Knowledge Elicitation and Ontology-Based Visualization of Business Ecosystems: A Case Study from the Wind Energy Ecosystem

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Abstract. The abstract should briefly summarize the contents of the paper in 150–250 words.

Keywords: Business Ecosystem · Knowledge Representation · Ontology · Wind Energy · Green Energy.

1 Introduction

1.1 P1: Hook

1.2 P2: Business, Wind Energy Ecosystems

1.3 P3:Ecosystem interactions

1.4 P4: Knowledge Representation, Ecosystem Knowledge

1.5 P5: Challange

Research Question

How can organizational interactions in the wind energy ecosystem systematically captured and explicitized into structured, formal knowledge representations to enable data-driven decision making?

2 Methology

2.1 Semi-Structured Survey

2.2 Term Disambiguation

2.3 OWL2 & Ontological Commitments

– **ClassAssertion**

Table 1. Relationships and Theoretical Foundations

Relationship Type	Theoretical Foundation	Logical Charecteristics
Product & Service Delivery	Supply Chain Management (Chopra & Meindl, 2016); Value Chain Analysis (Porter, 1985); Business Ecosystems (Adner, 2017)	Irreflexive, Transitive
Payment	Business Model Ontology (Osterwalder & Pigneur, 2005); Value Network Analysis (Allee, 2008); Input-Output Economics (Leontief, 1986)	Irreflexive
Data	Knowledge-Based View (Grant, 1996); Digital Ecosystem Theory (Tiwana, 2013)	Irreflexive
Information	Knowledge-Based View (Grant, 1996)	Irreflexive
Collaboration	Resource-Based View (Barney, 1991)	Irreflexive, Symmetric
Conflict	Stakeholder Theory (Freeman, 1984)	Irreflexive,ASymmetric
Competition	Porter's Five Forces (Porter, 1979)	Irreflexive, Symmetric
Coopetition (Implicit)	Coopetition Theory (Brandenburger & Nalebuff, 1996)	Irreflexive

- **ClassHierarchyAssertion**
- **ClassDisjointnessAssertion**
- **ObjectPropertyAssertion**
- **PropertyCharacteristicAssertions**
- **Methodological Limitations**

2.4 Query Language

- **SPARQL**
- **Fuseki Server**

2.5 Relationship Visualization

- **js and d3.js**

3 Results&Discussion

3.1 Survey Results&Discussion

3.2 Ontology Development

3.3 Information Retrieval with Sparql

3.4 Visualization Results

4 Conclusion

5 Appendix

A Semi-Structured Survey

B Github Repo

References

Main idea: Conventional modeling approaches does not leverage semantics, therefore the visualizations gets too complex such that decision makers cannot comprehend. However with the SPARQL querries, one can easily semantically query the information (e.g traversing the graphs) and visualize whatever needed for the decision maker. With the former methodologies it is not possible.

Sub effect: Because of the formality, one can also use the symbolic logic therefore can infer new relationships within the data, which is also not possible with the conventional methods.

Sub effect: Formal and needed representations reduces the ambiguity and the complexity of the data, therefore the decision makers can easily understand the data and make decisions.

Analogy: To go through something with a fine-tooth comb