DEVELOPING A HUMANITARIAN SUPPLY CHAIN DIAGNOSTIC TOOL

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Introduction

The humanitarian organization are faced with logistics complexity, destabilized infrastructure and environment and their staff works in an extremely chaotic environment. For an effective humanitarian supply chain management, the diagnostic tools are crucial. The aim of this paper is to apply Quick Scan Audit Methodology (QSAM) as an effective humanitarian supply chain health-check tool for the humanitarian organization. The research question is "Can the QSAM be adapted for the humanitarian organization?"

The layout of this research was demonstrated by the foundation of the original QSAM as developed by the Logistics System Dynamic Group (LSDG) at Cardiff University and was designed to refine the existing QSAM to be consistent with the characteristics of the humanitarian context and the use of the humanitarian organization as a case study. The adjusted QSAM will be under the consultancy of QSAM experts as well as staffs of humanitarian organization before its implementation in the case study. Since QSAM had been established as a health-check methodology for use as an automotive manufacturing supply chain diagnostic tool, the implementation of QSAM has been increasingly expanded to a number of various types of industry. There still has been no achievement of implementing QSAM within humanitarian context.

Quick Scan Audit Methodology (QSAM)

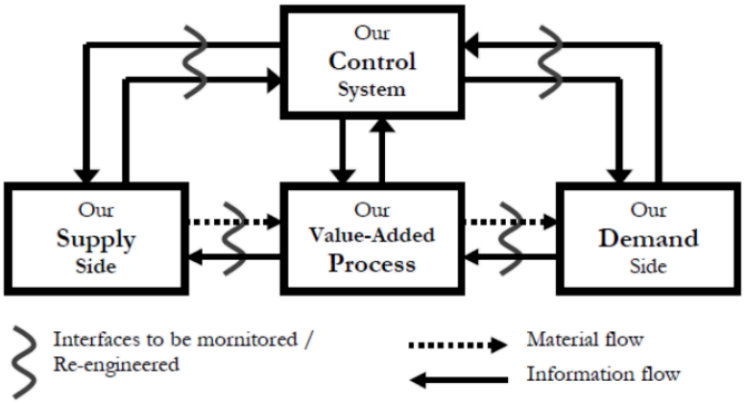
Quick Scan Audit Methodology (QSAM) is a systematic supply chain diagnostic approach to the collection and synthesis of qualitative and quantitative data from a supply chain (IMRC, 2008; Childerhouse et al., 2007). QSAM has been developed by the Logistics System Dynamic Group (LSDG) at Cardiff University in collaboration with their industrial partners (Lewis et al., 1998) to be a robust diagnostic tool (Potter, 2005). QSAM could be also called by its original name of Quick Scan (Childerhouse et al.,1999).

The aim of the development of QSAM is to have a practical and effective diagnostic tool for understanding and documenting a supply chain before re-engineering or fixing it (Childerhouse et al., 1999). However, the ultimate aims of QSAM also have two contradictory conditions which are: maximising the knowledge of the supply chains or value stream under QSAM, but minimising their impact on the everyday processes of the firms (Berry et al., 1999). Since the QSAM was first presented (Childerhouse et al., 1999), it has been both directly implemented within real cases using the original pattern (Childerhouse, 2002; Childerhouse, Disney et al., 2004; Potter, 2005; Hosoda, Naim et al., 2007) and it has also been developed for specific cases.

The QSAM methodology could be separated seven main stages (Childerhouse et al.,1999) as follows.

(1) **Identify a suitable supply chain business process.** First of all, a suitable supply chain process of the business under QSAM has to be identified in order to be the best practice or benchmark model.

(2) **Get buy-in from the business champion.** After the suitable supply chain business process is identified, buy-in from the business champion is also needed to be obtained to enable a better understanding of the value stream under the QSAM.
(3) **Preliminary presentation.** In this study, the methodology of QSAM will be explained as well as the objectives of the firm. The interview will be scheduled and the questionnaire will be issued.
(4) **Conduct a quick scan via four data collection techniques.** The data and information used to analyse in QSAM were obtained from qualitative and quantitative questionnaires, process mapping, structured interviews, and archival information in order to have a comprehensive picture of the current state of the value stream. In this stage a simple generic model of the causes of uncertainty in the product delivery process (see Figure 1) is utilised.

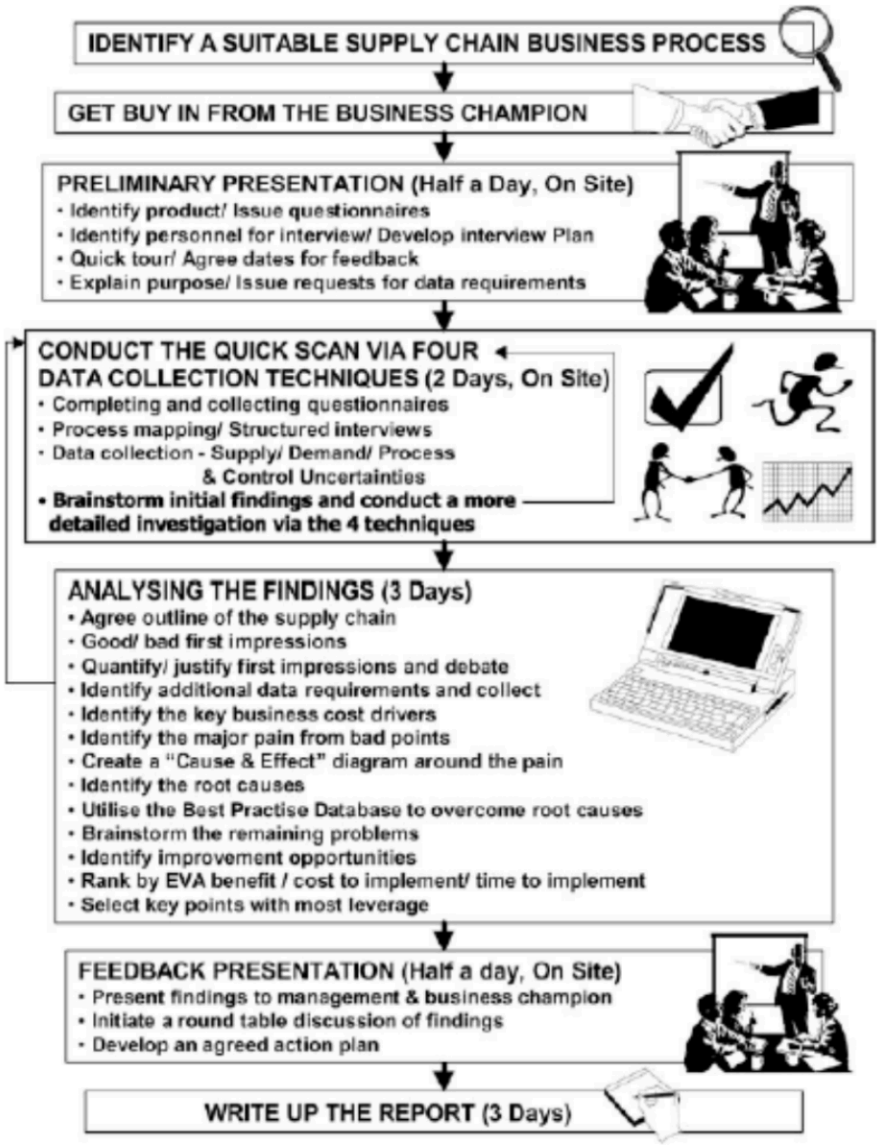


Source: Mason-Jones and Towill, 1998.

Figure 1: Uncertainty cycle used for data collection

Based. on the model of the causes of uncertainty mentioned previously, the primary data is collected into four main sources of uncertainty which consist of: (i) Supply side; (ii) Demand side; (iii) Process side; and, (iv) Control side. Details of these major causes of uncertainty could be presented as in Figure 2.

(5) **Analysing the findings.** Triangulation plays a significant role in this stage in order to avoid an individual bias. Not only triangulations of data but analysis methods are also triangulated to ensure the variety dimensions of the results. The methods in use include Cause and Effect Analysis, Pareto Analysis etc.
(6) **Feedback presentation**. This stage is very important for the firm under QSAM. QSAM teams will present the results of an analysis and staff or workers of the firm will provide their comments or opinions on the results which are then followed by mutual discussion.
(7) **Write up the report.** The results of the analysis and the feedback obtained from the feedback presentation will be presented in this report.



Source: Chiderhouse et al., 1999.

Figure 2: Major stages in Quick Scan

Characteristics of Humanitarian Supply Chain

Humanitarian supply chain management and humanitarian logistics are used interchangeably in this study as well as in the literature (Ertem et al., 2010). In general businesses, supply chain links the sources of supply (suppliers) to the owners of demand (end customers). The ultimate goal of any supply chain is to deliver the right supplies in the right quantities to the right locations at the right time. Supply chains comprise all activities and processes associated with the flow and transformation of goods from the raw material stage through the end user (Beamon and Balcik, 2008). Similar to commercial supply chain, supplies flow through the relief chain from the donation to the consumers. There is no single form of humanitarian supply chain, although a typical supply chain could follow the sequence. Government and NGOs are the primary parties involved. Governments hold the main power with the control they have over political and economic conditions and directly affect to supply chain processes with their decisions. Donors, public and private organisations are the other significant players in the humanitarian supply chains. Donors have become particularly influential in prompting

humanitarian organisation to think in terms of greater donor accountability and transparency of the whole supply chain (Wassenhove, 2006). Two-way arrow in the figure represents two-way communications in information, product and fund flows among the parties in the humanitarian chain.

According to McLachlin et al. (2009), humanitarian supply chains tend to be unstable, prone to political and military influence, and inefficient due to lack of joint planning and inter-organisational collaboration. They deal with inadequate logistics infrastructure, along with shifting origins of and/or destinations for relief supplies without warning. Further, donors often request their funds be spent on direct materials and food, and even at a particular disaster location, rather than on crucial but indirect services such as information systems, staff training, and/or disaster preparedness (Oloruntoba and Gray, 2006; Wassenhove, 2006; Kovacs and Spen, 2007). Therefore, humanitarian supply chain management does not only deal with delivering goods, materials or information to the point of consumption for the purpose of alleviating the suffering of vulnerable people, but also need to manage value to donors and other stakeholders.

The Fritz Institute defines humanitarian logistics as the process of planning, implementing, and controlling the efficient, cost-effective flow and storage of goods, and materials, as well as related information, from point of origin to the point of consumption for the purpose of alleviating the suffering of vulnerable people (http://www.fritzinstitute.org). The function encompasses a range of activities, including preparedness, planning, procurement, transport, warehousing, tracking and tracing, and custom clearance (Thomas and Kopczak, 2005). Considering at the meaning of humanitarian logistics, it focusses mainly on alleviating the affected people while the definition of humanitarian supply chain is broader and cope with more activities to response to the stakeholders in the supply chain.

Even though the structure of humanitarian chains is similar to most business supply chains, the humanitarian supply chain is often unstable (Oloruntoba and Gray, 2006). As a result, coordination and management of disaster supply chains are increasingly needed and must be put in place in the humanitarian supply chains. Goals, revenue sources, and performance metrics of humanitarian and regular supply chains differ notably. Unlike the humanitarian supply chains, which do not have any profit targets and rely heavily on volunteers and donors, in regular supply chains, stakeholders are the “owners” of the chain. The source of revenue for humanitarian supply chain is government funding, charitable donations from individuals and corporation, and in-kind donations. The goal of humanitarian supply chain is to be able to respond to multiple interventions, as quickly as possible and within a short time frame (Wassenhove, 2006). In addition, performance measurement in the nonprofit sector include the intangibility of the services offered, immeasurability of the missions, unknowable outcomes, and the variety, interests and standards of stakeholders (Beamon and Balcik, 2008). More comparison is given in Table 1.

Topic	**Business SCM**	**Humanitarian SCM**
Main objective	Maximise profit	Save lives and help beneficiaries
Demand pattern	Fairly stable	Irregular
Supply pattern	Mostly predictable	Unsolicited donations and in-kind donation
Flow type	Commercial products	Resources like vehicles, shelters, food, drugs
Lead time	Mostly predetermined	Approximately zero lead time
Inventory control	Safety stocks	Challenging inventory control
Delivery network structure	Location of warehouses, DCs	As hoc distribution facilities
Technology	Highly developed technology	Less technology is used.

Performance measurement methods	Based on standard supply chain metric	Time to respond the disaster, meeting donor expectation, percentage of demand supplied

Table 1: Comparison of Business and Humanitarian SCM

A Humanitarian Organization Case

The primary version of QSAM for humanitarian organization was developed based on the original QSAM which was used in the automotive and retail industry. The changes made were primarily in the use of language in the humanitarian context.

An original questionnaire was used as the default pattern and tested on site. The result found that the current version of the QSAM questionnaire does not work in this context. An adjustment of the questionnaire was needed in order to get information from the value stream or company under the study. The questionnaire was developed to be more understandable for people in the humanitarian organization by cooperating between researcher and the staff of humanitarian organization.

A QSAM was conducted at the Khon Kaen Municipality, a local administrative organization under the Department of Local Administration at the Ministry of the Interior. In accordance with, the Disaster Prevention and Mitigation Act 2007 or DPM Act 2007, the local administrator is designated as director of local for disaster management in local area. The local organization is the first public sector which faced with disaster in local level. The director of local must operate prevention and mitigation disaster suddenly. Khon Kaen Municipality is responsible for an area of 46 square kilometres. Khon Kaen currently face with the flood and thunderstorms. One of the major mission of the Khon Kaen Municipality during the disasters is to provide the relief kits to the victims. The scope of the supply chain reflects a basic or direct supply chain with three levels: the disaster victims, the Khon Kaen Municipality and the suppliers. Figure 3 describes the scope of the supply chain under study.

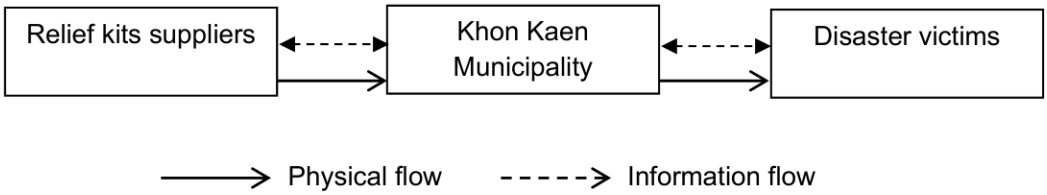


Figure 3: The supply chain scope

In order to refine the unit of analysis, the case study was developed to reflect the information and physical flow that occurs within the Khon Kaen Municipality supply chain. Figure 4 describes the flows moving within the supply chain. The information flow starts from the request for aid by the victims, while the physical flow in the supply chain under study starts from the suppliers. The humanitarian information flow has to inform the Mayor for the aid approval. The Mayor appoint investigation committee to survey and investigate the victims' demand. After the investigation, the committee report to the Mayor for the aid approval. Then, the Division of Finance proceed the procurement process. After procurement process, the supplier delivers the relief kits to the Khon Kaen Municipality. The Bureau of Social Welfare transport the kits to the victims.

An input/output diagram can be helpful to view how information and physical flow within the organization flows from function to function. It was found that there are seven related functions within this humanitarian supply chain: disaster victims, Village Headman or Member of the Municipal Council, Bureau of Social Welfare, Mayor, investigation Committee, Division of Finance and supplier –

as shown in Figure 5. This shows that the Bureau of Social Welfare is the focal point for either information or physical flow.

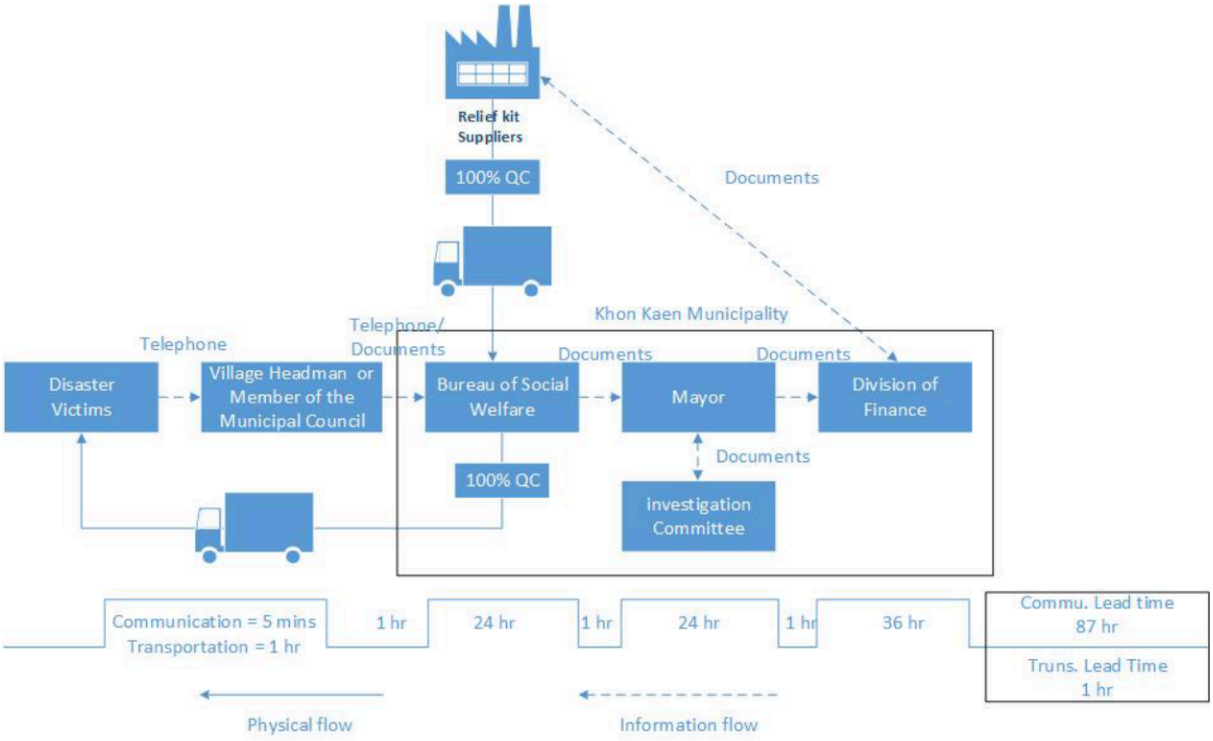


Figure 4: Information and Physical Flow in Khon Kaen Municipality Supply Chain

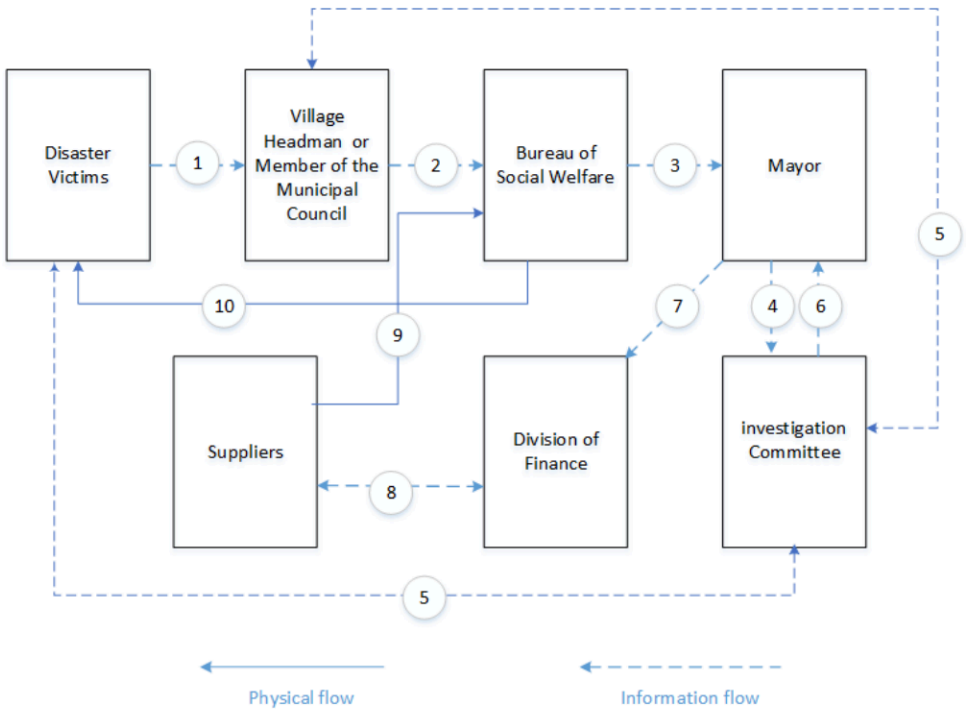


Figure 5: Input and output analysis

Khon Kaen Municipality supply chain 'uncertainty' cycle highlighted that its process uncertainty impacted the supply chain under study. In many instances, there was a long process of aid approval. Figure 6 summarizes the supply chain uncertainty circle in the Khon Kaen Municipality supply chain under study.

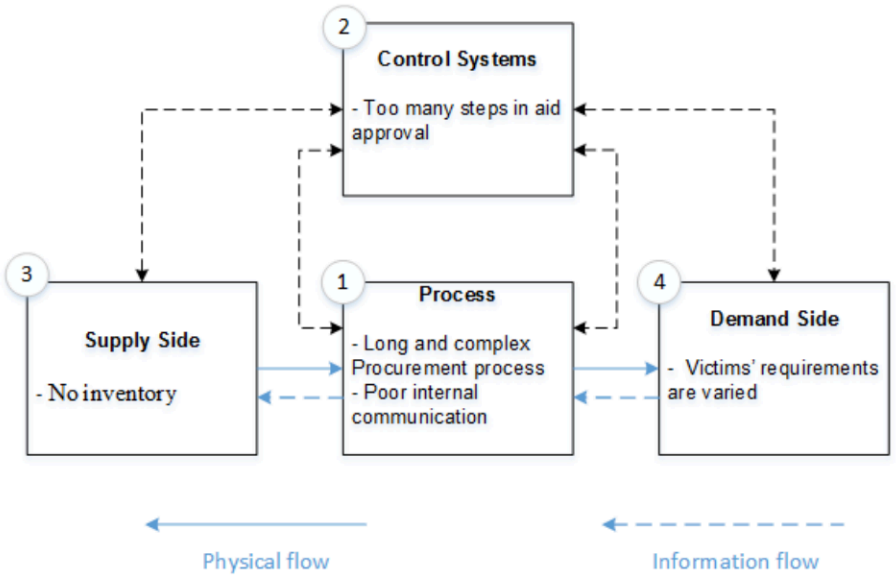


Figure 6: The uncertainty circle

The last analytical technique used is the causal loop diagram described in Figure 7. The main problem is the long response lead time caused by both internal and external uncertainty, as discussed above. This problem has five main root causes as follows:

No inventory keeps at Khon Kaen Municipality
Complex Procurement process
Poor internal communication
Too many steps in aid approval
Victims' requirements are varied

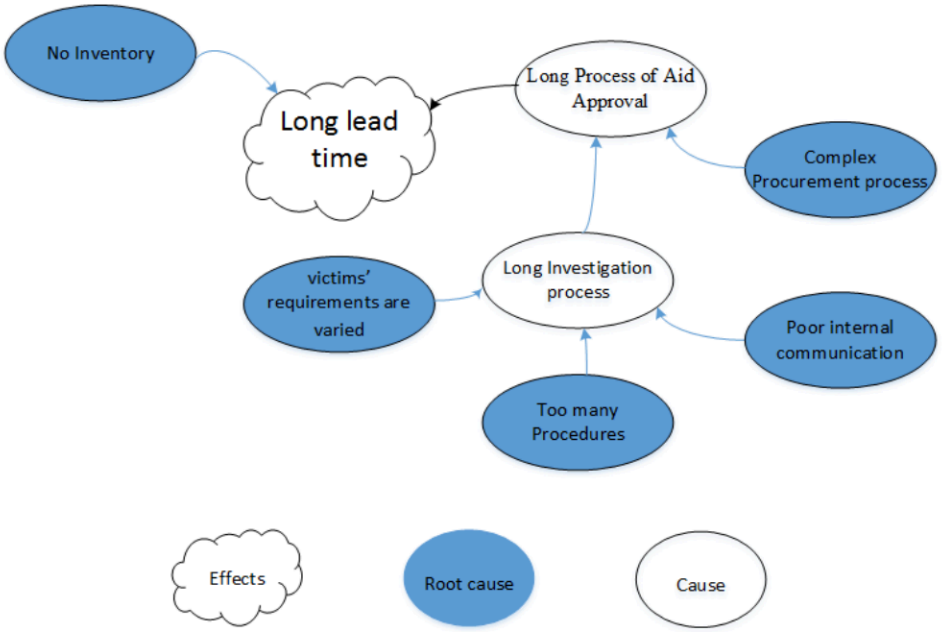


Figure 7: Cause and Effect Diagram for the Root Cause

The main symptom of this humanitarian supply chain is the long lead time to respond to a humanitarian situation. It is important to segregate the symptoms from the root causes. In order to find the root causes it is often useful to ask 'why' at least five times. This is a commonly used heuristic to help uncover the real problems. The advantage of using the causal loop diagram technique is that it also enables the identification of close loops within the humanitarian system under study. The identification of these close loops is critical and needs to be dealt with as a priority, as their impact is to self-reinforce the observed symptoms. In this particular case long process of aid approval is a key root cause.

Conclusions

The case study found that the original QSAM could not be properly used within the humanitarian context. The industrial and retail questionnaires of the QSAM did not work adequately in the humanitarian organization. The reasons for this discrepancy should be documented.

The result was found that the existing QSAM as it stands is not fully fit to be implemented in the humanitarian context. The original structure of QSAM may still be brought in to humanitarian organization, but an adjustment of timing on data collection should provide some room for analysis of the demand side rather than the supply side as was the case in the original version.

Based on the obtained results, as presented here, the team that audited the humanitarian supply chain was able to provide a number of short-term and medium to long-term suggested improvements for the Khon Kaen Municipality to implement.

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