Humanitarian Supply Chain Maturity Assessment Model for Indonesian Humanitarian Organization

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Abstract

Humanitarian activities related to natural disaster management and humanitarian operations have increased since 2020, when this period became the most prominent case in the last two decades. The role of humanitarian organizations and their supply chains is critical in prevention, response, and recovery. This study evaluates the maturity level of the current supply chain condition in handling humanitarian operations and disaster management by the ACT Foundation as an Indonesian Humanitarian Organization. This study applies a maturity assessment model with five levels and case studies from the ACT Foundation in three different areas. Analyzing the 14 dimensions of maturity assessment and 81 processes of the ACT Foundation for South Tangerang and Tangerang District branches, only the dimensions of goals and performance, human resource management, and services to residents have a maturity level between 3 Intermediate and 4 Advanced. The results of the maturity level are below 2 Elementary for the South Tangerang and Tangerang Regency branches, namely focusing on the disaster phase, strategic planning, transportation and capacity planning, search and rescue processes, and support operations. The results of the maturity level of the Head Office Jakarta assessment with a value below level 3 are information and data management and continuous improvement and collaboration. This study ensures that the humanitarian supply chain has reached the appropriate maturity level, namely level 4 Advanced to 5 Optimized. Improvements in the humanitarian supply chain focus on the maturity dimension with a maturity level of less than 4 Advanced, with a management approach and operational strategies.

Keywords

Humanitarian Supply Chain, Humanitarian Operation, Disaster Relief, Maturity Assessment Model, Humanitarian Organization.

1. Introduction

Recently, the world has been hit by various catastrophic events, making 2020 the biggest year for disaster events that occurred nearly two decades earlier (CRED International Disaster Database 2021). The number of disasters in 2020 was 389 events, more significant than the annual average from 2000 to 2019. Especially for handling disasters in Indonesia, the government agency with the authority and responsibility is the National Disaster Management Agency (BNPB). Based on data released by BNPB states that the total number of disasters in 2021 is 5,402, which is more significant than the number of catastrophes in 2020, which reached 4,650 events. From this perspective, currently, Humanitarian Supply Chain Management (HSCM) has received more attention from researchers and practitioners. in seeking ways to improve logistics processes and service delivery (Gralla et al. 2015). Humanitarian Supply Chain (HSC) is a crucial component in disaster management because almost 60 – 80 percent of the costs incurred in humanitarian activities are for logistics activities, an essential aspect of the supply chain (Van Wassenhove, 2006). Increasing the number of disasters is a challenge for the government and humanitarian agencies to improve the

efficiency and effectiveness of the operational system of disaster management activities. 80% of humanitarian aid in disaster events is logistics, so it is necessary to implement a perfect supply chain management system to create fast, efficient, and effective delivery of humanitarian logistics assistance (Van Wassenhove 2005).

In an organizational context, maturity refers to the evolutionary progress in demonstrating specific abilities or achieving a target from the beginning to the end desired or usually occurs (Mettler 2011). Measuring the level of supply chain maturity for companies is very important to maintain competitiveness and ensure organizational resilience (Lahti et al. 2009). The maturity model is the most appropriate method to determine the maturity level of the humanitarian aid supply chain process and the maturity level, which is the basis for the primary assessment. One of the NGOs that is well known in every humanitarian activity both in Indonesia and internationally is Aksi Cepat Tanggap or often called the ACT Foundation. This activity in the international sphere distinguishes ACT from other NGOs in the country (Alfiatus Sholikhah et al. 2021). Although researchers and practitioners cover many humanitarian fields, this Humanitarian Supply Chain has not been deeply involved in the standardization process (Paciarotti et al. 2021). Standardization in Humanitarian Supply Chain is indicated as future research because of its ability to increase interaction in operations (Kovács and Spens 2007). This study proposes a maturity assessment model for the humanitarian supply chain from the ACT Foundation to determine the level of maturity produced under current conditions and analyze the critical factors of the humanitarian supply chain and improve organizational performance. The originality of this research is in the design of the maturity assessment model with the dimensions of maturity and the compiled processes comprehensively in assessing the humanitarian supply chain in disaster management activities and humanitarian aid operations.

1.1 Objectives

The study develops a maturity assessment model focusing on the dimensions and processes in the humanitarian supply chain in disaster management and humanitarian aid operations. This study aims to determine the maturity level of the humanitarian supply chain in the disaster management process, and humanitarian aid operations carried out by the ACT Foundation and defined critical criteria to improve organizational performance. The results show the maturity level of the current condition for the disaster management process and humanitarian aid operations in the humanitarian supply chain aspect of the ACT Foundation.

2. Literature Review

The humanitarian supply chain is one of the disciplines derived from supply chain management, which focuses on a comprehensive process flow from various aspects and interconnected process actors. Not many studies have focused on the scope of the humanitarian supply chain, especially on the maturity assessment level of these processes. This study discusses the design of maturity level assessments and maturity level assessments for humanitarian supply chains in disaster management and humanitarian aid operations by the ACT Foundation. Thus, the relevant literature for humanitarian supply chain and maturity assessment models has been reviewed in this section.

Disaster management and humanitarian aid operations involve various ongoing processes to reduce the impact of the disaster phase, which includes mitigation, preparedness, response, and recovery (Van Wassenhove 2006). Disaster management is known as emergency management. The process involves plans, structures, and arrangements established to include efforts from government, voluntary and private institutions in a comprehensive and coordinated way to respond to the entire spectrum of needs and emergencies that are carried out urgently natural disasters (Moe and Pathranarakul, 2006). Disaster management is described as an effort consisting of planning, mitigation, detection, response, and recovery phases (Kovacs and Spens 2007). Disaster management aims to reduce the impact of disasters on the community, property, and the environment. Each country carries out these missions with non-uniform capacities due to different conditions from various aspects of the state, such as politics, culture, economy, and others (Coppola 2007).

In recent years, Humanitarian Supply Chain has received increasing attention, particularly regarding performance. Many papers address the current implementation of humanitarian organizations, but few propose suggestions (Abidi et al. 2013) or areas of supply chain improvement or identify critical success factors (Pettit and Beresford 2009). Humanitarian Supply Chain (HSC) is an essential component in disaster management because almost 60 – 80 percent of the costs incurred in humanitarian activities are for logistics activities, a necessary aspect of the supply chain (Van Wassenhove 2006). The supply chain system in humanitarian institutions is still lagging compared to the supply chain system in the commercial sector (Van Wassenhove 2006). The role of academics is needed to conduct research and

development on the supply chain system of humanitarian institutions to be more optimal in responding to humanitarian issues and providing assistance according to the recipients' needs.

Recent research using the Maturity Model has discussed logistics aspects but has not focused on humanitarian logistics (Santos-Neto and Costa 2019). An assessment tool for processes carried out by organizations to develop improvement programs to achieve better conditions and that has been widely accepted is the description for the Maturity Model (Latif et al. 2020). Latif et al. (2020) state that an organization's operational management can achieve the efficiency aspect by applying a maturity model that helps stakeholders make decisions to develop long-term plans. The primary purpose of the maturity model is to describe the stages and maturation paths that are visible from the level or stages of each available maturity model. The maturity model is intended to inform stakeholders about the current maturity level and desired conditions and include improvement steps of the process and related stages (Latif et al. 2020).

Resende et al. (2022) researched evaluating the maturity model of three different situations in Rio de Janeiro, Brazil. These are related to the general disaster situation, flood events in the north and northwest of Rio de Janeiro in 2020, and the Covid-19 pandemic. The study was conducted using a Systematic Literature Review (SLR) and case studies. Resende et al. (2022) use nine maturity dimensions and current strategies for improving current maturity levels for these three situations. The maturity level uses five levels with four phases of disaster management. Previous research conducted by Grest et al. (2020) has a scope for the humanitarian supply chain maturity model with three key areas and twelve sub-areas in the humanitarian supply chain process. The maturity level uses four levels, with the process focused on disaster management. Two-thirds of the improvement areas with twelve sub-areas are placed in the first level of the maturity model, while the rest remain in the second level. These results are not entirely surprising because Van Wassenhove (2006) has emphasized that humanitarian organizations lag behind private organizations in efficient supply chains.

Petit and Beresford (2009) identified Critical Success Factors (CSF) for the humanitarian aid supply chain using a conceptual design method and literature review. Critical success factors for the humanitarian supply chain have not been identified in research before being described by Petit and Beresford (2009). They mentioned seven elements in the humanitarian supply chain: strategic planning, inventory management, transport and capacity planning, information management and technology utilization, human resource management, continuous improvement and collaboration, and supply chain strategy. Previous studies did not consider critical success factors in the process applied to humanitarian aid operations. So humanitarian actors did not have the guidelines and basis for determining operations management strategies for the humanitarian supply chain before Petit and Beresford (2009) conducted this research.

3. Methods

In the research conducted with the scope of designing a maturity assessment model on the humanitarian supply chain for humanitarian organizations, there are several steps to achieve the objectives of this research. Figure 1 shows the research methods in general. The research method is as follows:

1) Identify the scope of the humanitarian supply chain assessment. At this stage, identifying the area for assessing the humanitarian supply chain is carried out at the ACT Foundation, one of the largest humanitarian organizations in Indonesia. Currently, the projected scope of the assessment is on disaster management and humanitarian aid operations.
2) Conduct a literature study to determine the maturity assessment model and the maturity dimension in the humanitarian supply chain. At this stage, a literature study is carried out to choose a specific maturity assessment model to be applied to the humanitarian supply chain process by the scope of research, both for disaster management and humanitarian aid operations. The maturity dimension is determined following the area of the study based on various previous literature equipped and identification of each maturity level.
3) Create a maturity assessment model used as a research questionnaire. The maturity assessment model has been designed as a research questionnaire to assess the maturity level of the current ACT Foundation humanitarian aid supply chain process. The questionnaire was specifically designed to evaluate the current state of the organization's processes for disaster management and humanitarian relief operations.
4) Validate the results of filling out the maturity assessment model questionnaire from the respondents. Validation for the results of filling out the maturity assessment model questionnaire from the ACT Foundation is intended to ensure that the maturity level is filled according to the aspects and dimensions that

have been determined. The specified maturity level has levels 1 – 5, where each level is ensured that the evidence of program implementation following the dimensions of the maturity model is appropriate.

5) Determine aspects of performance improvement based on the results of the maturity assessment model. The results of the validated maturity assessment model questionnaire and critical factor assessments create opportunities for the ACT Foundation to improve and improve the performance of the humanitarian aid supply chain that is being carried out.
6) Propose improvement strategies based on managerial and operational approaches. The proposed improvement focuses on increasing the maturity level resulting from the current condition of the dimensions and process of the maturity assessment model to an optimal level. Identification of improvement proposals using the managerial and operational aspects approach.

3.1 Maturity Assessment Model

A maturity assessment model is a framework approach designed to evaluate the maturity of a process and organization through structured levels that describe how thriving behaviors, practices, and procedures can reliably and sustainably obtain the required results (Battista and Schiraldi 2013). Maturity Level represents process implementation from a predetermined dimension related to humanitarian and humanitarian assistance supply chain, especially in handling disasters. This level will show maturity in several processes and organizational conditions in humanitarian aid operations for handling disasters. The levels in the maturity level are divided into five levels, as shown in Figure 2, where each level has the following meaning:

- Level I Unorganized: This level indicates the related processes do not have a clear and organized flow and planning of humanitarian aid operations.
- Level II Elementary: This level indicates related processes have a clear and organized flow and planning of humanitarian aid operations, but no monitoring has been carried out.
- Level III Intermediate: This level shows the processes that have a clear and organized flow and planning of humanitarian aid operations and have carried out a monitoring process for each of these stages, but there is no process for evaluating the performance of humanitarian aid operations carried out.
- Level IV Advanced: This level indicates related processes have a clear and organized flow and planning of humanitarian aid operations, have carried out a monitoring process for each stage, and have evaluated the performance of the humanitarian supply chain process.
- Level V Optimized: This level indicates that related processes have moved simultaneously and effectively for humanitarian aid operations and have periodically made continuous improvements to improve the performance of humanitarian aid operations processes.

The maturity assessment model that has been designed based on the results of a literature review that focuses on the humanitarian supply chain in disaster management and humanitarian aid operations is used as a questionnaire to assess the level of maturity in the current process from the ACT Foundation.

3.2 Maturity Dimension and Processes

The determination of the maturity assessment model as a tool to assess the maturity level of the humanitarian supply chain process must include the maturity dimension and the processes of each of these dimensions related to disaster management and humanitarian aid operations. The maturity dimension design is determined based on a comprehensive literature study. Altogether, fourteen maturity dimensions and eighty-one processes are defined. The maturity dimensions and processes that have been described are as follows:

1) Focus on Phases Disasters (Abidi et al. 2013). Process: Conducting mitigation phase, preparedness phase, response and operational phase, and the recovery phase (Resende et al. 2022).
2) Humanitarian Supply Chain (HSC) Strategy (Petit and Beresford, 2009). Process: Establish reactive HSC strategies, predictive HSC strategies, prescriptive HSC strategies, and HSC strategies by expanding partners between organizations engaged in humanitarian and commercial fields, education, etc., conduct HSC on a national scale consistently and periodically (Tohamy, 2017).
3) Objective and Performance (Grest et al. 2020). Process: Setting performance achievement targets from the program, evaluating the effectiveness of program performance achievement targets, inventory cost efficiency, supply cost efficiency, supply availability (availability of aid and fleet), determining the organization's ability to respond to various sizes of disasters, determining an organizational time to react or deal with catastrophe, establishes the organization's ability to provide multiple types of disaster relief items (Beamon and Balcik 2008).

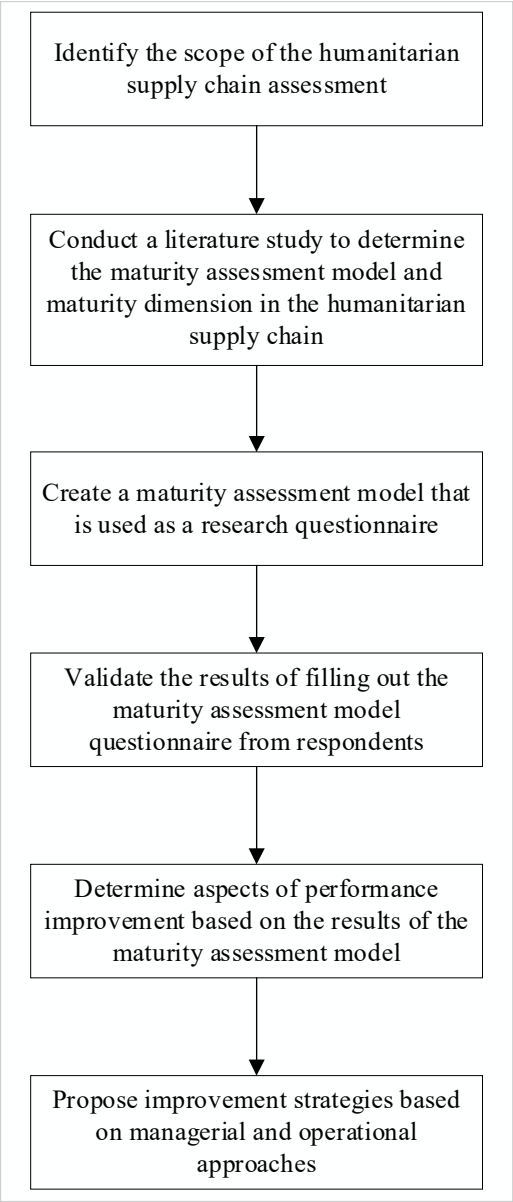

Figure 1. Research Method Flowchart

4) Strategic Planning and Current Condition Assessment (Petit and Beresford, 2009; Resende et al. 2022). The process: Conducting long-term planning (Petit and Beresford 2009), planning based on experience, arranging that involves the whole process (end-to-end planning), emergency analysis and risk identification (Haight 2012), assessment of current conditions in emergency locations, identification of types and magnitudes of disasters/humanitarian aid operations, determination of emergency teams and exploratory teams, identification of needs, classes, and several beneficiaries (Resende et al. 2022).
5)
6) Transport and Capacity Planning (Petit and Beresford 2009). The process: Planning in transportation fleet scheduling, transportation fleet route planning (Petit and Beresford 2009; Resende et al. 2022), transportation fleet maintenance scheduling (Petit and Beresford 2009), assistance load planning, handling equipment of logistics and capacity planning (material handling equipment) (Petit and Beresford 2009; Resende et al. 2022), the process of tracking and confirming receipt of cargo (Resende et al. 2022).

7) Inventory Management (Petit and Beresford 2009; Resende et al. 2022). The process: Planning for the distribution flow of supplies, planning the amount of inventory needed, planning for inventory storage, and implementing the FIFO (First In First Out) principle in the distribution of supplies for humanitarian operations assistance (Petit and Beresford 2009), identifying inventory costs for storing supplies, planning purchasing inventory (Beamon and Balcik 2008).
8) Human Resource Management (Petit and Beresford 2009). The process: Planning for human resources classified according to their competence, availability of human resources who have basic skills in handling emergencies (Fertier 2018), planning for training programs, identifying the number of personnel needed (Petit and Beresford 2009), identification and screening with partners/donors, gradual and open communication to partners/donors (Resende et al. 2022).
9) Information and Data Management (Petit and Beresford 2009; Fertier 2018). The process: Having an IT infrastructure that is used to process information and data received (Petit and Beresford 2009; Hilson 2001), using (Enterprises Resources Planning) in managing information and data between divisions/programs related to humanitarian aid operations, having related information containers organizing donations, having an information forum related to humanitarian aid operations that can be accessed by the public (Petit and Beresford 2009), having a database that connects real time data sourced from the Government or related agencies, has a mechanism for managing and protecting data from partners/donors (Fertier 2018; Tohamy 2017).
10) Search and Rescue Process (Resende et al. 2022). The process: Planning search and rescue points in the disaster area, competent personnel in the search and rescue process, conducting search and rescue, screening for treatment, and conducting medical action in the disaster area (Resende et al. 2022).
11) Response Support Operation (Resende et al. 2022). The process: Communicating with interested parties, activities to maintain order, making reports of damage and loss related to infrastructure as well as material and immaterial losses, post-disaster asset and inventory reports, distributed donation reports and accountability to partners/donors, summary reports of activity results, assessment of disaster relief handling performance (Resende et al. 2022).
12) Restabilizing the infrastructure in the response (Resende et al. 2022). The process: Construction of temporary infrastructure, mobilization equipment for clearing evacuation routes and logistical access routes, restoration of water supply, food, medicine, and communication services, distribution of humanitarian aid in recovery conditions, rebuilding of essential and general infrastructure (Resende et al. al. 2022).
13) Services to the Population (Resende et al. 2022). The process: Identifying needs and requests for assistance to the affected population, receiving operational assistance in the form of food, medicine, and other specific materials, providing services to the people, determining the storage, and planning for the distribution of aid during the emergency period, allocating assistance on demand and needs during emergencies and recovery (Resende et al. 2022).
14) Demobilization of the operation (Resende et al. 2022). The process: Carry out activities that ensure that the recovery process in the affected area has been completed, demobilize temporary infrastructure, and demobilize for logistical assistance distributed to affected people (Resende et al. 2022).
15) Continuous Improvement and Collaboration (Petit and Beresford 2009; Fertier 2018). The process: Identifying critical success factors in the performance of humanitarian supply chains for both disaster management and other humanitarian operations, setting Key Performance Indicators (KPI) for organizational performance, evaluating KPIs periodically and consistently, benchmarking against similar organizations (best practices), program cooperation that involves partners/donors to establish good relationships (Petit and Beresford 2009), select a partnership with several logistics suppliers (Petit and Beresford 2009; Fertier, 2018; Meng et al. 2011), establish cooperation and collaboration with affected local authorities, Police, TNI, private sector and other humanitarian organizations (Meng et al. 2011).

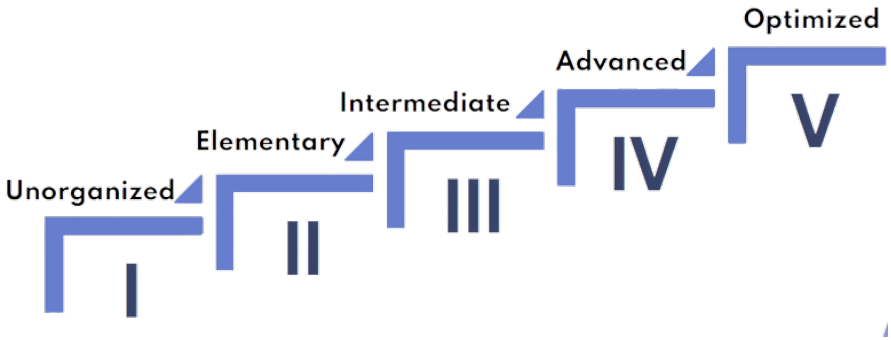

Figure 2. Maturity Level

4. Data Collection

The data collection and collection stages based on the flowchart above were carried out using a maturity assessment model questionnaire to the ACT Foundation. Respondents to the questionnaire were represented by the Jakarta Head Office and two Branch Offices. The selected branch offices are for the Tangerang Regency and Tangerang Raya (Tangerang City and South Tangerang City). In general, the steps in data collection and collection are as follows:

1) Respondents from the Head Office and Branch Offices were represented by three respondents from the team that carried out disaster management programs and humanitarian aid operations. The Head Office is represented by the Manager and the Disaster Emergency Response and Relief Management (DERM) Division. Each respondent for the Branch Office is represented by the Head and Program Implementor Staff.
2) The maturity assessment model questionnaire makes it easier for respondents to fill it out. The designed table consists of the maturity dimension and its processes with a choice of maturity levels that follow current disaster management and humanitarian aid operations conditions. Table 1 shows a sample questionnaire from fourteen maturity dimensions for the first maturity dimension.

3) The results of the maturity assessment model questionnaires for each respondent have collected for each maturity dimension and its processes. From three respondents representing each population, it will be processed to display the average maturity level of all maturity dimensions and processes. The result shown for each maturity dimension is the maturity level in the current state.
4) The program's data collection and implementation to validate the completed maturity assessment is conducted by interviews and observation to the Head Office and Branch Offices of the ACT Foundation.

Table 1. Maturity Assessment Model Questionnaire Design Sample

Maturity Dimension	Proses	Maturity Level				
		I	II	III	IV	V
Disaster Phase Focus	Execute the mitigation phase					
	Execute the preparedness phase					
	Execute the response and operational phases					
	Execute the recovery phase					

5. Results and Discussion

The measurement of the maturity model in the humanitarian supply chain for disaster management and humanitarian aid operations based on the questionnaire design above has been obtained from respondents from three populations of the ACT Foundation. The maturity assessment model assesses the implementation of ACT's programs related to disaster management and humanitarian aid operations, which have the program names the Global Humanitarian Program and the Disaster Relief Program. The numerical and graphical results are described in points 5.1 and 5.2.

This study indicates several maturity dimensions and critical process aspects with a maturity level value below level two. The second level shows that there has been a clear and organized flow and planning of humanitarian aid operations in these processes, but no monitoring has been carried out. These results represent the process of two ACT

Foundation branch offices. The Maturity Dimension is the Focus for Phase on Disaster, Strategic Planning and Current Condition Assessment, Transport and Capacity Planning, Search and Rescue Process, and Response Support Operation. Especially for the process organized by the ACT Foundation's central team, there are only two maturity dimensions with a maturity level below level three, namely Information and Data Management and Continuous Improvement and Collaboration. Thus, based on the objectives of this study, critical factors have been found in efforts to improve the performance of the humanitarian supply chain process in disaster management and humanitarian aid operations for each area of the ACT Foundation to a more optimal maturity level (Level IV Advanced and Level V Optimized).

5.1 Numerical Results

Three respondents have filled in the questionnaires for each area of the ACT Foundation process, respectively, by the Manager and the Disaster Emergency Response and Relief Management (DERM) Division for the Jakarta Head Office area and the Branch Office represented by the Chair and Program Implementor Staff. Table 2 shows the results of filling out the ACT Foundation area questionnaires. Result-1 described the maturity level of the Tangerang Raya. Result-2 shows the maturity level of the Tangerang Regency. Result-3 shows the maturity level of Head Office, Jakarta. The values shown in Table 2 are the average results obtained from three respondents for each ACT Foundation office population as described in point 4 of the Data Collection. This value is obtained from the average score of three respondents representing the ACT Foundation organization. Table 3 describes the achievement of the current condition of maturity level for each maturity dimension to the highest level, namely Level V Optimized. It can be monitored which processes are prioritized gradually to improve process performance from the organization's humanitarian supply chain.

Table 2. Maturity Assessment Model Questionnaire Results

Maturity Dimension	Maturity Level		
	Result-1	Result-2	Result-3
Disaster Phase Focus	2.8	1.8	4
Humanitarian Supply Chain (HSC) Strategy	2.8	2.4	3
Performance Objective	3.1	2.5	3.86
Strategic Planning and Current Condition Assessment	2.5	1.9	3.75
Transport and Capacity Planning	2.2	1.7	3.5
Inventory Management	2.7	2.5	3.67
Human Resources Management	3.5	2.8	4
Information and Data Management	2.2	2	2.83
Search and Rescue Process	1.2	1.2	4
Response Support Operation	1.9	2.1	4
Restabilizing the infrastructure in the response	2.8	2.2	4.4
Service the population	4	3.4	4.4
Demobilization of the operation	2.7	2.3	4
Continuous Improvement and Collaboration	3	3	2.86

Table 3. Maturity Level Achievement Percentage

Maturity Dimension	Maturity Level		
	Result-1	Result-2	Result-3
Disaster Phase Focus	56%	36%	80%
Humanitarian Supply Chain (HSC) Strategy	56%	48%	60%
Performance Objective	62%	50%	78%
Strategic Planning and Current Condition Assessment	50%	38%	75%
Transport and Capacity Planning	44%	34%	70%
Inventory Management	54%	50%	73%
Human Resources Management	70%	56%	80%
Information and Data Management	44%	40%	57%
Search and Rescue Process	24%	24%	80%

Response Support Operation	38%	42%	80%
Restabilizing the infrastructure in the response	56%	44%	88%
Service the population	80%	68%	88%
Demobilization of the operation	54%	46%	80%
Continuous Improvement and Collaboration	60%	60%	57%

5.2 Graphical Results

The numerical results are shown in Table 2 and Table 3 in a graphical result that displays the maturity level of the overall performance of ACT Foundation respondents, as shown in Figure 3 and Figure 4. The ACT Foundation in the Tangerang Raya area has 14.3% processes with a maturity level below two. The maturity level between two and three has a percentage of 57.1%. The maturity level between three and four is 28.6%, and there is no maturity level above level four. The ACT Foundation in the Tangerang Regency area produced 28.6% of processes that had a maturity level below two. Maturity levels between two and three have 57.1%, and levels between three and four with 14.3% of the overall maturity dimension and processes. Better results are shown by the maturity level of the Jakarta Head Office area. There is no maturity dimension with a maturity level below two. Only two maturity dimensions, i.e., 14.3% of the entire process, have levels between two and three. The level between three to four has 71.4% and 14.3% above four. The graphical display for the overall achievement of maturity can be seen in Figure 5.

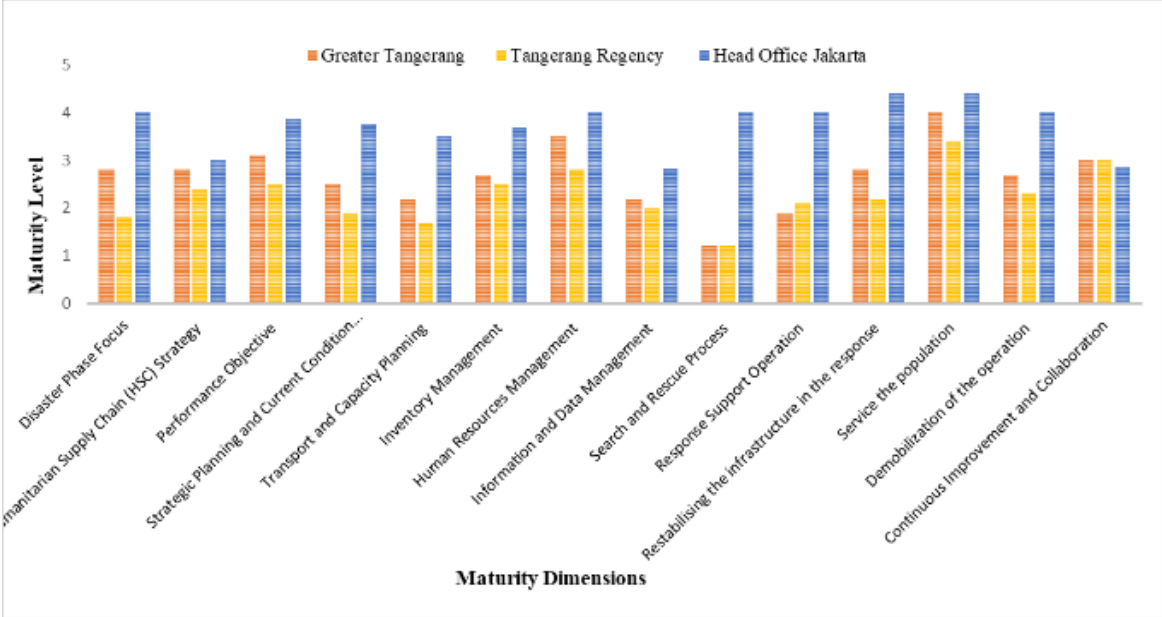

Figure 3. Maturity Level Performance

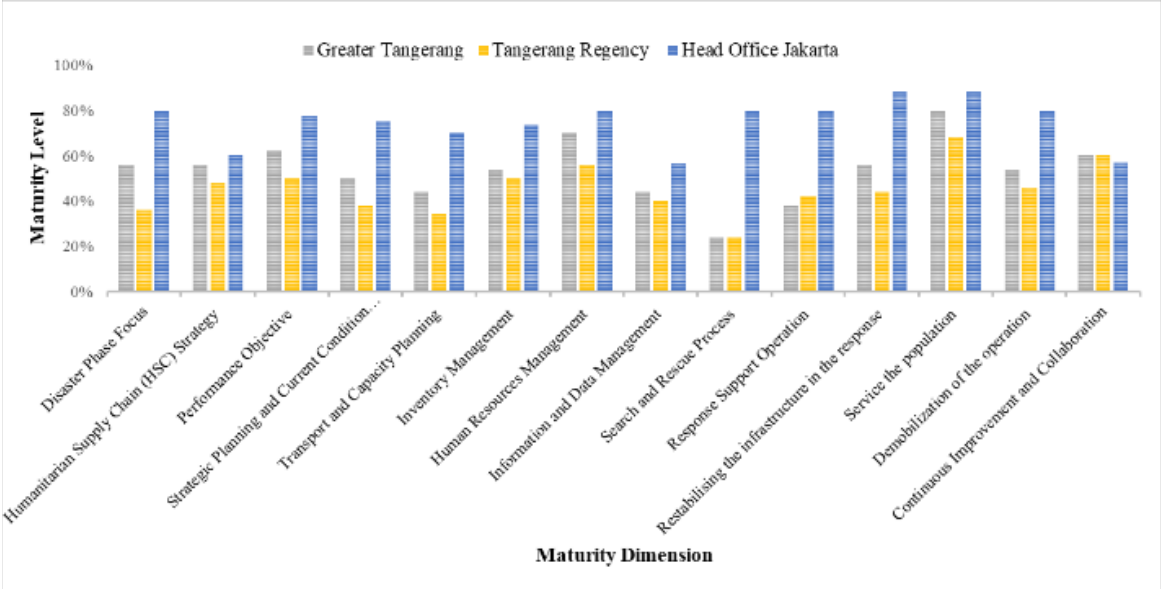

Figure 4. Maturity Level Achievement Percentage

5.3 Proposed Improvements

The proposed improvement for the humanitarian supply chain process in each area of the ACT Foundation focuses on a maturity level with a value below three. It means the related process has a clear and organized flow and planning and has carried out a monitoring process for each of these stages, but no performance evaluation was carried out. So those improvements are made to improve the evaluation process of each maturity dimension and its processes to achieve maturity performance at level four. For a maturity level with a value above three, the improvements carried out aim to reach level five as the most optimal level of the maturity assessment model that has been developed. The process improvement for the Greater Tangerang area focuses on the maturity dimension with a maturity level below two, namely the search and rescue process with a value of 1.2 and support operations for humanitarian aid operations with a value of 1.9. In this process, operational and managerial strategies must monitor the planning of search and rescue points in the disaster area, competent personnel in the search and rescue process, conducting search and rescue, screening for treatment, and carrying out medical actions in the disaster area. The managerial aspect plays a role in ensuring that person has the competence to carry out a search, rescue, and medical care processes in disaster areas. For operations related to logistics, search and rescue equipment, medicines, and associated with the process.

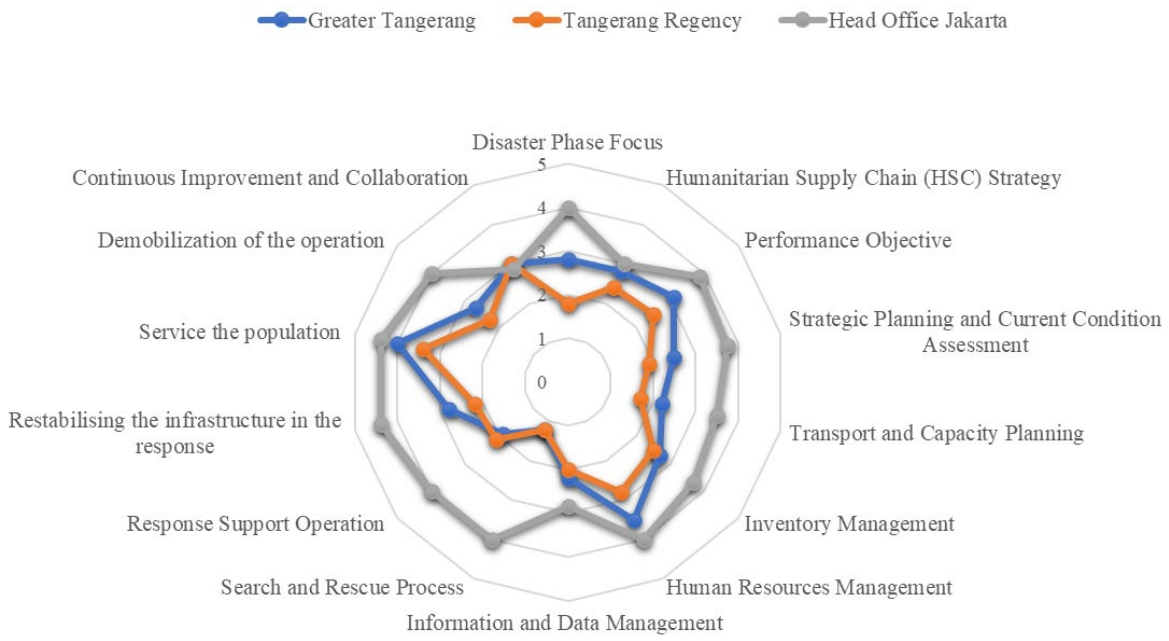

Figure 5. Radar Chart of Maturity Level Result

The response supports operational process is related to communicating with interested parties, activities to maintain order, making reports of damage and losses related to infrastructure as well as material and immaterial losses, post-disaster asset and inventory reports, reports on distributed donations, and accountability to partners/donors, a summary of activity results reports, assessment of disaster relief handling performance. The series of processes must also carry out a monitoring and evaluation process so that the organization's performance for the operational aspects of supporting disaster management and humanitarian aid operations becomes better so that services to interested parties can be optimal. Improvement of the performance evaluation process of programs and activities in the maturity dimension with maturity level above three must be carried out because, based on the results of the maturity assessment, it is stated that there is no evaluation process. This improvement makes a maturity level with a value of four. The overall process has a clear and organized flow, and the planning of humanitarian aid operations has carried out a monitoring process for each stage. It has evaluated the performance of the disaster management process and the humanitarian aid operation. It focuses on improving the maturity level with a value below two for the Tangerang Regency area, and below three for the Jakarta Head Office, it is shown in Figure 6. The proposed improvement strategy has been through discussions with respondents from each area of the ACT Foundation. Of course, the proposal represents the maturity level that has been determined and is complemented by other supporting strategies that are considered necessary in improving the performance of the humanitarian supply chain process and humanitarian aid operations.

6. Conclusion

The number of disasters in the recent period has increased significantly, emphasizing the need for effective management of humanitarian operations (Resende et al. 2022). Over the past few years, humanitarian organizations have been criticized mainly for their lack of effectiveness in implementing their programs in dealing with people affected by disasters or in need of humanitarian assistance (Haavisto & Goentzel 2015). The general objective of this study is to propose a Maturity Assessment Model that allows an assessment of the maturity of organizational processes for disaster management and humanitarian aid operations and suggests strategies to improve process maturity in critical processes. Thus, this study establishes the latest Maturity Assessment Model related to the humanitarian supply chain, which the ACT Foundation's Humanitarian Organization represents explicitly. The maturity assessment model was developed using 14 dimensions of maturity assessment and 81 processes. ACT Foundation, the largest humanitarian organization in Indonesia, has branches in almost all parts of Indonesia, even some in areas of international conflict. Respondents for this study were the Tangerang Raya branch and Tangerang Regency, with the results obtained for the dimensions of goals and performance, human resource management, and services to residents having a maturity level between 3 Intermediate and 4 Advanced.

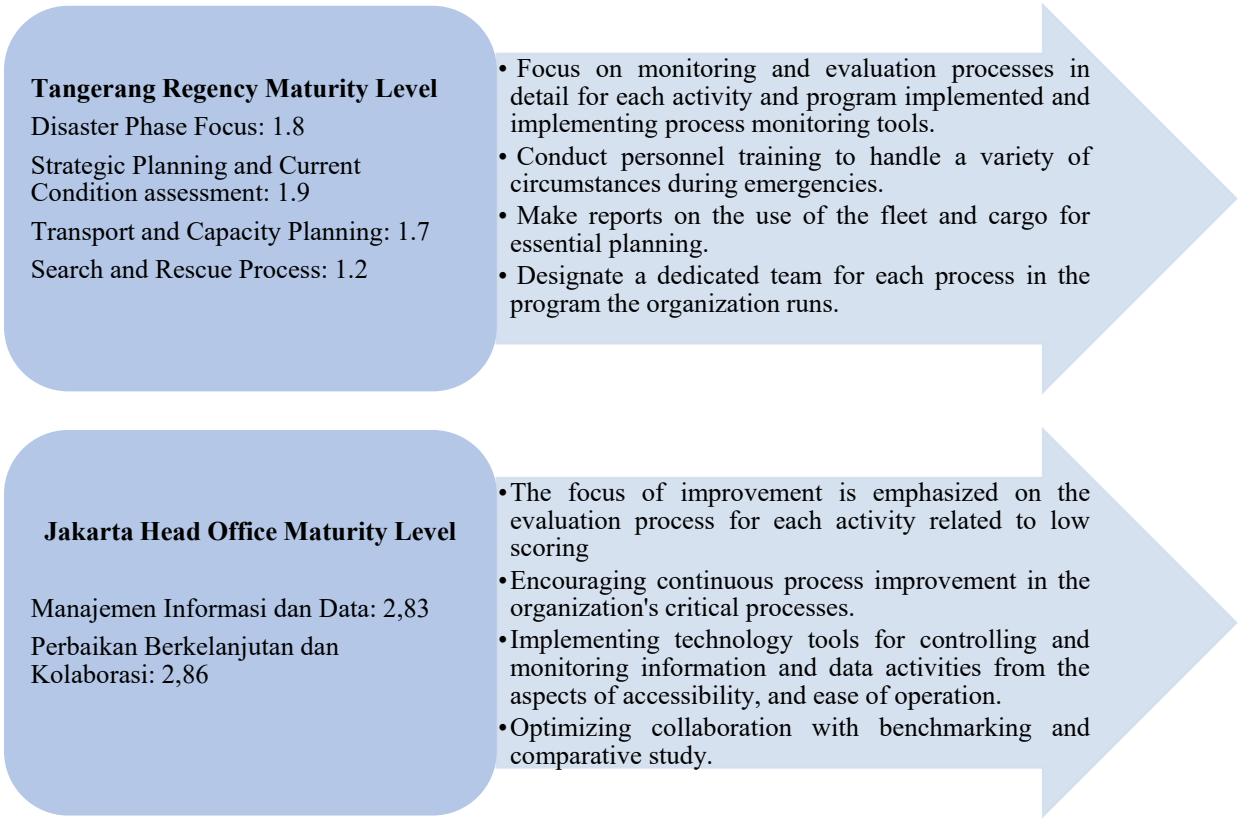

Figure 6. Improvement Strategy for Critical Process Maturity Dimension

The results of the maturity level are below 2 Elementary for the Tangerang Raya and Tangerang Regency branches (Figure 6), namely focusing on the disaster phase, strategic planning, transportation and capacity planning, search and rescue processes, and support operations. The results of the maturity level of the Jakarta Head Office assessment with a value below 3 Intermediate are information and data management and continuous improvement and collaboration. This study ensures that the humanitarian supply chain has reached the appropriate maturity level, namely level 4 Advanced to 5 Optimized. The proposed strategy to improve the maturity process has been discussed with the relevant respondents as program implementing personnel of the organization. However, in applying the maturity model for the humanitarian supply chain in this study, there are suggestions for further research. The aspect that can develop is the exploration of case studies with other humanitarian organizations both in Indonesia and other countries. In addition, it is possible to create a maturity dimension and processes that are specific to other programs of humanitarian organizations outside of disaster management and humanitarian aid operations. Direct assessment in field observations to see the actual implementation of the humanitarian supply chain of the organization is an area that can also develop further in further research.

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