Incentives for Inter-Organizational Environmental Information Systems

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ABSTRACT

Organizations word-wide are confronted with an increasing number of environmental requirements driven by social, legislative and competitive factors [33]. Since most of the required information to report and enhance environmental performance is located beyond organizational borders, firms need to exchange sustainability information within the supply chain. Inter-organizational environmental information systems (IO-EIS) promise to improve data availability, process flexibility, transparency, and costs [37]. In order to establish an IO-EIS in a particular industry, the solution provider needs to reach a critical mass of participants. Based on existing literature and the experience of five industry partners representing three use cases, this paper presents motives for organizations to participate in IO-EIS, and an incentive scheme to enhance quantity and quality of user contributions.

Keywords

Sustainability, Incentives, Inter-Organizational Environmental Information Systems.

1. INTRODUCTION

During the last decade, the awareness for safe and environmental friendly products has been growing constantly [35]. This changed economic background has led to many opportunities for the participating organizations. Nevertheless, companies are also challenged in numerous ways. Apart from normative pressures, social, legislative [5] and competitive [33] factors drive the need for exchanging sustainability information within the supply chain. Social environmental awareness is an important driver for companies to extend their responsibility for products and make sure they are environmental friendly [2]. Besides maximizing short-term profit, organizations are increasingly being held accountable for their impacts on society and environment [34]. More and more environmental directives have been passed during the last years, the majority in the European Union (EU). Companies can expect that in the near future, stricter regulations are to be enacted worldwide [31]. The positive financial impact of environmental improvements has been outlined by a plethora of authors [3]. Inter-organizational environmental information systems (IO-EIS) are information systems for the exchange of environmental information throughout the supply chain. IO-EIS promise manifold benefits to the participating organizations, including better data availability, higher flexibility of the involved processes, increased data transparency and improved efficiency [37]. Similar to many innovations with positive network externalities, IO-EIS are hard to establish as they require a certain number or critical mass of participants and content on the network [32, 36]. This results in a first-mover problem, since the first participants have costs for joining the network while on the other hand the benefits are still low. Therefore it is of utmost importance for the network provider to make the IO-EIS attractive by identifying the motives of the potential participants to join the network & contribute environmental content. Incentives can specifically be designed based on these motives. In the following sections, organizational motives to join IO-EIS & contribute content are identified, potential incentives are described, and finally an incentive scheme for IO-EIS is introduced.

2. METHODOLOGY

Based on a literature review presented in section three, the constructs extracted were presented to focus groups including environmental experts from five large European enterprises: a German solution provider, a German Technology Conglomerate, a Finish elevator manufacturer, a Finish research center, and a Swedish network provider. The concept of IO-EIS and prominent use cases are described in section four. Leveraging the focus groups, the concepts and their transferability to IO-EIS were discussed. The results served to identify relevant motives and the according incentives for IO-EIS as presented in section five. Finally the concept of an incentive scheme for IO-EIS is presented in section six. Section seven concludes.

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3. RELATED WORK

3.1 Inter-Organizational Environmental Information Systems

In the context of Business-to-Business (B2B) networks, the exchange of data can be based on three types of relationships among involved parties and respective information systems:

- One-to-one: Companies within the supply chain communicate directly, without any arranging topology. This implies that for every connection, the communication standard as well as the content has to be defined. The automation capability as well as the degree of freedom is very high, while the costs are very high as well.
- One-to-many: A logical topology where one company facilitates all its business partners to communicate within a common architecture (“enterprise-centric architecture”). This simplifies communication for the company providing the infrastructure, but not necessarily for its business partners, as long as other systems are in use within the industry. Furthermore, the scalability is limited [26].
- Many-to-many: A logical topology where all business partners use a common architecture based on a hub-and-spoke layout (“network-centric architecture”). This enables best flexibility, scalability at lowest costs, and new network enabled capabilities [24]. On the other hand the lock-in costs are very high and on-boarding/ privacy issues become prevalent.

IS for business networks, also often referred to as collaborative supply chain systems, use the exchange of information as a mean to reduce information asymmetries [28] and facilitate common decisions [12] for the benefit of the entire supply chain. The collaboration type can be distinguished by the mechanisms of the IS (adapted from [23] and [28]):

- Information integration: Required to remove information asymmetries within supply chains. Relevant is any data that can influence the performance of the supply chain. The information should be available real-time at low costs [23]. A popular example is point-of-sale data or inventory data.
- Resource coordination: The partners plan jointly and split competencies, e.g. by the means of collaborative planning, forecasting and replenishment (CPFR, [15]).
- Process integration: The partners use common resources and integrate and streamline their processes. This can be done by the means of contracts and/or revenue sharing [6].

These IS can also be used in order to invent completely new business models [23]. Which type of collaboration is suitable for a certain situation depends on the participants, their relations and the goal(s) of the collaboration. [29] give a summary of factors that enable supply chain collaboration. The most commonly mentioned factors are presented in the following:

1. Mutual trust is the facilitating factor for all network initiatives [21]. This holds for every management level and functional area [29]. Trust is a key enabler for mutual help and therefore also for collaboration.
2. Intellectual property should be respected, and private information should only be accessible by authorized users (Finch 2004), while an efficient diffusion of knowledge has to be granted [13].
3. Common interests/ goals are necessary in order to ensure all participants work together in every buyer-seller relationship [11]. The expectations and network roles should further be communicated clearly.
4. Value proposition for all participants means that all network members should benefit, if possible equally, from participating [30].
5. Technology is necessary as an enabler for next generation networks. The ubiquitous internet technologies have enabled the low-cost, standardized exchange of real-time information and collaboration which can be used by the ordinary/non-technical business user [23].

3.2 Incentives

A motive has been defined as the psychological disposition of an individual [22]. The activation of a motive takes place under certain conditions and causes a particular behavior. This can be triggered by internal motives (e.g. a desire) or external incentives (e.g. a payment), also referred to as intrinsic or extrinsic motivation respectively [10]. Therefore, incentives should be based on motives in order to activate a certain behavior [25]. Following [10], motives can be distinguished into intrinsic motives and extrinsic motives. As stated by [17], some organizations seek to fulfill other goals besides maximizing shareholder profits. These goals are oriented at the entrepreneur’s values and include the “well-being of other members of his organization and his fellow citizens” [17]. Due to the drastic impact on humankind, environmentally sustainable operation is one of the key challenges that society faces today. Therefore, ethical considerations can be an intrinsic motivation for organizations to improve their environmental impact by joining and strengthening IO-EIS. A number of authors are describing incentives for taking part in content-based IS. Organizations can expect direct payoffs from joining such networks. In the case of IO-EIS, these include the above mentioned process improvements of better data availability, flexibility, transparency, and efficiency. Depending on the business model, there could also be direct monetary compensations for joining the network, e.g. the solution owner could employ a referral bonus system [20] where Original Equipment Manufacturers (OEMs) get a compensation for onboarding their suppliers.

During the process of establishing the network, and even after reaching a critical number of participants, a continuous stream of high quality content has to be ensured in order to maintain users and motivate further participation [14]. The motives for content contribution are therefore analyzed separately. [38] have analyzed how individual motives and social capital influence users to share information in communities of practice. They study the following factors: reputation, enjoyment, network centrality, expertise, tenure commitment and reciprocity. They find reputation, enjoyment, network centrality and expertise to be statistically significant influencers of knowledge contribution. [27] identify factors that motivate users to contribute resources to P2P networks including rewards, personal need, altruism, reputation, liking, and affiliation and propose application features to stimulate resource contribution. They do not specify the type of tangible reward provided, but list monetary rewards, discount rates for subscription or purchase, bonus points for prize remedy and value-adding service. Furthermore they suggest an individual identity and profile generation to promote sub-community building, and peer recommendations in order to evaluate contributions to the network. [14] elaborate on a number of incentives for community contribution, and based on that build an incentive system for a social networking site in a business context. They suggest including features that provide rewards, explain the benefit for the community, set specific individual goals, provide reputation, and provide and illustrate a self-benefit. When incentivizing user contributions, [7] highlight that the quality of the contributions has to be controlled: A high amount of low quality contribution can lead to information overload which makes users leave the community. [25] elaborate on the motive of participants in Information Technology (IT)-based ideas competitions. They identify the following motives: learning (access to different types of knowledge), direct compensation (prizes and career options), self-marketing (profiling options), and social motives (appreciations by organizers and peers). Table 1 summarizes the motivation constructs in content-based IS as outlined above.

Table 1. Motivation constructs in content-based IS

Paper	Focus	Motives
Leimeister et al. 2009	Ideas Competitions	Learning, direct compensation, self-marketing, social motives
Farzan et al. 2008	Enterprise social networks	Rewards, community benefits, goal setting, reputation, self-benefit
Wasko & Faraj 2005	Communities of practice	Reputation, enjoyment, network centrality, expertise
Lui et al. 2002	P2P networks	Rewards, personal need, altruism, reputation, liking, affiliation
Cheng & Vassileva 2006	E-learning communities	Rewards, reputation, goal setting, community

4. INTER-ORGANIZATIONAL ENVIRONMENTAL INFORMATION SYSTEMS

In general, organizations integrate environmental performance indicators (EPIs) into a sustainability framework also comprising social and financial indicators. This work specifically focuses on environmental indicators but can easily be extended to other sustainability indicators. IO-EIS have the main purpose to efficiently exchange environmental information in the supply chain, but they also integrate and describe different external data sources, provide functionality for diverse use cases, and enable analytics and community-building on top of that. All use cases have in common that they facilitate the exchange of EPIs. EPIs are quantitative and qualitative indicators that describe the environmental performance of products, services, or organizations in certain dimensions. Typical use cases are environmental compliance, sourcing and procurement, design for environment, green logistics and sustainability reporting of which the following section will describe the first three.

4.1 Use Cases

Environmental product compliance is the first step in the environmental strategy of product manufacturers as non-compliance with regulations can lead to significant consequences such as fines, restrictions, and product bans. Environmental legislation is growing in number, scope, and complexity [31]. Product manufacturers which operate globally face the problem of differing regulation worldwide. Prominent examples are the legislations REACH and RoHS. The European Commission’s (EC) Directive on Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) requires all companies that import or produce chemical substances into the European Union in quantities of one ton or more per year to register these with the EC. It also requires companies to report if their products contain more than 0.1% of substances of very high concern (SVHC). The production and sale of these products may be limited or prohibited within the EC, if the company does not manage to find a substitute for the SVHC within a limited time period. EC’s Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS) is a directive to control the use of six hazardous substances in products and components. The list of restricted materials now includes lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls and polybrominated diphenylether, but may be extended later. Following the EC’s example, many governments have started to implement similar legislation, but including other substances and/or limits. Most environmental legislation is based on the principle of producer responsibility, while the reasons for non-compliance may happen upstream in the supply chain. As a consequence, product manufacturers need to

- Identify which regulation worldwide affects their products, and which substances and processes are regulated, as well as the corresponding limits.
- Analyze the substances and processes used for their products. Typically most of the manufacturing processes occur upstream, so the manufacturers need to collect the information from their 1st tier suppliers and make sure those include the information from the 2nd tier suppliers, and so on.
- Take corrective action (e.g. find a substitute), if necessary.

Most problems that the manufacturers face today are related to the collection of data throughout the supply chain. Until today, product compliance in many companies is handled by using spreadsheet and email-based solutions, which have proven to be highly inefficient [5]. A plethora of different formats and standards are in use, and these are exchanged either using enterprise-centric systems, where one organizations has established a system where all its suppliers and stakeholders can submit or access data, or the process is based on one-to-one communication channels, such as email or EDI, even though email has proven highly inefficient and the entry costs for most small and medium-sized companies are too high in the case of EDI [16]. Typical response rates with classical means are between 5 and 10% [36]. All other data has to be collected manually, e.g. by material experts and consultants, with the corresponding high costs. From the supplier side, duplication of work is further engraved by the fact that different companies ask for different material content: Some companies require a full product declaration, others ask for materials included in a particular substance list and finally some companies are satisfied by binary compliance statements.

The goal of *sustainable sourcing and procurement* is to decrease the environmental impact across the product life cycle. This is achieved via including EPIs in benchmarking of suppliers of the same material with regards to specific EPIs and in purchasing decisions, in particular for materials with high business and environmental leverage. Within sourcing and procurement, environmental information already plays a role in supplier management, material compliance and environmental assessments. Supplier management includes the evaluation of suppliers against several criteria such as quality, service, and financial aspects. Annual supplier evaluations typically follow an explicit program that includes setting performance categories and their weights, supplier scoring, and improvements. Environmental criteria are also part of this evaluation process, however they mostly comprise binary requirements that have to be fulfilled, e.g. existence of a certified environmental system, energy reduction programs, etc. This information is usually collected via questionnaires. Because the questions are yes/no questions that all accepted suppliers have to meet, different suppliers of the same product are not differentiated in their environmental performance. In order to really differentiate suppliers by their environmental performance, organizations should include quantitative EPIs in their supplier selection processes. Evidently, these EPIs should be integrated in a process leveraging quality, cost, and sustainability KPIs. The operational procurement function has the responsibility of carrying out the purchasing activities of a specific division, e.g. product line or business unit. When ordering a material from one of the preferred suppliers, the purchasing division should again include environmental KPIs amongst others in order to achieve the overarching goal of environmental improvements. In order to ensure maximum impact, the focus should be on high-leverage materials with [9]:

- Relatively high purchase volume
- High environmental impact per functional unit
- Potentially high level of supplier differentiation.

Design for Environment (DfE) is a general concept that refers to a variety of design approaches that attempt to reduce the overall environmental impact of a product, process or service across its life cycle. Based on product and process data, the environmental impacts of different alternatives have to be calculated and compared. DfE deals with several topics like environmentally-conscious manufacturing, design for disposal, and packaging related topics. Besides the identification of weak points of a solution and the comparison of alternatives, the tradeoff between decisions in different life cycle phases has to be investigated. The goal is to identify the design alternatives within the product lifecycle that can enable environmental impact reduction at minimal additional costs. This is achieved via including EPIs in the comparison of design alternatives. Life Cycle Assessment (LCA) is a part of the comparison and the following processes address two major process steps of LCA:

- Data inventory analysis (collecting data, calculation, allocation)
- What-if-scenarios as part of life cycle interpretation.

The calculation of the environmental impact of products and processes is usually based on unit processes and activity data. The activity data is the data of the actual activity or process quantifying an environmental impact. This can be data which directly measures the activity, such as the CO2 emissions related to a particular component, or data that can be used to determine the activity or its impact, such as the weight of a material used in the production of a product. Unit processes leveraging suitable conversion factors are used to relate the measured activity to the actual impact, such as a quantification formula that determines the CO2 emissions per kg of a certain material. There is a hierarchy of different types of activity data that can be used; as a general rule, companies should apply the following hierarchy of data types in collecting data of organizational accounting:

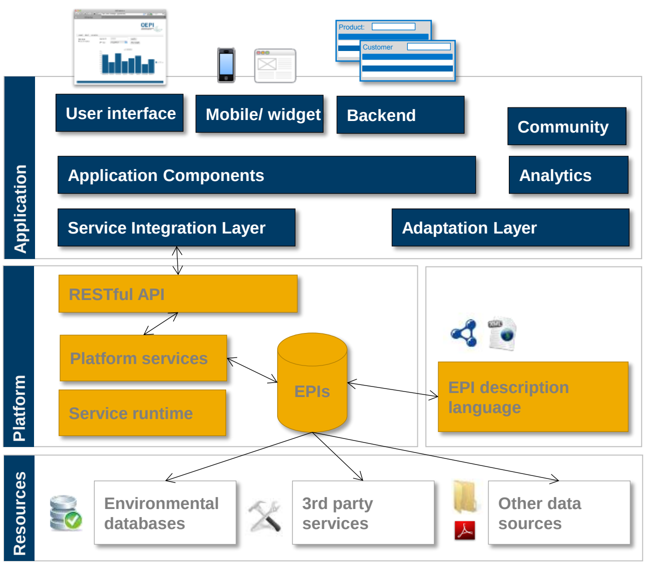
- *Primary data* are direct emissions measurements or activity data. Companies should obtain the most product-specific data available. Primary data can be further classified in product-level data, process-level data, facility-level data, business unit-level data, and corporate-level data.
- *Secondary data* are data that are not collected from specific sources within a company's operations or its supply chain. Secondary data include industry-average data, data from literature studies, and data from published databases.
- *Extrapolated data* are primary or secondary data related to a similar (but not representative) input, process, or activity to the one in the inventory, which are adapted or customized to a new situation to make it more representative (for example, by customizing the data to the relevant region, technology, process, temporal period and/or product).
- *Proxy data* are primary or secondary data related to a similar (but not representative) input, process, or activity to the one in the inventory, which are directly transferred or generalized to the input, process, or activity of interest without being adapted or customized to make more representative.

Data type 3 and 4 are estimation methods to fill data gaps. Similar to the other two use cases, the main challenge is the collection of data across organizational boundaries. In particular, primary data is only available directly from the supplier of the material or component. Therefore, many companies today use average values to determine the impact of a material which significantly deteriorates the accuracy of the results.

4.2 Requirement and features of IO-EIS

Regardless of the specific use-cases supported, IO-EIS share a number of features. Requirements of IE-EIS have been described by [37]. They suggest that the general layout should be divided into a resource layer, a platform layer, and an application layer. The resource layer is composed out of relevant external resources, such as environmental databases, governmental sources for legislation, or third party data. This data is stored as EPIs in the platform layer leveraging an EPI description language. The EPI description language stores the main constructs and relations of the environmental content and allows representing the EPIs in a machine-readable way. Based on the environmental data, the platform services provide functionality to access and manipulate the data, such as add and manipulate EPIs and other relevant entities. These services can be accessed using the platform API (e.g. RESTful API) by external applications as well as by the application layer. All organizations will use the same instance of the platform, allowing them to easily share and access EPIs throughout the supply chain. The application layer provides functionality for the actual use cases, e.g. accessible via web browser, mobile devices, or integrated in a backend system. Analytic capabilities provide a main value proposition of IO-EIS: Based on anonymized data, organizations can benchmark their EPIs with industry peers and averages. Adequate communication channels support community building. For maximum flexibility, the system should facilitate collaboration by adequate channels, such as push mechanisms (messaging) and pull mechanisms (forums, task marketplaces). The community can support establishing de-facto standards and industry practices. Furthermore, expert users can help by providing quality ratings for less experienced users. Figure 1 illustrates the main layers and components of an IO-EIS as described.

Figure 1: IO-EIS components



5. INCENTIVES FOR IO-EIS

Based on the identification of motives, there are a number of features and functionalities that the system should inherit. Due to the nature of the environmental content that is required, there are a number of additional requirements which have to be considered. Functionality to encourage organizations to join the network, contribute content to the network, and rate content on the network has to be distinguished. According to [17], the socially responsible entrepreneur has a concern for improving his impact on society and the environment. Therefore, this intrinsic motive should be leveraged by providing tools to improve the organization's environmental sustainability. On the other hand, there are a number of processes which the organization has to execute for performing its core business, including sourcing & procurement, compliant product design, and reporting processes. Organizations aim at performing these processes based on as much high quality information as possible, while keeping the time and costs for collecting this information low. Their goal is to increase process quality, which the system can help with by offering data & functionality supporting specific tasks. At the same time, organizations seek to increase process efficiency, which an IO-EIS can facilitate by dramatically decreasing the number of required interactions [37]. In order to enable participants to pursue effective sustainability marketing, it would help if the IO-EIS can establish a branding in the sustainability domain, and integrate well-known non-governmental organizations (NGOs). The motive of organizational learning can be activated by providing extensive data from various environmental databases as well as connecting the community in order to exchange best-practices. Communication and community features can tie in supply chain partners and therefore enable networking within the chain. As organizations seek to determine their position within competition, benchmarking features with industry averages and best-in-class provide substantial incentives to join the network. Table 2 synthesizes the proposed incentives to encourage organizations to join the network as presented.

Table 2. Motives & Incentives for joining IO-EIS

Motive	Incentive
Ethical	Tools to improve environmental sustainability
Improved task fulfillment	Task-specific functionality
Cost reductions	Many-to-many network
Marketing	Sustainability branding
Learning	Data & community
Networking	Communication features
Compare with competition	Benchmarking features

Designing for enjoyment has been previously defined as key for IT artifacts. In particular, positive experience should be created by a user interface which promotes pleasure, enjoyment, and fun in order to enable user satisfaction [1]. The system should also be easy to use. Community-building features and designing for sociability is required to fulfill the desire of individuals to participate in communities. E.g. [4] have identified a number of principles that facilitate sociability in social software. Comparability within the community should also be enabled in order to facilitate an advantageous competition [14].

Table 3. Motives & Incentives for contributing in IO-EIS

Motive	Incentive
Enjoyment	User friendly user interface
Community	Community building features
Low fees	Reduce fees based on contributions
Customer satisfaction	Sharing & communication tools
Reputation	Reputation score & badges
Supplier evaluation score	Include contributions in supplier evaluations
Sophisticated functionality	Provide functionality based on contributions
Access to industry data	Provide data access based on contributions

There are a number of incentives which could be offered based on the quantity and quality of contributions: These include reduced fees, the incorporation in (supplier) evaluations, extended functionality, and extended access to industry data, e.g. for benchmarking purposes. Additionally, the motive to enhance customer satisfaction can be supported by offering suitable tools for sharing data and communicating with the customer [37]. Reputation is mentioned as an important motive to stimulate user contributions [14, 27, 38], so the system should be able to compute a reputation score for the participants, and offer “badges” or “membership levels” in order to promote specific actions [8, 14]. Table 3 summarizes the incentives to encourage content contribution.

6. AN INCENTIVE SCHEME FOR IO-EIS

6.1 High-level concept

Most incentives to join the network are related to a convincing value proposition, thus have to be implemented via comprehensive characteristics and functionality of the IO-EIS itself. The goal of the incentive system therefore focuses on enhancing user contributions. Based on the considerations presented in the previous sections, the reputation mechanism should encourage uploading up-to-date Environmental Performance Indicators (EPIs) in high quantity and quality and accurately rating user contributions. Consequently we propose to distinguish a reputation score for contributing EPIs and for rating EPIs, and provide additional incentives based on these two scores. Aspects of EPI quality have been previously defined, e.g. by the Global Resources Institute (GRI).

Due to the high number of user contributions, it is impossible to employ enough resources to rate all content according to its quality. Depending on the commercial success, quality checks based on random sampling, such as the Continuous Sampling Plan 1 (CSP-1), may be applied [19]. Nevertheless, the majority of ratings will have to be done by the community. This is less problematic than in consumer networks, as many of the business users will indeed be domain experts. [8] present an adaptive incentive mechanism for contributing and rating content in an e-learning community which shares some of the features with the proposed mechanism. Due to the completely different context, the focus of their mechanism is to promote a certain number of user participations within a limited amount of time, while the focus of the proposed incentive scheme is to determine the quality of user contributions in order to promote quantity and quality of contributions.

We suggest calculating a quality score Q for every EPI $e \in E$, based on all ratings r_e for the EPI e and the participating business user $o \in O$’s historical rating expertise R_o:

$$Q_e = f\left(r_{e;o\in O} \,;\, R_{o\in O}\right)$$

Based on all EPI quality scores of an organization, its overall content reputation score C_o can be determined:

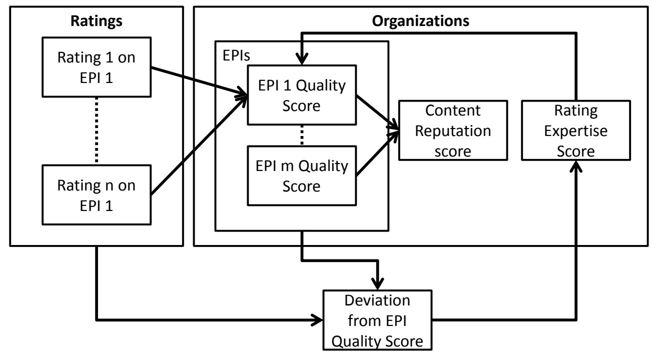
$$C_o = f\left(Q_{e\in E;o}\right)$$

Whether organizations and business users have to be distinguished depends on the actual use case. Based on the deviation of all ratings of a business user from the EPI quality scores, his individual rating expertise score R_o is calculated:

$$R_o = f\left(r_{e\in E;o} \,;\, Q_{e\in E}\right)$$

Before the rating is submitted, the user cannot see the EPI quality score. This prohibits a bias towards the displayed score as well as provides an additional incentive for rating. The aggregation of the rating deviations to a rating expertise score, as well as the aggregation of the EPI quality scores to an overall content quality score can be done leveraging diverse algorithms [18]. Figure 1 depicts the basic functional principle of the proposed reputation system, which provides the basis for incentives such as further dissemination of the reputation, monetary incentives, incorporation in supplier evaluations, enhanced functionality, or access to a larger amount of industrial data.

Figure 1. Overview of the proposed rating scheme



6.2 Evaluation

A first evaluation took place in a workshop including the five case companies. The motives and incentives were discussed as well as the proposed incentive scheme. Furthermore, a concept implementation based on a prototypical IO-EIS developed by the case companies was prepared and illustrated by mockups. Overall, the proposed incentive scheme was seen as a good enabler to enhance user contributions and EPI quality. However, a quantitative evaluation is still outstanding. The main statements of the evaluation workshop are summarized below:

- The proposed incentive scheme has the potential to improve the overall data quality within the IO-EIS, although the information quality challenges in the use cases cannot be solved by technical means alone. It will require the involvement of industry and legislation to define unambiguous standards.
- Incorporating the EPI quality scores and the overall content reputation score in supplier evaluations promises to be the most effective incentive for the sourcing and procurement scenario. Monetary incentives can mainly prove effective if they are integrated in the sourcing strategy. Discounts on the fees for the IO-EIS were seen less favorable.
- Analytic capabilities such as benchmarking were seen as strong incentives for joining the IO-EIS. If access to industry benchmarking data is only enabled based on the content reputation score, this would also provide a strong incentive for contributing high quality EPIs.
- The reputation scores and badges for contributing were seen as good individual incentives for the employee contributing the data, while no effect is expected on the organizational level.
- It was consistently stated that the incentive scheme needs to be simple and user friendly. This is an important factor especially for smaller companies, as these usually do not have a designated person for any of the use cases.

7. CONCLUSION

Based on a literature review and workshops with two focus groups including five European companies, relevant motives and incentives for IO-EIS were identified. These incentives propose an enhancement to the state of the art in the field of research of Green IS and also provide benefit for practitioners who seek to establish an IO-EIS, as to our knowledge similar research does not exist in this domain. Furthermore an incentive scheme for IO-EIS was developed based on these incentives. Future research will include a quantitative evaluation of the incentive scheme within the focus group companies.

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