Is Ignorance a Bliss in Sustainability?
Evaluating the Perceptions of Logistics Companies' Self-Assessment in Environmental Performance

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Abstract: Effective management of any company relies on awareness of surroundings and ability to appropriately measure and control the operations. As sustainability issues have emerged as central concern in societies, companies are also aiming to improve their performance in this regard. Therefore, sustainability related measurements are required for companies looking to manage their sustainability. Qualitative multiple case study data reveals some inconsistencies between companies' environmental performance and associated self-evaluation and reporting. The case studies are analyzed with focus on management capabilities in informed environmental sustainability related decision-making. It seems that companies are eager to take first steps towards environmental sustainability. However, overconfidence from initial successes can hinder further advances in environmental sustainability. Cognitive capabilities in self-evaluation seem to have implications for organizations in addition to individuals. While vital for advances in environmental sustainability, improvements should be reflected with critical view to avoid false sense of security. Companies' environmental communications are often overexaggerated due to illusory superiority. Self-awareness in context of companies' environmental performance should be further studied.

1 INTRODUCTION

Sustainability of business operations is a growing concern within societies, industries, and academia. Companies carry special responsibility in sustainability challenges, as their decision-making often impact not only their own operations, but surrounding environment and various external stakeholders. Logistics and supply chain management have extended influence towards environmental sustainability due to the high environmental impact of transportation (Solaymani, 2019). Therefore, supply chain management is facing pressure towards sustainability from governmental legislation as well as societal demand (Seuring and Müller, 2008). In European Union, transportation is subject to massive decarbonization targets (European Commission, 2021; Haas and Sander, 2020). Moreover, in Finland these targets are taken further from the baseline legislation provided by European Union (Finnish Government, 2020).

Informed decision-making in supply chain management requires adequate knowledge, which in turn stems from correct measurements and analytical tools (Vilko et al., 2014). Same holds for decisions and optimization towards more sustainable transportation systems (Kelle et al., 2019). In other words, for companies to acquire environmental awareness of their operations, they need to recognize the challenges and their own shortcomings in that context. Thereafter, it is possible to understand causalities related to sustainability related decisions. This impact of their operations must be then appropriately measured to allow management of sustainability through various control mechanisms.

The aim of this paper is to study companies' ability to self-evaluate their environmental performance, and how their knowledge and capabilities influence these assessments and affect their decision-making. The chosen research area is logistics industry, which faces pressure to increase its environmental sustainability. The research focuses on impact of cognitive biases, management knowledge and capabilities, and decision-making uncertainty in self-assessment of companies. By doing this, the

article instigates discussion on environmental self-awareness of logistics industry actors.

2 METHODOLOGY

This research employs qualitative multiple case study approach. The chosen method was used to create holistic view on the studied logistics industry, including different actors in the industry with varying roles, position in network, transport modes, ambitions, and maturity regarding environmental performance. Moreover, specific company level perspectives are attainable via case studies, which allows critical evaluation of larger company networks. Qualitative approach enables explorative lens on the complex issue of sustainability in logistics, which is required to study the characteristics and inner-workings of a multimodal-transportation networks.

Primary data gathering was carried out with semi-structured interviews. This method was seen appropriate to preserve the exploratory nature of the research. Informants for the interviews were chosen based on their experience and their organization's position in Finnish logistics system. In addition to transportation companies and logistics service providers (LSPs), infrastructure and regional logistics developers were included in the pool of informants to gain perspectives from higher level logistics planning. Described selection process resulted in twelve interviewees, as presented in Table 1. The semi-structured interviews followed predefined interview protocol with main themes related to interviewee company's technological, business, and system level maturity regarding environmental sustainability of their operations. However, the interview protocol was used lightly, and the interviewees were given the liberty to somewhat steer the discussion. This way, relevant information and themes that were not strictly determined in the protocol were able to emerge in the interviews. In addition to open ended questions on environmental sustainability, the interviewees were also asked to grade their companies', as well as their network partners' perceived importance of environmental sustainability. Grading was on Likert scale from 1 to 5, where 1 stands for "not important", while 5 is for "extremely important". Since some of the companies were not comfortable on grading with whole numbers, they were given the chance to use fractional numbers (e.g., 3.5 out of 5). Each interview took from 45 minutes to 1 hour.

The interviews were recorded and then transcribed. Transcribed records were coded to identify central topics in the interview data.

Table 1: Overview of the studied organizations.

Case organization	Informant's position in the company	Experience in the current position
Railroad operator	Key Account Manager	11 years
Terminal operator	Sales director	2 years
Transportation LSP	Chief Development Officer	5 years
LSP (4PL)	CEO	9 years
Regional development company	Sales manager	2 years
Logistics development company	Project manager	1 year
Transport infrastructure agency (road)	Development manager	8 years
Regional logistics association	Acting manager	7 years
Inland waterway infrastructure agency	Regional manager	15 years
Shipping and stevedoring company	Internal auditor	2 years
Passenger road transportation company	CEO	10 years
Regional passenger logistics planner	Public transport coordinator	3 years

To study companies' ability in measuring and evaluating their environmental performance, unit of analysis for this study is the companies' own environmental sustainability. Based on this, comparative company analysis is made with regards to differences in the studied companies' used transport modes, role in logistics network, and maturity of environmental sustainability in their operations. Moreover, the interplay between these companies in common networks must be considered.

3 THEORETICAL BACKGROUND AND CONCEPTUAL FRAMEWORK

Among individual people, cognitive bias can be found where individuals with lower capabilities tend to self-evaluate that skill higher, in contrary to skilled individuals being more modest and accurate in the evaluation (Dunning, 2011; Feld et al., 2017). Because organizations consist of individuals, similar bias can sometimes be found in companies (e.g., in external communications or reporting). As the amount of information is constantly growing intensively, companies struggle to use the tide of information in meaningful ways (Ge and Brewster, 2016). Moreover, mere existence of vast amount of gathered information on specific topic (e.g., environmental sustainability) can falsely convince companies that the information is properly used to

solve and manage the related challenges (Ge and Brewster, 2016). In construction project cost estimations, overconfidence on lacking capabilities acts as one of the factors for possible cost overruns (Ahiaga-Dagbui and Simon, 2014).

Environmental awareness and ability to make informed decisions towards improved environmental sustainability can be attributed to the management's ability in measuring environmental sustainability of operations. Drawing from theoretical framework on risk management and decision-making by Vilko et al. (2014), we have synthesized a framework describing different levels of environmental awareness and its effect to sustainability related decision-making in companies. The framework in question have not been used in environmental context before, which this study aims to do. In progress the research aims to bring decision-making and environmental management theories in logistics closer together. In other words, this study synthesizes theories from different fields of science to examine a contemporary phenomenon. This framework is presented in Table 2.

The different columns in this framework represent various levels of understanding or certainty related to sustainability issues in supply chain management. On the right side is radical uncertainty (hypothetical situation where management has absolutely no knowledge on the topic; Loasby,1976). From there on, the consciousness of management increases gradually going to left, ending up to absolute certainty (once again, hypothetical situation where management knows everything related to the topic).

Table 2: Levels of uncertainty in sustainability decision-making (modified from Vilko et al., 2014).

	Absolute certainty	Parametric certainty	Parametric uncertainty	Structural uncertainty	Procedural uncertainty	Radical uncertainty
The knowledge decision-maker holds related to the decision problem	Every piece of relevant knowledge is known.	The future states and the structure of the decision situation are known. Impact of each sustainability action is objectively known.	The structure of future is known. The impact parameters of sustainability actions are not certain.	Imperfect knowledge of the structure the future can take. Limited view of the parameters related to the sustainability actions.	Limitations of decision-maker's cognitive abilities to unambiguously pursue objectives given the available information.	All pieces of knowledge are imperfect, sometimes even comes close to ignorance.
The knowledge of the occurrence probabilities of possible states of the world, possible actions, and consequences	Complete knowledge.	Objective knowledge of parameters.	Subjective degrees of beliefs as to the probabilities of events and the consequences of sustainability actions.	Subjective beliefs of the effect of environmental actions.	Incomplete knowledge about effect of environmental actions.	No knowledge at all.
Implications to sustainability decision-making	Complete certainty about the sustainability actions and environmental effects. (Hypothetical)	Assumed implicit foundation for sustainability decision-making.	Sustainability effect probabilities are difficult to quantify.	The structure of sustainability actions and their environmental effect are difficult to formulate and perceive holistically.	Severely restricted ability to identify and perceive sustainability actions and their environmental effect.	Complete uncertainty about the sustainability actions and environmental effects of actions. (Hypothetical)
Implications to sustainability analysis	Sustainability analysis is not needed.	Sustainability parameters (likelihood and impact) of environmental effect can be measured and assessed with certainty.	Sustainability parameters (likelihood and impact) of environmental effect cannot be objectively assessed.	Sustainability actions and their causalities cannot be objectively assessed.	Sustainability actions, their causalities and environmental effects of actions are not fully known and assessable.	Sustainability actions, environmental effects of actions and related parameters cannot be assessed.

The rows in this framework describe the decision-makers knowledge, understanding of surroundings and causalities of taken actions, implications of made decisions, and lastly the analytical capabilities based on the possessed knowledge. For studying real companies, the focus should be directed to the middle states of certainty. This allows the assessment of companies' capabilities to conduct informed sustainability related decision-making and self-evaluation of sustainability performance.

When a company's management has *procedural uncertainty*, they lack required knowledge to conduct informed decision-making. In this situation, the consequences of company's actions are not considered, leaving that company prone to unwanted outcomes realized from otherwise benevolent decisions (Dosi and Egidi, 1991). This is due to the incapability to recognize sustainability related issues, counteractions, their benefits, and disadvantages. Furthermore, since the knowledge is inadequate, the decisions cannot be backed by data, i.e., necessary measurements and analysis is impossible to carry out.

Under *structural uncertainty*, the management has an idea about the parameters of sustainability related decision-making, e.g., what kind of technologies can be implemented in operations to reduce environmental impact. However, choosing the appropriate actions is hindered by the lack of knowledge on all available courses of action. When the appropriate courses of actions are clear to management, the degree of certainty is *parametric uncertainty*. Here the management can perceive different appropriate decision paths but understanding of their impacts and related probabilities are unknown (Langlois, 1984). In other words, the different pathways for the company are visible, but capability to choose the best one is limited.

Parametric certainty is the next step. When management can reach this degree of certainty, their decision-making is informed, backed up by data. Here the circumstances, available actions, probabilities, and possible outcomes are known by the decision-makers.

4 EMPIRICAL RESULTS

All the studied companies have dedicated some focus to environmental issues in their operations. Mostly the shift towards environmental awareness has been happening lately, within past few years. Spark for the change is due both governmental and societal demand. In other words, regional and national legislation has become stricter in terms of environmental performance of companies. At the same time, customers, consumers, and society at large have become more vocal in their demands for corporate sustainability in Finland. Since environmental focus is a new direction for companies, especially those in logistics sector, which is known for characteristics such as traditional and rigid, vast advances in environmental friendliness cannot possibly be expected yet. Indeed, most of the environmental advances in the studied companies have been incremental. As such, the related performance measurements are at basic level and lack coordination with strategic goals (procedural uncertainty). Therefore, management is not supplied with proper data to support their decision making. While the direction is correct for improved environmental performance, strategic implementation of environmental practices and technologies is needed to create meaningful results and simultaneous benefits in terms of environmental sustainability, societal approval, and economic profit. When the strategic objectives for companies are recognized, only then it is possible to measure correct things in operations (i.e., ascension to structural uncertainty and beyond). Furthermore, this also enables management of sustainability and appropriate control mechanisms.

Some of the studied logistics companies possess naturally advantageous position in environmental sustainability (e.g., railway operators have access to environmentally sound transportation when compared to road transportation companies). However, some of the mentioned companies are not actively reinforcing their position regarding environmental sustainability. In other words, some logistics companies do not recognize competitive advantages in environmental sustainability, and furthermore take for granted the most likely temporary advantageous position. The position can be described as temporary since some of the other studied companies (without inherent advantage in environmental sustainability, e.g., road transportation) are actively strategically thriving a position of forerunner regarding environmental issues in logistics industry.

While it is reasonable to assume that some of the distortion in environmental self-evaluation and actual performance is due to the lacking capabilities in environmental sustainability or "meta-ignorance", possible impact of external influence should also be entertained. For example, in Finland, utilizing biodiesel in road transportation is subject of high-profile marketing and is also recommended by

government through various programs and legislation (e.g., Finnish Tax Administration, 2020). However, it is debatable how beneficial for overall environmental sustainability of transportation these biofuels are. Nevertheless, many of the studied companies have been introducing biofuels, especially biodiesel, to their operations. Based on the interviews, it seems that these same companies lull in a feeling of achieved environmental sustainability after changing to biodiesel. At the same time, the environmental impact of these companies' operations is lowered only marginally if at all.

The self-evaluation grades (1-5) of value for environmental sustainability in companies' operation and that in their network is presented in Figure 1. When considering both company's and their network's score, it is possible to divide the interviewee companies to four different categories. Top left (high importance of environmental sustainability in network, low inside organization) is for reactionary companies who act upon changes in their direct business surroundings and are not prone to proactive decisions. Bottom left (low network and organizational importance) is for companies acting in networks that have not recognized value in environmental sustainability. Bottom right (low network, high organizational importance) is for companies positioned as forerunners in environmental sustainability: their network is not pushing for environmental performance, but they proactively act towards that. Lastly, top right (high network and organizational importance) contains companies operating in networks which recognize value in environmental sustainability.

Majority of studied companies are positioned to top right, to environmental focused companies among others, according to their self-evaluation. Second largest group can be categorized as environmental forerunners according to their assessment, locating in the bottom right. While none of the companies position themselves on the categories represented on left side of the matrix, two are on the edge. Inland waterway infrastructure agency sees themselves as moderately focused to environmental sustainability, while admitting that their network values that highly. Similarly, Logistics development company evaluates themselves as moderate on environmental issues but assesses surrounding network as not particularly focused on environment. According to some of the companies, environmental measurements and related communications lack standardization. These interviewees claim that it is extremely difficult to benchmark environmental sustainability of logistics operations between the companies. Lack of industry standards in environmental measurements and reporting is one factor explaining the relatively high grading in self-evaluation for the studied companies. It seems that none of the companies except one rated their network's focus on environment higher than their own: a sign of the studied companies overestimating their own alignment towards environmental issues.
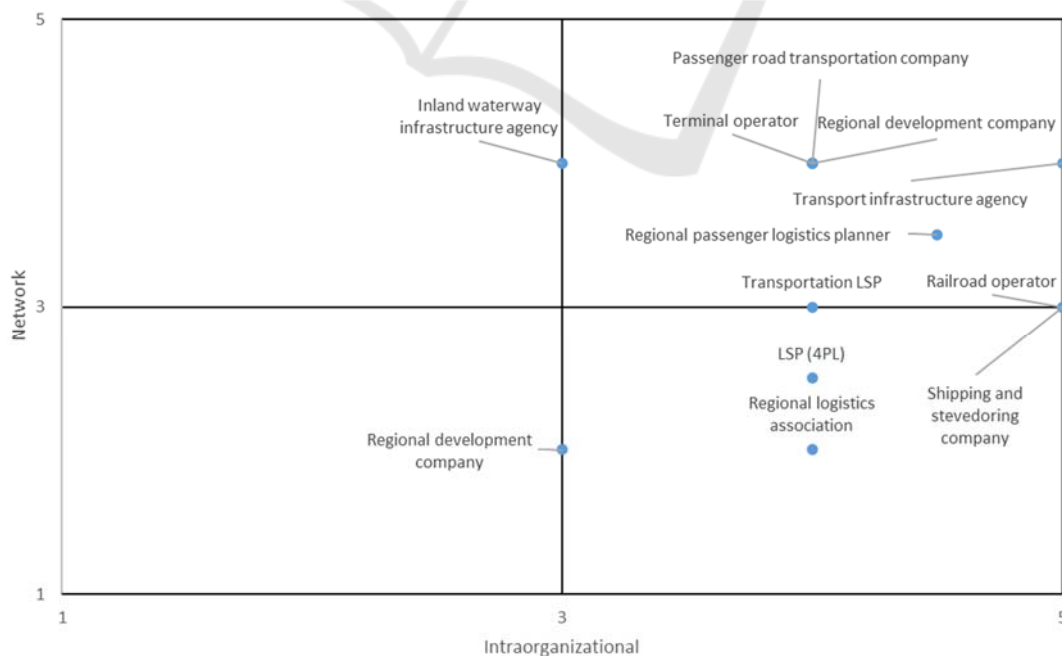

Figure 1: Evaluation for organizational and network position environmental sustainability.

5 DISCUSSION

This research continues from the previous scientific discussion (Vilko et al., 2014; Dunning, 2011) by synthesizing on uncertainty and biases in decision-making in sustainability context. Informed decision-making in supply chains under uncertainty requires adequate cognitive abilities (Vilko et al., 2014). Similarly, decisions towards environmental sustainability in supply chains require specific knowledge to understand causalities, impacts, and outcomes of those decisions (Kelle et al., 2019).

The multiple case study on intermodal logistics system reveals that most of the studied companies have taken some substantial steps towards improving their environmental sustainability. In most cases, this can be boiled down to implementing some incremental advancements on top of the existing operations, e.g., using biodiesels in road transportation instead of conventional fuels. However, at the same time the pursuit for environmental sustainability seems to be limited to these incremental changes – companies are hesitant to make strategic and structural changes to existing operations to improve their environmental performance.

While most of the companies describe their actions towards environmental sustainability as conservative, most still evaluate their own environmental sustainability and that of their immediate networks highly. This represents an obvious mismatch in actions and communications related to environmental sustainability. The situation can also be interpreted as companies having illusory superiority. First initial decisions towards reducing environmental burden of operations are made, tying investments, time, and work to environmental challenges. This in turn could create a feeling of radical improvement, especially since rigid benchmarking in environmental context between companies is lacking. Therefore, it is relatively for companies to evaluate their environmental focus as exceptionally high. Organizations with longer experience in environmental advances, however, hold more informed view on environmental decision-making and desired outcomes. For example, the studied fourth-party logistics service provider, which has carried out numerous environmental programs for its customers (logistics companies), can be seen possessing a more informed view on the matter. While they rank themselves high in environmental sustainability, they see their network performing below average on the matter. Similarly, the studied logistics development company, which intends to create modern, competitive regional logistics, sees the surrounding logistics industry as immature when it comes to environmental sustainability.

However, it is not fair assessment to attribute the high grades solely on illusory superiority. For example, the studied transportation LSP company has been positioning themselves as a forerunner in environmental issues for decades already. In their case, environmental sustainability has been lifted as part of their strategy and they believe that this direction will grant them prolonged competitive advantages. Business processes have been coupled with measurements, and appropriate data on sustainability goals reaches the management. In other terms, they can be seen as reaching for parametric certainty in sustainability related decision-making. Therefore, they rightfully grade themselves high in environmental sustainability while at the same time assessing their network as low on the matter.

Interestingly, the studied railroad operator assesses themselves exceptionally high, with full score. Indeed, railway transportation in Finland, where most of the tracks are electrified and hydroelectricity is preferred power source, can be considered as environmental alternative for transportation. However, during the interview with this company, it was evident that they are not strategically pursuing to improve their position regarding environmental sustainability in logistics industry. In other words, they seem to feel secure in their current position, and are not actively trying to improve environmental sustainability of their operations. In future, this could lead to other actors in the industry in taking over parts of the market which values environmental sustainability. In worst case scenario, inaction now could lead to lost market position in the future, stemming partly from illusory superiority. Especially as some of the other studied companies are more aggressively redefining their businesses to become more environmentally sound.

6 CONCLUSIONS

So, is (unintentional) ignorance a bliss in the context of environmental sustainability in the studied industry? In short term, it is easier to implement sustainability superficially to company's strategy with ambiguous measurements and reporting. However, if improvements in this regard are not made, it can be costly for the company in future. Long-term planning is not an easy road to travel: the more is known, the more the required work for meaningful sustainability actions becomes apparent.

There are also scientific implications for this research. It seems that psychological phenomena, such as illusory superiority, are not extensively considered in organizational studies. According to the authors best knowledge, only a few studies consider such bias in research which relies on informant companies' self-evaluation. In addition, as corporate sustainability is still emerging topic in academia as well as in practice, biases in self-assessment manifest easily due to the lack in long-term experience. The proposed framework helps in structuring sustainability related decision-making and understanding causalities and possible outcomes. It offers a way to evaluate the current situation of a company, as well as what is needed to improve in informed environmental decision-making.

This study offers several managerial implications. Firstly, the multiple case study of a multimodal logistics system presents a snapshot on how environmental sustainability is regarded in such business environment. Secondly, the empirical study shows that all the companies in the given industry are shifting their focus to environmental challenges. Some do so more actively than others, but the overall notion is that there is growing value in environmental sustainability in logistics. Lastly, the used certainty framework illuminates some pitfalls in environmental decision-making, and that false sense of superiority could be detrimental to a company's long term overall performance. As a major takeaway, companies should thrive to carry out meaningful measurements to enable informed decision-making based on data and knowledge.

Limitations of this research make it difficult to justify the experienced effect in sustainability related self-assessment as wide scale phenomenon. This multiple case study focuses on a single industry in a specific geographical location. However, further studies can be extended to multiple industries in a wider geographical scale. In addition, further research should aim to gather quantitative data on the phenomenon to investigate how wide the self-assessment bias is in companies.

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