

Sustainable supplier development within healthcare: an embedded case study in a hospital setting

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Abstract

Extant literature on sustainable supplier development typically relates to the manufacturing industry. The public healthcare sector, with its strong, negative impact on the environment, tends to be overlooked. Our study aims to understand how sustainable supplier development is applied in hospitals and to what extent such initiatives contribute to achieving their sustainability goals. We used an embedded case study within the facilities segment of a large Dutch hospital group. Although various forms of direct and indirect supplier development were applied, we observed a striking lack of measurable targets and insufficient monitoring. The results show a worrisome lack of commitment rather than a sense of urgency.

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Climate change, driven by greenhouse gas emissions from burning fossil fuels, poses one of the most significant public health challenges of the 21st century (Costello et al., 2009). The healthcare sector has long focused on the impact of climate change on human health. However, only recently has there been increasing attention to the impact of the healthcare sector on the climate. Paradoxically, the healthcare sector is a major contributor to CO₂ emissions, water pollution, and waste production worldwide, leading to adverse effects on human health (Costello et al., 2009, 2013; Ladriagan et al., 2018; Watts et al., 2021).

In light of this, the healthcare sector faces growing demands for sustainability from various stakeholders, including government regulations, clients, and staff, all urging reductions in CO₂ emissions (Van Raaij, 2016; Sherman et al., 2020). Achieving environmental goals requires healthcare organizations to take responsibility not only for their own immediate impact but also for their supply chain's environmental footprint. Thus, it is of utmost

importance for healthcare organizations to collaborate directly with suppliers to address sustainability issues. In other words, supplier development with a focus on sustainability is needed. By managing and/or collaborating with suppliers, healthcare organizations can contribute to sustainable development goals (e.g. Rezali et al., 2018).

Sustainable supplier development goes beyond traditional supplier development by incorporating activities and performance focused on environmental and social objectives (Sancha et al., 2015; Zimmer et al., 2016). It involves a joint effort between the buying organization and its suppliers to improve performance and capabilities to meet sustainability goals (Bowen et al., 2006; Chan et al., 2013; Foerstl et al., 2015; Liu et al., 2018). Many organizations apply sustainable supplier development to encourage their suppliers to develop and implement sustainable initiatives and measures (Sacha et al., 2015; Zimmer et al., 2016; Jia et al., 2021).

While studies on supplier development have mainly focused on its impact on the supply chain (Sancha et al., 2015; Busse et al., 2016; Joshi et al., 2016), less attention has been paid to its potential in enhancing the sustainability performance of the buying organization (Liu et al., 2019). Moreover, there is a notable lack of studies on supplier development within the healthcare sector as most studies on supplier development have been conducted in manufacturing sectors. The Dutch healthcare sector annually procures billions in resources and materials from suppliers. In the coming years, hospitals' procurement costs are expected to rise from approximately 30% to 50% of every euro spent (Gupta Strategist, 2017), making this sector highly relevant for studying supplier development.

The current study specifically concentrates on hospitals as mayor players in the healthcare sector supply chain. Hospitals have a significant impact on sustainability, and the “assessment of environmental impacts (...) is still at an early stage (...) at the level of individual hospitals” (Migdadi and Omari, 2019, p. 1107). Hospital supply chains are held responsible for many “negative environmental impacts and social concerns” (Duque-Urbe et al., 2019, p. 1).

The aim of this study is to understand how sustainable supplier development is applied in hospitals and how it is used to achieve sustainability objectives. To this end, we conducted an embedded case study investigating different supplier development practices, focusing on three main suppliers of a focal organization, one of the larger top clinical hospitals in the Netherlands.

LITERATURE REVIEW

PROCUREMENT WITHIN THE HEALTH CARE SECTOR AND SUSTAINABILITY

The procurement function in the healthcare sector differs from other sectors in several ways. Procurement in the healthcare sector faces a high degree of complexity, involving numerous distribution channels and strict rules and regulations (De Vries and Huijsman, 2011). In addition, the COVID-19 pandemic has caused major disruptions in global supply chains and especially in the healthcare sector (Scala and Lindsey, 2021). The pandemic greatly increased demand for critical medical equipment and supplies.

A hospital's procurement department plays an active role in cost-saving efforts (Janssen, 2017; Gupta Strategist, 2017; Gelderman et al., 2018). These departments, however, encounter major challenges in meeting both financial and sustainability targets. International studies in Western countries reveal that hospital procurement costs represent a significant portion of their budgets, accounting for as much as 30-40% of expenses (Miller et al., 2019; Sanderson et al., 2015). Hospitals may be inclined to focus on securing the best price. However, this approach often leads to weak buyer-supplier relationships with little or no trust (Mettler and Rohner, 2009), which may hinder achieving sustainability goals.

Hospitals serve as social role models and one may expect them to take responsibility for their environmental impact in a proactive way, without solely relying on government regulations. This responsibility extends beyond setting and managing environmental targets for their own organization as the entire supply chain could contribute to achieving sustainability goals (e.g., Carter, 2011; Ladriagan et al., 2018). Suppliers are key stakeholders, and their active participation is essential for the successful realization of sustainability ambitions (Brammer and Walker, 2009; Liu, 2019). Achieving successful sustainability practices requires holding suppliers accountable for their contributions to a better environment (Zimmer et al., 2016) as well as integrating sustainability objectives into supplier contracts, as recommended by relevant plans (e.g., RIVM, MVI action plan). To this end it can be a valuable approach for hospitals to set up supplier development practices that focus on sustainability.

SUPPLIER DEVELOPMENT WITHIN HOSPITALS

Buying organizations can adopt various strategies to enhance supplier performance, known as supplier development. Supplier development generally encompasses initiatives aimed at improving supplier capabilities in quality,

flexibility, service, and cost (Fan et al., 2021). The existing literature on supplier development often classifies supplier development on the level of commitment of the buying organization to its suppliers (Krause et al., 2000; Wagner, 2006; Humphreys, 2010). Two main types of supplier development practices can be distinguished: indirect and direct (Wagner and Kraus, 2009; Wagner, 2010).

Indirect supplier development involves limited resources from the buying organization for the development of a specific supplier. On the other hand, direct supplier development requires more active involvement, with cooperation leaning towards a partnership (Monczka and Trent, 1993; Wagner and Krause, 2009). Direct supplier development relies on trust and commitment (Yawar and Seuring, 2015). Examples include training supplier staff, providing temporary resources for cooperation enhancement, supplying equipment, and even financial investments in supplier development.

The concept of sustainable supplier development represents a joint effort between buying organizations and suppliers to improve environmental and social performance (Chan, 2013; Foerstl et al., 2015; Busse et al., 2016; Liu et al., 2018; Jia et al., 2021). Embracing sustainable supplier development can be a win-win strategy, benefiting both buyers and suppliers in terms of sustainability performance (Bai and Sarkis, 2011; Wagner, 2011).

There are several ways in which hospitals can offer supplier development initiatives focused on sustainability. For example, hospitals can provide training and capacity-building programs for their suppliers to enhance their knowledge and skills in sustainable practices. This may include workshops on eco-friendly manufacturing processes, waste reduction techniques and energy-efficient operations. Hospitals can also work with their suppliers to identify and source sustainable materials and components. They can provide guidance and resources to help suppliers transition to more sustainable sources of raw materials, such as recycled or renewable materials. Furthermore, hospitals can collaborate with suppliers to reduce their carbon footprint. This may involve conducting carbon audits to identify emissions hotspots and developing action plans to implement energy-efficient practices, transportation optimization, and carbon offsetting measures. All these initiatives require trust and commitment between hospitals and their suppliers. The question becomes whether in practice financial pressures hinder building strong buyer-supplier relationships that allow for sustainable supplier development initiatives to take root.

METHOD

For healthcare organizations, managing suppliers is crucial in achieving sustainability goals (Rezali et al., 2018). Without full supplier participation and support, the likelihood of achieving sustainability objectives diminishes (Ashan and Rahman, 2017). The aim of this study is to gather insights about whether and how sustainable supplier development is applied in hospitals and to what extent such initiatives contribute to achieving their sustainability goals.

To this end, this study uses an embedded case study design, focusing on a large Dutch hospital organization, which has set out to apply sustainable supplier development practices with its three suppliers in the facilities segment. These three suppliers are considered as the three embedded cases. The selection of similar (embedded) cases enables a comparative analysis, allowing for the discovery of patterns and drawing conclusions beyond the outcomes of a single case.

The focal organization is a prominent hospital organization with multiple locations across the Netherlands. It is known for its high quality and quantity of clinical services. This hospital is not only ambitious in its medical specialism but also committed to sustainability. Given its ambitious sustainability objectives and active policy in sustainable supplier development, this hospital is a suitable focus organization for this study.

The embedded cases in this study revolve around the sustainable supplier development practices of the focal organization concerning three suppliers in the facilities segment. The selection criteria for these cases relate to the availability of contract and purchasing files, current contractual cooperation, and the application of supplier development by the focus organization. This approach allows for a comprehensive examination of the focal organization's sustainable supplier development initiatives and their impact on the three suppliers involved.

DATA COLLECTION

Two primary data collection methods were used in this study: (1) document analysis through content analysis of various policy documents, (procurement) contracts, SLAs, minutes, (policy) documents and external information sources; and (2) interviews, collecting different perceptions from the focal organization and suppliers. These two data collections were expected to complement each other and provide a complete image of the situation.

Pilot interviews were conducted with respondents prior to data

collection. The interviews were aimed at gaining insight into respondents' experiences, considerations and interpretations related to the use of sustainable supplier development and the impact on the achievement of sustainability goals by the focal organization. For the study, a total of fourteen interviews were conducted. The interviews consisted of open-ended and semi-structured questions. The operationalisation of key concepts is shown in Appendix 1.

Interviews were held with experts and/or managers of purchasing organization, who are (co-)responsible and/or involved in sustainable supplier practices and could provide anecdotal evidence of the current initiatives employed with each supplier. The following officers participated: head of procurement, buyers, supplier contract managers, sustainability manager and department managers. In addition, interviews were held with the account managers and or (product) specialists of three suppliers within the facilities segment with whom the focal organization maintains sustainable supplier development practices: (1) a cleaning service provider; (2) an algae removal organization; and (3) catering facilities for staff and visitors.

DATA ANALYSIS

In-depth interviews were recorded and fully transcribed. To enhance the reliability of the outcomes, the transcribed interviews were shared with the respondents to obtain their feedback. The raw data from the interviews were then coded, with data having similar meanings being categorized and labeled accordingly. A table was created to summarize the essence of the answers, using keywords or sentence fragments, for each respondent. Subsequently, the raw data were organized in a large data matrix to identify patterns. Only the most important outcomes and phrases were extracted. The cases were first analyzed individually, conducting within-case analyses. Following that, a cross-case analysis was performed, comparing the results from different cases to draw broader insights and identify common themes or differences. For each separate case, we document (1) forms and impact of direct supplier development; (2) forms and influence of indirect supplier development; and (3) impact on the focal organization's sustainability targets.

RESULTS

SUSTAINABILITY OBJECTIVES OF THE FOCAL ORGANIZATION

The document analysis reveals that the focal organization has set ambitious sustainability targets. This is evident from the appointment of a sustainability programme manager in March 2022, tasked with implementing various sustainability initiatives based on the sustainability plan. Additionally, sustainability is prominently featured in the 2021-2024 strategic long-term plan as one of the five guiding principles, further emphasizing the organization's commitment to sustainability.

In the strategic annual plan, the focal organization emphasizes its social responsibility across several sustainability areas. This policy document outlines key sustainability aspects, including the sustainable employability of employees, a focus on using sustainable materials and limiting energy consumption in renovation and construction plans, and consideration of the environmental impact during materials purchasing and reuse.

We found several examples of sustainability initiatives that have already been implemented or achieved by the focal organization. For example, at one location, the hospital's main building and two ancillary buildings have been connected to the heat network of the Household Waste Treatment Plant, eliminating the need for natural gas for heating. Furthermore, the organization supported an initiative where employees established a solar park on an outdoor location, generating a significant portion of the organization's power needs sustainably. Ownership of the solar park lies with employees who have purchased certificates, while the organization leases the land to the BV that operates the solar park. To reduce energy consumption, LED lighting is being gradually installed to replace traditional lighting within all buildings.

In addition, energy consumption has become a key consideration in the assessment of new equipment. Moreover, in each part of the organization a critical evaluation has been made of the potential replacement of disposables with sustainable materials, and efforts are made to minimize packaging materials and other waste generation. Moreover, the multi-year sustainability agenda for 2021-2024 encompasses various themes, such as social return, healthy food, waste reduction, energy management, local involvement, nature, and circular procurement.

Detailed information on the sustainable initiatives and objectives of the focal organization is provided in Appendix 2.

CASE STUDY 1: CLEANING AND SERVICE PROVIDER

Supplier A holds a significant role as a supplier within the facilities segment for the focal organization. They are responsible for handling the daily, periodic, and specialist cleaning tasks for both hospital sites and ancillary sites, making their services crucial for the organization's smooth operation. Considering the vital impact of cleanliness on the primary process (e.g., surgery rooms must be immaculate for operations to proceed safely), it becomes evident that the partnership with Supplier A carries not only financial implications but also potential risks. Ensuring sustainable practices in this domain is of utmost importance, as it aligns with the organization's broader sustainability goals and risk management strategies. Consequently, it is essential for the focal organization and Supplier A to address sustainability aspects in their agreements and work collaboratively towards implementing sustainable solutions within the facilities segment. This approach will not only mitigate potential risks but also foster a positive impact on the organization's overall sustainability performance.

While numerous agreements have been established between Supplier A and the focal organization regarding performance and innovation, there seems to be a lack of concrete commitments on sustainability aspects. The facility services manager of the focal organization, admits: "*In terms of sustainability, we don't have many agreements yet, only on Social Return.*" The same picture emerged from the document analysis.

1. Forms and impact of direct supplier development

In this case study, direct supplier development practices are observed. This is evidenced by the contract form, where a performance agreement was established using a 'Best Value Procurement' approach. The document analysis and interviews provide further insights, indicating that Supplier A is actively engaged in fostering cooperation and performance. This is demonstrated through collaborative efforts, joint innovation initiatives, and the exchange of knowledge, resources, and materials. A good illustration is the following statement by the internal service team leader of the focal organization: "*One example is the application of the cleaning control system by Supplier A. That system is from this supplier and we are going to switch to a national system and we are also going to use that, so we actually maintain the same methodology and the same system. And I do think that is a win-win situation, because otherwise you get that we are comparing apples with oranges. And right now, the entire management of Supplier A is taking the course. And we do partly meet that too by partly co-investing.*" Several other

examples were mentioned in which the focal organization and Supplier A were engaged in joint innovations, such as applying cleaning robots and new or innovative cleaning techniques. An example of an innovative cleaning technique is the UVC lamp. On this, the branch manager of Supplier A said the following: *"The UVC lamp, that's a great example where we need the expertise of the focal organization 's infection prevention department, so it takes quite a lot of expertise from the focal organization to achieve a result. And the UVC lamp was initially developed not necessarily from an environmental perspective, but from a hygiene perspective. But again, an advantage is that you're going to save chlorine and or alcohol, so that's a chemical-free method of disinfection. And here we need your input very much, because infection prevention department has to approve this and you are liable if we don't do it properly. That's really a form of direct supplier development."*

2. Forms and influence of indirect supplier development

A range of indirect supplier development practices are implemented for Supplier A. Notably, supplier assessment and performance measurement are frequently utilized in formal documents, such as management reports and a KPI dashboard. All respondents during the interviews emphasized the significance of supplier assessments and measuring supplier performance. The following quote illustrates this: *"Of course, we have a KPI dashboard. A dashboard where we show what the figures are, for example, from the VSR checks, but also the KPIs what is the average time of bed cleaning or insulation cleaning. And whether there are peaks and troughs in that. And the customer conversations we have with the departments and what kind of figures come out of that. That is all recorded."(object manager Supplier A)*

Both Supplier A and the purchasing organization recognize the significance of indirect supplier assessment. The practice of regular and systematic monitoring, assessment, and adjustments has visibly led to improved performance and cooperation. This progress is evident through quantifiable evidence from the KPI dashboard and through internal and external audits, among other sources. This picture is confirmed in the interviews, with all five respondents experiencing an improvement in performance by applying indirect supplier development. The following quote from the head of facility services corroborates this statement: *"We have very clearly defined all the areas of focus and we have also put those very clearly, say, in a Service Level Agreement and through internal and external audits and the like we monitor that."*

However, not all typical forms of indirect supplier development are

being utilized, including company visits. According to all respondents, there have been very few company visits in recent years. They either report that such visits have not occurred or that they perceive minimal added value in conducting them. An explanatory underlying cause may be illustrated by a quote from Supplier A's branch manager: *"I really do want to make connections between parties, so I also want to visit Utrecht University once. But it is not really a theme at the focal organization. The focal organization is quite internally focused. So we should also dare to look from internal to external."*

3. Impact on the focal organization's sustainability targets

The document analysis and interviews indicate a lack of insight into Supplier A's influence on the achievement of the focal organization's sustainability goals. There seems to be a deficiency in clearly translating the focal organization's sustainability objectives into specific performance expectations from Supplier A. Hardly any concrete agreements have been made on the sustainability targets and/or performance to be achieved by the sustainable initiatives and how this performance relates to the focal organization's sustainability targets.

Furthermore, the absence of robust monitoring of sustainability performance exacerbates this situation. Although respondents mention examples such as reducing CO₂ emissions and waste reduction as sustainability objectives that Supplier A contributes to, the lack of monitoring makes it challenging to quantify the actual impact of these initiatives. The following quote illustrates this: *"I can imagine that, well, for example, you want to have less waste and a lower CO₂ footprint. But what that is concretely for the focal organization I really don't know."*(property manager Supplier A). The head of facility services at the focal organization confirms this picture: *"I think we have an agreement in terms of Social Return, so how many people with a distance to the labour market they deploy, which is, say, a minimum of 5%. They are exceeding that now and that also fits very well with Supplier A's intrinsic motivation. It is also something in their genes, so they tackle it themselves. In other areas such as chemicals, water consumption and the like, there are no KPIs on that."*

In summary, the analysis of this case shows that although agreements are made on sustainability aspects, they often lack specificity, particularly concerning the desired output. The implementation of supplier development seems to have a positive impact on the performance and cooperation between Supplier A and the focal organization. The results of the efforts made by both

parties seem to influence efficiency, quality and risks in particular.

However, it is noted that the focus on sustainability aspects is relatively limited, with few concrete results except for Social Return. The influence on sustainability goals is not clearly evident, suggesting that more focused and concrete actions are needed to achieve sustainable outcomes. Overall, there seems to be a need for improved clarity and monitoring mechanisms to ascertain Supplier A's role in achieving the focal organization's sustainability targets effectively. This could enable a more accurate assessment of the outcomes and progress in sustainability efforts.

CASE STUDY 2: WASTE AND RECYCLING COMPANY

Since November 2021, the focal organization has established a long-term partnership with Supplier B, a renowned regional waste and recycling company. Supplier B has taken on the responsibility for collecting, processing, separating, and recycling all waste generated across various locations of the focal organization. Given the hazardous nature of waste produced by hospitals, considerable attention is directed towards adhering to high safety standards and environmental considerations. Additionally, the financial aspect of waste management has become increasingly critical as stricter laws and regulations, along with the shift towards circularity, have resulted in rising waste removal and processing costs.

Both the focal organization and Supplier B have recognized the significance of sustainability issues in their collaboration and have laid out a comprehensive Service Level Agreement (SLA) for the next five years. The SLA encompasses not only efficiency and quality objectives but also sustainability targets aimed at enhancing waste separation and reducing waste and CO₂ emissions.

Nevertheless, the main challenge facing the partnership lies in transitioning from perceiving waste solely as 'waste' to considering it as a potential 'raw material.' The focal organization and Supplier B have not yet established specific and measurable agreements for achieving their sustainability objectives to address this challenge effectively.

1. Forms and impact of direct supplier development

Respondents provided several examples of direct supplier developments, including the sharing of knowledge and resources. However, the focal organization has shown only modest involvement in such collaborative endeavors. It appears that the application of direct supplier development

practices is relatively scarce, and the relationship between the focal organization and Supplier B leans more towards a traditional supplier-client relationship. One potential reason for this limited cooperation could be attributed to the relatively short duration of Supplier B's association as a supplier to the focal organization, which spans merely six months. Nonetheless, both parties acknowledge the importance of fostering greater cooperation and development moving forward. There is a shared intention to enhance collaboration and establish a more robust and meaningful relationship that involves proactive supplier development initiatives. The following quote from the head of logistics at the focal organization endorses this: *"But we do have the objective to enter into real partnership and to really start looking together at how we can achieve our objectives in this case."*

2. Forms and influence of indirect supplier development

Several forms of indirect supplier development are demonstrated in this case. The document analysis reveals a well-structured approach, where a formal supplier review occurs every quarter, based on a comprehensive SLA. This SLA encompasses key performance indicators related to efficiency, quality, and sustainability aspects. The purpose of a formal supplier assessment is explained by the head of logistics in the following quote: *"Well, a periodic supplier assessment mainly keeps the supplier on his toes and ensures that we identify in time whether agreements are not being met, so that we can anticipate or steer this together."* This quote implies that a formal supplier assessment increases supplier performance and provides clarity on expected (future) performance. Another example of indirect supplier assessment in this case study is a company visit. A delegation of employees from the focal organization visited Supplier B's facility with the primary objective of gaining deeper insights into how the focal organization's waste is processed by Supplier B and understanding their operational processes. Supplier B's key account manager said: *"We did one tour of GP Groot's entire site. We set aside a day for it and then we actually visited all the different areas, as it is fifty football fields in size. We looked at all the waste streams from composting to rubble to residual waste and how those processes work. At what has to happen on a daily basis at our site, to, say, reprocess or work up all the waste into raw materials in general."*

3. Impact on the focal organization's sustainability targets

As of the effective start of cooperation in late 2021, the reference year for evaluating progress is set as 2022. However, at this stage, it remains uncertain

whether the intended results are achievable and realistic. The document analysis indicated a lack of clarity on the methodology used to determine the assumptions and percentages presented in the various documents. Additionally, there are no specific and definitive figures available in the focal organization's policy documents concerning waste management. In the first quarter of 2022, Supplier B provided management reports on waste volumes, types, and transport activities. However, these reports fail to offer sufficient information and insights into the progress towards achieving the desired sustainability outcomes. The analysis of interviews conducted presents a somewhat conflicting picture. On one hand, it confirms the concern that concrete starting points and measurable results related to waste sustainability have not been established. The following quotes illustrate this: *"Yes, we have created an SLA / KPI document in which we have defined various sustainable initiatives. In it, we have actually determined per period or per quarter and per year when we are going to deploy certain processes" (key account manager Supplier B). "(...) in consultation with my colleague from facility services or the sustainability coordinator, we determine whether the objectives are in line with the overall objective of the focal organization. And then I am assignment owner and contract owner of Supplier B and we have to make sure that they fulfil the agreements which in turn align with the objective." (Head of logistics, focal organization)*

On the other hand, respondents gave examples of successful sustainability results, such as: *"what proved successful is that we reduced the emptying frequency of all waste presses. So reducing the emptying frequency reduces CO₂ emissions through fewer transport movements. Also a cost reduction, but that is not a sustainability objective" (head of logistics, focal organization)*. Supplier B's key account manager also pointed out several concrete results that affect the achievement of the focal organization's sustainability targets, such as: *"Well one of the sustainability aspects comes to my mind now that we have applied is the fact that we use recycled plastic for the SZA drums (Specific Hospital Waste) that has resulted in a 50% reduction in CO₂. And: "The agreement that we make in that that we do that in the most sustainable way possible, so that we drive the right equipment. Which run on the right fuels, for example, HVO 100, which in turn is more economical. That we don't detour if not necessary, that we dump at locations as close as possible to the focal organization."*

Supplier B diligently records a wide range of pertinent information, including details on various waste streams, waste processing volumes, distances traveled (in km) and their corresponding CO₂ emissions, and the

number of empties per compactor. This valuable information is readily accessible to the focal company through management reports. The availability of such concrete data ensures transparency in evaluating the outcomes of sustainable initiatives aimed at achieving the set sustainability objectives. Nonetheless, despite having access to this detailed information, translating these figures into tangible and demonstrable results may present challenges. The data alone might not directly illustrate the progress made towards sustainability objectives. It requires careful analysis, benchmarking, and context to understand the actual impact of sustainable efforts. This situation is recognized in the following quote from the head of logistics: *"It's about sustainability objectives of the focal organization, like we commission something, for example a waste disposal. And now we make an assumption that a waste disposal costs so much CO₂. But I would like that instead of assumption to become a real value. Because it could be a shared ride, so that the addition of our assignment instead of, an extra stop, produces much less CO₂ extra than a whole ride. Or if, for example, we request a change of waste press that they also report with that what the actual ride was instead of us assuming it's a ride between Supplier B and the focal organization."*

From the analysis of this case study, it appears that the focal company and Supplier B have formulated more or less concrete sustainability targets. However, upon closer examination, these agreements lack specificity, particularly regarding the expected outcomes and outputs of these targets. The application of direct supplier development practices is limited. On the other hand, various forms of indirect supplier development have been applied, and these efforts seem to positively impact performance in terms of efficiency, quality, and sustainability. Nonetheless, it remains unclear what the actual performance and tangible outputs are concerning the achievement of the focal company's sustainability targets.

CASE STUDY 3: CATERING AND RETAIL COMPANY

Supplier C, the market leader in the hospital sector for catering and retail, has established a long-term partnership with the focal company. Their collaboration encompasses the management of visitors' restaurants, shops, staff restaurants, catering at meetings and events, as well as the vending machines within the focal company's premises. To ensure a sustainable approach, clear agreements have been made with Supplier C, incorporating sustainability principles, especially concerning food. Supplier C has developed a comprehensive vision named 'foodvision,' which focuses on providing healthy and sustainable food options. Starting from 2020, sustainability targets have

been set, and specific objectives are expressed in percentages or numerical figures on an annual basis. These targets were then formalized in an SLA, which serves as the basis for monitoring and steering their progress. Quarterly evaluations take place, encompassing critical aspects such as productivity, guest satisfaction, sustainability, and hygiene. Through regular assessments and performance tracking, Supplier C and the focal company can measure the effectiveness of their sustainability efforts and make informed adjustments where necessary.

1. Forms and impact of direct supplier development

The document analysis and interviews reveal the intensive and collaborative nature of the cooperation between Supplier C and the focal company. Both parties are dedicated to positively influencing results, which is evident in the concrete forms of direct supplier development employed. Their joint efforts aim to achieve efficiency, improve quality, enhance customer satisfaction, and promote sustainability. The document analysis shows, for example, that there is transparent cooperation and that Supplier C uses the knowledge and resources of the focal organization. The staff restaurants are jointly operated through an 'open-book' construction. Supplier C uses all facilities of the focal organization and receives a management and operating fee. Notably, investments are made jointly, underscoring the spirit of collaboration. In this arrangement, the focal company remains actively involved in decision-making processes and agreements, including those related to sustainability objectives. The interviews consistently emphasize a sense of collective identity, using 'we' rather than 'they' when referring to Supplier C and the focal company. This underscores the constructive and far-reaching nature of their partnership. The following quote supports this statement: "*we discussed and drafted the new catering catalogue together (food & beverage team leader).*"

2. Forms and influence of indirect supplier development

In this case study, an extensive range of indirect supplier development practices is applied. The partnership between the parties involves an SLA, which serves as the basis for monitoring performance through quarterly reporting, audits, and a communication matrix. Respondents highlight that indirect supplier development is primarily employed to monitor service quality and efficiency. Securing agreements and maintaining focus are cited by the food & beverage team leader as the main reasons for utilizing indirect supplier development. This is illustrated by the following quotes: "*Understanding whether all noses are still in the same direction or whether they are still doing*

what they are asked to do" and *"I find if you don't do it, you lose grip."* Moreover, the "formal supplier development" approach is specifically directed towards influencing sustainability issues.

3. Impact on the focal organization's sustainability targets

In recent years, significant progress has been made in addressing sustainability aspects related to healthy food and food waste, resulting in concrete and demonstrable achievements. These accomplishments have had a discernible influence on the focal company's sustainability targets. Supplier C has set the year 2020 as the 'start' year and formulated annual objectives concerning sustainability aspects. Through regular monitoring and evaluation of results, new targets are established based on the progress made. On the sustainability aspects of healthy food and food waste, Supplier C has achieved notable results, which are communicated quarterly. For instance, the percentage of plant-based food increased to almost 50% in 2021, surpassing the target by approximately 5%. Additionally, the percentage of food waste decreased to 5.29%, which is around 2% below the target, in just one quarter. However, it is worth noting that the focal company has not set specific objectives, such as target percentages and key figures, for these sustainability aspects. Furthermore, on other sustainability dimensions like CO₂ reduction and energy reduction, no formal agreements or monitoring processes have been established between Supplier C and the focal company. As a result of the lack of concrete targets and monitoring on all sustainability aspects by the focal company, the full impact of Supplier C's performance on the focal company's sustainability objectives remains unclear. Supplier C's contributions may play a partial role in achieving these targets, but without comprehensive and defined benchmarks from the focal company, it becomes challenging to precisely assess the extent of their influence.

CROSS-CASE ANALYSIS

AGREEMENTS ON SUSTAINABILITY

Table 1 shows the sustainability agreements and monitoring methods for each case. Agreements on several sustainability aspects are made with suppliers in the facilities segment. These agreements relate to the themes of Social Return, healthy food, waste reduction and energy management from the focal organization's sustainability policy. Agreements on the other themes, such as local involvement, nature and circular procurement are scarce in the analyzed cases.

On environmental aspects, several agreements and similarities between

the three cases exist. Indeed, in all cases, agreements were made on waste reduction & waste separation, CO₂ emission reduction and energy saving. In addition, some agreements are mentioned regarding the following sustainability aspects: cleaning and cleaning agents with ecological/organic labels, water reduction, sustainable procurement and food waste. These aspects are addressed individually in each case, with no apparent cross-links identified between them. It is likely that these aspects are tailored to the unique requirements of each case study. For instance, the implementation of ecological cleaning agents at Supplier A addresses specific environmental needs within that context.

While some examples of energy saving and circular procurement are mentioned in the case studies, the provided information is not sufficient to draw comprehensive conclusions. In terms of social sustainability, a consistent trend is observed. In all cases, agreements have been made on the use of Social Return. However, other social aspects are hardly mentioned, except in the Vermaat case study, where agreements have been made concerning the social aspect of providing healthy food for patients and staff.

Table 1: Cross case analysis - sustainability agreements and monitoring

	Supplier A	Supplier B	Supplier C
Agreements on sustainability			
Environmental aspects	Waste reduction Waste separation CO ₂ emission reduction Energy saving Cleaning & cleansing agents with Eco/Bio label Water consumption reduction	Waste reduction Waste separation CO ₂ emission reduction Energy saving	Waste reduction Waste separation Energy saving Sustainable procurement Food waste
Social aspects	Social Return with percentage of min. 5%	Social Return not a 'hard' percentage	Social Return with target percentage of 5% Healthy food
Monitoring			
Mode of monitoring	Management reports Established KPIs on Social Return and ambition KPIs on environmental aspects	Management reports ambition KPIs on social & environmental aspects Established KPI on supplier sustainability targets (CO ₂ ladder)	Management reports Established KPIs on most social and environmental aspects
Measurement output	Percentage of Social Return per quarter No output measurement on environmental aspects	Percentage & volumes of waste by quarter No output measurement on Social Return and energy consumption CO ₂ performance ladder for sustainability ambitions of supplier (external)	Percentage of healthy food & food waste ('waste') by quarter No output measurement on Social Return, CO ₂ reduction, energy consumption and sustainable procurement

MONITORING

The method of monitoring is largely uniform across all cases. However, concrete answers regarding formal agreements on specific environmental objectives are lacking. Sustainability aspects are primarily monitored through management reports, but it remains unclear what specific outcomes are expected from these reports. Respondents identify CO₂ emission reduction, waste reduction, waste separation, and Social Return as key outputs of sustainability efforts. Nevertheless, measuring and monitoring performance are viewed as complex processes. There is limited information available on the results of environmental aspects achieved through suppliers' efforts, and the available output data varies from case to case. This inconsistency makes it difficult to draw comprehensive conclusions on the overall impact of sustainability initiatives. Furthermore, there appears to be a discrepancy between the sustainability principles outlined in the focal organization's policy documents and how they are implemented in practice. On the supplier's end, there is a lack of or insufficiently defined concrete starting points to effectively contribute to the client's sustainability targets.

IMPACT ON SUSTAINABILITY OF THE FOCAL ORGANIZATION

Table 2 shows the impact of applying each form of direct and indirect supplier development on achieving the sustainability objectives. In all cases, both direct and indirect supplier development practices are utilized, although variations exist among the cases in terms of their extent and influence on sustainability aspects. Notably, a discernible trend in indirect supplier development is the consistent use of the 'formal supplier assessment' form in every case study, significantly impacting multiple sustainability aspects. This trend can be attributed to the establishment of SLAs with Key Performance Indicators (KPIs) pertaining to sustainability aspects with each supplier. Consequently, the assessment and monitoring of these SLAs are integral components of the formal supplier assessment process. However, it is intriguing to observe that, apart from the GP Groot case study, other forms of indirect supplier development are not employed across the cases. In contrast, the GP Groot case study involves the application of other forms of indirect supplier development while not utilizing any forms of direct supplier development. The analysis does not provide an explanation for this discrepancy.

A key observation is the lack of clarity regarding the impact of suppliers' efforts and achievements on the focal organization's sustainability objectives. This uncertainty stems from the absence of specific targets set by the focal organization and insufficient monitoring of results. In addition, supplier

dependence may also play a role. As suppliers exert more significant influence on sustainability outcomes, the healthcare organization may become increasingly reliant on their performance. Finally, the analysis shows that no use is made of external sources and methodologies to measure and or monitor sustainability aspects, such as the "Green Deal" and "CO₂ performance ladder". By not employing external measurement systems, there is uncertainty about the reliability of the figures and data provided by suppliers.

Table 2: Cross case analysis - impact on sustainability the focal organization

Forms of direct supplier development	Supplier A	Supplier B	Supplier C
Training of staff by the focal organization	CO ₂ reduction		Food waste
Providing resources	Waste reduction Waste separation Cleaning & cleansing agents with Eco/Bio label		
Supply of equipment/resources to supplier	Water consumption reduction Energy saving		Waste separation
Forms of Indirect supplier development	Supplier A	Supplier B	Supplier C
Formal supplier assessment	Social Return of 5% Waste reduction Waste separation	CO ₂ reduction Waste reduction Waste separation	Social Return of 5% CO ₂ reduction Food waste Sustainable procurement
Communication feedback Company visits		Waste reduction	
Supplier audit		CO ₂ reduction	

DISCUSSION

The results of this study confirm that the focal organization has indeed formulated sustainability objectives and indicators in their procurement and policy plans. These sustainability objectives are categorized into various themes, with specific objectives outlined for each theme. However, despite the formulation of these objectives, the analysis reveals a significant gap in translating them into measurable outcomes, expressed in quantifiable numbers or percentages. For example, the organization has insufficient insight into its CO₂ emissions. This is remarkable, as healthcare organizations are tasked by the Climate Accord to jointly realize 50% CO₂ reduction (compared to 1997) by 2030. Our findings contribute to the current knowledge by investigating and documenting less successful practices in hospitals, which needs additional attention in academic research (cf. Duque-Urbe et al., 2019).

The findings show that the need and sense of urgency to increase sustainability tend to be non-committal. This phenomenon has been explored in existing literature, which offers potential explanations. One such explanation is that a strong focus on operational efficiency can hinder sustainability efforts (Shou et al., 2019). This might be the reason why the actual impact of supplier development initiatives receives limited attention. Nevertheless, based on our analysis, we cannot conclusively determine whether this applies to the focal organization as well. Furthermore, Handfield et al. (2002) demonstrated that integrating sustainability objectives into supplier agreements is a challenging task, especially in conjunction with agreements centered on lowest cost, best quality, and highest flexibility. Through interviews conducted for this study, it became evident that sustainability issues are inherently complex, making the assessment of sustainability initiatives a difficult undertaking. Measuring and monitoring performance is seen as a complex process. Management reports are used to monitor sustainability aspects, although it is not clear what concrete results this should yield.

Zimmer et al. (2016) stress the importance of holding suppliers accountable for contributing to a better environment to achieve successful sustainable practices. The Dutch governmental institute for healthcare and environment (RIVM) recommends all healthcare organizations to incorporate sustainability into procurement contract objectives to guide contract drafting and management with suppliers. Drammer and Walker (2009) suggest that organizations can fulfill their responsibility by standardizing sustainability objectives in contracts and proactively managing them. The results from our study show that sustainability agreements have been established with suppliers, and some aspects have been defined through Key Performance Indicators (KPIs). However, no consequences are attached to achieving or not achieving these results. Moreover, contrary to expectations, sustainability objectives are not clearly formulated in contracts. This lack of clarity hinders proactive contract management.

In addition, the analysis shows that there is insufficient insight into how sustainability agreements with suppliers have been reached. One explanation for this could be that the hospital's policy and principles are insufficiently elaborated and the lack of an integral approach to sustainability. Our study confirms that suppliers are monitored using performance measurement systems, measuring conventional business indicators, namely quality and price (cf. Neely et al. 1996; Ho et al., 2010), while sustainability aspects receive limited attention. A striking fact from these cases is that managers do not use

(external) measurement systems that measure sustainability aspects, while these systems are available to (healthcare) organizations. Respondents state that they are not aware of these systems. As in all forms of collaboration, the lack of monitoring may easily lead to the formation of social norms with few consequences in case of defect by parties (cf. Sternberg et al., 2021).

The focal organization simultaneously applies direct and indirect supplier development to promote supplier performance. Supplier development is used to influence price, quality and sustainability aspects. Our results show that formal supplier development is used to influence social and environmental performance. Applying direct and indirect supplier development simultaneously does not seem to negatively affect effectiveness in supplier development. This contrasts with a study by Wagner (2010) suggesting that supplier development efforts are less effective with simultaneous indirect and direct supplier development, as the overall goals and expected contributions of the supplier become less clear.

Existing studies highlight that organizations use supplier development to encourage their suppliers to develop and implement sustainable initiatives and measures (Sacha et al., 2015; Zimmer et al., 2016; Jia et al., 2021). In line with theoretical expectations, this study confirms that agreements are established with suppliers that should contribute to achieving the purchasing organization's sustainability goals. The analysis shows that indirect supplier development in particular is used to stimulate and secure supplier efforts. This supports the theoretical expectation that supplier development practices are seen as important catalysts for other supplier development efforts (Krause et al., 2000; Wagner, 2006; Wagner and Krause, 2009). However, absence of defined environmental objectives in contracts hinders insight into the impact of the supplier's efforts with regard to the healthcare organization's sustainability objectives. One possible explanation is the absence of a formulation of clear starting points by healthcare organizations. The lack of measurement and output data further complicates proactive management of supplier contributions to sustainability goals. Addressing these issues is crucial for progress in sustainable practices in healthcare.

Finally, our study could not provide insight into the required capabilities and skills of suppliers to positively contribute to the sustainability goals of the hospital. This challenge aligns with findings by Lui et al. (2019), who also highlight the lack of research on the impact of suppliers' capabilities in improving sustainability.

CONCLUSIONS

Despite playing a critical role in combatting pollution's adverse health effects (Costello et al., 2013; Watts et al., 2021), the healthcare sector significantly contributes to environmental pollution itself (National Health Service Sustainable Development, 2018). Recent calculations underscore the substantial impact of the healthcare sectors' activities on the environment (e.g. Gupta Strategist, 2019; Duque-Urbe et al., 2019).

Healthcare organizations face major challenges to achieve sustainability goals. Supplier development is a strategy that they can employ to influence and improve supplier performance. Embracing sustainable supplier development presents an opportunity to integrate environmental and social objectives into supplier activities and performance. Our study provided insights on how sustainable supplier development are used to affect the achievement of sustainability goals.

In the focus organization of this case study, sustainability has a prominent place on the strategic agenda. However, specific environmental and social goals and the suppliers' role in achieving them remain obscure to some extent. While some level of supplier development is implemented to influence performance, it primarily focuses on financial and quality aspects, with limited attention to sustainability. Despite employing various forms of direct and indirect supplier development, we noticed a significant absence of measurable targets and inadequate monitoring of sustainability efforts.

RECOMMENDATIONS FOR PRACTICE

A number of concrete recommendations for practice can be derived from the findings. First, sustainable supplier development could be improved when hospitals would make measurable agreements on the expected performance of suppliers in the field of sustainability. Agreements could be more concrete and measurable, and results could be monitored and discussed with suppliers. Not only our results, but also other studies have shown that continual monitoring and motivation from purchasing organizations are important for suppliers to reduce the environmental impact of their products or services (e.g. Cartner, 2011).

Second, hospitals could gain by being more mindful of all possible aspects of sustainability and their impact. Healthcare organizations may tend to limit their facility services to agreements on themes such as social return, waste, waste reduction, waste separation and energy saving in particular, as shown in this case study. Agreements on other important sustainability

aspects may then be overlooked, such as local involvement, healthy food, nature and circular procurement. Third, hospitals could make more use of available forms of direct and indirect supplier development, as practice shows a tendency to limit themselves to formal supplier assessment (on SLAs). Last, hospitals could use external sources and methodologies to monitor sustainability, such as the Dutch Green Deal and the CO₂ performance ladder.

RECOMMENDATIONS FOR FURTHER RESEARCH

This study has several limitations. The case can be considered 'unique' within a specific industry (healthcare) and specific segment (facilities management). A related limitation is the focus on hospitals in the public sector, while private hospitals face both similar challenges and different challenges, relating to market competition (Rodriguez and Svensson, 2020). The results are therefore less generalisable. Replicating this study in other segments (e.g., Medical, ICT) is recommended. Although the study provided useful insights, more research is needed to make firmer statements about the effectiveness of (different forms of) supplier development.

Another limitation is that respondents include personal experiences and opinions in their observations. Future studies are advised to check to what extent objective, hard metrics are available. Having sustainability high on the strategic agenda does not mean that hard agreements are actually made and/or that results are objectively measured. In addition, future research could investigate the impact of sustainable supplier development on customer satisfaction (cf. Fan et al., 2021).

This study showed a lack of commitment rather than a sense of urgency when it came to increasing sustainability. Research into barriers to (rather than a lack of intrinsic motivation) could provide more insights into why hospitals adopt a non-committal attitude towards sustainability. For instance, in a literature review on hospital-based interventions Cowie et al. (2020) found that inadequate staff resourcing was the most reported barrier to sustainability in hospitals. More research is also needed into explanations for not working out agreements with suppliers in contracts. Many organizations are driven by operational efficiency rather than by sustainability orientations (cf. Shou et al., 2019), explaining why healthcare organizations do not attach consequences to the non-fulfilment of agreements. Do healthcare organizations rely on relational governance rather than partly on contractual governance? It is also a question to what extent suppliers are able to increase their sustainability performance in response to supplier development. Do they have the necessary capabilities and skills?

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REFERENCES

- Abdulsalam, Y., Gopalakrishnan, M., Maltz, A., and Schneller, E. (2015). Healthcare business: Supply chains in and from the health sector. *Journal of Business Logistics*, 36(4), 335-339.
- Bai, C., and Sarkis, J. (2010). Green supplier development: analytical evaluation using rough set theory. *Journal of Cleaner Production*, 18(12), 1200-1210.
- Bai, C., and Sarkis, J. (2011). Evaluating supplier development programs with a grey-based rough set methodology. *Expert Systems with Applications*, 38(11), 13505-13517.
- Bowen, F. C. (2006). Horses for courses: explaining the gap between the theory and practices of green supply. In *Greening the supply chain* (pp. 151-172). Springer, London.
- Brammer, S., and Walker, H. (2011). Sustainable procurement in the public sector: an international comparative study. *International Journal of Operations & Production Management*, 31(4), 452-476.
- Busse, C. (2016). Doing well by doing good? The self-interest of buying firms and sustainable supply chain management. *Journal of Supply Chain Management*, 52(2), 28-47.

- Busse, C., Schleper, M.C., Menglei N. and Wagner, S.M. (2016). Supplier development for sustainability: contextual barriers in global supply chains. *International Journal of Physical Distribution and Logistics Management*, 46(5), 442-468.
- Carter, C. E. (2011). Sustainable supply chain management: Evolution and future directions. *International Journal of Physical Distribution & Logistics Management*, 41(1), 46-62.
- Chan, C. L. (2013). Environmental performance - impacts of vendor-buyer coordination. *International Journal of Production Economics*, 145(2), 683-695.
- Chen, L. E. (2016). A supplier development adoption framework using expectancy theory. *International Journal of Operations & Production Management*, 36(5), 592-612.
- Claessens, F., Seys, D., Brouwers, J., Van Wilder, A., Jans, A., Castro, E. M., ... and Vanhaecht, K. (2022). A co-creation roadmap towards sustainable quality of care: A multi-method study. *Plos one*, 17(6), e0269364.
- Costello, A., Abbas, M., Allen, A., Ball, S., Bell, S., Bellamy, R., ... and Patterson, C. (2009). Managing the health effects of climate change: lancet and University College London Institute for Global Health Commission. *The Lancet*, 373(9676), 1693-1733.
- Costello, A., Montgomery, H., and Watts, N. (2013). Climate change: the challenge for healthcare professionals, *BMJ*, 347:f6060.
- Cowie, J., Nicoll, A., Dimova, E. D., Campbell, P., and Duncan, E. A. (2020). The barriers and facilitators influencing the sustainability of hospital-based interventions: a systematic review. *BMC health services research*, 20(1), 1-27.
- De Bruin, J., Houwert, T. and Merkus, K. (2019). A steering wheel for the transition to sustainable healthcare. Quantification of CO2 emissions and measures for sustainability. Gupta Strategist.
- Duque-Uribe, V., Sarache, W., and Gutiérrez, E. V. (2019). Sustainable supply chain management practices and sustainable performance in hospitals: a systematic review and integrative framework. *Sustainability*, 11(21), 5949.
- Fan, D., Xiao, C., Zhang, X., and Guo, Y. (2021). Gaining customer satisfaction through sustainable supplier development: The role of firm

reputation and marketing communication. *Transportation Research Part E: Logistics and Transportation Review*, 154, 102453.

Foerstl, K. A. (2015). Drivers of sustainability: Moving beyond compliance to commitment. *Journal of Supply Chain Management*, 51(1), 67-92.

Frazier, G. (1995). Exchange relationships and interfirm power in channels of distribution. *Journal of the Academy of Marketing Science*, 23(4), 321-326.

Gelderman, C.J., De Jonge, J., Semeijn, J., and Schijns, J.M.C. (2018). Investigating cooperative purchasing performance – a survey of purchasing professionals in Dutch hospitals. *The Central European Review of Economics and Management*, 2(1), 133-153.

Handfield, R., Walton, S. V., Sroufe, R., and Melnyk, S. A. (2002). Applying environmental criteria to supplier assessment: A study in the application of the Analytical Hierarchy Process. *European Journal of Operational Research*, 141(1), 70-87.

Jia, M., Stevenson, M., and Hendry, L. (2021). A systematic literature review on sustainability-oriented supplier development. *Production Planning & Control*, 1-21. doi: 10.1080/09537287.2021.1958388.

Joshi, S. K. (2017). To examine the relationships between supplier development practices and supplier-buyer relationship practices from the supplier's perspective . *Benchmarking: An International Journal*, 24(5), 1309-1336.

Krause, D. R. (1998). Critical elements of supplier development The buying-firm perspective. *European Journal of Purchasing and Supply Management*, 3(1), 21-31.

Krause, D. R. (2000). A Structural Analysis of the Effectiveness of Buying Firms' Strategies to Improve Supplier Performance. *Decision Sciences*, 31(1), 33-55.

Li, W. H. (2007). The impact of specific supplier development efforts on buyer competitive advantage: an empirical model. *International Journal of Production Economics*, 106(1), 230-247.

Liu, L. Z. (2019). The adoption of sustainable practices: a supplier's perspective. *Journal of Environmental Management*, 232, 692-701. doi.org/10.1016/j.jenvman.2018.11.067

Liu, L., Zhang, M., Hendry, L. C., Bu, M., and Wang, S. (2018). Supplier development practices for sustainability: A multi-stakeholder perspective.

Business Strategy and the Environment, 27(1), 100-116.

Lu, R. X., Lee, P. K., and Cheng, T. C. E. (2012). Socially responsible supplier development: Construct development and measurement validation. *International Journal of Production Economics*, 140(1), 160-167.

Mettler, T., and Rohner, P. (2009). Supplier relationship management: a healthcare case study. *Journal of theoretical and applied electronic commerce research*, 4(3), 58-71.

Migdadi, Y. K. A. A., and Omari, A. A. (2019). Identifying the best practices in green operations strategy of hospitals. *Benchmarking: An International Journal*, 26(4), 1106-1131

Miller, F. A., Lehoux, P., Peacock, S., Rac, V. E., Neukomm, J., Barg, C., ... and Krahn, M. (2019). How procurement judges the value of medical technologies: a review of healthcare tenders. *International Journal of Technology Assessment in Health Care*, 35(1), 50-55.

Rezali, N., Ali, M. H., and Idris, F. (2018). Empowering green healthcare supply chain management practices challenges and future research. *International Journal of Supply Chain Management*, 7(5), 282-289.

Rodríguez, R., Svensson, G., and Otero-Neira, C. (2020). Future direction of sustainable development in private hospitals: general similarities and specific differences. *Journal of Business & Industrial Marketing*, 35(3), 537-550.

Sancha, C. L. (2015). Sustainable supplier development practices: Drivers and enablers in a global context. *Journal of Purchasing and Supply Management*, 21(2), 95-102.

Sanderson, J., Lonsdale, C., Mannion, R., and Matharu, T. (2015). Towards a framework for enhancing procurement and supply chain management practice in the NHS: lessons for managers and clinicians from a synthesis of the theoretical and empirical literature.

Schleper, M. C. (2017). The dark side of buyer power: Supplier exploitation and the role of ethical climates. *Journal of Business Ethics*, 140(1), 97-114.

Sherman, J. D., Thiel, C., MacNeill, A., Eckelman, M. J., Dubrow, R., Hopf, H., ... and Bilec, M. M. (2020). The green print: advancement of environmental sustainability in healthcare. *Resources, Conservation and Recycling*, 161, 104882.

Shou, Y., Shao, J., Lai, K. H., Kang, M., and Park, Y. (2019). The impact of

sustainability and operations orientations on sustainable supply management and the triple bottom line. *Journal of Cleaner Production*, 240, 118280.

Sternberg, H., Linan, I., Prockl, G., and Norrman, A. (2022). Tragedy of the facilitated commons: A multiple-case study of failure in systematic horizontal logistics collaboration. *Journal of Supply Chain Management*, 58(4), 30-57.

Van Raaij, E.M. (2016). Purchasing Value: Purchasing and Supply Management's Contribution to Health Service Performance. *ERIM Inaugural Address Series Research in Management*. Retrieved from <http://hdl.handle.net/1765/93665>.

Wagner, S. (2010). Indirect and direct supplier development: performance implications of individual and combined effects. *Engineering Management, IEEE Transactions on Engineering Management*, 57(4), 536-546.

Wagner, S. M. (2006). Supplier development practices: an exploratory study. *European Journal of Marketing*, 40(5-6), 554-571.

Wagner, S. M. (2011). Effects of suppliers' reputation on the future of buyer-supplier relationships: the mediating roles of outcome fairness and trust. *Journal of Supply Chain Management*, 47(2), 29-48.

Wagner, S. M., and Krause, D. R. (2009). Supplier development: communication approaches, activities and goals. *International Journal of Production Research*, 47(12), 3161-3177.

Watts, N., Amann, M., and Arnell, N. (2021). The 2020 report of The Lancet Countdown on health and climate change: responding to converging crises. *The Lancet*, 397(10269), 129-170.

Yawar, S. A. and Seuring, S. (2018). The role of supplier development in managing social and societal issues in supply chains. *Journal of Cleaner Production*, 182, 227-237.

Zhang, M., Pawar, K. S., and Bhardwaj, S. (2017). Improving supply chain social responsibility through supplier development. *Production Planning & Control*, 28(6-8), 500-511.

Zimmer, K. F. (2016). Sustainable supplier management - A review of models supporting sustainable supplier selection, monitoring and development. *International Journal of Production Research*, 54(5), 1412-1442.

Appendix 1 Operationalisations

Theoretical concept	Definition	Dimensions	Indicators (measurement)	References
Supplier development	Activities undertaken by the buying organisation to identify, measure and improve supplier capabilities and/or performance	Direct	Active contribution purchasing organisation, such as:	Krause, 1998
		Supplier development	-instructing/training supplier personnel -offering resources	Krause et al., 2000 Wagner & Krause, 2009 Wagner, 2006, 2010
		Indirect supplier development	Limited degree of effort purchasing organisation, such as: -supplier assessment -communication feedback -company visits -performance measurement -supplier audits	
Direct sustainable supplier development	A joint effort of the buying organisation and its suppliers to improve supplier capabilities with regard to environmental and social aspects	Training/ inducement	Technical training, sharing/transferring knowledge on sustainability	
		Staff transfer	Site visits, joint team, visit supplier sites, etc.	
		Management commitment	Top management build commitment from supplier, formal long-term plan/contract, process/product design with supplier, et	
		Investments	Direct financial support, invest asset, help obtain loan from bank, etc.	
Indirect sustainable supplier development	A joint effort of the buying organisation and its suppliers to improve supplier performance with regard to	Evaluation & feed-back	(Corrective) action plan	Busse et al., 2016
			Regular audits	Chan et al., 2013
			Evaluations with feedback	Foerstl et al., 2015
				Jia et al., 2021

Sustainable Supplier Development

	environmental and social aspects	Improve incentives	Better terms and conditions in contracts Revenue or cost sharing Increase in offtake from supplier	Liu et al., 2018
Sustainable suppliers performance	Performance agreements between purchasing organisation and suppliers on achieving sustainability targets	Critical Performance Indicators	-Energy consumption -Water consumption -CO ₂ emissions -Percentage of waste -percentage of sustainable (recycled) material -Mileage-conscious production process	Zimmer, 2016 Jia et al., 2021 Liu et al., 2018

Sustainable Supplier Development

Appendix 2: Sustainability objectives of the focal organization

Topic	Objectives	Source
Social Return (SROD)	<p>giving people at a distance from the labour market a chance</p> <p>Offering growth opportunities to (disadvantaged) young people</p> <p>A culturally diverse Northwest Hospital Group</p>	<p>Strategic annual plan 2021-2024</p> <p>multi-year sustainability agenda 2021-2024</p>
Healthy food	<p>Healthier choices</p> <p>Responding to protein needs for recovery</p> <p>Responding to patient needs</p> <p>More fresh vegetables, less meat</p> <p>Less sugar & salt</p>	<p>multi-year sustainability agenda 2021-2024</p>
Waste reduction	<p>From waste to resource, promoting circularity and upcycling</p> <p>The cup trays were introduced in late 2020 and in 2021 we plan to extend the volume reduction to separate processing.</p> <p>Motivate employees to get their own cup of coffee as much as possible.</p> <p>Separating organic waste in restaurants</p> <p>Investigate separate collection of paper towels from toilets</p> <p>Research separate collection of coffee grounds</p>	<p>multi-year sustainability agenda 2021-2024</p>
Energy management	<p>In building and renovation projects, we focus on the use of sustainable materials, limiting energy consumption, etc.</p> <p>Replacing installations</p> <p>Participating in energy initiatives</p> <p>Electrifying RLC fleet</p>	<p>Strategic annual plan 2021-2024</p> <p>multi-year sustainability agenda 2021-2024</p>
Local involvement	<p>Local suppliers</p> <p>Neighbourhood initiatives</p>	<p>multi-year sustainability agenda 2021-2024</p>
Nature	<p>Own herb garden</p> <p>Bee hotel</p>	<p>multi-year sustainability agenda 2021-2024</p>
Circular procurement	<p>When purchasing materials, consideration is given to environmental impact when (re)using them</p> <p>Together with the procurement department, we want to launch a programme to integrate circular procurement into daily business operations. The basis for this is the 9R model.</p> <p>Include sustainability as a requirement in procurement processes. The new triad should be price, quality & sustainability</p>	<p>Strategic annual plan 2021-2024</p> <p>multi-year sustainability agenda 2021-2024</p>