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## Networking for sustainable supplier development: evidence from a Finnish industrial cluster

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### Abstract

This article examines a network approach to sustainably developing suppliers in the context of a Finnish industrial cluster. The approach (HSEQ AP) aims to assess and develop the health, safety, environmental and quality-related capabilities of the suppliers of the buying companies that form the cluster. In this study, the impact of this approach, which has been operating for more than a decade, is examined through a mixed-methods approach. Suppliers that have been audited two times or more ( $n = 29$ ) were quantitatively analyzed in terms of safety performance, consecutive assessment scores and the relationship between assessment scores and financial indicators. To support the quantitative analyses, interviews were conducted with buyers and suppliers. The results suggest that the HSEQ AP can be linked to improvement in operational results and to enhancing social sustainability in the supply network, and that the suppliers and buyers generally find it a worthy investment. The antecedents for this network approach are partially similar to supplier development in general: Buyer demonstration of commitment, particularly through purchasing processes, is crucial and not fully realized in all cases. The use of a competent, trained third-party assessor was seen to bring value, and the suppliers also rated buyer participation very highly. Interestingly, no significant improvement was found regarding environmental capabilities. The HSEQ AP can be viewed as a CSR practice, but the results show there could be further potential to unlock.

## 1. INTRODUCTION

Outsourcing has increased internationally on a wider scale at numerous, often large organizations (Lind & Nenonen 2008; Milch & Laumann 2016; Walter 2017). In many cases, outsourcing concerns high-risk activities (Walter 2017), such as maintenance or construction where many diverse accidents happen (Lind & Nenonen 2008; Valluru et al. 2017). As a consequence of outsourcing, at various industrial workplaces and construction sites, employees from many organizations work together on the same worksite, and often at the same time (Valluru et al. 2017).

These multi-employer worksites, often high-risk process industry sites or construction sites, are complex to manage (Mearns & Yule 2009; Fang & Wu 2013; Milch & Laumann 2016; Mapatar et al. 2019). Problems related to health, safety, environment or quality (HSEQ) issues may cause significant disruptions at the worksite, and the legal responsibility for risk management at a multi-employer worksite lies with the buyer. In practice and in scientific literature this combination of the four elements of H, S, E and Q is discussed under the concept of Integrated Management Systems (IMS) (Salomone 2007; Domingues et al. 2017; Cabecinhas et al. 2020)

which in turn can be juxtaposed to corporate social performance and widened to sustainable stakeholder development and management (Gianni et al. 2017).

In ensuring safety at a multi-employer worksite, cooperation between the buyer and the supplier is a key factor (Milch & Laumann 2016), but it may not be enough (Nenonen & Vasara 2013). Regarding safety, some of the issues can be tackled with efficient safety management, systematic considerations of safety issues and interaction between various organizations on the site (Nenonen et al. 2015). Although multi-employer worksite literature focuses on safety due to its criticality, it would make sense that environmental and quality issues at a multi-employer worksite are similar.

Some potential HSEQ issues could be tackled proactively by developing and evaluating the HSEQ capabilities of suppliers. This relates to the ongoing practical and scientific debate on corporate social responsibility (CSR), in which examining environmental, economic and social dimensions throughout the value chain is encouraged (Nawaz et al. 2019). IMS, in turn, serves as a framework for weaving CSR into company business processes (Asif et al. 2013; Gianni et al. 2017). We see that such a CSR oriented examination in the value chain utilizing IMS would positively affect delivery and facilitate sustainable supplier development (SSD) and sustainable procurement processes.

Additionally, supplier development in itself has a positive effect on the environmental and social sustainability of the supply chain (Mitra & Datta 2014; Kumar & Rahman 2016). However, there is a practical dilemma. Supplier development (SD) cannot include every supplier (Wouters et al. 2007; Krause et al. 2000), but failure to perform in HSEQ issues may be critical, and procurement options are often limited, which poses the following question: How can the buyer develop and evaluate HSEQ capabilities of suppliers working in a multi-employer worksite in a resource-effective manner, that is, balance efficiency and effectiveness to improve performance (Mentzer et al. 2000; Kros et al. 2019)?

In this study, we analyze one such attempt at sustainable supplier development (SSD), a network approach to assessing and developing industrial suppliers. The network was developed in collaboration with a Finnish industry cluster and other stakeholders over a period of 15 years. The approach is based on an HSEQ assessment model, sharing of assessment information within the cluster to aid purchasing and using the assessment audits and subsequent results for supplier development.

To study the effects of this approach, named the "HSEQ Assessment Procedure" (HSEQ AP), we take a mixed-methods approach (Johnson et al. 2007), answering the following questions:

- 1) What is the relation of the HSEQ AP to supplier performance?
- 2) What are the suppliers' and buyers' perceptions of the impact of the HSEQ AP?

For the first, quantitative, question, we examine three performance indicators: accident frequencies before and after an assessment, changes in assessment scores between assessments and the correlation of assessment scores to financial results. For the second, qualitative, question, suppliers and buyers were interviewed to gain an understanding of the perceived benefits.

The results contribute to several recognized directions for further research. The impact of SD activities on suppliers' financial performance has not received much attention (Nagati & Rebolledo 2013), a dearth of work on local supplier development and empirical research on practical experiences with supplier development has been noted by Wouters et al. (2007), and the importance of including the supplier viewpoint in studying SD impact is pointed out by Yawar & Seuring (2017). In addition, further research utilizing a network perspective on SD (Aune et al. 2013), corporate social responsibility at value chains (Lu et al. 2014; Nawaz et al. 2019) and on buyer-supplier relations in general (Fynes et al. 2005; Johnsen et al. 2017) has been suggested.

A more detailed literature review on supplier evaluation and network approaches is provided in Section 2. In Section 3, the HSEQ cluster and the assessment procedure (HSEQ AP) are

presented in further detail, as well as the materials and methods used. In Section 4, the quantitative and qualitative results are shown, which are discussed further in Section 5.

## 2. LITERATURE REVIEW

Including every supplier in SD is generally not plausible, so buyers embarking on SD assess providers of strategic supplies to determine which ones to develop (Kros et al. 2019; Wouters et al. 2007; Krause et al. 2000). In general, a buyer wants to ensure that its suppliers' performance and capabilities conform to the buyer's needs (Humphreys et al. 2004). In particular, the buyer may expect to benefit in the form of gaining preferential treatment as value-added services, direct investments or other adaptations, while the supplier may expect a combination of profit, increased market position or supplier acquisitions as eventual outcomes of SD (Handfield et al. 2000; Blonska et al. 2013). However, doing SD for merely preferential treatment may have an adverse effect on the results (Blonska et al. 2013), and operational improvement should also be considered (Krause et al. 2000).

Furthermore, SD can be viewed as a social responsibility practice (Yawar & Kauppi 2018), and as a way to mitigate supplier sustainability risk (Hajmohammad & Vachon 2016). When environmental or societal goals and practices are included in SD it is often referred to as SSD (Yang & Chang 2017). SSD requires active involvement of other stakeholders besides buyers and suppliers in roles such as a facilitator or an inspector (Liu et al. 2018).

SD approaches are often divided into indirect and direct approaches (Monczka et al. 1993; Krause et al. 2000; Wagner 2006; Modi & Mabert 2007; Sucky & Durst 2013). Indirect approaches can include competitive pressure, evaluation and incentives (Modi & Mabert 2007). Direct approaches can involve a transfer of capital or human resources from the buyer to the supplier (Wagner 2006).

Although the performance effect of different supplier relationship and development approaches in different contexts has not been well established (Terpend et al. 2008; Blonska et al. 2013), scholars are positive that SD efforts generally make an impact. For the supplier, SD has been found to directly contribute to supplier performance in relationships with buyers (Nagati & Rebolledo 2013; Glavee-Geo 2019), and to supplier satisfaction (Glavee-Geo 2019). SSD was found to affect the buyer's operational performance but not short-term economic performance by Sancha et al. (2015), who point out that besides the latter, there is also the risk of suppliers acting unethically that is mitigated by SSD.

The perceptions of trust and preferred customer status for the buyer were found to be antecedents of SD success (Nagati & Rebolledo 2013). Sucky and Durst (2013) provide a review of the effects on buyers, and summarize that generally a positive impact had been observed regarding operating and business performance. For these benefits to realize, the intent of SD must be well communicated (Forker et al. 1999), and the buyer must show commitment (Krause et al. 2007). In conclusion, motivations and actual efforts by both parties determine SD success (Nagati & Rebolledo 2013).

During the last decades, buyer-supplier relationship (including SD) research has widened in scope, from looking from the position of a single party to both parties in a dyad (Terpend et al. 2008), triads (Choi & Wu 2009), and furthermore, toward a more holistic positioning (Ellram & Murfield 2019), and as a part of a larger network if feasible (Johnsen et al. 2017). A network focus avoids a myopic view as pointed out by Fynes et al. (2005); assuming a single focal supplier-buyer relationship contradicts practice, as a supplier may have a selection of equally important customer relationships that influence each other.

In SD research, numerous studies have investigated supply networks, particularly supplier development programs have been a research topics for decades (Hahn et al. 1990). Nevertheless, in nearly all studies the network is assumed to converge on a focal buyer, and studies and approaches investigating numerous buyers and suppliers are scarce. Arráiz et al. (2013) examine a Chilean national SD program and find that it benefitted supplier and buyer firms, but the study was conducted from a policy research viewpoint, not that of buyer-supplier relationships. A rare SD study on networks with multiple buying companies is the work by Aune

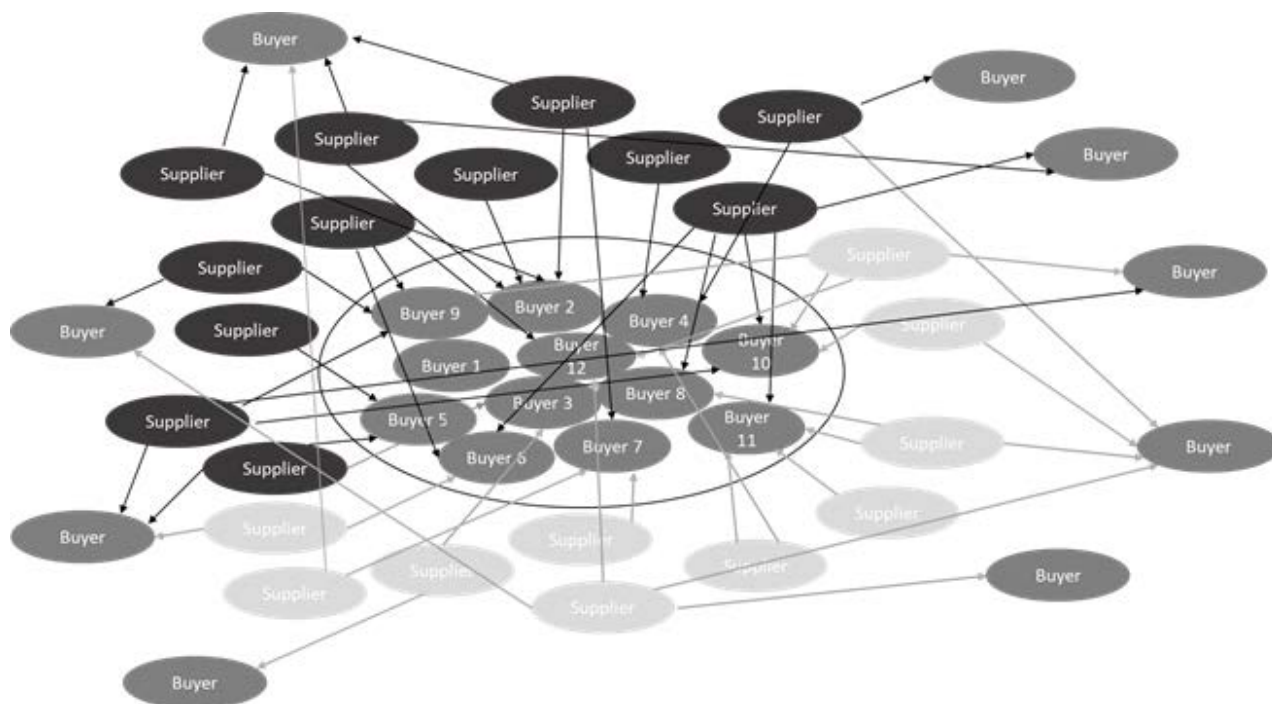
et al. (2013), who present a taxonomy based on different roles of the networking parties. The authors also suggest that long-lasting relationships could enable and facilitate network-based SD strategies (Aune et al. 2013).

### 3. METHODS AND MATERIALS

#### 3.1. HSEQ cluster

A group of large Finnish industrial buyers created an HSEQ cluster network that aims at developing collaboration processes for assessing and developing suppliers (Väyrynen et al. 2016). The cluster network was created in buyer collaboration in the early 2000s; the first supplier audits performed in 2007. Cluster network and supplier assessment and development activities are controlled by cluster meetings four times a year. The meetings focus on network and audit process development and planning, and decisions about upcoming supplier audits. Five large industrial buyers founded the cluster, and now, the cluster totals 12 buyers. The buyers are all major actors associated with the process industry; however, their lines of businesses vary from industrial maintenance to the energy, steel and paper industries.

HSEQ assessment processes are initiated by buyers based on their own criteria for selecting suppliers; thus, not all supplying companies are targeted for audits. Most often, the supplier selection is based on strategic choices; that is, only the suppliers that are considered strategic partners are audited. Some of the audited suppliers are considered strategic partners by several buyers; thus, there is a common interest among the buyer network to collaborate in supplier development. In addition to these strategic partner suppliers, there are suppliers that are not considered strategic partners and thus not audited. In addition, for many suppliers, the buyers in the cluster network are not the only buyers, and the suppliers may have other buyers for their products and/or services. This supplier–buyer network complexity is visualized in Figure 1.



**Figure 1.** HSEQ cluster supplier–buyer network illustrations. Buyers 1–12 in the middle are the cluster buyer companies, and the highlighted suppliers are the strategic partners

The assessment tool is called the HSEQ AP. It measures HSEQ performance using an EFQM (European Foundation for Quality Management) Excellence Model–oriented evaluation approach. The assessment process includes a self-assessment followed by an audit led by a third-party auditor. Buyers may, at their discretion, appoint their own representatives for the audits, which

they have in nearly all assessments. In the audit session, the supplier is audited based on 41 criteria on a four-step scale during the course of a day.

The audit is valid for three years; thus, some suppliers may have been audited two or more times. The audit process results in a quantitative assessment of the auditee's HSEQ performance, and is supplemented by qualitative feedback concerning observations on identified development topics. The level of observation varies and includes development topics ranging from minor to major, that is, to deviations. After the audit, the auditee is given three months to complete corrective actions and respond to the observations. The main auditor decides whether the corrective measures comply and saves the audit results in an HSEQ-register database to which the buyers have access. If the auditee wants, they may restrict access to their results. To date, more than 200 HSEQ audits have taken place. The validity of the assessment scores was examined in a previous work by Jounila et al. (2017). A more detailed description of the HSEQ AP can be found in Kauppila et al. (2015) or at [www.hseq.fi](http://www.hseq.fi).

### 3.2. Sampling, data collection and analysis methods

For this study, we investigated the portion of suppliers that have been audited at least two times, as this allowed us to get a better longitudinal view in the qualitative and quantitative analyses. A total of 29 suppliers met this criterion, of which seven had been audited three times. The suppliers all offered support services to industrial buyers; however, the service selection and the size of the company varied from small to medium-sized. The majority of the supplier companies provide industrial maintenance services performed at the buyers' sites. Most suppliers also have their own workshops. Two suppliers provide technical solutions for use on work sites, such as cranes and hoists, and two suppliers provide services and products related to personal clothing and other equipment. To provide a more holistic view of the longitudinal effects of HSEQ AP in the network, buyer representatives were also interviewed.

For the quantitative analysis, health and safety performance, HSEQ assessment scores and financial performance were examined. Concerning occupational health and safety, annual accident frequencies (accidents per million work hours) were used as organization-level indicators. Supplier-specific annual accident frequencies were acquired from the HSEQ register database where they are registered following the criterion that accidents that lead to an absence of one day or more from work are included. Annual data from the national statistics by the Workers' Compensation Center (2019) was acquired as reference. The data was limited to two branch-specific categories that follow the European Standard Industrial Classification (Eurostat 2008): Manufacturing and Repair and Installation of Machinery and Equipment. The Workers' Compensation Center database covers all occupational accidents in Finland for which compensation has been paid. In the database, accidents are categorized in two groups: all accidents and accidents that lead to an absence of more than four work days. As the HSEQ register database and the national data criteria differ, this comparison is only indicative.

HSEQ performance scores were acquired from the HSEQ register database. Company-specific HSEQ performance scores and separate scores for HS, E and Q performance were utilized in the analyses. As each company has been audited at least twice, the score change between the audits was analyzed. To account for variance in the time between audits, change in score per year was used as a metric.

For analyzing the HSEQ AP's effects on financial performance, suppliers' annual accounts were used as a source for the data. The statements were ordered from the commercial national database *Voitto+* that includes about 210, 000 Finnish companies. All the suppliers selected in the sample are publicly traded companies, so all the statements were available. For investigating the potential financial impact of the HSEQ AP, we used the gross profit margin, calculated as  $(\text{Turnover} - \text{Cost of materials and services} - \text{Labor costs}) / \text{Turnover}$ . It was seen to represent the effectiveness of a supplier's operations, one of the goals of SD. For all the statistical analyses of the data, paired t-tests and Pearson correlations were used, as the data was continuous and did not violate the assumptions of these parametric methods. Minitab 19 software was used for the statistical analyses and graphs.

Qualitative interviews were performed to enliven and deepen the effectiveness analyses. Company-specific information concerning the indicators was used as the background material

for the interviews. Buyer interviews ( $n = 8$ ) were performed as semi-structured group interviews in which a person representing sourcing and a person representing HSEQ were invited to facilitate the discussion on how HSEQ issues are considered in sourcing processes. The interviewees were selected by the buyers based on this criterion. In two companies, the interview was conducted as a personal interview, as one person was deemed by the buyer to be able to represent the HSEQ and sourcing perspectives. Buyer interviews (on average, 60 minutes) were conducted on the buyers' premises and focused on describing the buyer's internal HSEQ audit process, utilization of the data acquired in the audits, auditee selection process and possible effects of the audits at the buyer and supplier levels. Interviews were recorded and transcribed.

Supplier interviews ( $n = 20$ ) were performed as semi-structured personnel interviews. The interviewees were selected based on their status in the company as having an adequate understanding of the cluster itself and the audit process. Originally, the interview requests were sent by email to the individuals who had been nominated as company-specific contact persons in the HSEQ cluster database. The majority of the contacted individuals were also interviewed, and in only in a few companies was the contact person someone other than the interviewee. The job titles of the interviewees were, for example, managing director, department head, administrative director, HSEQ manager and maintenance manager. The interviews (on average, 36 minutes) focused on discussing the experiences and effects of the audits by the supplier in question. Interviewees were asked to describe whether the assessment scoring seemed reliable and truthful, and whether the audits had initiated any development processes and conceptions of aspects that might have hindered the realization of the development processes. Interviews were performed by telephone ( $n = 12$ ) or face to face at the company's premises ( $n = 8$ ). Written notes were made during the interviews.

## 4. RESULTS

### 4.1. Safety impact

For assessing the effect of the HSEQ AP on safety, we investigated accident frequencies two years before and two years after the AP. We ended up with a limited dataset as reliable information was not available for all companies, even after requests for data were made during the supplier interviews. But even with before and after data from 18 assessments, we can see a clear difference in the average accident frequency for the before and after scenarios as shown in Figure 2 (paired t-test,  $n = 18$ ,  $p = 0.005$ ).

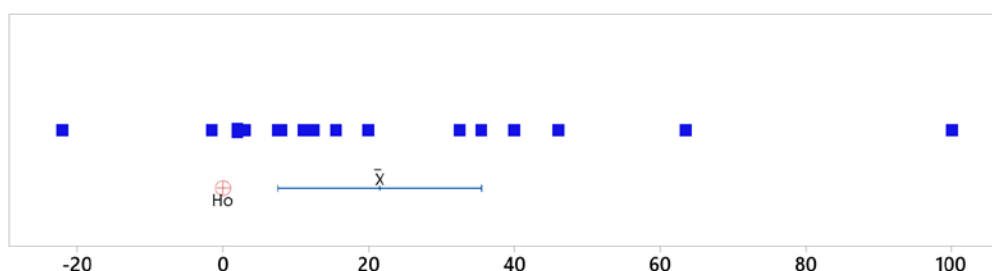


Figure 2. Differences in accident frequencies: two years before and after an assessment

Some of the difference can be attributed to the overall trend of increasing safety. A direct comparison is challenging because the national statistics by the Workers' Compensation Center use a different indicator. In the HSEQ AP statistics, accidents resulting in an absence of one day or more is used, while the national statistics use either absences of four days or more, or a total of all accidents. A very tentative comparison of trends showed that between 2011 and 2015 the positive trend of the HSEQ AP sample companies ( $n = 15$ ) outperformed the generic "Industry" sector classification and the more detailed "Repair, maintenance and installation of machines and devices" classification.

### 4.2. Assessment scoring

As the assessment scores are consistent, two consecutive assessments of the same company can be used to investigate development trends. To do this, a paired two-sample t-test for means

was used to test the difference in the scores between two consecutive evaluations, with the alternative hypothesis being that the difference in the scores equals zero. For this comparison, we were able to use the whole set of twice or more audited companies ( $n = 35$ ). These differences are illustrated in Figure 3.

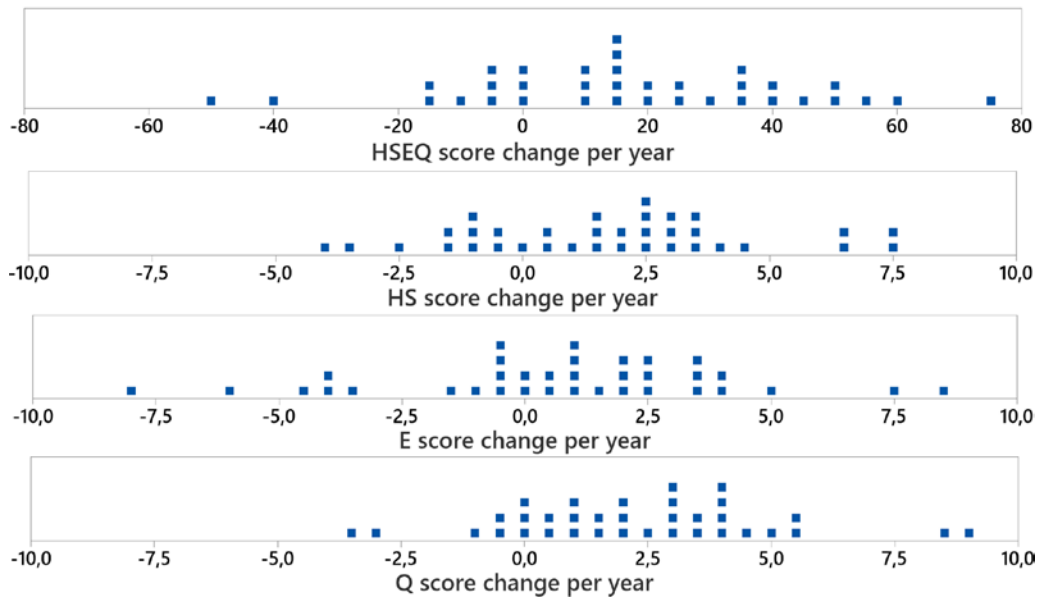


Figure 3. Changes per year in assessment score between two assessments

The difference between scores was statistically significant for overall scores ( $p = 0.001$ ), HS scores ( $p = 0.002$ ) and Q scores ( $p < 0.001$ ). Curiously, the change in the E scores was not statistically significant ( $p = 0.29$ ).

### 4.3. Financial metrics

For examining the relation of the HSEQ AP to financial performance, we compared suppliers' assessment scores with their gross profit margin from the year of the assessment. These two correlate quite well as illustrated in Figure 4 (Pearson correlation = 0.441,  $p < 0.01$ ,  $R^2 = 19.4\%$ ,  $N = 57$ ).

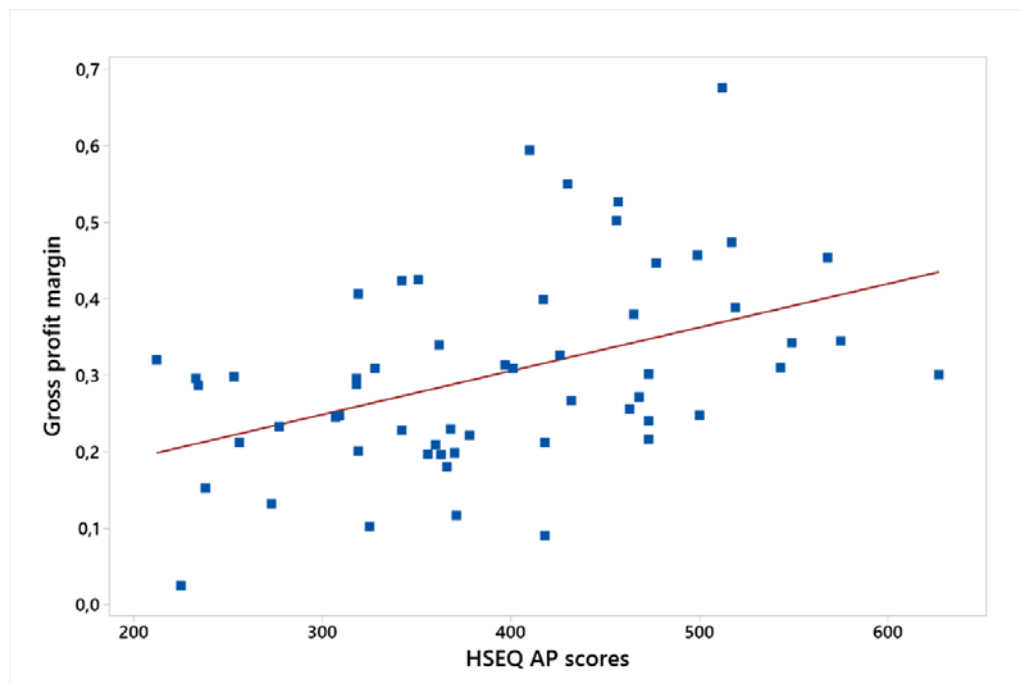


Figure 4. HSEQ AP scores vs. gross profit margin

This result could be interpreted as firms scoring higher on the HSEQ AP being more efficient in transforming their resources into outputs. From the sample, one large multinational corporation was excluded as drastic yearly changes due to tax planning, for example, caused issues with the analysis. We also tried inspecting other metrics, such as pretax profit or return on equity, but this seemed to add more noise from issues such as corporate arrangements causing spurious jumps in the metrics. In addition to examining the correlation of HSEQ score and gross profit, we investigated the behavior of financial metrics three years before and after an assessment, but this was not particularly fruitful. The number of data points available within the dataset was further reduced by many assessments being very recent, so yearly accounts regarding “after” data were not available in many cases.

#### 4.4. Supplier interviews

The majority of the interviewees emphasized that the audit scoring was realistic, and only a few interviewees expressed dissatisfaction with or suspiciousness of the audit scores. The majority of the interviewees thought that the company-specific audit scores reinforced beliefs regarding development actions that had taken place between the audits. Some interviewees questioned whether the audit group, especially the main auditor, had enough in-depth expertise in topics such as industry specific production and operation systems. Some suppliers also noted that the change in the main auditor between assessments seemed to have an effect on what topics were the focus.

Interviewees emphasized that the company-specific HSEQ development between audits was often initiated by their own internal development strategies. The audits were considered as checkpoints that force key personnel in the company to discuss the HSEQ performance level and development needs in depth. The bigger the company based on the number of personnel, the more likely they would discover development needs through their own internal processes, not by the audits. Thus, the audits did not provide anything surprising to those companies; the audits only strengthened the firms’ existing knowledge of their development needs or steered and fostered in-depth strategic discussion at the senior management level.

For instance, as a result of the audits, interviewees highlighted how they had identified the need to renew their personnel rewarding, training register or new employee orientation processes or a need to elaborate on their occupational health service contracts. Concerning such needs, related mainly to human resources management, the audits can be considered discussion points that had resulted in several smaller development actions; such as updating contracts with their support services and developing internal guidelines. Interviewees were also able to identify certain, more concrete development actions that were initiated by the audit processes. In addition to human resources management issues, some companies identified how the audits had resulted in certain development actions concerning work environment management at their own sites. In a few companies, the audits had initiated lean-oriented 5S processes, aiming to improve the quality of the work environments on their premises. Several companies had identified the need to develop customer relations by introducing new practices or tools for improving customer satisfaction. Overall, customers’ presence in audits was often seen as particularly positive.

Regarding the relationship effects of the HSEQ AP, the interviewees pointed out how they had expected the HSEQ audit scores would have more influence on buyers’ purchasing processes. However, they had experienced that only in a few cases was the HSEQ AP used as a criterion for selecting suppliers. This has had effects on suppliers’ motivation for investing in HSEQ AP participation.

In larger supplier companies, the audit process was considered routine; however, in smaller companies, the efforts made for the audit process, including audit payments and time spent preparing for and participating in the audits, was seen as laborious compared with how little influence the audit scores have on purchasing processes. As expressed above, the interviewees would appreciate more transparency from buyers. The interviewees pointed out their willingness to collaborate more systematically and for the long-term with buyers. In such collaboration, regular audits would serve as checkpoints facilitating continuous development processes.



#### 4.5. Buyer interviews

Interviewees thought that HSEQ audits provide added value and are best suited when auditing is targeted at suppliers working of shared workplaces, and nearly all interviewees experienced HSEQ audits first as a tool for developing suppliers. Regarding the scope of the HSEQ AP, it was felt that the current content and one-day audit are sufficiently comprehensive. In buying companies, audit results are mainly utilized by procurement staff, but to some extent by operation and maintenance personnel. However, how audit results were utilized varied among the buyers. In some companies, utilizing HSEQ scores was included within the procurement process, but in most cases, utilization was lower, such as occasional reading of the audit results at the tender request stage.

Utilizing audits was challenging due to problems in information flow in buyer organizations. Personnel who have been involved in the audit receive the necessary information about the audit, but often, other personnel do not receive audit information. Integrating the audit database with buyers' own information systems could be a solution to this challenge.

The most significant business benefits were seen in the fact that collaborative assessments save resources and thus, costs, although some costs are involved in participating in the cluster activities. With an independent external auditor, the assessments are more consistent and comparable. In addition, an external auditor is better able to assist the supplier in developing its operations. The most tangible benefits come from the development of occupational safety. Buyer companies collect quantitative data on occupational safety issues from suppliers, and this is one of the most monitored areas of business. Improved safety and fewer accidents benefit both parties economically, as well as through more efficient and higher-quality operations. Assessments and the need for buyer companies to develop and improve occupational safety have contributed to the improvement of the general safety awareness of suppliers.

### 5. DISCUSSION

What, in the end, deems whether the HSEQ AP is a viable approach to SSD? As Sucky and Durst (2013) point out, the division of costs and benefits between the buyer and benefits in SD is of interest but less studied. A transactional cost economics (TCE) viewpoint (Williamson 1996; Ketokivi & Mahoney 2020) has been previously applied to examine supplier relationships (Kros et al. 2019; Lo et al. 2018; Sancha et al. 2015; Williamson 2008; Wouters et al. 2007) and is a viable option for judging the benefits and costs of adopting an SD technique. What does a supplier or a buyer expect to gain when committing resources to the technique? How have these expectations been realized? As Lo et al. (2018) suggest regarding green supplier development, SD can be a relationship-specific (or in this case, network-specific) investment to improve supplier capability and supply chain integration.

The supplier expects either technical or symbolic benefits (Meyer & Rowan 1977; Kujala & Ahola 2005) in return for the investment of resources; that is, benefits either through the assessment resulting in improved HSEQ performance and operations, or through getting favorable status in the eyes of the buyer(s). We attempted to capture some technical benefits through the quantitative analysis. For accident frequencies two years before and after an evaluation, a statistically significant ( $p < 0.01$ ) difference was found. In the comparison of scores between two sequential evaluations, statistically significant differences were found in the trend of overall HSEQ scores, as well as in the trends of HS and Q scores ( $p < 0.01$ ). This result suggests the HSEQ AP has had a positive influence on operational performance. This finding lends further support to previous, often interview or survey based, findings that SD tends to have a positive effect on performance (Nagati & Rebolledo 2013; Glavee-Geo 2019, c.f. Sucky & Durst 2013).

To analyze the economic impact of the HSEQ AP, we compared gross profit and assessment scores, and found that they have a statistically significant correlation ( $p < 0.01$ ). The reliability of assessment scores was found to be satisfactory by Jounila et al. (2017), a finding confirmed further by the supplier interviews as the majority agreed that the scores reflected reality. This result does not directly confirm the effectiveness of the HSEQ AP, but supports the idea that the areas examined in the HSEQ AP relate to operational effectiveness, and from there on to profitability. The economic impact of SD is a less studied topic (Nagati & Rebolledo 2013), but a

very important one from both scientific and strategic points of view. In practice, having evidence of SD's effect on financial performance and competitive advantage is vital for persuading and satisfying top management and stakeholders (Ağan et al. 2016).

Particularly for larger suppliers, the HSEQ audit process and the HSEQ scores were seen as checkpoints and evidence of the supplier's own long-term development work. However, the audits also resulted in tangible improvement suggestions in all HSEQ areas. It was noted that the perceived effects of this SD approach seem to differ depending on the size and the maturity level of the supplier.

Buyers viewed the HSEQ AP as a resource-efficient method for evaluating and developing suppliers. The buyers did not express that they expect preferential treatment, which was found to be one of the main SD motivations in previous studies. This finding could be explained by being a part of the network instead of singularly pursuing SSD and could be seen as a positive, considering that Lo et al. (2018) found out that relational governance has a direct negative impact on upstream green supply chain integration. The buyers expected an improvement in operational performance, which is in line with previous findings on how SD should be motivated (Blonska et al. 2013; Krause et al. 2000). The cluster has remained stable and grown, suggesting that the participating companies have found membership to be a profitable transaction. The business benefits were seen to be achieved through resource savings, and in the end, improved safety and quality particularly at shared workplaces, suggesting that the buyers considered bearing the cost of SSD smaller than bearing HSEQ risk posed by incapable suppliers. This sort of a transactional trade-off was also suggested by Sancha et al. (2015).

The buyers thought that using an expert third-party lead assessor helps in realizing these benefits, which is in line with Liu et al. (2018) suggesting that parties other than buyers and suppliers should be involved in sustainable supplier development in the role of e.g. a facilitator. Aune et al. (2013) state that network approaches to SD may be most relevant for small- or medium-sized buyers and suppliers. However, larger firms also seek effective methods for conducting SD sustainably, and an approach similar to the HSEQ AP might be the answer in some cases. Impactful sustainable supplier development achieves both coverage over the supplier base and effectiveness in terms of performance improvement (Liu et al. 2018), a well planned network approach could help in reaching suppliers that might normally fall outside SD efforts.

Overall, the results demonstrate that this network SD approach seems to produce results in the multi-employer worksite context and seems to be generally considered a worthy investment by buyers and suppliers. But room for improvement remains; some suppliers were disappointed that audit scores, or participation, did not seem to have a direct impact on buyers' supplier choice. As Krause et al. (2007) have noted, a buyer requesting a supplier invest in relationship-specific assets must also demonstrate commitment, or else suppliers will lose motivation, and SD activities will yield no results. This seemed to hold true, particularly for smaller companies, where the value of resources on preparing for an assessment is more significant.

This supplier observation was confirmed by the buyers' interviews. Not all of the buyers have linked HSEQ AP to the procurement process, and often, utilization was lower and more random. To further motivate suppliers, buyers should reinforce the use of the audit results in procurement decisions and make this visible, or at least clarify to suppliers the main purpose of the audits. Lack of internal transparency of assessment information was suggested as a reason, in which case integration of databases would at least provide a partial solution. But it can be contested whether this is the root cause and even then, staff would definitely need information and reminders about the existence of audits. Still, even now, purchasing has an active role in the HSEQ AP, and it is a way for them to be seen by internal stakeholders as "other than a cost cutter or a hardball negotiator" (Handfield et al. 2015).

Other methods of communicating the goal of and commitment to SD could also increase supplier motivation. These methods include participating in supplier events and trade fairs, which was first piloted with the HSEQ AP in late 2019, and clearer communication with suppliers regarding the goals and benefits of the HSEQ AP. Furthermore, some supplier interviewees hoped that SD

participation would strengthen relations with buyers and lead to more strategic cooperation, demonstrating this would also be beneficial.

## 5.2. SD considerations from the CSR perspective

One interesting perspective on HSEQ in the SD context is its relation to the larger management philosophy on CSR ([International Standard Organisation \[ISO\] 26000 2010](#)). SD practices can be viewed as socially responsible if they positively affect the capabilities as well as the financial and social sustainability performance of suppliers ([Yawar & Kauppi 2018](#)). CSR in industrial value chains and networks is an ongoing debate in the scientific literature and efforts have been made to discuss the responsibilities from a global perspective, reaching all actors inside the value chains (see e.g. [Alsamawi et al. 2017](#)). HSEQ as understood in this study context as an IMS for SD contains various objectives similar to those of CSR from the normative, strategic and operational perspectives (refer to [Gianni et al. 2017](#)). Both management approaches highlight the need to influence stakeholders at large, including supplier networks and local communities. Fair operating practices, proper labor practices and a need to operate in an environmentally sustainable manner are evaluated in HSEQ audits and are cornerstones of CSR. The findings of this study provide some interesting evidence of the link between the HSEQ AP and CSR. The participating suppliers showed a clear upward trend in HSEQ performance except for environmental management. Findings of this study provided some perspectives for this discussion, however only partially as direct questions on the links between HSEQ and CSR were not originally included in the interview framework.

In the interviews, some buyers brought up how HS criteria might be somewhat overrepresented in the HSEQ audit criteria. On the other hand, such an overrepresentation of HS criteria might be even beneficial, thus contributing to the discussion that [Nawaz et al. \(2019\)](#) started by arguing that the operationalization of sustainable development would be better understood in practice when the association of sustainability and safety is first recognized. Similarly, as in sustainability, safety shares the same three pillars; financial stability, environmental responsibility and social protection. If we consider H and S as the main indicators representing corporate social performance and pay attention to the suppliers' positive development in financial terms, we can agree with the conclusions made by [Lu et al. \(2014\)](#) who demonstrate a positive, yet not static connection between corporate social performance and financial performance. A similar causality between SD aiming for improving economic performance of suppliers and improving social performance of suppliers has been suggested by [Yawar and Seuring \(2018\)](#).

Furthermore, buyers raised the question whether the evaluation of environmental performance should include more higher-level goals, for instance, concerning suppliers' sourcing processes and the origins of the suppliers' raw materials and components, an idea similar to [Hajmohammad and Vachon \(2016\)](#), who suggest that buyers should invest more in supplier relationships to mitigate sustainability risk. Such goals would supplement more practice-oriented goals, such as waste sorting and disposal and environmental hazard recognition processes that seem to dominate E questions in the current HSEQ audit process, as [Jounila et al. \(2020\)](#) found. Only about a tenth of deviations and development targets were related to environmental and chemical safety issues. These findings indicate that suppliers' E performance is adequate at the moment from the buyer perspective, or that the HSEQ audit process is not motivating E performance development. The empirical material does not provide further evidence on this point. Thus, future studies should study the E perspective in depth from the supplier and buyer perspectives.

As other future studies, the following research topics arising from this study are proposed. This study covered only a limited set of buyers and suppliers. As the HSEQ cluster has shown potential for growth in the number of buyer companies and supplier audits, future studies could repeat this study setting for a larger data set. This would also be a good basis for further work with a purely quantitative focus. The use of other theoretical lenses such as those related to networks or relationships could also prove interesting. As many of the buyers in this study are international actors, it would be possible to tailor this study setting to their actions outside Finland. As large national actors, the buyers are constantly running or considering running new industrial investment projects in Finland. A case study focusing on one investment project would provide a more in-depth understanding of SD in the HSEQ context. As the accident frequencies were

only partially comparable, a future study could examine ways for merging the HSEQ register database with the national statistics.

## 6. LIMITATIONS

This study included some potential biases that are typical of organizational studies. First, effect evaluation in the organizational context is complicated, as the effects of a certain organizational operation or activity, as in this case the HSEQ audit process, are often influenced by different factors. Thus, a mixed-methods approach combining quantitative and qualitative data was justified. Good progress in the quantitative data and general acceptance of HSEQ audits was highlighted in the buyer and supplier interviews. This mutually shared impression strengthens our conclusions on the efficiency. Second, due to the buyer–supplier setup, suppliers may feel compelled to provide positive feedback. However, the supplier interviews were led by experienced researchers, included a promise for anonymity in reporting and provided consistent data from the suppliers. Thus, it is unlikely that the buyer–supplier setup have biased the results. Third, target suppliers can all be considered strategic partners; thus, they likely have a better motivation for HSEQ development in general. Fourth, suppliers' accident frequencies are reported by the suppliers themselves in the HSEQ register database. The data was only partially validated in the audit session. Fifth, national accident statistics data acquired from the Workers' Compensation Center was only partially comparable to the HSEQ register database data. Thus, comparison between the suppliers and national figures was only indicative.

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