



Developing a Supplier Evaluation Conceptual Framework for Humanitarian Supply Chains

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Abstract

Performance measurement in the humanitarian sector is a somewhat under-researched area. To our knowledge, there seems to be a lack of a supplier evaluation framework for humanitarian organisations to categorise their critical suppliers - strategic and bottleneck suppliers related to high supply risk purchases. This study addresses three fundamental research questions: the existing landscape of supplier evaluation in the humanitarian sector, challenges encountered in this process, and the essential criteria for evaluating Strategic and Bottleneck suppliers with high supply risk. The overarching goal is to construct a conceptual framework tailored to the evaluation of suppliers with elevated supply risk. Through synthesizing insights from literature reviews, interviews, and additional validation from a humanitarian field expert revealed four primary criteria areas for evaluating Strategic and Bottleneck suppliers. These criteria align with five of Carter's 10 Cs: Communication, commitment, capacity, cost, and cleanliness. The proposed framework encapsulating these five Cs as the critical criteria for ensuring satisfactory performance in procurement contracts enables HOs to methodically assess their high risk suppliers.

Keyword: 1) Humanitarian Procurement 2) Supply Chain Management 3) Supplier Evaluation 4) Kraljic Matrix

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Introduction

Procurement is essential in the context of humanitarian operations. A humanitarian organisation (HO) typically spends around 65% of its budget on procuring goods and services (Falasca and Zobel, 2011, pp. 151-169). In practical terms, the effectiveness and performance of procurement affects the availability and delivery of supplies crucial to disaster response (Balcik and Ak, 2014, pp. 1028–1041). However, despite its importance, research in humanitarian procurement is limited (Moshtari, et al., 2021, pp. 1-15; Torabi, et al., 2018, pp. 123-146). As such, HOs must optimise their procurement operations to maximise the value of these purchases in supporting the needs of their beneficiaries. Procurement strategy development aims to seek the best way to procure the required supplies, supply planning that further operationalizes the procurement strategies and supplier relationship management. (Chen, Lai and Cheng, 2019, pp. 185-206; Moshtari, et al., 2021, pp. 1-15; Rezaei, 2019, pp. 136-147).

There are many scholarly articles regarding procurement operations, strategies and methodologies for the four established quadrants of Kraljic's procurement portfolio matrix (Kraljic, 1983, pp. 109-117). However, there is room for further research on and development of complete supplier/purchasing evaluation frameworks. Specifically, there is currently no reliable framework for humanitarian organisations to perform supplier evaluation for suppliers with high supply risks, which are mostly classified as Strategic and Bottleneck suppliers in Kraljic model. This paper seeks to fill this

gap in research and practices of humanitarian procurement. The purpose is to improve the practical relevance and potential impact of humanitarian procurement research. The research questions (RQs) and objectives of this study are as follows:

RQ (1): What is the current state of supplier evaluation in the humanitarian aid sector?

The first objective seeks to understand the current supplier evaluation practices in the humanitarian aid sector. Existing literature will be reviewed, and field work, such as interviews, will be utilised to address the gaps for application.

There are three key themes that will guide the answering of this research question:

i. What are the current practices of evaluation of suppliers in general and critical suppliers in particular?

ii. How are suppliers treated and categorised?

iii. How are high supply risk suppliers handled in the absence of evaluation frameworks?

RQ (2): What are the challenges and difficulties of evaluating suppliers in the humanitarian sector?

The second objective seeks to understand the challenges and difficulties faced by HOs when evaluating both prospective and contracted suppliers. This will mainly be addressed through field work, such as interviews, as well as a certain degree of literature review.

RQ (3): What are the key evaluation criteria for Strategic and Bottleneck suppliers in slow-onset disaster relief operations?

The final objective will be to understand the key evaluation criteria for strategic and bottleneck (i.e., high supply risk) suppliers operating in the humanitarian aid sector. This will be achieved through literature review and field work, such as interviews and surveying of HOs.

This paper reviews extant literature and practices in supplier selection and evaluation in the humanitarian context to conceptualise a supplier evaluation framework to aid humanitarian organisations in making decisions in their sourcing process. This framework will focus on the Strategic and Bottleneck categories of the Kraljic model, as these suppliers are recognised as carrying high supply risk, which is closely linked to the balance of power between a buyer and their suppliers (Caniëls and Gelderman, 2007, pp. 219-229). Additionally, any disruptions to the supply of goods/services of these two categories will severely affect operational effectiveness or result in a high financial impact on HOs. Hence, this paper focused on suppliers of these two categories (hereafter referred to as "high supply risk suppliers") to provide practical insights to ground practices in humanitarian procurement. The findings from this study were also validated by an independent humanitarian field expert, who supported the focus on studying the two critical categories – strategic and bottleneck suppliers for humanitarian procurement expenses at the HOs.

Literature Review

Purchasing Strategies for Relief Items

Effectively managing procurement across various missions and stages presents

significant challenges. Bhusiri, et al. (2021, pp. 639-660) introduced a procurement portfolio model tailored for enhancing humanitarian supply chain resilience within a development context. Their model, an adaptation of Kraljic's purchasing model (Kraljic, 1983, pp. 109-117), segments humanitarian supplies based on two critical factors: the strategic importance of the purchase (such as its impact on effectiveness, acquisition costs, and range of usage) and supply vulnerability (encompassing supplier availability, substitution options, and variability in lead times).

Similarly, Lamenza, Fontainha and Leiras (2019, pp. 151-171) proposed a strategic purchasing matrix specifically aimed at procuring disaster relief items for pre-positioning. Drawing from Kraljic's model (Kraljic, 1983, pp. 109-117), this matrix categorizes relief items along two key dimensions: the significance of their purchase (including the impact of item scarcity, the number of beneficiaries/locations served, and financial implications) and the complexity of the supply market (encompassing factors like supplier availability, entry barriers for new suppliers, and demand forecasting challenges) (Lamenza, Fontainha and Leiras, 2019, pp. 151-171). Both Bhusiri, et al. (2021, pp. 639-660) and Lamenza, Fontainha and Leiras (2019, pp. 151-171) pioneered a portfolio-based approach to procurement within distinct contexts; Bhusiri focusing on development and Lamenza on pre-disaster preparedness.

Lamenza, Fontainha and Leiras (2019, pp. 151-171) sought to create a purchasing matrix to fill the gap of a suitable solution in evaluating suppliers in the procurement of humanitarian relief items and suggested an



overlapping commonality with purchasing models in the commercial world. Using the established Kraljic (1983, pp. 109-117) model as the basis for their matrix, as well as the Analytic Hierarchy Process (AHP) (Saaty, 1980, pp. 177–191), common or similar parameters

between those in the model and humanitarian operations specifically were identified. These mainly centred around the "Importance of Purchasing" and "Complexity of Supply Market" parameters of the Kraljic model and the use of the AHP to prioritise evaluation criteria.

		Importance of Purchasing			
		Criticality			
		High		Low	
		Financial Impact		Financial Impact	
		High	Low	High	Low
Complexity of Supply Market (Risk)	High		Hygiene Kit Cleaning Kit	Raincoat	
	Low	Mattress/ Food Basket	Glove	Blanket	Coat Sheet T-shirt

Figure 1 Humanitarian Purchasing Matrix

(adapted from Lamenza, Fontainha and Leiras, 2019, pp.151-171)

Lamenza, Fontainha and Leiras (2019, pp. 151-171) also discussed the current state of supplier evaluation in the humanitarian aid sector, with many organisations only recently realising the benefits of strategic procurement, such as improving capacity and efficiency in managing resources. Extant research also noted the lack of academic studies and models for procurement strategies. The article is relevant to the first two research questions regarding the current state and challenges of supplier evaluation in the sector. Based on the article, we learn that HOs generally tend to be more reactive in the procurement of goods rather than establishing long-term strategies, which include a system or framework to evaluate supplier performance.

Lamenza, Fontainha and Leiras (2019, pp. 151-171) also helped determine the eval-

uation criteria for the Strategic and Bottleneck categories, as the authors had provided academically-validated criteria, in which there was a higher interest in the parameter of "Complexity of Supply Market". This aided immensely in answering our third research question regarding the key evaluation criteria for Strategic and Bottleneck items and the development of the conceptual framework. Figure 1 shows an applied version of the humanitarian purchasing matrix, with insights from practices on the types of humanitarian supplies or aids that can be categorised in the respective quadrants of the Kraljic Matrix based on two parameters (or dimensions): "Importance of Purchasing" and "Complexity of Supply Market".

Key Evaluation Criteria for High Supply Risk Suppliers

Pazirandeh (2011, pp. 364-384) developed a conceptual paper centred around procurement and supplier evaluation criteria for the international health supply chain. It aimed to create a model to optimise the procurement of medication and vaccines for developing countries, where slow-onset national health disasters can be prevalent. The paper primarily utilised a criteria literature review to establish supplier evaluation criteria and exist-

ing methods for sourcing decision-making. The author reviewed criteria for supplier evaluation proposed by other scholars and eventually developed a list to distinguish criteria for both local and global sourcing (Figure 2). These criteria are relevant to answering our research question on the critical supplier evaluation criteria for Strategic and Bottleneck items. Despite the limited scope of the paper on vaccine sourcing, these criteria were adapted to further define objective criteria and sub-criteria for our stakeholders regardless of the disaster.

Table 1 Proposed List of Criteria for Sourcing Decisions (Pazirandeh, 2011, pp.364-384)

Orientation	Criteria	Sub criteria
Common in global and local sourcing	Quality Service	Rejection rates
		Reputation
		Flexibility
		Reliability
		Communication
		Reputation
Common in global and local sourcing	Delivery	On-time
		Lead time
Common in global and local sourcing	Cost	Product price
		Logistics
In global sourcing	Risk	Environment
		Density
		Political stability
	Compatibility	Culture
		Infrastructure
		Language

Key Barriers to Performance Measurement in Humanitarian Supply Chains

In Patil, Shardeo and Madaan (2020, pp. 1972-2000), the authors sought to determine and model the key obstacles to performance measurement in the humanitarian

supply chain. The authors determined 17 barriers under 5 categories, as shown in Figure 3, by performing an extensive review of the literature before ranking them based on established quantitative and qualitative methods.

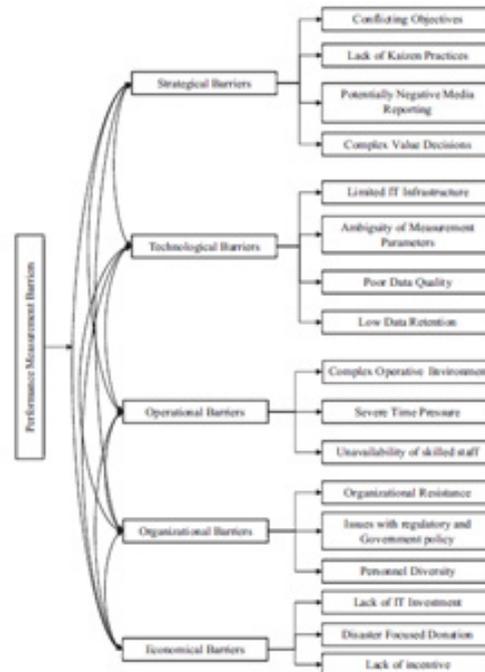


Figure 2 Proposed List of Criteria for Sourcing Decisions
(Patil, Shardeo and Madaan, 2020, pp.1972-2000)

Within the 17 barriers, the authors determined that the lack of skilled staff has the most significant impact. They have also determined that the disorganisation of the operative environment, organisations' conflicting objectives and a lack of resources for investment into information technology were other vital barriers.

These findings helped answer our research question on the challenges of supplier evaluation, as the authors had provided specific barriers or challenges within defined categories. Thus, we were able to use these barriers, especially the four key ones mentioned above, to validate findings from our study regarding challenges faced in supplier evaluation.

One notable limitation of this article is that it was meant to establish common key barriers for performance measurement in the whole supply chain and not just for procure-

ment/supplier evaluation. Nonetheless, the barriers determined by the authors are general enough in the area of supply chain management to be explicitly adopted in supplier evaluation.

Carter's 10 Cs

The final literature review is centred around Dr. Ray Carter's 1995 article, which sought to develop a framework to facilitate effective decision-making in supplier evaluation. The final model, known as Carter's 10 Cs, eventually comprised ten key criteria that would contribute to an optimum decision: Competency, Capacity, Commitment, Consistency, Cost, Cash, Communication, Control, Clean and Culture.

Whilst not providing specific importance on Strategic and Bottleneck suppliers, Carter's 10 Cs model was critical to developing our framework. Based on the literature re-

viewed and insights generated from the field work, we aimed to identify the most relevant Cs specific to Strategic and Bottleneck suppliers for the humanitarian sector and form the basis of a new framework to help HOs evaluate and select these suppliers.

In summary, the literature reviewed highlighted a lack of academic work on procurement strategies to guide HOs' sourcing decisions. The review also established the key obstacles to performance measurement and the critical evaluation criteria for Bottleneck and Strategic suppliers. Our study sought to adapt Carter's 10 Cs [8] to develop a conceptual framework that could help guide future work on developing supplier evaluation strategies for HOs to evaluate their suppliers effectively.

Additionally, the study aimed to address some of the limitations of the literature reviewed, particularly on the current on-the-ground state of and challenges faced in supplier evaluation in the humanitarian sector, as well as the critical evaluation criteria specifically for high supply risk suppliers.

Methodology

Research Design

The primary data sources from the study are semi-structured interviews with humanitarian field experts who have had experience working with and consulting for HOs of different sizes and leaders and managers of small-to-medium HOs. The interviewees are selected based on their services across extensive geographical contexts and experience working in and consulting on humanitarian contexts of different sizes and are thought

leaders across various concerns on humanitarian supply chain and procurement matters. The five interviewees provided insights to answer our first two research questions on the current state and difficulties/challenges of supplier evaluation in the humanitarian sector. We also used the insights garnered to determine the critical supplier evaluation criteria in the sector, which encompassed our third and final research question.

The insights provided by these interviewees were analysed according to the research questions to identify commonalities, themes, differences and additional insights between and within each category. This analysis also used insights and findings from the literature review section. A different humanitarian field expert validated the insights from the interview findings to eliminate potential bias.

Data Collection

The main data collection type was primary, qualitative data, manually gathered through five online interview sessions (e.g., via Google Meet and Zoom). The interviews were transcribed, mined for qualitative data/insights, and analysed.

Current State of Supplier Evaluation: For the first research question regarding the current state of supplier evaluation in the humanitarian sector, the interviewees at different HOs were asked questions to determine their current practices and views on supplier evaluation. The semi-structured interview questions were aimed at understanding the type of framework that would be helpful to these organisations. The interviewees will be asked



the following questions:

- How do you currently evaluate and select suppliers (current and prospective)?
- At which stage(s) of the procurement process do you perform supplier evaluation?
- What are the outcomes you expect when performing supplier evaluation?
- Do you currently have a system or framework in place to evaluate suppliers (current and prospective)?
 - If there is no framework at all, how do you currently evaluate and select suppliers?
 - Do you categorise your suppliers?
 - If you do, how do you categorise suppliers?
 - If not, why do you not categorise suppliers? Do you categorise but not know how to develop frameworks for these categories?

In the semi-structured interviews, the interviewees were encouraged to elaborate on their answers, which provided additional insights into the current state of supplier evaluation in the sector.

Challenges and Difficulties in Supplier Evaluation: We asked questions about the challenges and difficulties faced by the HOs during their supplier evaluation process to generate insights on factors and obstacles in the procurement process. As with the previous set of questions regarding the current state of supplier evaluation, the interviewees were asked to elaborate and share specific examples of challenges and difficulties. The insights gained from these questions helped us understand the biggest and most common obstacles

that the supplier evaluation framework should help eliminate or mitigate risk and facilitate effective supplier evaluation. Examples of the semi-structured interview questions are:

- What are the challenges faced when evaluating the performance of contracted suppliers?
- What tools/information do you feel you are lacking in order to perform an objective supplier (performance) evaluation and selection?

These questions generate insights on factors and obstacles that hamper HOs' evaluation of their suppliers. As with the previous set of questions regarding the current state of supplier evaluation, the interviewees will be asked to elaborate and share specific examples of challenges and difficulties faced. The insights gained from these questions are expected to help us understand the biggest and most common obstacles that the supplier evaluation framework should help eliminate or mitigate in order to facilitate effective supplier evaluation.

Key Supplier Evaluation Criteria: For the third research question, namely the critical supplier evaluation criteria for suppliers of Strategic and Bottleneck items, the analysis includes data from interviews, relevant literature, and annotated records. During the semi-structured interviews, we asked questions specifically on Strategic and Bottleneck suppliers based on the Kraljic model. Our questions relate to if there is a framework specifically for strategic and bottleneck suppliers (high supply risk; the HO's general view on and current relationships with strategic and bottleneck

suppliers; as well as the expected performance of their strategic and bottleneck suppliers. During the course of the semi-structured interviews, we asked the following questions specifically on Strategic and Bottleneck suppliers after explaining the Kraljic model and the above two categories:

- Do you have any framework/approach specifically for strategic and bottleneck suppliers (high supply risk)?
- What is your general view on, and current relationships with strategic and bottleneck suppliers?
- What performance do you expect from strategic and bottleneck suppliers?
- How do your existing strategic and bottleneck suppliers currently perform?

Through the above questions, insights on the factors, and in turn evaluation criteria that are important to HOs when dealing with high supply risk suppliers, are expected to be gained. We performed qualitative coding of all the interviews, where themes and exemplars were identified and noted across all five interview transcripts. The findings from the interviews were validated by an experienced humanitarian field expert who was not involved in the interviews to eliminate any potential bias during analysis. The validated findings – particularly on the third research question, were then adapted to Carter's 10c model for supplier evaluation (Carter, 1995, pp. 44-46) and form the basis for the development of a conceptual framework.

Findings and Discussions

The research findings are presented in accordance to the research questions in this

section.

Research Question 1 - the current state of supplier evaluation in the humanitarian aid sector

Existing Systems and SOPs: A key insight from the analysis of the interview results is that most HOs tend not to have a formal SOP/framework in place to deal with supplier evaluation. However, some larger organisations with some degree of in-house supply chain management expertise tend to have at least a basic system for evaluating suppliers, including the weighted point methodology or a rudimentary/partial version of the cost-ratio method. Lamenza, Fontainha and Leiras (2019, pp. 151-171) provided a key insight that HOs are only recently starting to realise the importance of a strategic approach to supply management. These HOs operate on a reactive approach to evaluating suppliers instead of utilising a pre-defined framework supporting an overarching procurement strategy.

Item and Supplier Categorisation:

The categorisation of purchases and suppliers is an essential first step in evaluating Strategic and Bottleneck items, as HOs have first to be able to identify the suppliers and items that fall into these categories, as well as the unique parameters for evaluating the suppliers' performance. Based on the analysis, most organisations split the supplier evaluation process into low-value and high-value purchases. More focus tends to be on the latter, with the former being somewhat ignored. A possible reason for this is that smaller purchases tend to be for ad-hoc purposes where it is a spot buy/one-off purchase, and evaluation is not perceived as necessary (Sarkis and Dhavale,



2015, pp. 177–191). However, since larger purchases inherently carry a higher risk level due to high-value or high-volume assets, HOs would want to evaluate these suppliers before and after contracting them to minimise any potential adverse impacts to the organisation and its operations.

Recognising and Dealing with High Supply Risk Suppliers: An additional consequence of HOs' inability to categorise suppliers and the lack of academic studies and models for humanitarian procurement strategies is the failure to recognise and deal with high supply risk suppliers. Most smaller HOs often do not recognise that they work with high supply risk suppliers and state that they try to avoid suppliers with "high supply risk". Interestingly, after explaining Strategic and Bottleneck suppliers in greater detail, these interviewees tend to acknowledge that they work with such suppliers. There appears to be a common notion that dealing with such suppliers requires extraordinary effort and levels of expectation. This is an encouraging insight that was highly useful in developing our framework. It highlights the need to fully and adequately explain to Strategic and Bottleneck suppliers so that HOs can correctly identify and effectively utilise them. Beyond that, there appears to be at least a general understanding of dealing with the high-supply risk suppliers.

Research Question 2 - challenges and difficulties of evaluating suppliers in the humanitarian sector

Internal Systems, Resource and Manpower Availability: Our interviews with HO representatives established that all organ-

isations have some challenges regarding internal resource availability to continuously and consistently perform supplier evaluation. This is because much of the supplier evaluation process is manual and can include compiling documents and data to perform the evaluation. It also necessitates a high level of involvement, such as following up on assurances on delivery time, delivery to the right place and consignee, etc. Most HOs do not have the resources or time to commit to developing automation capabilities and IT systems, even if it would carry the extended benefit of easing the burdens of manually performing these tasks in the long run. This can be especially difficult for smaller organisations with a limited workforce but affects even the large HOs. Additionally, with the amount of time and involvement that the process requires, both small and large HOs tend to defer this responsibility during times of emergency (e.g., responding to a sudden-onset disaster such as earthquakes or flooding) until the damage has been done – such as being served by poor supplier performance. Our review of literature corroborates the above findings from the interviews conducted. Patil, Shardeo and Madaan (2020, pp. 1972-2000) developed a list of 17 performance measurement barriers: limited technological infrastructures, lack of skilled internal manpower, lack of investment in IT, and the bulk of donations often redirected towards disaster relief operations. With the understanding that the availability of internal systems, resources, and manpower are cumbersome obstacles faced by the majority of HOs, any framework developed for supplier evaluation in the humanitarian sector should seek to minimise, where possible, the

time, resources, and manpower required.

Lack of Knowledge and Data: According to several interviewees, HOs face the challenge of not having sufficient market data to help in the pre-contracting supplier selection process. In addition, smaller organisations also lack general knowledge and competencies in supply chain/sourcing management, manifesting as a lack of frameworks or SOPs that hamper the supplier evaluation process. Indeed, Patil, Shardeo and Madaan (2020, pp. 1972-2000) provides validation for this, as the authors identified the lack of skilled manpower and Kaizen practices, and low data quality and retention rates, as part of their 17 critical obstacles to performance measurement. It can be argued that HOs' lack of knowledge results from a lack of a proper supplier evaluation framework that could guide a more systematic supplier evaluation and selection and continual data collection for performance measurement.

Organisational Culture and Perception of Supply Chain and Sourcing Management: One of the more common challenges cited by the interviewees of this study is the conflicting objectives and perceptions on the importance of Supply Chain/Sourcing management by the various stakeholders of a HO. One interviewee explained that every HO has a different priority in its value chain setup. Not everyone sees supply chain management/procurement as a primary function but as more of a support function. As a result, fewer resources and investments tend to be allocated to the various areas of the HO's supply chain. Indeed, this notion is supported by Patil, Shardeo and Madaan (2020, pp. 1972-2000), who explains

that organisational resistance and culture are critical barriers to effective performance management. Any framework developed for supplier evaluation in the humanitarian sector must consider this obstacle, e.g., including detailed explanations on why each aspect of the framework is vital to the overall strategic supply chain function.

Cost of Switching Suppliers: Another challenge that mainly affects smaller HOs is the cost of switching suppliers. This challenge was explicitly highlighted by two interviewees representing small-scale, local HOs. Smaller HOs tend to consider switching costs due to their relative lack of leverage and lower purchase volumes. Thus, they do not see the value of evaluating suppliers as even poor supplier performance could cost less than switching suppliers. On the other hand, larger HOs tend not to be as susceptible to this since they would have higher leverage and purchase volumes than smaller ones. While there is no mention of this in any literature reviewed in this study, it should be regarded as a minor point of consideration for the framework to cater to the unique circumstances of smaller HOs during supplier evaluation. For example, the framework could have a note to smaller HOs to evaluate their supplier switching costs versus the cost of poor supplier performance at their discretion.

Research Question 3 - key evaluation criteria for Strategic and Bottleneck suppliers in slow-onset disaster relief operations

In our literature review and analysis of interview results, we determined that four key areas are significant in evaluating high-supply



risk suppliers. They are service, reliability, cost and corporate social responsibility (CSR). These four areas were adapted to four of Carter's 10 Cs:

Communication and Commitment:

With the criteria area on service (communication and willingness to collaborate), two of Carter's 10 Cs can be adapted: Communication and Commitment. In the HSC, poor communication often results in disparities between demand and supply and in some cases, can directly impact people and HO volunteers (Kabra, Ramesh and Arshinder, 2015, pp. 128-138) [9]. Measuring communication determines how timely, reliable and effective a supplier's communication is. Based on Carter's 10 Cs, the sub-criteria for communication are responsiveness to requests (for information, quotations, etc.), pre-emptive communication of issues, and availability of communication lines. In measuring the commitment of their suppliers, HOs will be able to assess a supplier's willingness to discuss key issues such as product improvement/iteration and delivery service variability. This allows the organisations to decide if the prospective or current supplier would be suitable for long-term strategic partnerships to manage the supply of high-supply risk items effectively. Sub-criteria to evaluate commitment include quality standards certifications, willingness to collaborate on joint improvement, continuous improvement processes and organisational culture.

Capacity: The criteria on reliability can be translated into one of Carter's 10 Cs: Capacity. By measuring a supplier's capacity to provide the necessary supply – including the flexibility to ramp up production and delivery

capacity when required – HOs will be able to identify suitable potential suppliers and determine if current suppliers are able to keep up with the fluctuating demand of the humanitarian sector. Sub-criteria for capacity include total capacity, key buyers and flexibility.

Cost: While the analysis findings suggest that cost tends to decrease in priority in place of other criteria (especially during crises/emergency situations), it is still an essential consideration for all HOs, particularly smaller ones with fewer resources to expend. As such, one of Carter's 10 Cs, Cost, can be measured to provide organisations with insight into the pricing of products and services set by suppliers, how they compare to other potential suppliers in the market and the organisation's budget and requirements. Sub-criteria for costs include product and logistics costs, which, while essential to evaluate before contracting to understand the baseline costs associated with the supplier, is bound to change for several reasons. HOs should thus also consider these sub-criteria after contracting to understand the degree to which costs increase and the supplier's effort in ensuring that prices stay as reasonable as possible throughout the contract period.

Clean: One of Carter's 10 Cs, Clean, is explicitly used to measure the CSR performance of suppliers. While this criterion may be of lower importance in the commercial sector, we have established in the analysis that this is arguably the most critical factor that HOs have to consider – possibly even before considering the other criteria we have explored. Clean measures how a supplier treats the environment and people and can be tangibly mea-

sured through carbon emission reports, green accolades/certification, CSR activities, and even employee review aggregate scores. Measuring and thus ensuring good performance of their suppliers in this criterion allows HOs to ensure that the operations they conduct for the good of their beneficiaries do not do the opposite and contribute to environmental or ethical issues. Sub-criteria for clean include CSR activities, sustainability reports, ethical and green accolades/accreditation, positive publicity and carbon emissions.

Conceptual Framework for Supplier Evaluation

By synthesizing the research findings and extant literature, we found the five Cs corresponding to the five key criteria areas for HOs

to evaluate Strategic and Bottleneck suppliers can be represented in a conceptual framework, as shown in Figure 3, to guide HOs on the most critical metrics for evaluating Strategic and Bottleneck suppliers. Each C has at least two sub-criteria to guide specific evaluation efforts and a corresponding key reason for selecting a Strategic/Bottleneck supplier to help HOs understand the importance of each C concerning evaluating suppliers with high supply risk in particular. Each sub-criterion is colour coded, where the purple boxes denote sub-criteria to be assessed before and after contracting a supplier; the orange boxes denote sub-criteria to be assessed solely after contracting; and the green boxes denote sub-criteria to be evaluated solely before sub-contracting.

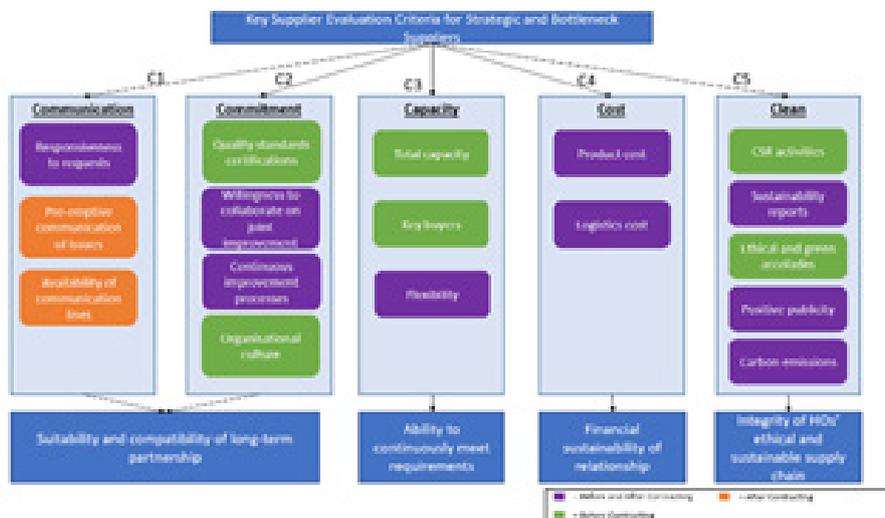


Figure 3 Conceptual Framework for Supplier Evaluation (Source: Authors)

Implications and Limitations of Study

There are several potential areas for further study as determined by this report. Some insights were gained on a few areas within the humanitarian supply chain which are under-researched. These include the broader topic of supplier evaluation itself, as well as supplier categorisation.

Due to the time and manpower constraint as well as the scope of this project being conceptual in nature, a quantitative approach involving extensive data collection and in-depth analysis was not able to be conducted. As such, there is room for such work to be explored based on what this project has proposed – e.g., specific weightages of impor-



tance for each criterion can be calculated/developed and the framework can be further iterated upon. The framework proposed in this report can also be expanded upon, such as by translating it into a more intuitive format, e.g., a questionnaire. This would be highly useful for HOs that may require a higher level of guidance in evaluating suppliers.

While the conceptual framework proposed in this study aims to guide HOs on evaluation of high supply risk suppliers, it is important to be mindful of the other risks associated with all suppliers that cannot be mitigated by the framework. These include market conditions (monopoly/oligopoly/perfect competition, etc.), inherent product characteristics (e.g., products that carry high macroeconomic supply risks such as items made with rare earth metals), and even culturally inherent risks such as prevalence of corruption/fraud in a country and/or supplier opportunism (forming cartels to artificially raise prices during emergency scenarios).

Additional work can also be conducted to determine the ranking of all of Carter's 10 Cs in the context of evaluating Strategic and Bottleneck suppliers in the humanitarian sector, expanding past the five crucial Cs to provide a more thorough approach to evaluating these suppliers. Whilst the additional five Cs may have been deemed as not crucial to evaluating high supply risk suppliers, their inclusion may yet yield some benefits to supplier performance and selection than established in this report.

Finally, while this study aims to assist HOs in selecting Strategic and Bottleneck

suppliers, it assumes that HOs have already successfully identified these high supply risk suppliers. However, this may not always be the case, and further research in identifying these suppliers would be highly beneficial to the sector.

Conclusion

This project sought to develop a conceptual framework for HOs to evaluate Strategic and Bottleneck suppliers. An extensive literature review was paired with fieldwork in the form of interviews to answer three research questions using the insights gained.

The literature review and interviews determined that the current state of supplier evaluation in the humanitarian sector leaves plenty to be desired, with a marked lack of established systems, frameworks, and academic work. This area of supplier evaluation also encounters various challenges, including the availability of resources, skilled manpower, and relevant data for supplier evaluation, amongst others. Finally, the literature reviews and interviews provided insights on the most critical and impactful criteria areas for Strategic and Bottleneck suppliers. These were then adapted onto Carter's 10 Cs to provide a high-level framework to guide HOs in high supply risk supplier evaluation.

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