

Sustainable Supply Chain Management: Improved Prioritization of Auditing Social Factors, Leveraging Up-to-Date Information Technology

Andreas Thöni

Vienna University of Technology, Vienna, Austria

1 Introduction

For companies, sustainability issues in the supply chain can cause severe problems and reputational damage. Especially social sustainability is of a problem (e.g. human rights) and has only been narrowly addressed in academic literature [1].

In business, the increased risk of issues in supply chains has amplified the need for the auditing of social responsibility at supplier locations [2]. As supply chains can include hundreds of suppliers, it seems impossible for companies to evaluate all factors in depth and even lesser in first-hand [3]. Because no interaction would require too much trust, a prioritized approach to the auditing of suppliers appears necessary.

The thesis addresses this prioritization problem of social sustainability auditing in international goods supply chains based on a design science approach to reduce risk and save costs [4]. Thus, the thesis' core question is: *How can the prioritization of auditing activities of socially sustainable supply chain management be improved, leveraging up-to-date information technology?* Hence, a new prioritization software toolset could be an answer.

2 Related Work and Research Hypotheses

Existing academic work relates to selecting and measuring suppliers as well as specific supply chains (e.g. [5]). However, it lacks aspects for improved prioritization of social auditing such as automatic and quick data-integration, real-time event inclusion and data integrating necessary for a complete, up-to-date picture of supplier locations.

In recent years LOD has grown as an instantly-accessible data pool allowing to derive rating-relevant statistical and meta data (e.g. corruption indexes). Moreover, as a method, it allows a simple representation of supply chains, leading to the first hypothesis: (H1) *LOD can leverage the prioritization of auditing activities of socially sustainable supply chain management (SSSCM) by improving data-update efficiency.* Unstructured text mining has already been applied to multiple fields. In the specific context it allows analyzing news for risk evidences (e.g. geographically close events): (H2) *Text mining with a focus on companies/industries/geographies can further leverage auditing prioritization of SSSCM by generating real-time sustainability risk events.* Bayesian networks and Dempster-Shafer's belief-function formalism are

related approaches to integrate uncertain data from multiple sources. In order to combine supplier-related indicators, punctual evidence and history, a third hypothesis is connected: (H3) *Bayesian networks or Dempster-Shafter theory can improve auditing prioritization of SSSCM by facilitating the integration of multiple data sources.*

3 Methods, Work Plan and Evaluation

In order to show the usefulness of the approaches described above for social sustainability auditing, the thesis follows a design science approach (i.e. a software artifact will be developed and evaluated) and is built in several steps. First, an overarching literature review will be performed followed by detailing H1 to H3. Each step will include specific literature work followed by data gathering, model building and evaluation. The thesis will focus on one aspect of social sustainability (e.g. corruption, to be defined). A prototypical implementation will be based on an artificially created supply chain first. For evaluation, multiple techniques (experimental/observational evaluation; experimental simulation) will be combined and artificial data will be pooled with real data from an international goods sourcing supply chain (case study).

4 Discussion and Conclusion

Publicly discussed social sustainability issues can cause severe damage to a company. Existing approaches to limit risk appear to offer insufficient inclusion of dynamically available and real-time data in an integrated way while respecting uncertainty. By applying new sources and methods this thesis aims at closing this presumed gap. Thus, the software artifact of the design science approach has the potential to save costs in social sustainability auditing by increasing its effectiveness and efficiency.

References

1. Seuring, S., Müller, M.: From a literature review to a conceptual framework for sustainable supply chain management. *Journal of Cleaner Production* 16, 1699–1710 (2008)
2. Klassen, R.D., Vereecke, A.: Social issues in supply chains: Capabilities link responsibility, risk (opportunity), and performance. *International Journal of Production Economics* 140, 103–115 (2012)
3. Kogg, B., Mont, O.: Environmental and social responsibility in supply chains: The practise of choice and inter-organisational management. *Ecological Economics* 83, 154–163 (2012)
4. Hevner, A.R., March, S.T., Park, J., Ram, S.: Design science in information systems research. *MIS Quarterly* 28, 75–105 (2004)
5. Govindan, K., Khodaverdi, R., Jafarian, A.: A fuzzy multi criteria approach for measuring sustainability performance of a supplier based on triple bottom line approach. *Journal of Cleaner Production* 47, 345–354 (2013)