

The evolution of requirements on XBRL

A shift from data exchange to data integration

Research objective

- ▶ 1) What have been the original requirements and expectations towards XBRL?
- ▶ 2) What has XBRL become (instead)?
- ▶ 3) What is actually done with XBRL in practice (for analytical purposes)?

What have been the original requirements and expectations towards XBRL?

- ▶ Charles Hoffman wanted computer applications to be able to effectively **exchange information** between each other (Karen Kernan 2009, p. 3)
- ▶ This implies:
 - ▶ Seamless and quick electronic exchange of business information
 - ▶ No need for re-keying information from one format to another
 - ▶ Enhancing reusability (Pinsker, Li 2008, pp. 47-48)

What has XBRL become (instead)?

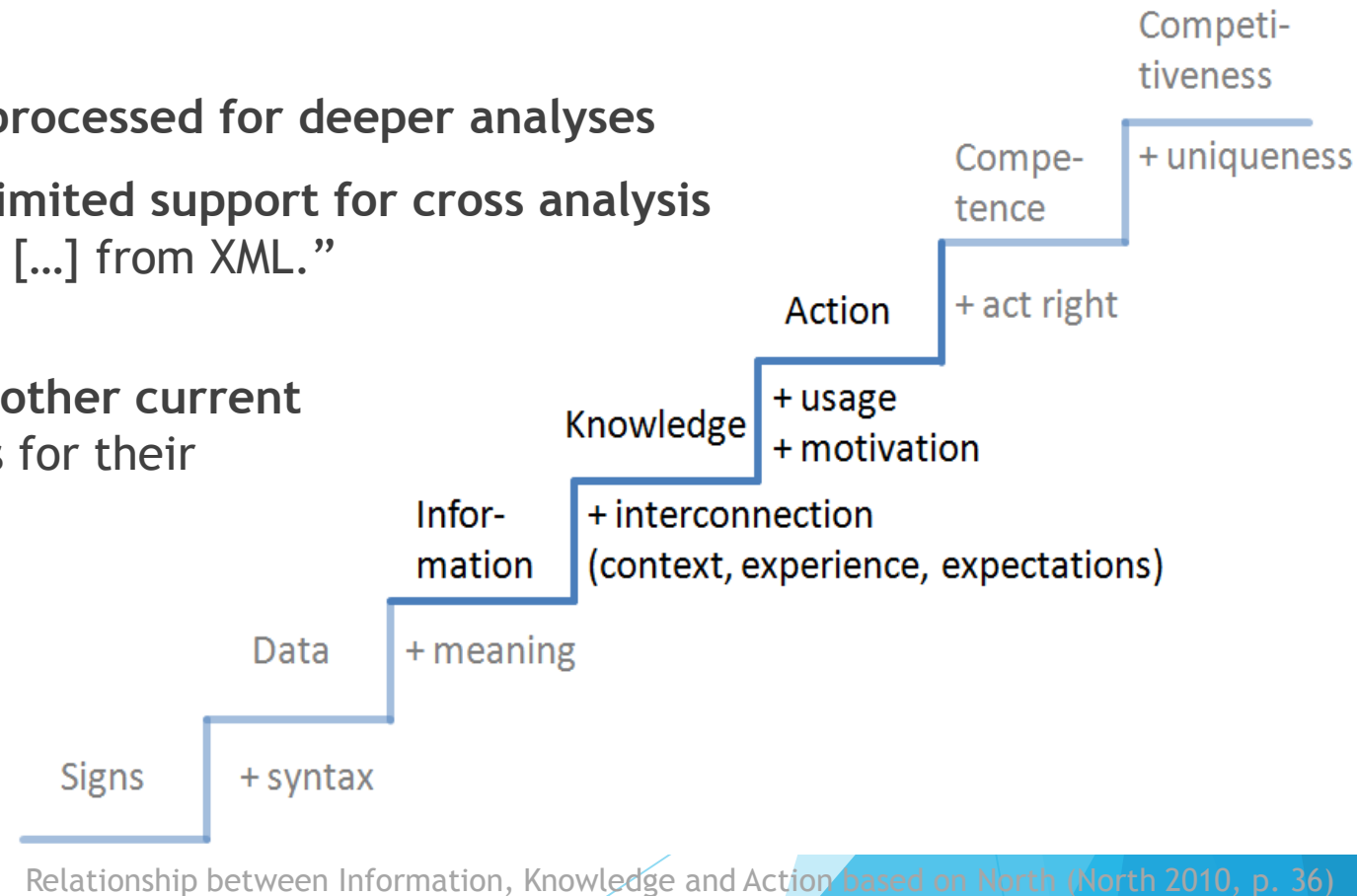
- ▶ XBRL 2.1 base specification for **creation, exchange and comparison** of business reporting information
 - ▶ Includes meta-data for hierarchical representation and arithmetic expressions

VS

- ▶ Further specifications and **additional meta-data**
 - ▶ XBRL Dimension 1.0 for multi-dimensional definition of concepts
 - ▶ Formula 1.0 for validation and transformation of XBRL instance facts
 - ▶ Table Linkbase 1.0 for tabular layouts of facts
- ▶ allow for more **flexible navigation** through information, to **assure data quality** and to **enable rendering** (XII 2016a)
- ▶ but work on single, isolated XBRL instance files

What is actually done with XBRL in practice (for analytical purposes)?

- ▶ XBRL-formatted information has to be **pre-processed for deeper analyses**
- ▶ “The main limitation of XBRL tools is their **limited support for cross analysis of financial information** [...] inherited from [...] from XML.”
(Garcia, Gil 2010, p. 3)
- ▶ Information that cannot be connected with **other current or information stored in the past** is useless for their consumers (North 2010, p. 37)



What is actually done with XBRL in practice (for analytical purposes)?

- ▶ Pre-processing includes **ETL and shredding** of XBRL instance files
 - ▶ “In many or most use cases XBRL instance documents will be **loaded into a BI data warehouse.**” (Alles, Debreceeny 2012, p. 88)
 - ▶ “**ETL will have normalized-away the semantic uniqueness** that its DTS had in the original form.” (XII 2016c)
 - ▶ “**Shredding** generally fails to preserve some of the XML-centric aspects of stored data.” (Rys et al. 2005, p. 946)
 - ▶ **XML/XBRL vs. SQL/MDX:** Divergent technologies as “**integration barrier**” (Spies 2010, p. 405)

What is actually done with XBRL in practice (for analytical purposes)?

- ▶ **Consequences (of ETL and shredding):**
- ✓ **Derive warehouse data models** from XBRL taxonomies (thanks to concepts, labels and dimensions)
- ✓ **ETL for facts**
- ✓✗ **Possible, but bespoke/proprietary solutions**
- ✗ **Preserve rendering metadata** (table linkbase)
- ✗ **Preserve assurance metadata** (formula linkbase)

What is actually done with XBRL in practice (for analytical purposes)?

▶ Reasons:

- ▶ „Integration barrier“: Source (= taxonomy) and target (= warehouse) do not match
 - ▶ Where to store rendering and formulae information?
 - ▶ How to store this information (format)?
- ▶ Relevant use / problem cases for preserving considered meta-data:
 - ▶ application of formulae to integrated data pool, e.g. across periods and entities
 - ▶ avoid changeover between applications for tabular views, standard reports and OLAP

Potential contributions to the XBRL community

- ▶ **Analytical** (importance of integration) as well as a **constructive** (enabling integration) approach
- ▶ Question no. 3 will point out the **need for data integration and related weaknesses** of XBRL
 - ▶ Functionalities like rendering (table linkbase) and validation/assurance (formula linkbase) are **restricted to processing single files** and ETL leads to **potential meta-data loss**
- ▶ Exploring a way to **preserve XBRL-specific meta-data through ETL** and making it accessible in an integrated data store
- ▶ Upcoming ideas: **changing the basis of XBRL** from XML to more ontology-oriented and therefore better database-compatible semantic-web languages like OWL, RDF or data formats like JSON
- ▶ **Expand the process in scope** “by which users receive, find, compare and analyze information” (and not just shorten it) (Alles, Debreceeny 2012, p. 88)

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