



Web-enabled vocabularies



Value Vocabularies

- Simple lists...
 - “Animal”, “Vegetable”, “Mineral”
 - “Yes”, “No”, “Maybe”
- Controlled vocabularies...
 - Subject headings (“China – History”)



Moving from string-based metadata...

<<http://openlibrary.org/6/0L7983950M>>

a bibo:Book

dc:title 'Weaving the Web';

dc:creator 'Tim Berners-Lee' ;

dc:subject 'World Wide Web' ;

dc:publisher 'Texere Publishing';

dc:identifier '0752820907'.



...to Linked Metadata

<<http://openlibrary.org/6/0L7983950M>>

a bibo:Book

dc:title 'Weaving the Web';

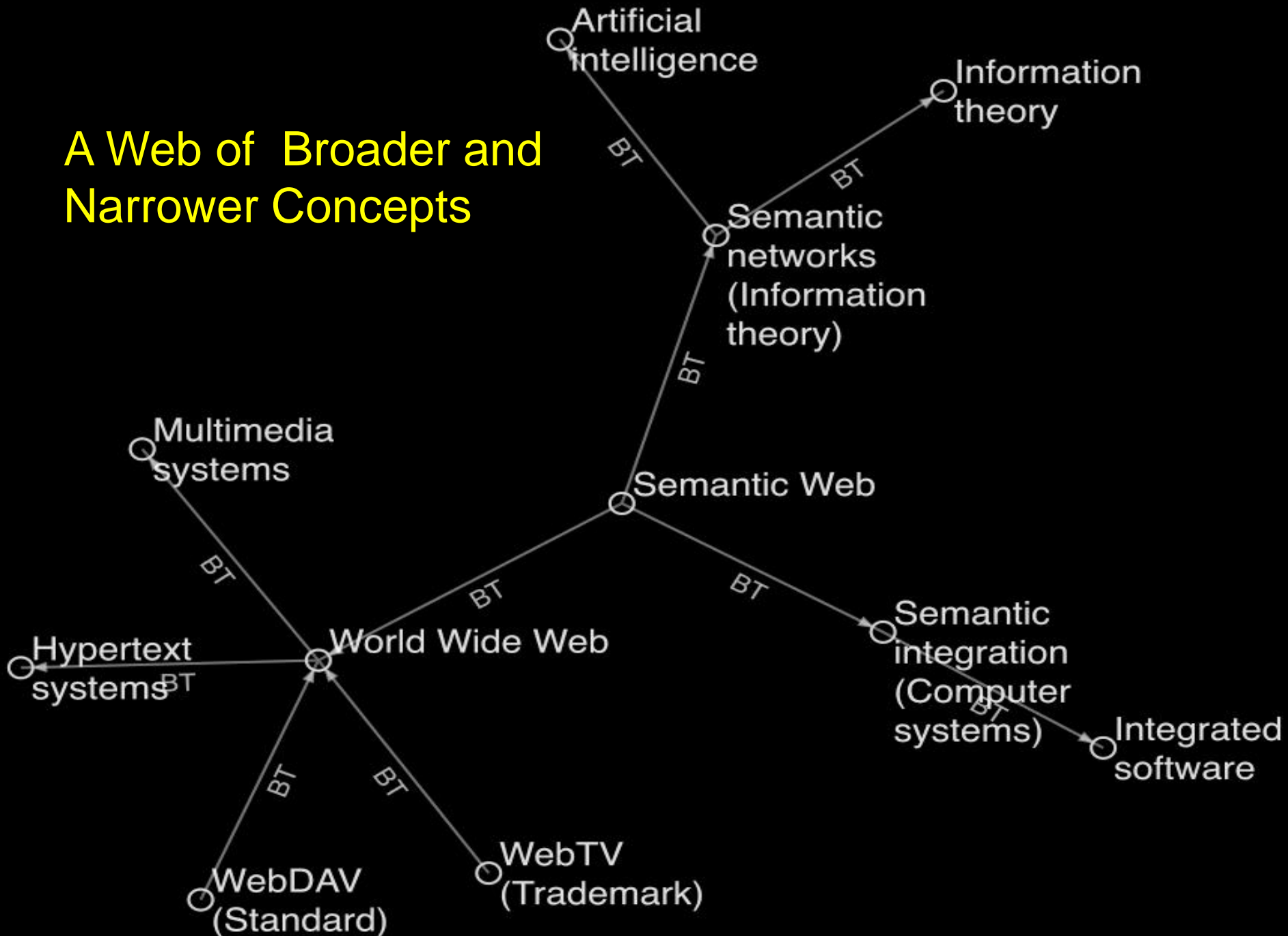
dc:creator 'Tim Berners-Lee' ;

dc:subject <<http://id.loc.gov/authorities/sh95000541#concept>> ;

dc:publisher 'Texere Publishing';

dc:identifier '0752820907'.

A Web of Broader and Narrower Concepts



Term: **Economic cooperation**

Used For: Economic co-operation

Broader terms: Economic policy

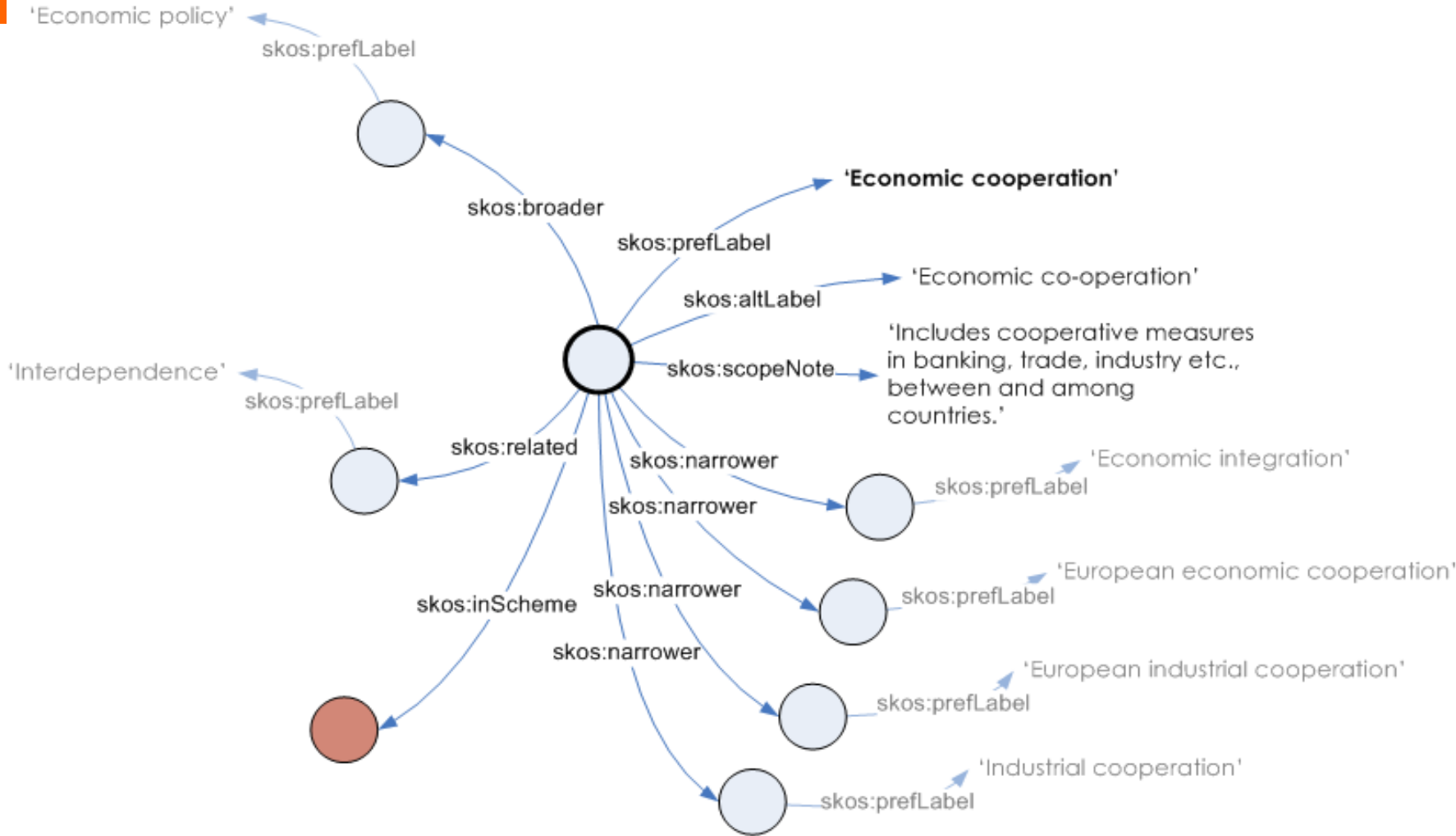
Narrower terms: Economic integration, European economic cooperation, European industrial cooperation, Industrial cooperation

Related terms: Interdependence

Scope Note: Includes cooperative measures in banking, trade, industry etc., between and among countries.



Expressing a thesaurus as linked data



prefix skos: <<http://www.w3.org/2004/02/skos/core#>>



SKOS

- **Simple Knowledge Organisation System**
 - RDF-based model for simple knowledge structures such as thesauri
 - Porting (“Webifying”) thesauri: representing and sharing classifications, glossaries, thesauri developed in the Print World
 - Examples of existing knowledge structures:
 - In the Print World: Dewey Decimal Classification, Art and Architecture Thesaurus
 - In the Web World: DMOZ categories



SKOS in a Nutshell

- Using SKOS:
 - concepts can be identified using URIs,
 - labeled with lexical strings in one or more natural languages,
 - assigned notations (lexical codes),
 - documented with various types of note,
 - linked to other concepts and
 - organized into informal hierarchies and association networks,
 - aggregated into concept schemes,
 - grouped into labeled and/or ordered collections, and
 - mapped to concepts in other schemes.



SKOS Properties

- RDF properties for links to Broader, Narrower, Related Concepts
- RDF properties and classes for defining a knowledge system
 - Basic description (Concept, Concept Scheme)
 - Labeling (Preferred Label, Alternative Label)
 - Documentation (Definition, History Note)
 - Mapping (Broader Match, etc)
- As of August 2009 a W3C Recommendation
 - <http://www.w3.org/TR/skos-reference>



SKOS Philosophy

- The aim of SKOS is not to replace original conceptual vocabularies in their initial context of use,
- ...but to allow them to be ported to a shared space,
- ...based on a simplified model,
- ...enabling wider re-use and better interoperability.



Extensibility of SKOS

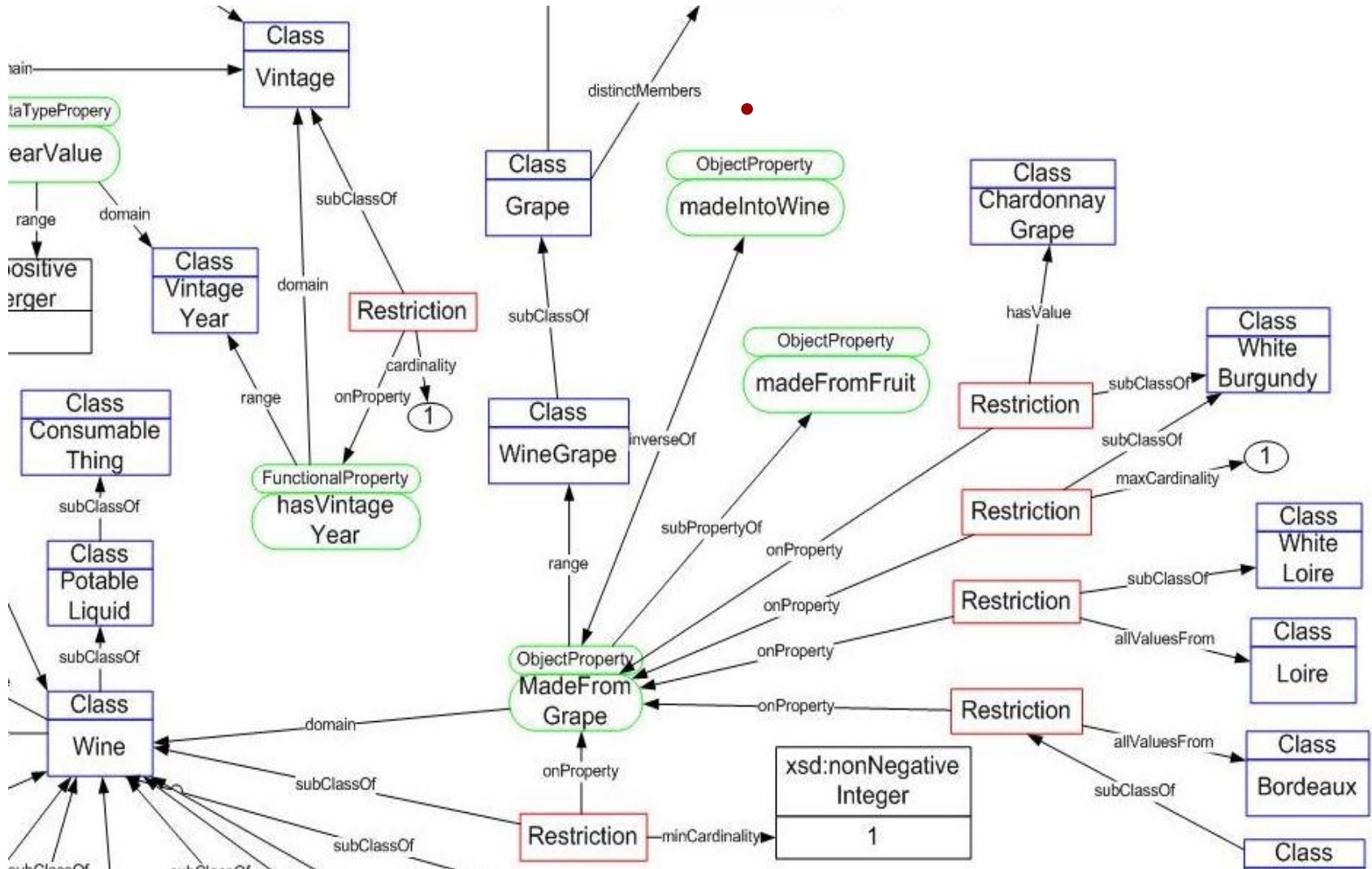
- Not “take it or leave it”, but “take what you want, create what you need”
- Extension “by refinement”
 - Sub-properties or sub-classes of SKOS properties or classes
 - Extensions are backwards-compatible via RDFS inference
- Extension “by combination”



Ontology engineering – OWL

- **Web Ontology Language** for defining complex conceptual structures
- **Class-oriented, logically precise modeling**
 - Demanding in terms of expertise, effort, cost

OWL Wine Ontology





Knowledge Organization Systems versus Formal Ontologies

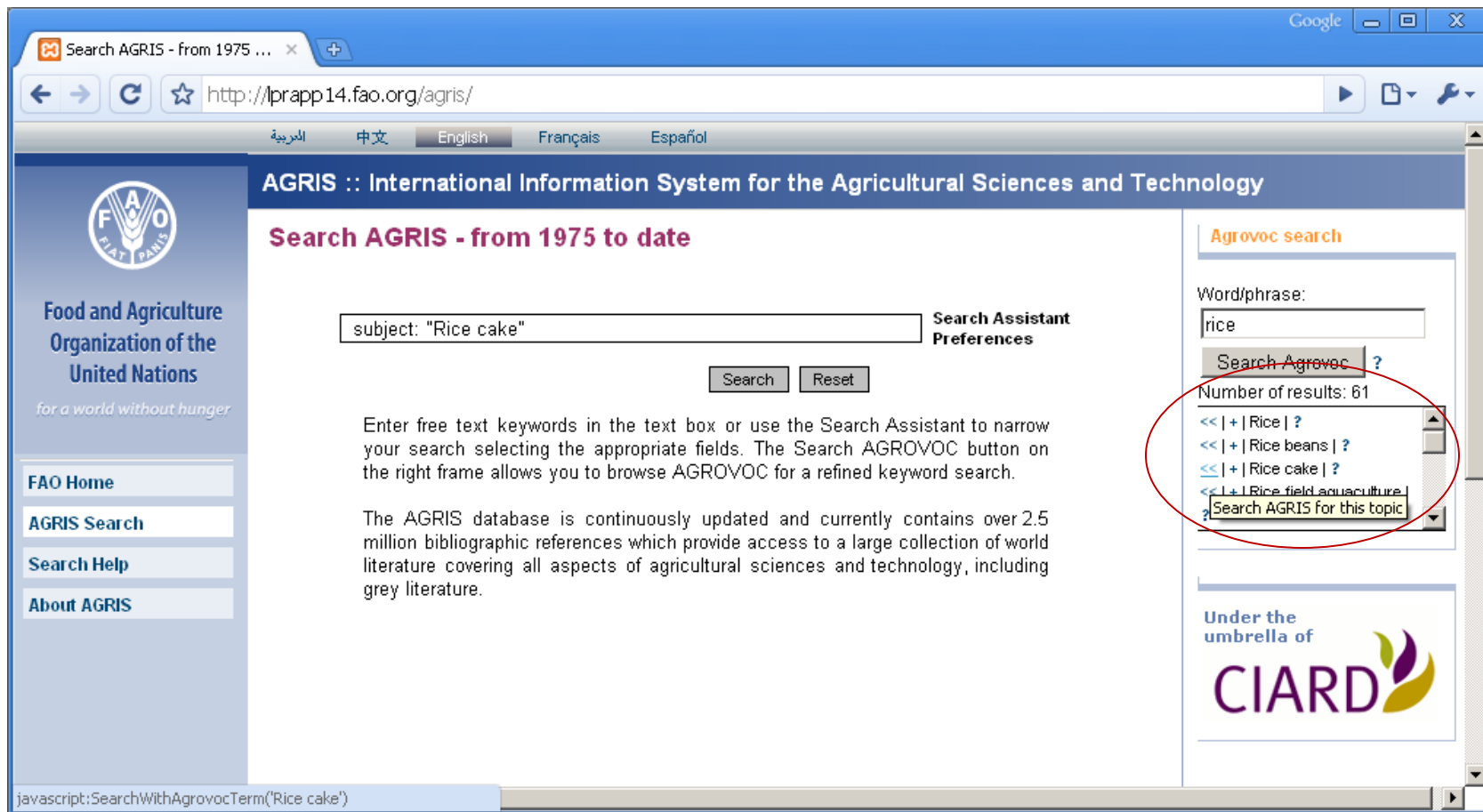
- **Knowledge Organization Systems (KOS)**
 - Concepts may be linked pragmatically
 - Semi-formal, intuitive “maps” of domains
 - Aid in finding related objects
 - Port to Semantic Web without re-engineering using SKOS
- **Formal Ontologies**
 - Provide an interpretation of reality
 - Assert axioms or facts about things in the world
 - Inference using logical entailments
- Re-engineering a KOS as formal ontology is hard



Role of Knowledge Organization Systems

- KOS are magnets for attracting links
 - Hubs for resources indexed according to a given subject or topic URI
- Concepts embedded in a KOS can be used to expand or narrow queries
- KOS provide pathways for navigating to related resources

Narrowing a search by topic



The screenshot shows a web browser window with the URL <http://prapp14.fao.org/agris/>. The page title is "AGRIS :: International Information System for the Agricultural Sciences and Technology". The search results are for the query "subject: 'Rice cake'".

The search results page includes a search box with the text "subject: 'Rice cake'", a "Search Assistant Preferences" button, and "Search" and "Reset" buttons. Below the search box, there is a paragraph of text: "Enter free text keywords in the text box or use the Search Assistant to narrow your search selecting the appropriate fields. The Search AGROVOC button on the right frame allows you to browse AGROVOC for a refined keyword search." Another paragraph states: "The AGRIS database is continuously updated and currently contains over 2.5 million bibliographic references which provide access to a large collection of world literature covering all aspects of agricultural sciences and technology, including grey literature."

On the right side of the page, there is an "Agrovoc search" section. It contains a "Word/phrase:" field with the text "rice", a "Search Agrovoc ?" button, and a "Number of results: 61" indicator. Below this, a dropdown menu is open, showing the following options: "<< | + | Rice | ?", "<< | + | Rice beans | ?", "<< | + | Rice cake | ?", "<< | + | Rice field aquaculture |", and "Search AGRIS for this topic". The dropdown menu is circled in red.

The footer of the page contains the text "javascript:SearchWithAgrovocTerm('Rice cake')".