PolisGnosis Project

ISO 37120 Indicator Definition Text

Indicator Theme Knowledge

City Specific Knowledge

City Indicator and Supporting Data Spreadsheet

ISO 37120 Indicator Definition Semantic Web

Indicator Theme Knowledge Semantic Web

City Indicator and Supporting Data Semantic Web

City Specific Knowledge Semantic Web

PolisGnosis Analysis Engine

Definition Consistency Axioms

Intra Indicator Consistency Axioms

Inter Indicator Consistency Axioms

Quantitative Analysis Axioms

Definitions Analysis Axioms (logic & spatial)

Event Analysis Axioms
Indicator Pattern

Indicator unit of measure *(measurement ontology)*

Year of measurement *(temporal ontology)*

Place of measurement *(placename and geospatial ontologies)*

Statistic being measured *(Statistics ontology)*

Population being measured *(Population ontology)*

Person being counted *(Theme ontology)*
Pattern Competency

- What is the age range for school age women?
- Did the student attend a public school or private school?
- What schools did student attend in year Y?
- Was the student part time or full time?
- What grade level did they attend?
Indicator Value Meta Data

- Measurement
- Place
- Time
- Provenance
- Validity
- Trust
GCI Ontologies Structure
City Performance Analysis

Longitudinal

Toronto 1990

Student Teacher Ratio

Decreased

Student Teacher Ratio

Toronto 2000

Can we automate the discovery of the root cause of change?

Different

Student Teacher Ratio

Chicago 2010
Root Cause Analysis

Longitudinal Analysis

Toronto 1990

- Student Teacher Ratio
- Number of Students
- Student Population
- City
- Student Definition
- School Definition

Increase

Toronto 2010

- Student Teacher Ratio
- Number of Students
- Student Population
- City
- Student Definition
- School Definition

Heterogeneous Models
Status

Ontologies

- **Completed Indicator Themes**: Foundation, Education, Energy, Environment, Finance, Innovation and Shelter themes ontologies and indicator definitions.


Analysis

- Consistency analysis complete
  - Definitional, transversal, longitudinal
Adoption

- ISO/IEC project
  - NP 21972 create a standard for representing city indicators based on our Foundation ontology.
  - NP 30145-2: create a meta data standard

- City Protocols Society has adopted our ontologies for the representation of their indicators, which include the ISO 37120 indicators.

- Standards Council of Canada exploring the standardization of the theme ontologies

- Partnering with the City of Toronto to adopt our ontologies in publishing city data.
Technology Infrastructure

Ontology
- OWL Specification of Classes and Properties
- Prolog Axioms

Data
- Represented using OWL ontologies as RDF triples

Prolog Reasoner

Query

Triples + Prolog Axioms

Triples

Result