBVR have strongly related central concepts:

- From the BPDM perspective, Business Rules deliver 'factored out', flexible detail to support Business Processes.
- From the SBVR perspective, Business Processes provide the specific contexts in which Business Rules need to be evaluated. (In a PIM view, this might mean 'fired' or 'triggered' for example.)

Whether the BRG's Business Motivation Model is accepted or not, the BEIDTF will need a metamodel for its domain. Business processes are better defined when a business knows where it wants to go (its goals and objectives), and what it needs to do to get there (its strategies, tactics, and policies). Business processes realize the strategies and tactics. Business rules realize the business policies, and both support and constrain the business processes.

Business processes, supported by business rules, are associated with organization roles and structure. Some business rules apply to organization structure and roles, independently of processes.

There is clearly a need for integration. This has been recognized. For example, the BPDM submission included 'hooks' for business rules and organization roles.

Need for a Common Vocabulary

An important first step towards integration is to ensure a common vocabulary. Within a business, 'customer' and 'product' should mean the same everywhere they are intended to be the same, no matter what aspects of the business people are discussing or defining -- processes, rules, organizational responsibilities, locations, etc.

It is suggested that the BEIDTF consider *integration by adoption*, a loose coupling of metamodels by adoption of concepts and terms. This would mean:

- Shared concepts would be defined once in an 'owner' standard, and adopted by other standards as 'users'
- Benefits would be consistency across standards and reduction of replication
- The implication would be that when an 'owner' standard is revised, all the 'users' have to be considered (note: this would be a good thing!)

Concepts could also be adopted from outside the OMG; for example, this specification for SBVR adopts from ISO, standard dictionaries, and other authoritative sources.

What is important for OMG Business Modeling Standards is to ensure a shared body of meanings, largely by use of accepted vocabularies and diligent examination of the similarities and differences in the vocabularies of BEI and ADPTF standards. By definition, there are different communities and contexts involved, and the signifier-concept relationships may be different. Synonyms and homonyms need to be recognized, and definitions brought up to a formal logics quality.

For the Future – A Common Vocabulary Model?

This specification for SBVR incorporates a well-developed approach to vocabulary development. The SBVR view is that the concepts should be consistent across the business, and the terms used for them should be unambiguously understood. This includes management of synonyms, homonyms, and resolution of ambiguity by providing contexts.

This is important for practical application of SBVR to real businesses. People in different operational areas, in different geographical locations and in parts of businesses that have been merged or acquired, will use their familiar terminology. They

can be encouraged into standard terminology, but they cannot be forced. Major customers, partner organizations, outsourcers, and trade groups will also share concepts, even if they use different words.

This need to support this is not specific to business rules. It is relevant to all types of business description, from mission statements to scripts for help lines.

A next step from *integration by adoption* across OMG business modeling standards would be to create a common metamodel for business vocabularies. If the BEIDTF decided to do this, it would be reasonable to propose a subset of the SBVR model as a candidate. The part of the model that supports concepts, fact types, and vocabularies has been separated from the business rules part, and can be reused to support other aspects of business modeling.

K.1.4.2 SBVR and Platform Independent Modeling

As discussed above, the SBVR standard should be integrated with other OMG standards for business modeling. This would help ensure that coherent business models are developed and supported consistently with tools and methodologies based on these standards.

Such business models (or substantial parts of them) will be used as bases for specification of information system models. In MDA, this would require mappings and transformations from a business model to a Platform Independent Model (PIM).

Mapping to a PIM

The current MDA practice is for a PIM to be defined using UML models. Two kinds of transformation will be used:

- From business concepts (including fact types) to a UML class model. Some concepts will map to classes, others to attributes. Some fact types will map to associations in the class model. Some structural business rules will map to constraints on cardinality, optionality, and mutual exclusion.
- From business rules to operations and constraints in the UML models formed from business concepts. There are several possible approaches for this, and further investigation would be needed.

The transformation of business rules would provide only part of a PIM, which would also support transformed content from other business model aspects, including business process, user interfaces and workflow. This reinforces the case made above for a common business vocabulary model.

See K.1.1.2 for adopted PIM non-OMG standards and OMG Specifications.

Other submissions for SBVR

Other submissions for SBVR have presented PIM-oriented metamodels that would support a rule-based approach more directly than the general mapping to PIM described above.

They are based on extensions of UML such that many types of business rule (as described in this specification) could be expressed in OCL. Two kinds of transformation would be required:

- From a subset of the business vocabulary to a UML class model, as described above.
- From a subset of business rules to OCL, using the vocabulary of the class model. Additional guidance would be needed for types of business rules that would not map directly.

This is an important piece of the architectural jigsaw, especially with regard to transformation to a Platform-Specific Model (PSM), and the BEIDTF might consider issuing another RFP to address it.

Production Rule Representation

The BEIDTF has issued an RFP for Production Rule Representation. The RFP requests a model and XML interchange format for rules executed in an inference engine. Initial responses were submitted in August 2004, and the proposers have since agreed to collaborate on a joint proposal.

Production rules have the general form "if condition, do action," and would use the vocabulary of a PIM's class model. They may be grouped into rule sets that can be invoked en bloc.

Business rules in this SBVR specification have the declarative form "the following proposition should/must always be true," and use a business vocabulary.

As with other approaches for mapping to PIM, a UML class model consistent with the business vocabulary is assumed. Some transformations from declarative business rules to production rule form are already well-understood at the level of individual rules, but substantial work will be required to develop a full mapping that includes making all conditions and actions explicit, and grouping rules into rule sets.

Ontology Definition Metamodel

As well as BEIDTF initiatives, SBVR is also related to the Ontology Definition Metamodel (ODM), which is being developed in response to an RFP issued by the OMG Analysis and Design Task Force.

The OMG Ontology Definition Metamodel (ODM) intends to provide an integrated family of metamodels for a variety of knowledge representation techniques, to assist in defining and interchanging ontologies, with a key objective of supporting semantic technologies. Most of the metamodels in this family reflect the abstract syntax of an existing standard, rather than inventing a new representation paradigm. The term "ontology" refers to a machine-processable representation of knowledge, particularly for automated inferencing. In general, the audience for the ODM is the developers of inference engines, tools that capture and prepare ontologies for inference engines from other declarative forms, such as UML models and structural business rules, and tools that convert ontologies into other forms of implementation model. A key concept in ontologies is that knowledge is "monotonic": Over time we can add to our knowledge, but we won't learn anything that contradicts something we already know for sure, so that knowledge from multiple sources can be combined.

The ODM is being developed concurrently with SBVR. The draft proposed ODM includes metamodels of several popular knowledge representation languages, with mappings between them.

The draft proposed ODM as of October 2004 includes proposed MOF metamodels for:

- Resource Description Framework Schema (RDFS – W3C Recommendation),
- Web Ontology Language (OWL – W3C Recommendation),
- ISO Common Logic (CL, defined in ISO 24707),
- Topic Maps (TM – ISO 13250),
- Unified Modeling Language (UML), and
- Description Logic (DL).

For business rules, monotonic logic is only applicable to a small fraction of the concerns. In many areas, the business is not interested in what is true for all time, but rather in what is true now and may change in the next hours or days. And in some cases, it is the objective of certain business rules to change currently true but unfavorable situations into future favorable situations. So there is a significant difference in the purposes of these standards. And this gives rise to significant differences in the interpretation of the logic models. (In the Semantic Web work, the distinction is made between class-based reasoning, which matches a subset of SBVR structural rules capabilities and is monotonic, and instance-based reasoning, which deals with actual facts about specific objects and may not be "safe" for monotonic reasoning.)

To handle operative business rules, which involve obligations and permissions, SBVR supports logic elements beyond those of the ODM languages, including CL. Lossless bi-directional transformations between the SBVR rules metamodel and the ODM metamodels are not guaranteed. A partial mapping between SBVR and the ODM metamodels could be developed. With proper care, SBVR could be used in ontology development.

ISO is considering extending CL to include modal and other logics and is planning a natural language surface syntax for CL. Both of these ISO initiatives may be important to SBVR and ODM in the future, but they are out of scope for the current ODM and SBVR work.