

ETIHQ – A cross-domain decision support system in tourism

Statistical information plays a vital role in supporting medium and long-term decision-making in tourism. The *ETIHQ system* enables tourism managers to access a wide range of statistical data from various domains and to inspect potential cross-domain correlations.

Challenges

While a wealth of statistical data is available, current tools enable inspecting data within the boundaries of a single domain. For example, inspecting the arrivals of American tourists to Vienna in the last decade is well supported. However, a more complex question, such as “Does the American GDP influence the arrivals of American tourists to Vienna”, cannot be easily answered with current tool support.

quency. They also employ different ways of measuring the same indicator. However, all these differences are not made explicit in a machine readable format and can only be understood by an analyst. Therefore data is usually integrated manually.

Criteria for a good solution

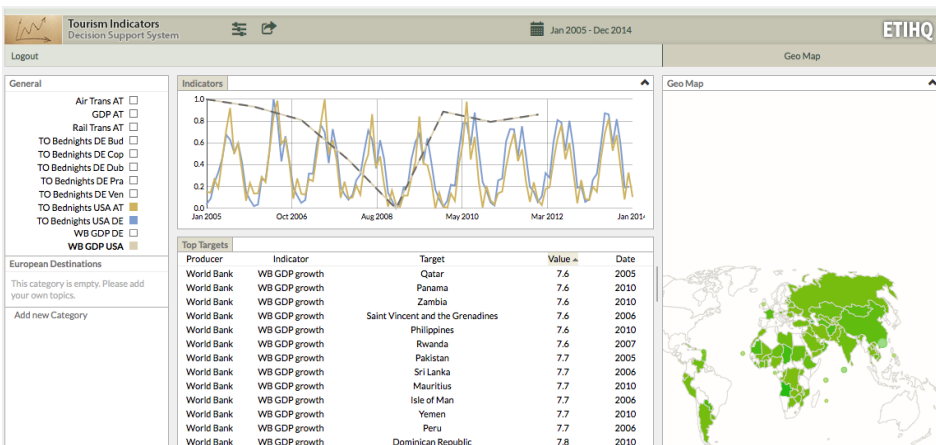
1. Tourism managers must be able to access statistical data from different domains and data sources.
2. Data from different domains (e.g., tourism, economics, sustainability) should be displayed concurrently to help identify correlations.
3. It should be easy to alternate between high-level graphical overviews and detailed data inspection.

Results

An evaluation with 13 tourism practitioners showed that ETIHQ provides considerable improvements over manual approaches when answering a range of complex questions. We obtained an average time improvement of 28%. The precision of the obtained answers was over 63% when using ETIHQ and under 63% when not using the tool.

Improvements

- Tourism managers can select relevant statistical data from different domains and data provider.
- Cross-domain indicators can be visualised concurrently.
- Data analysis is enabled both at trend inspection level and at detailed data analysis level.



Creating tools that would support such complex queries is currently hampered by the difficulty of integrating statistical information across domains drawn from different data providers:

- at the *data encoding* level, while most data sets are published as open data, they use syntactic encoding formats that lead to substantial manual effort when integrating them (e.g., data dumps and in some cases custom APIs);
- at the *data semantics* level, data sets contain data of different geographic granularity or time fre-

Implementation

The *ETIHQ system* enables tourism managers to inspect statistical data from different domains (tourism, economics, sustainability) and drawn from three major data sources: TourMIS, The World Bank and Eurostat.

It allows extracting aspects of interesting data (i.e., data slices), visualising various data slices concurrently on chart-based views (this enables visually detecting potential correlations) and then inspecting the data in detail through data tables and a geographic map-based data visualisation.

Technologies

The *ETIHQ system* is based on *Semantic Web and Linked Data* technologies, which enable flexible and intelligent data integration across the diverse statistical data sources.

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