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External sustainability communication

A case study based on the B2B perspective

Master's thesis in Maritime Management

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Abstract

This paper examines the ways in which transport companies can enhance their external sustainability communication to encourage more individuals to adopt greener transport solutions in a business to business relationship. The study investigates the kind of sustainability related information that the stakeholders would desire to have so as to make informed transport decisions and also the communication strategies that are perceived to be the most effective in promoting the sustainable alternatives. A qualitative study approach with an abductive design was employed, based on fourteen semi-structured interviews carried out with the representatives of manufacturing firms, logistics firms, and one technology firm, which operates in the transport industry. The results indicate that the main requirements that stakeholders seek are transparent, comparable, and context-specific information about the emissions data, the pricing structures, the implications of these operations on the stakeholders, and the compliance with the regulations. Sustainability data that is clear and verifiable was found to be the key in the development of trust and reduction of skepticism towards greenwashing. The findings further suggest that an effective sustainability communication must shift beyond a one-way reporting to more dialogue-based, strategic, and customer-adapted communication. Those companies which incorporate the idea of sustainability communication into the initial planning stages, purchasing procedures, and long-term customer relations are in a better position to enable greener decision-making. Nevertheless, the cost sensitivity, operational constraints, weak standardization and infrastructural challenges remain as some of the barriers to adopting sustainable transport options. Finally, the study indicates that enhanced transparency, reporting processes standardized and coordinated communication practices are pivotal to enhancing external sustainability communication and speeding up the process of transitioning to more sustainable transport systems.

Keywords

Sustainability, communication, transparency, credibility, emissions, collaboration, compliance, strategy, stakeholders.

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Adela Ella Alagic

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1. Introduction

This chapter introduces the overall context of the study. It describes the background and problem discussion that will drive the research. It defines the purpose and the research question, as well as the scope and limitation of the study. All these sections laid the groundwork to analyze the way in which transport companies convey the sustainable transport solutions and the importance of communication as a determinant in facilitating greener decisions.

1.1 Problem discussion

With the logistics sector under growing pressure to decarbonise, transport firms are investing in various more environmentally friendly options, such as biofuels and electrification, intermodal restructuring and carbon offsetting programs. Although such innovations are necessary in order to mitigate the environmental impact, the innovations present complexity in the decision making of customers and stakeholders. The number of transport options, each with their own details to analyze, and the multitude of contradictory environmental claims make it almost impossible for customers to determine the transport options' true environmental value (Weder, 2023). Although every innovation is important, the greatest focus lies in how companies communicate with their customers and stakeholders. Customers and stakeholders should be able to make decisions based on the company's provided information which should be clear and tailored to the operational context specific to the transport service offered.

Studies reveal that sustainability communication in business settings is not always deep as companies pay more attention to image control than empowering sound decisions (Golob et al., 2023). This is manifested in the transport industry as ambiguous or uncoordinated messages on the topic of green logistics: such expressions as low carbon, climate neutral, or sustainable transport are used without a specific definition or standardized measures (Elving et al., 2015). Consequently, the customers might develop decision fatigue, mistrust, or at least skepticism, particularly when the sustainability claims lack clear information or third-party confirmation (Einwiller & Carroll, 2020).

In order to accomplish more than shallow marketing concerning the promotion of the sustainability concept, the latter has to be integrated within the organization's day to day activities. As noted by Weder and Stranz l (2025), the real leverage comes from the relationships within the organization, such as from employees, mid-level managers and sustainability specialists negotiating sustainability everyday. Thus, internal dialogue acts as the basis of organizational infrastructures for external communication. Weder (2023) points out an important gap in corporate communication about sustainability, where communication that is deemed flexible to meet the stakeholder expectations is still operating on the level of what can be termed as transformative, and has not even crossed over to the level of transformational where there is change in the internal communication structure and the behaviors. This is the bottom line, where companies find it impossible to communicate the trade-offs customers desire (carbon cost, etc). Transport companies can make shifts in internal communication along the lines of greater transparency and alignment to help customers explore the trade-offs to which the companies can respond with sustainable solutions. Governments may align regulations to support long-term sustainable solutions developed by transport companies. Providing a framework of more meaningful conversations is done through the informal, unstructured conversations that sustain dialogues around the norm within the organization, and that go beyond just making outward-facing reports with no internal dialogue (Weder & Stranzl, 2025).

This frame of internal dialogue is vital as the global transport sector is responsible for almost 13.7% of greenhouse gas emissions. In order to meaningfully reduce this share, and most importantly, to be in line with the targets such as those of the Paris Agreement, transport companies should establish sustainable communication to the customers (United Nations Development Programme, 2025). However, customers do not have the tools or knowledge to assess them. Communicative lack is the

issue rather than a lack of choice. The customers and stakeholders require more than the lists of green services; they require comparative, situational, and reliable information that correlates with their individual logistics requirements and sustainability objectives. This will involve recommendations on the interpretation of emission data, regulatory trends (e.g., EU taxonomy, CSRD), and will be offered to align their transport decisions with their own ESG commitments (European Commission, 2022).

Overall, the main issue is not the absence of sustainable innovations that impedes the logistics transition to a green one, but a communication breakdown. To hasten the shift, the transport companies must shift out of promotional sustainability discourses and into dialogic, contextual, and decision enabling communications. It does not necessarily mean merely better messaging, but also new forms, like interactive applications, scenario-based consultations, or co-branded sustainability roadmaps, which will enable the customers and stakeholders to make informed, confident, and values aligned decisions.

The current literature on sustainability communication in the transport sector has much to do with the final customer and consumer decision. Nevertheless, there has been a smaller focus on the intermediary level where transport companies decipher sustainability requirements, turn regulatory pressures, and determine the process through which these are externally communicated. This thesis aims to fill this gap by researching conceptualisation and operationalisation of sustainability communication by transport firms themselves in the interface between internal decision-making and customer-facing communication.

1.2 Background

Sustainability communication is no longer a corporate peripheral issue but it has taken a central position as strategy. It has over the past twenty years been modelled as a condition of legitimacy (Carroll, 2015), a source of competitive advantage (Du & Vieira, 2017), and most recently as a governance mechanism to achieving the UN Sustainable Development Goals. However, time and again meta-analyses find that most corporate sustainability communications are still declarative, selective and internally inconsistent, which makes them subject to green- and sustainability-washing (de Freitas Netto et al., 2020; Golob et al., 2023). Consequently, the stakeholders disbelieve sustainability language to a greater extent, a process that communication scholars refer to as issue fatigue or post-truth scepticism (Canel, 2023).

The credibility gap can be attributed to three repetitive deficits. First, the majority of messages remain one-way messages that announce success, rather than encourage discussion (Newig et al., 2013). Second, organisations are inclined to make the distinction between communicating of sustainability (reporting) and communicating for sustainability (transformation) ambiguous, restricting communicative practice that considers itself a part of norm-building to image management (Weder, 2024). Third, internal actors, such as employees, middle-managers, professional communicators, are seen as mere implementers rather than co-creators of sustainability meanings, which inhibits the organisational learning that sustainability governance would need (Onkila & Sarna, 2022; Weder & Stranzl, 2025).

The customer's experience of having to manage choice overload: competing metrics, obscure language and lack of third-party validation decreases readiness to pay a bit more to go green (Einwiller & Carroll, 2020). The European Commission (2023a) does not blame the lack of uptake of the low-carbon transport options on the lack of technology but instead blames it on the information asymmetry and lack of trust. There has been developing evidence that the gap can be bridged through the replacement of declarative communication with relational communication. Aviation, shipping and road transport case studies indicate that in cases where firms involve shippers, passengers and employees in the co-creation of carbon budgets, route planning or a green-labeling criterion, customer loyalty and environmental performance enhance. On the inside, the dialogic practices, such as listening tours, cross-functional workshops, appreciative inquiry, transform sustainability as a

corporate slogan into a negotiated organising principle (Men et al., 2020; Yue, 2022). Weder (2024) sums up this reorientation as follows: a process of communicative cultivation of sustainability: new norms are questioned, stabilised and re-negotiated across organisational boundaries in an iterative process.

Put collectively, the literature conducted in the literture review will be united by three imperatives of future sustainability communication in transport:

1. *Replace dissemination with dialogue*: make employees, customers and value-chain partners co-authors and not audiences.
2. *Unify in-house and insourcing arenas*: bring what is being stated to investors and that which is being discussed in depot canteens and driver Whatsapp groups.
3. *Enhance trade-offs transparency*: substitute selective success stories with contextualised data enabling the stakeholders to compare environmental, economic and social impacts.

It is the new conversations that will be important to whether the next generation of transport companies can further accelerate decarbonisation, rather than new engines.

1.3 Purpose

The purpose of this study is to explore how transport companies can strengthen its external communication about sustainable transport solutions to increase adoption of greener transport options.

1.4 Research questions

- What information needs influence transport buyers' adoption of sustainable transport alternatives in a B2B context?
- How does external sustainability communication influence trust, transparency, and decision-making in sustainable transport procurement?

1.5 Limitations

The main purpose of this study will be to examine the ways in which transport companies can increase the transparency and efficiency of their sustainability communication to external parties. As a result, the limits are restricted to the communicative behaviors of transport providers, but not an overall analysis of all stakeholders in the logistics and supply chain ecosystem. This emphasis also implies that the paper does not examine how much internal operations transformation, new technology, or regulation structure affects sustainability performance.

Moreover, the research characteristics as a qualitative type of study and the necessity to rely on a comparatively small sample of production companies and logistics and transport companies, that put restrictions on the ability to extrapolate the results. The results obtained will represent the opinions of the particular companies that were interviewed and may not be entirely indicative of the entire industries and market segments. Another limitation of the study can also be seen in the willingness and accessibility of companies to be involved in the study which might introduce some self-selection bias on the study. Lastly, since the analysis of the study relies on the self-reported perceptions and experiences of the participants, there are possibilities that the data will be affected by interpretive biases or respondent strategic framing. These restrictions are to be considered when trying to analyze the findings and understand their generalizability.

2. Literature review

This chapter reviews key literature on sustainability communication in the transport and logistics sector. It discusses both internal and external communication behaviors, any theories applicable in communication and previous studies on motivation or obstacle to the uptake of greener transport options.

2.1 Internal sustainability communication

Internal sustainability reporting in transport, airlines and shipping companies and their subcontractors has developed as an optional CSR initiative to a statutorily diverse instrument of climate regulation. The EU Corporate Sustainability Reporting Directive (CSRD) demands companies to elaborate on the embedding of sustainability principles within organisational culture and operations (European Commission, 2025). Conceptually speaking, such requirement enshrines what communication theorists refer to as the development of sustainability, i.e. the ongoing communicative practice according to which sustainability norms are established, bargained, and stabilised in organisations (Weder & Stranzl, 2025).

Empirical studies have constantly proven that internal sustainability communication works best when employees are placed as authors of sustainability practices and not as receivers of pre-set messages. E.g., in a survey of 482 drivers of truck-fleets and warehouse employees in China, Dong, et al. (2024) discovered that symmetrical communication, i.e. two-way feedback and participatory target setting, enhanced pro environmental behaviour by 0.42 standard deviations over top-down messaging. Equally, in a Scandinavian rail-cargo operator, qualitative research demonstrated that drivers that had attended periodical energy efficiency huddles realized a 7% higher fuel savings compared to their counterparts who were only given instructions through emails (Barendsen et al. 2021).

Notably, the impacts of these are relational rather than informational. Not only does internal sustainability communication pass on knowledge, but it defines the relationship of the employees with the organisation and the environmental goals that the organisation seeks. With the help of the organisational-employee relationship scale, Men et al. (2020) show that transparent and listening focused communication reinforces affective commitment, which consequently determines the readiness of the employees to become champions of fuel saving innovations. Generalizing this finding, Kang and Sung (2017) demonstrate, using the three country logistics sample, that dialogic communication describes 31% of the variance in extra role green advocacy, including the situation when a driver willingly provides customers with eco-efficiency advice.

These relational dynamics are also preconditioned by leadership communication. Behavioural change is more likely to occur in transformational fleet managers who describe a collective sustainability vision (i.e., we move Europe to net-zero) and coach employees individually on eco-driving than managers who solely rely on the spread of performance indicators (Yue, 2022). Ethnography, however, warns Onkila and Sarna (2022) that, in situations when middle managers are deficient in conversational resources, sustainability discourse might end up being turned into compliance-focused talk. Internal communication in these scenarios can serve as a buffering effect, covering up trade-offs in operation as opposed to facilitating collective sense-making.

In addition to leadership styles, organisation structuring also has a definitive impact on internal voice institutionalisation. Dong et al. (2024) discover that transport companies that have official green proposal plans and anonymous reporting applications realize 24 percent more fuel-saving improvements than those that use informal internal bulletins. Similarly, DHL also credits much of its

sustainability development to its GoGreen Champion network made up of 3, 500 trained employee ambassadors. The company states that this network has helped the company to reduce CO2e emissions per parcel by 37% since 2013 (DHL Group, 2023).

Internal sustainability communication has, most recently, started to take a developmental dimension. This can be evidenced by the increased use of the Inner Development Goals (IDGs) by transport multinationals. Weder and Stranzl (2025) capture the incorporation of the five IDG dimensions; Being, Thinking, Relating, Collaborating, and Acting, into toolbox talks at depot level by a European logistics provider. A year later, drivers documented a 15 percent growth of perceived behavioural control regarding the consumption of fuel and a 9 percent decrease of the idling period. When put together, these findings highlight the importance of internal sustainability communication as the one which integrates personal capacity building with group sense-making.

2.2 External sustainability communication

External sustainability communication within the transport and logistics industry describes how carriers, ports, third-party logistics providers and passenger-service operators present their environmental performance, strategic trade-offs and future decarbonisation strategies to those beyond the organisational boundary such as shippers, passengers, investors, regulators and local communities (Weder, 2024). This type of communication does not belong to any promotional messages, but more often involves symbolic narratives and quantified and standardised information which can be assessed by outside stakeholders and measure improvements over time. According to Vienazindiale et al. (2021), who discuss in their research on transport and logistics businesses the idea of sustainability communication, it can only be meaningfully conveyed when accompanied by the real green logistics operations and decision-making processes and not a reputation exercise in itself.

Longly, external sustainability communication within the sector was typified by one-way flow of selectively positive information. Companies focused on relative efficiency benefits, including less emissions per tonne-kilometre or less fuel consumption per vehicle, yet excluded absolute emission growth, rebounds or upstream and downstream consequences. This trend reflects the initial phase of sustainability engagement, which Vienazindinea et al. (2021) outline as companies investing in visible environmental activities but reporting them in a disjointed and mostly promotional way. With time, however, this selective disclosure has added to the increasing stakeholder scepticism. However, according to surveys, most citizens of Europe do not trust the environmental assertions of transport businesses, which means that the relevance of symbolic signalling in external communication no longer causes legitimacy (European Commission, 2022).

The lack of credibility is currently being resolved by the tightening regulatory environment that essentially changes the external information space. The Corporate Sustainability Reporting Directive (CSRD) represents a significant change in unfocused sustainability reporting to compulsory and similar and machine readable reporting. Starting 2024, the large companies engaging in transport and logistics in the EU are required to disclose the standard indicators, including modal split, well-to-wheel greenhouse gas intensities and the proportion of renewable fuels, by using European Sustainability Reporting Standards approved by EFRAG (2022). This regulatory change is consistent with the results presented by Vienazindieme et al. (2021) who demonstrate that external pressure exerted by regulating bodies and clients of businesses is one of the major factors that urge logistics companies to leave the informal sustainability reporting practices and transition towards data-driven, more structured reporting practices. Significantly, preliminary financial data has indicated that firms that actively promise their ESG data enjoy reduced capital charges and turn the process of communicating their sustainability to external stakeholders into a generator of economic value (Coelho, et al. 2023).

Although there is a growing standardisation, the credibility of the external sustainability communication is stakeholder-specific as opposed to being universal. The empirical research proves that various audiences need various kinds of information and forms of it. Corporate shippers focus on core carbon-footprint figures and scenario-based decarbonisation roadmap, and symbolic images, including green trucks or tree-planting projects, are viewed as being of lower value or even false (Einwiller & Carroll, 2020). Conversely, more straightforward and immediate information is beneficial to passenger-facing operators: carbon labels in place in apps to book or request a ride-hail boost the decision to pick lower-emissions options (Pham et al, 2024). This distinction echoes what Vienazindiene et al. (2021) characterize as the growing demand of compatibility between the sustainability communication and the stakeholders' decision contexts and not the homogenous messaging approach.

The digitalisation also adds to the list of the external sustainability communication by providing transparency in real-time and at asset level. The technologies including AIS-based vessel tracking, blockchain-authenticated fuel certificates and QR-coded parcel information can enable ports and logistics providers to reveal the emission of individual ships, trucks or consignments (Pham et al, 2024). Although these tools contribute to increased informational transparency, studies have warned that the availability of data is not in itself a cause of trust. Golob et al. (2023) demonstrate that when companies release accurate figures of emissions, their openness is heightened through scepticism whenever the companies are shown to be lobbying, or even through operations, a phenomenon termed as discursive decoupling. This risk is connected to the results related to sustainability communication expressed by Vienazindaine et al. (2021) that the situation in which sustainability communication cannot be seen as congruent with the wider strategic orientation of a firm leads to its loss of efficiency.

In order to handle this difficulty, external sustainability communication is slowly being converted into monologic disclosure into a more dialogic and participatory mode of communication. Multi-stakeholder initiatives like the so-called green corridors of the TEN-T network initiate shippers, logistics service providers and state authorities to collectively establish carbon limits and publish performance indicators in the long run (Weder, 2024). Essentially, participatory processes like citizen juries on urban delivery prohibitions or joint innovation forums led by ports shift the involved stakeholders in the affected cities and beyond the passive receivers of sustainability to the co-creators of sustainability solutions. These strategies align with the point of Vienazindiale et al. (2021) that sustainability in logistics should be long-term, and it cannot be achieved through improving the technology alone but also through stakeholder engagement and shared responsibility.

Lastly, the professionalisation of external sustainability communication and connecting it immediately to market outcomes is being achieved by sector-wide standards and independent assurance mechanisms. Several frameworks like the Global Logistics Emissions Council (GLEC) approach offer standardised guidelines through which greenhouse gas emissions in multimodal supply chains are computed and reported (Smart Freight Centre, 2023). Credibility is enhanced by independent certification by organisations like SGS or TUV. It has been empirically demonstrated that carriers that report GLEC-compliant and assured emission data are much more likely to win a green tender than non-certified carriers, especially when accompanied by disclosure that is consistent with the CSRD requirements and future-oriented goals (Åhlvik and Rehfield, 2022). External sustainability communication, in this regard, is changing into a reputational nice-to-have feature into a decisive quality message that is a factor in procurement and competitive positioning.

2.3 Communication teories

Any effort to provide reasons as to why one sustainability message has an effect on the behaviour of a driver whereas another is disregarded must start with the classical transmitter-receiver paradigm. The mathematical model developed by Shannon and Weaver (1964) in its original version conceptualises communication as a signal-processing problem where a source codes a message, a channel carries the message and the recipient decodes it under noisy conditions. Noise can be described as any type of interference that alters, slows down or makes the signal to be received improperly. In the case of a haulage company, this interference may be physical, e.g. radio noise or bad phone signal along motorways, but also semantic, organisational. The resulting ambiguity between conflicting performance indicators that characterise the same trip as urgent or eco-optimal makes the message less clear and discourages behavioural guidance (Fiske, 2011; Noble, 1996).

Going beyond the engineering paradigm, the SMCR (Source-Message-Channel-Receiver) model by Berlo (1960) adds psychological and social aspects to the field of communication. Berlo explains that the measures that make the message effective are not only the structure of the message but also the nature of the source and recipient of communication such as skills in communicating, attitude, knowledge, and cultural background. Notably, this model emphasizes the fact that noise can be reputational as well. The dispatcher may lose the message despite being factual when he or she has poor credibility because of a track record of exaggerating his or her fuel-saving results. This opinion is supported by the empirical studies carried out in European road freight, which indicate that the attitude of drivers to eco-driving instructions is not dependent on the particularities of the message but on their trust in the communicator (Yue, 2022). The quality of communication, thus, cannot be separated by the impressions of credibility of the source.

The interactional models also take the analysis a step further by focusing on the transmission to meaning-making. The axiom of the impossibility of not communicating that was developed by Watzlawick, Beavin and Jackson (1967) underlines that any communication is viewed in the context of a continuous relationship. Communication is therefore never neutral: it is always interrupted by previous communications, organisational history, and perceived intent. To take another example, when a carbon performance report is released by a transport company that has actively opposed the tighter regulation of the climate in the past, it can be viewed as hypocritical, no matter how well the information is presented. According to Golob et al. (2023), such a misfit between communicative claims and observed practices has been referred to as discursive decoupling. In this sense, it is not only the favourable signal to noises ratio that facilitates a message getting through, but a built-up trust and consistency between words and actions over time.

Grunig and Hunt (1984) four models of communication offer a strategic framework in which these micro-processes can be placed at the organisational level. One way publicity models e.g. press releases or sustainability reports, meet the disclosure needs but seldom lead to behaviour change. Two-way asymmetrical forms of communication involve feedback loops, although these are mostly to enhance persuasive communication, but not to change organisational behaviour. On the contrary, bi-directional symmetrical communication is mutual accommodating, where the organisation and the stakeholders are both accommodating to change. According to Grunig and Hunt's research, the long-term legitimacy and resilience are the strongest predictors of this orientation. Such projects as Nordic green corridor projects, where shippers, ports, and carriers co-determine carbon budgets and publish joint ISO 14001 audit results, provide examples of very high rates of symmetrical communication, and when failures are reported in the media (Heide and Simonsson, 2021; Wright, 1996).

2.4 Determinants and Barriers to Green Choice Adoption

What motivates transport buyers, commuters or haulage contractors to use the low-carbon alternative, or not to use it? Despite all other predictors being found to be less effective than out-of-pocket price, meta analysis confirms that the presence of the visible surcharge on the green alternative depresses the adoption rates by 0.7 percent per 1 percentage point price difference compared with the conventional service (Åhlvik and Rehfield, 2022). The effect of wallet-first is observed to hold in freight tenders, airline tickets and urban parcel delivery, and therefore it was concluded that the budget constraint is the major obstacle hindering the adoption of the green choice.

Nonmonetary drivers moderate price sensitivity, but do not reverse it. Ek and Söderholm (2010) range the willingness-to-pay (WTP) premium of CO 2, offset road freight among Swedish shippers at 6-9 percent although when the surcharge is presented as a certified climate investment and limited to less than 0.05 Euro per tonne-km. After the premium increases beyond 10 percent, WTP decreases rapidly and denotes that there is a kinked demand curve. It is based on these ceilings that many bio-fuel or electric-truck services are niche: marginal abatement costs in road freight continue to be in 150-200 euro/tCO 2, which translates to 12-15 percent price increase, above the average WTP (European Commission, 2023b).

The price barrier is increased by income and size of the firm. SMEs in logistics that have less than 50 employees indicate a probability that is 30 percent higher to reject green tenders when pay-back periods are longer than 18 months, but pay-back periods to 36 months are accepted by large corporations (> 250 employees) (Vienazindienė et al. 2021). Despite the fact that the empirical data provided by Lin and Wang (2023) concern the household consumers, the results are quite applicable to the study of green choice barriers in business-to-business procurement of transport. Just like in the case of households, B2B transport purchasers are constrained by budgets which tend to override the purported environmental intentions. Although at the strategic level, corporate customers can be very ambitious with regards to the sustainability agenda, the readiness to pay price premature to greener transport arrangements are likely to decrease as decisions are converted into operational purchasing environments. This discrepancy is a typical intention-behaviour gap, where intentions to be pro-environmental do exist but are not realised in actual purchasing behaviour because of the cost sensitivity and short-term efficiency pressure.

3. Method

This chapter explains the methodological approach of the study. It outlines the qualitative and abductive research design, describes how empirical data was collected and analysed through semi-structured interviews. The chapter is finished of by discussing ethical considerations as well as the issues of validity and reliability.

3.1 Research approach

The methodology of this research is a qualitative research that adheres to an abductive research approach. The abductive methodology is a synthesis of deductive and inductive reasoning, and allows an iterative process of interaction between empirical observations and theoretical explanation. This is especially appropriate where the area of the research is exploratory and the prevailing theory might be divided or incomplete in nature and thus, not comprehensive enough to explain the complex decision making processes (Eriksson and Wiedersheim, 1999).

The deductive part of the study is based on the literature available on sustainable transport, environmental performance and sustainability communication. This theoretical background was used to develop the research purpose, research questions, and the general structure of the empirical research. Meanwhile, the inductive part was developed by gathering and examining empirical data. Patterns, meanings, and perspectives could be identified on the basis of the experiences of the respondents, which was not possible without the empirical material. The research process enabled the theoretical assumptions to be discussed and improved concerning the obtained data through the interaction of theoretical views and empirical results.

The study falls under qualitative research tradition. This methodological orientation informed the selection of the data collection methods, sampling strategy and analysis processes (Patel and Davidsson, 2003). The empirical study is grounded in the fourteen semi-structured interviews held with the representatives of the manufacturing companies, logistics providers and one technology provider who are working in the transport industry. Purposive sampling strategy was used to incorporate actors who had various roles in the transport system.

3.2 Data collection

The combination of primary and secondary data contributes to the overall validity of the study through methodological triangulation. Although the primary data present extensive information on organizational views and activities, the secondary data have theoretical and contextual information. Combined, these sources make the analysis more robust and contribute to the well-grounded conclusions on the topic of sustainable transport alternatives and communicative processes between manufacturing and logistics companies with each other.

3.2.1 Primary Data

Primary data were gathered to meet the aim of this thesis, that is to study the ideas of the sustainable transport alternatives and to discuss how the communication between the manufacturing and logistics firms can impact the creation and introduction of the sustainable transport alternatives. Consistent with the accepted reasoning of the methodology, primary data allow the researcher to develop contextually specific and directly relevant information that is highly in accordance with the developed research questions.

The main empirical data were conducted from the fourteen semi structured interviews that were carried out with the representatives of seven manufacturing firms, six logistics firms, and one technology provider. The purpose of the inclusion of both manufacturing and logistics companies was an intention to include different yet interdependent perspectives on the transport system. The transport buyers are often the manufacturing companies, with the definition of sustainability requirements, and the operational execution of the transport services being executed by the logistics companies. The study aims at bringing both groups on board to create a richer insight, in the way sustainable transport alternatives are perceived, negotiated, and enacted at an organizational level.

The technology provider was also involved to add technical knowledge pertaining to the measurement of emissions and generation of data. This view provides another level of analysis concerning monitoring and checking the sustainability performance of transport activities. The respondents hence were chosen on a purposive basis and also depending on their professional roles, expertise and engagement in decision making processes that have a bearing on transport. This type of strategic sampling reinforces the topicality and depth of the empirical content.

3.2.2 Secondary data

Secondary statistics were gathered to enrich the primary empirical data and put them into perspective. These sources include scientific publications, scholarly books, industry reports and official publications related to sustainable transport systems, interorganizational cooperation and environmental performance measurement. The secondary sources that were used had various purposes. To begin with, it offered a theoretical basis of the study and guided the formulation of the research purpose and questions. Second, it allowed placing the empirical results into the existing research. Third, it added some background information on regulatory systems, technological advancements and sustainability trends in the transport sector.

Search was a combination of structured and iterative search. Preliminary searches have been made with the help of the relevant keywords, such as ”*sustainability*”, ”*sustainability communication*”, ”*sustainability goals*”, ”*emission data*”, ”*emission communication*”, ”*internal communication*” and ”*external communication*” that associated sustainable transport options, interorganizational communication, emission measurement, and supply chain collaboration. Such searches were conducted mostly by using academic databases like Google Scholar, Supersearch, Scopus and The Chalmers Libary. Citation tracking of reference lists of discovered key articles was then conducted to find more relevant sources. This search method as a chain search helped to explore the main streams of research in more depth.

Criticism of sources was used during the process. The reliability of both sources was determined on the basis of the date of publication, authors, institutionalization, transparency in methodology, and topicality to the research topic. Peer reviewed journal articles and academic literature which were well established were given priority. Industry reports and organizational reports were employed carefully and mainly to give the contextual or descriptive information.

The structure of the report follows the hourglass model for academic writing, moving from a broad introduction to a focused empirical analysis and returning to broader theoretical implications. (Coles, 2008). This strategy was used to structure the thesis in the current research. It has introduced the problem of sustainability in the transport industry in general and the particular research problem which is on the subject of sustainable transport options and communication between the manufacturing and the logistics stakeholders. The methodology and the empirical sections form the smallest section of the hourglass where the paper will focus on the particular interviews and data gathered. Later in the thesis, the discussion and the conclusion widen the view once more by comparing the empirical results to the

existing theory as well as broader trends in sustainable transport and sustainable supply chain management.

3.3 Interview procedure

All interviews conducted for this thesis are to be regarded as semi structured and were conducted from manufacturing companies, logistics providers and one technology provider . Keeping the interviews semi structured allowed there to be flexibility in the structure of the interviews (Patel & Davidson, 2003). The interview process included the development of interview guides, execution of the interviews and the transcription and analyse of the recorded material.

3.3.1 Interview guide

The individuals who were interviewed are the representatives of the organizations that have been working in the manufacturing and logistics industries and have a lot of professional experience in their fields. The respondents as a group are mainly strategic or operationally responsible in terms of transport decisions, sustainability work, or supply chain management. Most of the participants have been in the industry between 5-20 years and thus they have much practical knowledge and industry specific insight. The respondents choosen to take part in the survey are actively engaged in the transport procurement, logistics operations, and sustainability management which guarantees informed and experience-based views of the data collected by the study. This demographic profile substantially reinforces the validity of the study, where participants have the professional skills necessary to offer reliable information on the subject of sustainable transport alternatives and communication processes between manufacturing and logistics companies.

The preparatory stage was associated with developing two distinct interview guides, one of them being focused on manufacturing companies and the other on logistic companies. The development of two individual guides was aimed at achieving contextual applicability and permitting sector specific modifications to have a consistent overall structure according to the research questions. All respondents received questions that were associated with the major themes that were determined based on the theoretical framework and the purpose of the study, such as the strategies of sustainability, the assessment of transport alternatives, the collaboration practices, information needs, why green choices are not choosen, communication between transport buyers and the suppliers, and what the future holds in the subject. Concurrently, the format allowed probing inquiries and expounding, thereby allowing further investigation of intricate organizational processes. This methodology helped to increase the internal validity of the study because it ensured that the data that were gathered were tightly related to the aims of the research, and it also gave the research respondents an opportunity to explain their experiences in their words.

The guides served as thematic models that helped the respondents to have a preview of the areas of discussions. They were also created and distributed to the respondents to enhance validity. This process brought more transparency and gave participants time to prepare reflective answers and hence enhances the accuracy and richness of the given information. Moreover, informed consent to record all interviews and transcribe them word-to-word minimized the potential misinterpretation factor and backed up a systematic and transparent analytical procedure. This aspect of including the respondents of various sectors also allowed some sort of triangulation of views, which adds to a more subtle and plausible empirical basis.

3.3.2 Interview process

The first level of contact with the possible respondents was strongly based on electronic mail. The aim of the study was well stated in this communication along with the reasons why the respondent was important to the general aims of the research. This was a strategy that would help in ensuring transparency, as well as, establishing a basis of trust before the interviews. The respondents were also required to specify whether they wanted their participation to be disclosed in the study or whether the respondents wanted to be anonymous before each interview. All the companies that agreed to participate were anonymous and their identities have thus been kept secret during the thesis.

All the fourteen interviews were done online on Microsoft Teams, while four respondents chose to submit written responses to the interview questions via email. After the time of the interview was made known, the respective interview guide was dispatched on each respondent some days beforehand to enable ample preparation. The Microsoft Teams interviews took around half an hour to 45 minutes. Even though the interview guide was used to provide a structured guide, it was flexible to give some flexibility to follow up and elaboration where necessary. This semi structured format was useful in exploring the emerging themes and also ensures that all the central topics were covered.

At the start of all interviews, the question of anonymity was restated, and informed consent was obtained concerning audio recording. In case of the interviews, short notes were made to note down the important points and other important statements by the various thematic areas. These notes were an additional support to the audio records and presented the follow-up analytical procedure.

After the interviews were conducted the audio tapes were transcribed verbatim using TurboScribeAI (https://turboscribe.ai/sv/dashboard). The main items that were to be analyzed are the transcriptions. They were critically scrutinized and formed a basis of coding, thematic categorization, and formulation of major insights voiced by the respondents in relation to each of the themes covered in the interview guides.The verbatim transcription reduced the chances of selective interpretation and the empirical material was in the original formulations of the respondents. The subsequent analysis was based on the transcriptions.

3.4 Data analysis

To guarantee rigor and reliability of methods, the analysis of the empirical material was done following a systematic and transparent procedure. The analytical process was perfectly in line with the aim of the thesis, which is to assess how manufacturing and logistics firms view sustainable transport solutions, and how the communication between these entities affects the creation and adoption of sustainable solutions to the same.

The emprical data was analysed through a thematically procedure. It is used to identify, analyze, and report patterns of meaning, referred to as themes, in this case within the empirical data. The method helps researchers organize and describe qualitative data in detail and can also support the interpretation of different aspects of the studied phenomenon (Braun & Clarke, 2006). At the beginning, the transcripts were read repeatedly to obtain familiarity with the information and to have a general picture of the patterns and main statements. The material was coded in the following step. The coding was an amalgamation of deductive and inductive. Deductively, the research questions of the study and the theoretical framework were used to develop codes, such as sustainable transport strategies, evaluation criteria, interorganizational collaboration, communication practices, and the role of emission data. Inductively other codes were developed when new or unforeseen themes were discovered by the empirical material.

Following the initial coding, the comparison of codes was made between interviews and grouping them into general thematic categories. The special consideration was given to similarities and differences between manufacturing and logistics companies to determine convergences and divergences in the perspectives. Such comparative design allowed examining the difference in expectations, constraints, and communication patterns of transport buyers, as well as transport providers. The technology provider interviewed was also analyzed relative to the other interviews to be in a position of understanding the impact of emission measurement and data availability on the communication and decision making processes.

Coding scheme was applied consistently to all transcripts and old coded material was re-coded with new codes to have internal consistency. The probability of arbitrary and inconsistent categorization would be minimized by applying the same analytical framework to every interview in a systematic manner. In addition to this, the reliability was achieved through the use of semi structured interview guides, which ensured that all respondents were given similar questions concerning the same central themes. With this thematic consistency, it is more likely that a follow-up study done under similar conditions and using similar sampling strategy would be able to find similar patterns and thematic structures.

The use of audio recording and verbatim transcription also enhanced the reliability through the generation of an auditable path between raw data and an analytical conclusion. Transparency of the process was improved since the analysis was not based on the summary via memory but on document transcripts. Replicability is also evident in the obvious connections between research questions, interview themes, coding categories, and final analysis.

The fact that a qualitative research is not based on statistical replication notwithstanding, methodological transparency and systematic methods can enhance the likelihood of another researcher, using the same research design, interview structure, and analysis steps, coming up with similar broad interpretations. The thematic analysis, which was conducted in a systematic fashion, the presence of codification, and adequate recording hence adds to the overall credibility of the research.

3.5 Ethical aspects

Ethical considerations are an essential part of qualitative research, and especially in the case of interview-based study, where human participants are to be involved (Patel and Davidsson, 2003). The ethical principles have been appropriately applied in the current research by systematizing them in the research process to protect the integrity, rights and well-being of all the subjects. All data has been collected in compliance with four major ethical requirements identified by the Swedish Research Council (Vetenskapsrådet, 2002): information requirement, consent requirement, confidentiality requirement and use of gathered data requirement.

The information requirement was met by making sure that all the respondents were well informed about the purpose of the study, the research problem, and the various stages of the research process before they participated in the study. As per Patel and Davidsson (2003), the subjects were given adequate information to facilitate an informed knowledge about the research and its purpose and hence, a well-informed decision about whether to participate or not.

The informed consent condition was met by giving informed consent to all of the participants in the interviews prior to the start of data collection. The study was explained to the respondents beforehand by the format and dimensions of the interviews, their voluntary nature, and the fact that they could pull out of the study at any point without consequence. Moreover, respondents received information

regarding their anonymity and volunteered to take part under these circumstances, which is also a sign of ethical research in qualitative interviewing (Kvale and Brinkmann, 2014).

The consent requirement is closely related to the requirement of confidentiality, i.e. the security of the anonymity of the participants, and the safe processing of the empirical material. To cater to this need, the respondents were made anonymous before the interviews and during the process of the interviews, it was assured that no data would be revealed to identify the respondents when presenting the results. Interviews were recorded and transcribed using a AI-powered transcription software. It was only utilized in aiding the transcription process and for efficiency. The way this tool was used was consistent with Chalmers guidelines on AI-assisted tools, in which AI is used as a supporting tool instead of doing the analysis for the authors and all generated transcriptions were manually reviewed and verified for accuracy. No disclosure of data and all information has been treated in accordance with the accepted principles of social scientific research, i.e., in an ethical way (Bryman, et al. 2013).

Lastly, the need regarding the use of data collected was also monitored well. This condition means that the collected empirical material can only be utilized in the mentioned purpose of the research. In this respect, the research subjects were told regarding the utilization of the obtained data and how the data was to be used without any dissemination or further application other than the extent of this study. Through these principles of ethics, the study is a sure way of being transparent, credible and respectful of the participants during the research process.

3.6 Method discussion

The principles of validity and reliability lie at the heart of the reliability and scientific rigor of the given study. Reliability indicates the degree to which the study could yield the same or similar results in case the same research design was used under similar circumstances (Bryman, et al. 2013). In order to improve reliability, an interview guide was formulated in a structured manner and was used in all the interviews. All the respondents were asked the questions with regards to the same central themes and it lessens the chances of variation due to inconsistent questioning. The interviews were audio taped and transcribed verbatim, which provided a clear connection between raw data and analytical conclusions. Besides, documentation of the analytical process, both in terms of coding and thematic classification, was made to permit procedural transparency.

The abductive research method also has effect on reliability. As theory and empirical material were interdependent, the same researcher working according to the identical design, theoretical framework and steps of the analysis would probably discover similar overarching themes even though slight differences in interpretation might arise. Although the goal of qualitative research is not to replicate the results statistically, the transparency of the methods makes the findings more reliable.

Validity deals with the level at which the study is accurate and representative of the phenomenon under study (Bryman, et al. 2013). There are a number of steps that were undertaken to enhance validity. To begin with, theoretical framework had to be developed through peer reviewed academic sources that were accessed in the established databases like Supersearch, Scopus, and The Chalmers Library. Recent publications and foundational studies were evaluated critically in terms of relevance, frequency of citation, and rigor of the study. This literature review was systematic and had a consistent conceptual background on the empirical investigation.

Second, the interviews were conducted using open ended questions and probing which allowed the respondents to explain their own views on sustainable transport alternatives and interorganizational communication. This minimized the possibility of inflicting predetermined assumptions on the responses of the participants. Third, both manufacturing and logistics firms were included, which

made possible the comparison of the perspectives based on various functions in the organization. This type of triangulation amongst categories of actors helps to form a more detailed perspective of how the issue of sustainability affects the transport related decision making.

However, there are some weaknesses that must be mentioned. The purposive sampling strategy and qualitative design do not allow the generalizations of the results to the whole transport market. The findings can thus be viewed as analytically generalizable and not statistically representative. Also, since the analysis is interpretative, it is also affected by the analytical outlook of the researcher although systematic processes have been practiced in order to minimize subjectivity.

Combined, the transparent research design, equal data collection methods, systematic literature review, and analytical process of iterative character worked towards the credibility, reliability, and validity of the study.

4. Results

The results, from a compilation of interviews with production companies, logistics and transport companies and a sustainable tech company, are presented below based on five main themes.

1. *Sustainability communication as a strategic driver in transport*
2. *Sustainability information and decision making in transport*
3. *Transparency, credibility and trust*
4. *Barriers to green choices and implementation challenges*
5. *Dialogue, collaboration and future directions*

4.1 Sustainability communication as a strategic driver in transport

According to the outcomes of the interview, sustainability communication gains more and more significance within the transport industry. Increasing demands to incorporate environmental factors in transport decisions are described by both the production companies and the logistics providers. Sustainability is therefore no longer viewed as a separate issue, but as something that is gradually becoming part of broader business and logistics strategies.

Meanwhile, the results show the obvious conflict between the sustainability visions and operational reality. Cost, lead time, reliability, and quality of service remain highly influential factors in transport decisions even when companies are more interested in minimizing environmental impact. The concept of sustainability is usually a factor that is deemed significant, yet it seldom comes out as a determining factor when operational risks or financial pressures are high.The results also indicate that there is a difference in the aptitude of prioritising sustainability across organisations. Larger organisations tend to have larger resources at their disposal, they have often better internal frameworks and more sustainability objectives whereas smaller organisations tend to be hampered by limited budgets, lack of knowledge and lower organisational capacity. On the whole, the findings indicate that sustainability communication is increasingly becoming strategic, although its practical impact remains to be influenced by economic factors, priorities of operations, and organisational variations.

4.2 Sustainability information and decision making in transport

In general, the results indicate that sustainability information and communication are enshrined in complex and context specific structures of decisions. The basic functions of reliability of operations and economic effectiveness have not been disregarded, but with the changes in the expectations of the stakeholders, environmental concerns are now being incorporated. This demands elastic communication strategies that accommodate dissimilar organisational abilities, economic realities and regulatory circumstances in the transport sector.

4.2.1 Operational priorities and sustainability trade offs

The results have indicated that sustainability aspects are integrated into a larger operational decision model as opposed to being a major unilateral motivator. In the case of production companies, the reliability of delivery and cost is the most determining factor in transport related decisions. Other key items in the process of evaluation are service quality, lead time and customer impact. The concept of sustainability is generally accepted to be a significant one, but it is seldom of the decisive value when the operation or economic viability is being endangered.

Respondents define sustainability as balancing it with price and efficiency, especially in the procurement situations or comparing certain transport options. As a matter of fact, environmental ambitions are usually counterbalanced by the necessity to organize stable supply chains and to satisfy

customers. This is an example of a multidimensional decision rationale whereby sustainability is one of the elements in a list of conflicting priorities. The level of weighted importance given to sustainability will be different depending on the nature of goods being transported, the strategic role played by the shipment, and the business circumstance at large.

4.2.2 Integration of sustainability in procurement and supplier selection

When sustainability comes into the decision making process is dependent on the organisation. There are production firms that incorporate sustainability requirements in the initial steps of procurements processes and supplier evaluations especially when official climate objectives and internal guidelines exist. In such situations, sustainability is incorporated in tender requirements and in long term strategic planning.

The consideration of sustainability is mainly implemented by other organisations when it is necessary to consider the use of particular means of transport and not at the point of the original planning. The bigger companies tend to exhibit a greater ability to introduce sustainability in a more advanced stage with the help of properly organized procurement strategies, specific sustainability goals, and enhanced internal control. Smaller firms might be faced by limitations in terms of financial flexibility, limited competency and availability of resources that may slow down or limit methodical merging of sustainability factors despite proclaimed intentions.

The decisions on transport are usually discussed with long term contractual partners who are established logistics partners. Reliance on established suppliers is significant, and the customers assume that a certified participant should have the required knowledge and meet the regulatory conditions, such as frameworks related to the European Union. Sustainability is thus integrated in a continuous relational decision process as opposed to a transactional assessment.

4.2.3 Information needs and emission data in customer relationships

According to the logistics providers, concrete and similar information is of high demand among the customers. Data on the difference in emissions of transport options, the cost implications as well as differences in transit time are often demanded by clients. There is also common questioning on risk exposure, compliance, and alternative fuels availability. One of the most repeated issues is related to the necessity of emission data associated with real transport flows, especially regarding the Scope 3 emission in the supply chains.

Customers tend to demand clear and clear explanations on how the emission is calculated and how the use of alternative solutions to transport affects the general climate impact. The pragmatic sense and utility of the climate compensation actions are also doubted, which indicates the need to have a verifiable and operationally-based information. According to the logistics providers, price sensitivity is a major communication difficulty. Although a large number of customers outline their desire to have less negative impact to the environment, their readiness to pay more money is rather different. It is thus considered to be complex to explain the long term worth of the greener solutions when faced with the short term cost pressures.

4.2.4 Organisational diffrences and decision maturity

The interviews demonstrate the presence of apparent differences between the customer groups regarding the level of sustainability maturity, level of knowledge, and strategic orientation. The larger organisations are generally characterised as more formalised climate objectives, more internal expertise, and more motivation to incorporate sustainability in the procurement decisions. Such firms tend to demand more specific data on emissions and are more willing to include the environmental standards in the long term policies.

Smaller organizations, in turn, are perhaps more dependent on short run economic forces, external regulatory constraints, or competitive forces. Their information requirements may be less standardised and more contextual with the internal sustainability ambition and organisational capacity levels varying. The variation in goods carried, complexities of operations, and priorities of the strategies also influence the interpretation and application of sustainability information during decision making.

4.3 Transparency, credibility and trust

The findings, on the whole, reveal that the trust in sustainability communication is the result of the interaction between the transparent data, the uniformity of methodology, the realisticness of the benefits and limitations descriptions, and the ongoing, context-dependent communication. Although structural constraints and low standardisation are persistent issues, the integration of verifiable information and flexible communication practices are core in enhancing credibility in the transport industry.

4.3.1 Transparency as a foundation for credibility

Transparency is mentioned throughout the interviews as the key element in the credible sustainability communication. The focus of production companies on organised sustainability reporting with specific data on emissions, well-defined climate policies and quantifiable goals is also a notable strength. The emissions numbers related to real traffic flows are considered to be much more credible than the statements that are general concerning the environment. Transparency in terms of calculation practices and their reporting over time will also help in enhancing the credibility even more especially where organisations are able to show their past performance and recorded improvements.

This is the same opinion of the logistics and transport companies who emphasize on the importance of credibility in the measurement and explanation of the emissions. Some of the respondents emphasize the need to use the carbon dioxide equivalents terms instead of the simplified terms of emissions because they are a more complex comprehension of the impact of climate. Open pricing audiences and straightforward descriptions of how greener modes of transportation affect the cost and emissions can be viewed as the key contributors to generating trust. The customers have to feel that sustainable alternatives are real operational options and not token additions.

Stability and proven track record is also regarded as key factors in establishing long term trust. The companies that are capable of demonstrating how they have been involved in sustainability over the years and have supported it with verifiable data and known partners are seen to be more legitimate. Meanwhile, the respondents mention the role of humility in communication. The idea of sustainability work as a continuous process, as opposed to a successful outcome, helps to make the story more realistic and credible.

4.3.2 Sources of scepticism and perceived greenwashing

The lack of sustainability communication specificity and evidence is where scepticism occurs. General sustainability statements, imprecise environmental terminology, and buzzword usage without substantiated information are listed by production companies as some of the biggest points of suspicion. The lack of the actual level of emissions or the vague descriptions of the calculation processes undermines trust and contributes to the mistrust of greenwashing. Within a framework where the sustainability claim is growing under scrutiny, the respondents emphasize that the communication should be based on verifiable and quantifiable facts and not on rhetoric of marketing orientations.

Poor or non-standardised data is also a contributing factor to scepticism. Where there are discrepancies in emission calculations between players or where they are not clearly articulated, customers find it hard to compare the options and determine the real effect. Credibility is thus directly associated with

the capability to introduce particular, comparable and contextual pertinent data that adds to clarity in relating the sustainability performance to the performance of operations.

4.3.3 Structural transparency challenges in pricing and emission data

Although there are high hopes of transparency, there are a number of structural challenges which make its realisation a difficult process. The problems associated with manufacturing and logistics firms are the issues concerning the pricing model, emission rates, and service rates. The logistics providers can frequently depend on the services of external subcontractors providing the transport capacity, restricting the direct determination of the pricing schemes and emission estimates. The differences in availability, timing of shipment, and the volumes of transport are some of the reasons why the cost structures vary which cannot be standardised and communicated in a transparent manner.

In other instances, contractual deals limit the degree of information that will be disclosed about emission data and pricing elements. This makes communication with customers complicated since the providers have to be attentive to describe the situation of circumstances instead of offering fixed and easily comparable options. Production firms are uncertain about the capacity of delivery as well as the practicality of sustainable choice which can diminish the readiness to choose greener alternative even in the presence of environmental ambitions.

Lack of standardisation within the actors adds more difficulty to transparency. The lack of consistency in calculation practices and reporting systems complicates the comparison of emission data among transport providers and, consequently, influences the transparency, as well as credibility.

4.3.4 Balancing simplicity, precision, and dialogue

The other theme that can be frequently observed is the issue of simplicity versus technicality in sustainability reporting. According to the respondents, such a balance is a constant challenge. The information should be available and clear to comprehend and still be factual. According to the logistics providers, communication can start with the key figures being clear, and then proceed to more in-depth discussions, when the customers are to have the analysis. It is deemed necessary to adjust the detail and language to the level of knowledge of an individual customer and his/her motivation.

The dialogue oriented communication is important in this process. Sustainability debates have been found to be entrenched in the existing customer relations, and not presented as a unidirectional information. Dissatisfaction with the answer to questions posed by customers often leads to the subsequent elucidation, enhancement of services, and the development of solutions in conjunction. Nonetheless, some of the operational processes are still more information based, e.g. booking systems, in which the customer is provided with the data and makes the decision on their own.

The interview with informatics the technology company further explains how data transparency may be used in supporting the credibility in the presence of communicative contextualisation. Using sensor based monitoring systems, organisations are able to access unceasing operational information which they can use to optimise their routes as well as reduce indirect emissions. Even though the actual emissions are not measured, efficiency increases and lowering the frequency of transport offer quantifiable environmental advantages. Analytical tools and customer dashboards help organisations to track performance and be able to incorporate this into sustainability reporting. Simultaneously, the interview demonstrates that technological transparency is not the only thing. This has to be accompanied by continuous communication and clarification so that stakeholders can make sense of the contents and breadth of the information and how to transform technical outputs to plausible and pertinent sustainability discourses.

4.4 Barriers to green choices and implementation challenges

This asymmetry results in disproportionate uptake behaviours throughout the supply chain and supports the view that sustainability changes need not only organisational willingness and financial investments, but also favourable infrastructural and regulatory environments in the regions and internationally.

4.4.1 Cost and operational constraints in green transport decisions

The results indicate that greener forms of transport are often given second priority even in the organisations that declare high intentions of lessening their environmental effect. In all groups interviewed, price and reliability of delivery appear to be the biggest barriers. By the time more sustainable alternatives are more costly, time-consuming, or seem to put the sustainability of the service at risk, sustainability will be relegated to the back seat. This tendency can be seen even by companies who have the formal climate targets and high environmental intentions.

Manufacturing businesses always stress that cost and delivery time is given much priority, especially when there is an urgency or when a rigid service demand must be met. There are other times that the items that are greener are not seen as competing regarding pricing or performance, which makes them less viable to use. In some instances, failure to choose a greener alternative is termed as passive. Traditional transportation solutions are normally fronted with the cost and delivery performance framework in mind, whereas their sustainable alternatives are fronted in the form of supplementary options as opposed to a default selection. Such framing affects the results of a decision and supports the status quo operational priorities.

This dynamic may be further reinforced with the help of operational performance measures and internal targets. The performance indicators and efficiency requirements in larger organisations have the inadvertent effect of deterritorialising the choice of options that are seen to be divergent to the set cost or service goals. Consequently, the sustainability goals become negotiated in the framework, in which economic and operational stability stays the key decision factors.

4.4.2 Transparency limitations and communication complexity

The problem of low transparency in pricing structures, emission data, and terms of services makes the implementation issues even harder. According to the explanation by logistics providers, they often depend on external subcontractors to supply capacity of transport, which makes them less in control of pricing model and emission estimation. Change of cost structure that is hard to standardise and communicate easily comes with market fluctuations in availability, shipment timing, and volumes of transportation. Thus, sustainability communication tends to be contextual and needs to be explained with attention more than just being promoted with more green alternatives.

Production companies are also uncertain about the capacity of delivery and the feasibility of sustainable alternative. Vagueness in cost apportionment and the lack of clarity when it comes to the actual emission cuts foster reluctance. In cases where the emission data is not completely transparent or comparable it is harder to justify more greener decisions within the organization. Such structural conditions make the implementation difficult and require more context specific and sensitive forms of communication.

4.4.3 Gaps in knowledge and uncertainty

Another major impediment to implementation is knowledge limitations. Both the customers and transport providers have realized gaps in knowledge regarding the calculation of emissions, sustainability trade offs, and long run effects on the environment. As a rule, it is third parties who produce emission numbers, not the companies themselves, and this fact makes these numbers less credible and harder to communicate with.

It is defined that the practical value of climate compensation mechanisms is especially hard to explain. Customers often raise the question of the concrete effects of compensation measures and want to see them more evidently. Such uncertainty adds to the conservative communication styles and strengthens the need of additional pedagogical description of the environmental advantages as well as operational possibility.

Moreover, infrastructural limitations affect the viability of the green solutions of transport. The availability of renewable energy sources, like HVO100, and the presence of electric vehicle charging systems differ greatly according to the regions. Nordic countries also have advanced infrastructure, which is said to be more developed than other regions in Europe where the availability of some alternatives is very limited and thus restricts the practicality of the implementation. These institutional realities constrain the embrace of greener alternatives despite the communicative undertakings.

4.4.4 Organisational capacity and resource constraints

The resource constraints also influence the communication practices and implementation outcomes. Some of the logistics companies suggest that they do not have the ability to present sustainable alternatives systematically in all interactions with the customers. The customers are thus the ones that initiate sustainability discussions as opposed to being proactively introduced. Small businesses especially might not be in a position to acculturate extra expenses relating to environment-friendly transportation even where they are inspired to achieve environmental solutions. Larger organisations on the other hand tend to have more financial flexibility and ability to incorporate sustainability costs in long term strategic planning.

Nevertheless, the interviews also display that bigger and more globalized organizations have different structural issues. They can have more financial and organisational strength but their transport networks can be shared by several countries whose infrastructural conditions are quite different. The respondents remark that the Nordic region was relatively well-developed in terms of the renewable fuel supply and electrical vehicles infrastructure, and the areas of southern Europe have the insufficient electric vehicles charging infrastructure and usability of renewable fuels like HVO100. Such disproportional infrastructural terrain makes attempts to unify greener transport options in the global operation more difficult. Consequently, multinational organisations are likely to face feasible constraints in their quest to adopt homogenous sustainability policies in intercontinental transport flows.

4.4.5 Alignment of responsibility and expectation

Lastly, the interviews emphasize how production and logistics actors should have shared responsibility and expectations. Sustainability in transport is seen as a matter of collective investment, achievable cost projection and set goals of sustainability in the whole supply chain. Logistics providers point out that the reduction of emissions cannot be realized only due to communication but requires coherent changes in the operations and investment of various parties.

Constant communication is thus considered to be necessary to explain the allocation of costs, realistic schedules, and practical climate goals. It is believed that collaborative communication such as debate on trade offs and realistic constraints are needed to build trust and allow the more successful execution of greener transport solutions. In general, the results indicate that the obstacles to green options are not purely communicative but are entrenched in the economic patterns, logic of operation, knowledge limitation and infrastructure that influenced decision making in the transport industry.

4.5 Dialogue, collaboration, and future directions

All in all, the findings indicate that sustainability communication within transport sector is taking more interactive, data intensive, and collaborative patterns. It is a transition to take the place of broad assertions of intention to measurable and transparent and strategically instilled communication. Meanwhile, the extent to which sustainability can be entirely incorporated in the making of transport decisions remains to be subject to economic circumstances, operational needs, and infrastructural factors to which the overall implementation landscape is determined.

4.5.1 Towards a more dialogue based and strategic communication

The results have shown that there is an apparent anticipation that sustainability discourse in the transport industry needs to be more conversational and that it should be built into the initial planning phases. The representatives of the production companies stress that traditional sustainability reporting is quite important but not enough in itself. In lieu of this they demand continuous interaction that would allow them to get closer to the practical implications of transport related decisions. Continuous meetings and systematic discussions are seen to be more effective than the unidirectional flow of information, especially when there are complex trade offs that have to be met between the cost, service level, and environmental performance.

Increased need to have clear and more comparable data is also in demand. Companies involved in production are complaining that it would help them have tangible comparisons between transport alternatives to demonstrate disparities in emissions, price, and lead time. This form of organized information is deemed as a requirement in decision making. Moreover, the sustainability communication will be pedagogical and business oriented. Respondents stress that the reduction of the emissions should be converted into the visible organisational value to ensure the internal commitment. Once the sustainability performance is clearly linked to competitiveness, risk management and long term efficiency, there is higher chance of its increased acceptance within the organisation.

The logistics providers are urged into being more proactive in this development. Instead of having to offer sustainable alternatives when prompted, they should offer greener alternatives earlier during customer conversations and make their advantages more explicit. The concept of communication and transparency is continuously outlined as a base of trust and a requirement of establishing the concept of sustainability into strategic transport decisions.

4.5.2 Standardisation, regulation and credibility

The other key theme is the necessity to have improved standardisation and better regulatory frameworks. Respondents also point at inconsistent calculation procedures and different reporting practices as the factors that lead to the lack of consistency and restrict comparability of transport options. Unified methods of treating emissions and good standards of reporting are thus regarded as key to enhancing transparency and credibility.

This demand is further upheld by the heightened scrutiny concerned with greenwashing. As much as more demanding demands can cause companies to exercise a more guarded communication tone, they are also seen to be obligatory in protecting trust. Ambiguity can be minimized by clear rules and common standards that can help companies convey sustainability performance in a more confident fashion. The existence of standardised ways of calculating and reporting carbon reductions is considered especially significant in terms of the creation of a level playing field and making claims about sustainability verifiable and comparable.

Regulatory compliance is not the only aspect that is linked with transparency but also the capacity to illustrate the connection between operational decisions, costing frameworks, and actual climate effect.

Respondents emphasize that such connections need to be brought into the limelight of communication so as to enable informed decision making and enhance organisational responsibility.

4.5.3 Digital tools and technological development

The future of sustainability communication is likely to be determined by technological innovation. Digital applications that incorporate the information about the emissions into booking systems or customer portals are characterized as particularly promising. Such solutions enable customers to access real time information regarding the emissions of particular transport flows by integrating sustainability data in business operational processes. This immediacy is seen to make more conscious and data driven decisions.

Another way in which the enhancement of visualisation and data use is identified by logistics providers is their necessity. Computerized systems that produce comprehensible insights and tabular reports are deemed useful in streamlining complicated computations of emissions without the need to compromise the technical precision. An opportunity in the future is identified in the possible application of artificial intelligence. Artificial intelligence applications may aid in calculation of emissions, sorting, and analysis of extensive data and analyse predictions to improve planning and optimisation activities.

The experience of the sensor technology firm Reen as evidenced in the interview can please those who want to know how sensor based systems can deliver validated data in terms of operation which empowers both optimisation and external communication. Companies can continuously monitor their direct emissions and use such information in their own sustainability reporting by customer accessible portals. Nonetheless, the respondents underline that technology is not enough. Data have to be deciphered and contextualised using a conversation to generate significant insight and wise strategic choices.

4.5.4 Collaboration, shared responsibility, and systemic change

Teamwork becomes one of the enablers of the future development. There are also improved collaborations, collaborative pilot projects, and shared testing of new solutions that can be characterized as effective mechanisms of spreading risks and cost distribution. These types of collaborative efforts provide the chance to test new transport solutions and harmonize expectations along the supply chain.

It is assumed that the adaptation of climate goals, financial assets, and workability is the key to success in attaining sustainable change. The respondents stress that the sustainability communication should be backed by feasible budgets and economic incentives that would allow adopting more environmentally friendly alternatives. Unless there are adequate investment of finances and a working implementation capacity, communicative intentions are bound to be paternalistic.

5. Discussion

The results verify that cost is still among the greatest obstacles to the use of more environmentally friendly transport options. This is consistent with the previous studies revealing that price sensitivity has a significant impact on transport choices, in many cases, overriding the environmental concerns (Åhlvik and Rehfield, 2022; Ek and Soderman, 2010; Vienazindien ne et al., 2021). The empirical findings indicate that despite formal sustainability intentions of organisations, organisations are more likely to focus on cost, reliability, and lead time when sustainability means increased financial or operational risk. This confirms the idea of intention-behaviour gap, in which environmental ambitions are undermined when converted to operating purchase situations (Lin and Wang, 2023).

Nonetheless, the findings indicate that the concept of price can actually be interpreted not only as a financial limitation, but also as a communicative problem. The challenge is the way in which the extra price of the green alternatives is presented and justified. Regulatory preparedness, long-term competitiveness, or reduction of risks, which are not measurably or related to business value, are hard to defend internally. This can be explained using the SMCR communication model (Berlo, 1960) where poor communication occurs when the message (value of sustainability) is out of line with the knowledge, context or priorities of the receiver. The lack of translation of environmental information into business-relevant meaning in this case makes it less persuasive.

In addition, logistics providers experience structural problems of communicating price because of depending on subcontractors and changing operational circumstances. This introduces discrepancy in pricing and emission data which supports uncertainty. This ambiguity is a symptom of problems detected in the literature on sustainability communication, in which ambiguous and unstandardised messages lead to scepticism and poor decision support (Elving et al., 2015; Golob et al., 2023; Weder, 2023). Sustainability may be relegated when it is linked with uncertainty, and not quantifiable value.

This problem is only enhanced by knowledge gaps. There is uncertainty on the part of both the transport provider and the customer in terms of the calculation of the emissions, carbon metrics and practicality of sustainability measures. This is consistent with past research that stakeholders do not just need access to data but also assistance in the interpretation and contextualisation of data (Weder, 2023; Einwiller and Carroll, 2020). This issue is further extended by the absence of standardised calculation procedures, as pointed out by Elving et al. (2015), as they inhibit comparability and credibility. Hence, price and knowledge create a two-fold barrier: or the perceived cost of sustainable alternatives is not justified unless appropriate clear, comparable, and contextualised information is available.

Key discoveries include that the key to successful sustainability communication is continuous customer dialogue. Through the continuous dialogue, the stakeholders need to know the implications of various transport options on cost, service level, and the impact on the environment, as opposed to using a one-way information or a stagnant report. This helps in the transition between dissemination and dialogue found within sustainability communication literature (Newig et al., 2013; Weder, 2024).

Hypothetically, this is consistent with the two-way symmetrical model of communication as postulated by Grunig and Hunt (1984) where communication is interpreted as a reciprocal act of meaning-making, as opposed to one-way persuasion. The findings suggest that sustainability choices are frequently associated with complicated trade-offs, which need negotiation and mutual understanding between transport providers and customers. Dialogue allows such trade-offs to be discussed within a context, and thus sustainability becomes actionable.

In addition, communication is relational and thus it is an aspect of interactional communication theory (Watzlawick et al., 1967) where meaning is created by the existence of relationships as opposed to discrete messages. Credibility and trust are consequently established through time after time and not through a one time sustainability assertion. Although it is important, the findings reveal that organisational constraints tend to restrict dialogue. Logistics providers often focus on the reactive, but not proactive model, and sustainability is one of the topics that are only mentioned when asked. Their time constraints, resource constraints, and operational priorities limit their capabilities to ensure sustained engagement. This is indicative of more general obstacles found in the literature as the organisational capacity restricts the use of dialogic communication practices (Onkila & Sarna, 2022; Men et al., 2020).

The findings indicate that a more active strategy will be needed in which sustainability will be incorporated as part of the decision process and not as an optional feature. This contributes to the earlier studies that highlight that participatory communication increases trust, commitment and behavioural change (Men et al., 2020; Yue, 2022). Transparency becomes a core precondition of credibility, but the results indicate that there are a lot of structural obstacles to transparency. Whilst the stakeholders require elaborate and similar emission information, the logistics providers are confronted with issues associated with subcontracting frameworks, variable pricing systems, and unreliable data.

This is the credibility gap that has been discovered in the literature with sustainability communication being commonly viewed as ambiguous, selective, or inconsistent (Golob et al., 2023; de Freitas Netto et al., 2020). Comparability is further complicated by the absence of standardised calculation methods, which add to the scepticism and understanding of greenwashing (Elving et al., 2015).

This can be explained through the theory of communication in terms of noise in the Shannon-Weaver model (1964) where the message is distorted by inconsistencies, unclear metrics and conflicting information which makes it less effective. Noise in this regard is not merely technical but also semantic and organisational and stakeholders find it hard to comprehend sustainability information in the right way.

Additionally, the results demonstrate the danger of discursive decoupling (Golob et al., 2023), in other words, the sustainability claims communicated are viewed as unrelated to the real practice. Limited or inconsistent transparency leads to broken trust, no matter how accurate the information given is. The results also highlight the importance of balancing simplicity and precision. Although the stakeholders need to have easily accessible information, oversimplification may lead to loss of credibility. This pressure underlines the importance of adaptive communication strategies, in which the information is customized according to the level of knowledge and the situation in which the stakeholder has to make a decision. Regulation and standardisation are thus essential facilitator of plausible communication. Similar to the literature recommendations, the frameworks like CSRD and GLEC help to minimize ambiguity and increase comparability (European Commission, 2022; Smart Freight Centre, 2023). This is supported by the findings which show that the stakeholders appreciate structure, verifiable and consistent data. In general, transparency does not just concern the availability of data but rather entails the capability to deliver consistent, comparable and contextually relevant information to aid in decision-making.

The findings indicate that sustainability communication is shifting towards a strategic and decision-enabling aspect of promotional role. Communication must now contribute to operational and strategic decisions, rather than image-building. This change is consistent with the difference between communicating sustainability (reporting) and communicating for sustainability (transformation) by Weder (2024). The findings suggest that the existing practices continue to be mostly based on the former, and communication is mostly descriptive instead of action-enabling.

Sustainability communication should combine three major elements found in the findings to be decision enabling:

1. ***Contextualisation*** - connecting the data about emissions with operational realities, costs and business implications.
2. ***Comparability*** - to allow evaluation of options during standardised and structured data by stakeholders.
3. ***Interactivity*** - promoting dialogue and shared decision making.

On the side supporting this transition is the availability and accessibility of data through digital tools and technological advances. Nevertheless, the results highlight that technology is not enough. Information should be explained and incorporated into communicative practices in order to create valuable information.

Another important factor is collaboration. Transport sustainability is neither an organisational issue but a systemic problem that must be addressed collectively by the entire supply chain. It confirms earlier studies where stakeholder engagement and co-creation have been identified as key factors in attaining the goal of sustainability (Weder, 2024; Vienazindienė et al., 2021).

Addressing the research questions, the research shows that the stakeholders not only need accurate and standardised information, but also communicative processes, which allow them to interpret, compare, and apply them into the real context of a decision. Successful sustainability communication is not thus determined by transparency but by its capacity to inform, instill confidence, and context-based decisions.

6. Conclusion

This study aimed to investigate how transport companies can reinforce their external sustainability communication to boost uptake of greener transport solutions. The results indicate that the main issue is not the absence of sustainable transport options, but the constraints in communication, perception, and appraisal of these options in decision-making.

The findings show that the stakeholders need more than general sustainability claims to make informed transport decisions. Rather, they require transparent, comparable and context-specific information especially in the form of quantifiable emission data associated with actual transport flows. But access to data is not enough. The stakeholders also need to be assisted to make sense of this information and the environmental performance is converted to operational and strategic implications in terms of cost, level of service and long term business value. The absence of standardised calculation techniques and poor reporting practices also hinders comparability and diminish trust so stakeholders are not sure how to prioritise greener alternatives with confidence.

Simultaneously, the research demonstrates that the effectiveness of sustainability communication heavily relies on the way in which sustainability is communicated. It is not enough to have one-way communication, that is, a report or a static data to make a decision. Rather, ongoing, dialogue based communication is critical, as it allows the stakeholders to learn about trade-offs between cost, reliability, and environmental impact in their context. The best way to sustainability communicate is therefore to have the concept integrated into the planning and procurement process early and entrenched in relationships with the customer and not as an option at a later stage.

In addition, effective communication revolves around credibility and transparency. Stakeholders trust more communication that incorporates verifiable data, uniform methodologies, and realistic portrayals of advantages and constraints. Nevertheless, structural issues like the dependency on subcontractors, unstable pricing, and different information availability complicate the ability of transport companies to offer entirely transparent and standardised information. This reinforces the need for improved industry standards and clearer communication frameworks.

In general, this thesis finds that to achieve successful sustainability communication, there should be a transformation of information provision to decision support where the transport companies should not only report on sustainability information but also facilitate the stakeholders to interpret, compare and use the sustainability information in actual decision-making situations. This integration of clear information, context-based descriptions, and an ongoing conversation can empower transport companies to become facilitators of more sustainable transport decisions.

6.1 Future research

The conclusion of this research shows that there are a number of fields in which additional research and development is required.

To start with, standardisation of sustainability metrics and communication practices requires additional research. Absence of harmonised methods of calculating emissions is a significant impediment to transparency and comparability. Further research might examine the effect of the new regulatory frameworks and industry standards on the effectiveness of communication and decision-making.

Second, the ability to translate sustainability information into business relevant value requires additional research. This involves enigmatising how the environmental data can be better connected to

the financial performance, risk management and strategic decision-making. This kind of research would help in closing the gap between the sustainable aspirations and practical application.

Third, the impact of digital tools and technological solutions is a valuable field of study in the future. Although this paper suggests that digital platforms, real-time data, and AI-based tools can improve transparency, further research is needed to learn how these technologies can be incorporated into communication processes in a manner that is likely to assist the user to understand and make decisions.

In practice, the research has shown that there are a number of important requirements in the transport sector:

- Standardisation and development of similar emission reporting schemes.
- Greater sustainability communication investment in the internal capabilities.
- Sustainability data incorporated into the operational and digital decision-support systems.
- Enhancement of joint activities along the supply chain.

Lastly, a quantitative method or a bigger sample size should be considered in future studies to supplement the qualitative findings of this study and increase generalisability. Further insight into the role of contextual factors on sustainability communication and adoption might be gained as well through comparative studies between regions or industries.

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