Bringing sustainability to the daily business: The OEPI Project

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Abstract. In this position paper the motivations and goals of the OEPI Project will be briefly described. This FP 7 EU-Project is heading for the design and development of a software solution that provides a single space of accessible Environmental Performance Indicators (EPIs) that are based on a comprehensive ontology. The project's outcome should support different users in exploring and monitoring any organizations' environmental performance indicators (OEPIs).

1 Motivation

Environmental information is published throughout companies and other organizations in order to reduce their environmental impact. Here, one major tool is the classic environmental or sustainability report. Further actions are done for example by terms of reduction programs or supply chain improvements. However, most of these actions are taking place as a one shot activity or are only carried out once a year.

By contrast, the environmental impacts take place every day: Tasks like material or energy procurement, product design, service outsourcing, traveling and so forth have an impact on the environmental footprint that is not negligible. Currently these daily business tasks are done in the respective enterprise systems without any feedback about the environmental impacts or about how they influence the overall environmental footprint of a company. Business users of these enterprise systems cannot act in an environmental friendly way due to the limitations of the underlying organizational and informational structure. Such systems, for example, offer alternatives in product design distinguished merely by economic considerations - environmental differences are missing here.

The outlined problems give the motivation for the Project presented here: Exploring and Monitoring any Organizations' Environmental Performance Indicators (OEPI)

2 Vision

The vision of the OEPI project is to enable business users across industries, organizations and supply chains to reduce their organizations environmental impact in their daily business. This will be achieved by making appropriate Environmental Performance Indicators (EPIs) visible to them for their specific tasks. By that, they can choose among alternatives not only in an economic but in an environmental friendly way. One major point in these thoughts is the creation of interoperable services that collect data and calculate EPIs from them. These EPIs will be processed and can be published and further processed by additional tools and services.

The provided EPIs are designed to be integrated in existing enterprise systems and by this means, the users will become aware of them for inclusion into their daily business decisions throughout the company and the whole supply chain.

3 Business applications and use cases

To structure the vision, it is divided into four distinct application focus areas:

- Sustainable procurement
- Design for environment
- Network deployment & circuit provisioning
- Corporate communications

Each area will be investigated in order to scrutinize in which way the EPIs can be integrated best in the respective business processes. The needed level of visibility and decision support will be determined as well to support the targeted user group (e.g. business users, customers, etc.) best in reducing environmental impacts. During the project, business concepts and accompanying process modifications that enable the integration of EPIs in the daily operations will be further specified and evaluated for each application area.

Each of these areas will be specified and evaluated in great detail by corresponding industry partners of the project consortium. This concept greatly supports the requirement engineering and the development of the software components.

3.1 Sustainable Procurement

In this use case the reduction of environmental impacts during the procurement process is focused. This is accomplished by incorporating supplier-dependent

EPIs. Using these values the users responsible for sourcing and procurement are enabled to choose same or equivalent materials among different suppliers with the possibility to choose the one with the lowest expected environmental footprint. This use case is led by SAP.

3.2 Design for Environment

This use case enables product engineers to reduce the resulting environmental impact of their products on the whole product life cycle by integrating EPIs during the optimization process of their design process. Thus it will be possible to choose amongst several design alternatives which integrate environmental aspects. This use case is led by Siemens.

3.3 Network Deployment and Circuit Provisioning

This use case lays the focus on the telecommunication industry. EPIs shall be included in their typical processes of network deployment and circuit provisioning. By that it will be possible for example to consider circuit energy consumption. This use case is led by Telefónica.

3.4 Corporate Communication

At the moment most solutions for an organization to communicate environmental or sustainability information to several stakeholders is limited to static information that is measured mostly one time a year. OEPI will provide centralized management and access to current real-time information of an organizations environmental or sustainability performance. This use case is led by St. Gallen.

4 Technology and Development

4.1 Definition of a set of Indicators to use

As a starting point an extensive review of existing standards for EPIs has been done as part of the first deliverable. Among the examined standards and proposed EPIs were

- The Sixth Environment Action Programme of the European Community 2002-2012,
- The Global Reporting Initiative (GRI),
- Corporate Sustainability Assessment of SAM Research (used for Dow Jones Sustainability Index),
- Greenhouse Gas Protocol (GHG Protocol),
- and the ISO 14025 standard.

Coming from these concepts, five possible dimensions of an EPI have been derived: Absolute, relative and indexed indicators, aggregated depictions and weighted evaluations.

Following the approach of the five accounting and reporting principles (relevance, completeness, consistency, transparency and accuracy) several requirements have been extracted for the further description of the EPIs to be used in OEPI. Coming from these requirements a set of quality indicators has been developed for corporate and product level accounting. By these indicators the data quality of the diverse data sources can be described further. In detail these are

- Technological,
- temporal and
- geographical representativeness,
- completeness and
- precision.

As a starting point a core set of indicators has been defined. These are shown in the following table and allow application of the properties defined above.

Material	Renewable
	Non renewable
Energy	Renewable
	Non renewable
Water	Fresh water
	Waste water
Emissions	Global warming (GWP)
	Acidification (AP)
	Ozone depletion (ODP)
	Photochemical oxidant formation (POCP)
	Eutrophication (EP)
Waste	hazardous waste
	regular waste (recycled, incinerated, disposed)

4.2 Ontology for Environmental Performance Indicators

As the data that will be further processed and converted to EPIs is totally incoherent between several companies and software systems, a common EPI description language must be defined as a first step. This language will be based on an ontology that enables unambiguous definitions and relations between concepts. Using the ontology it is possible to enable semantic reasoning on the EPI information for example for system boundaries, data sources or factors of uncertainty.

As a starting point serves the selection of EPIs and their properties which were briefly described in section 4.1. Together with the use cases from section 3 concrete requirements for the development of the ontology are currently created.

Those requirements and a review of existing top level and application ontologies combined with technological requirements leverage currently the ontology engineering process.

4.3 Platform, Services and Tools

The described four business areas leverage the development of a generic software platform that needs to be extremely flexible to address the required tasks. To deliver this versatility, the OEPI core platform will be developed to follow the Service Oriented Architecture (SOA) principles: For example the diverseness of the underlying data sources can be addressed by developing several software services in the architecture that provide a unified interface for higher level services like data aggregation and EPI calculation. By that specialized components may for example enhance the raw data using semantic information. Further generic services like EPI management, lookup and provision will be developed as services as well.

The EPIs and their values will be published as web services as well and are thus able to provide different interfaces for various consumption channels like Enterprise Information Systems, Production Systems, Geo Information Systems, Web Portals, or Mobile Devices.

In addition to the comprehensive set of services, several OEPI tools will be developed to utilize the various services of the platform. These tools enable developers, experts and users in managing and using the provided services. Specialized tools will be developed to integrate the OEPI platform in the described business areas, too.

Currently research in the state of the art of SOAs in combination with semantic web technologies is taking place to leverage the development of the platform. Modern design and modelling principles like rapid prototyping will be evaluated, too. Only by that the challenging tasks of OEPI may be addressed properly.

5 About the Project

The OEPI project is an ICT research project supported by the European Commission through the Seventh Framework Programme (FP7). Starting in 2010 the total duration of the project will be 30 months. The consortium consists of eight partners coming from high-tech industry, applied science and academic institutions. Namely these are:

- SAP AG
- Carl von Ossietzky University, Oldenburg
- Otto-von-Guericke-University, Magdeburg
- University of St. Gallen
- Siemens AG
- Kone Corporation
- VTT Technical Research Center of Finland
- Telefónica Investigación y Desarollo SA

6 Outlook

The completion of the OEPI project will provide new opportunities in the area of Corporate Environmental Management Systems (CEMIS). The availability of an EPI description language and its ontology may then leverage further development of existing and new CEMIS applications.

Additionally the created OEPI platform and its accompanying services will provide a proven common basis for similar and new projects. These may extend OEPI to address other use cases and businesses processes than those used in the initial development of OEPI. This will be done by extending the EPI ontology with regard to other indicators and by creating respective services that are based on existing ones that will serve as a common blueprint for these purposes.

After all OEPI will improve the current state of the art in EPI processing and managing CEMIS.