

Improving Organisational Performance with Balanced Scorecard in Humanitarian Logistics: A Proposal for Key Performance Indicators

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Abstract *Thousands of people have been affected by major disasters in countries across the world over the last decades. Many governmental and non-governmental organizations participated in aid actions just after disasters. But, they could not prevent inabilities in taking action due to the magnitude of the disaster. Humanitarian aid organizations, like the others, should identify their targets and its priorities with selecting key performance measurements. Humanitarian logistics may use indicators based on both physical and non-physical dimensions. In this study, Balanced Scorecard approach is recommended as a suitable performance management system to develop and improve in managing of humanitarian aid logistics. This conceptual study contributes literature by proposing key performance indicators (KPI) for humanitarian logistics.*

Key words Disaster, humanitarian logistics, balanced scorecard, KPI

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1. Introduction

Humanitarian aid organisations intervening natural disasters aim providing food, water, medicine, shelter and various materials to the areas affected by large-scale emergency situations (Beamon and Balçik, 2008). Humanitarian logistics can be defined as the planning, implementation and effective control of the process to meet the needs of those who need it, from the starting point to consumption point, by ensuring efficient flow of cost, storage of goods, materials and related information (Tatham and Spens, 2008). The humanitarian logistics function has many features. One of these features is the level of uncertainty where organizations have to deal with. While the needs of the survivors increase over time and this becomes difficult to predict, the demand and supply vary on a daily basis. Humanitarian logistics engineers should have the sophisticated tools and methods to respond quickly to the fast moving changes, and therefore the agility of the supply chain needs to be improved (Charles *et al.*, 2010).

A better preparation phase is needed to reduce the adverse effects of disasters. It appears that aid organisations are increasingly under pressure with the monitoring the effects of aid and the raising awareness of the volunteers and donors. For these reasons, aid organizations need to be result-oriented, accountable and more transparent (Wassenhove, 2006).

This study presents a balanced scorecard for humanitarian logistics organizations and proposes Key Performance Indicators for the performance of management system. Measuring the performance of humanitarian logistics organizations is important for the business development. The aim of this study is to define key performance indicators by adapting the model to the humanitarian aid logistics, based on an effective performance management tool in non-profit organizations in order to transform the strategies into viable targets so that organizations can sustain their assets and measure the targets. Although there have been major developments on the humanitarian relief operations, it is seen that their performance has not been investigated sufficiently. This study is important because, as far as I am concerned, balanced scorecard approach has not been used as a performance metrics for the humanitarian logistics. It offers key performance indicators based on balanced scorecard for humanitarian logistics. It also aims to pay attention to focus on the gap on this issue in the literature.

2. Humanitarian Logistics

Humanitarian aid logistics as it has been in the process of definition for many years has undertaken as only "firefighting" operations because of the lack of planning and budgeting system. Only about couple of decades ago, humanitarian organisations were introduced to the "logistics" phenomenon operating with the private sector mentality (Wassenhove, 2006). Despite the fact that many governmental and non-governmental organizations (NGO) have participated in relief activities after the Tsunami disaster in the Indian Ocean, they were inadequate due to the lack of coordination. The Fritz Institute, in particular, pointed to disruptions in the supply chain, saying that the problem actually required a logistics conference rather than a charity conference. Accordingly, the Tsunami experience in 2004 was the birth of humanitarian logistics on the academic scene (Fernandez and Suthikarnnarui, 2011).

In order for a humanitarian aid organization to achieve its goals, the first is to determine which action has priority. For instance, procuring goods for those who need it in the event of a disaster? Or keep the most needed materials at the right amount? The best way to solve such kind of dilemma is to determine the actual goals and core competencies of the organizations. Besides, in the absence of an effective emergency management system, the results of natural disasters are calculated solely by the number of people dead, injured or lost and the economic impacts on the region. When the aid organisations in the global rescue chain are examined, it appears that there are three categories. Two of them are international organizations operating in the framework of the United Nations (UN) (with country offices helping the governments), the International Federation of Red Cross and Red Crescent Societies, and the NGOs. Here it is seen that NGOs also established country offices but they do not work for the governments of the countries they operated in. All types of organizations work under different rules (Beamon and Balciik, 2008).

In 2005, the strategic goals of the International Federation of the Red Cross have been determined by developing their logistics strategies on the basis of the strategic plans (IFRC, 2006). It was intended to support national associations to provide sufficient logistical capacity in terms of personnel and resources to support disaster preparatory activities. Globally, it was targeted to reach a level of referral of standard aid materials to a maximum of 5,000 families within 48 hours and beyond, to 15,000 families in 14 days. In order to achieve these objectives, it was decided to develop the operational capability of the supply chain in an emergency situation. Prior to that, while the International Red Cross Federation's Logistics and Resource Mobilization Department had only a centralized supply chain, this new strategy encouraged the establishment of regional logistics units where temporary warehousing and regional service providers were serving. The advantages of this new regional logistics unit concept are stated as other synergies with reduced response time, reduced transportation and storage costs (Schulz and Heigh, 2009).

3. Balanced Scorecard

The concept of balanced scorecard was introduced in the literature by Kaplan and Norton (1992). In 1996, Kaplan and Norton also published a book on the subject and pointed out the balanced success indicators as "a way to turn company strategies into action". One principle of the balanced scorecard approach is to select key metrics that will help to develop organizational competencies (Davidson, 2006: 28). The research on performance measurement includes a variety of disciplines, from production and operations management to accounting and management control (Moreira and Tjahjono, 2016).

Strategy and vision but not control is at the centre in the scorecard. It has goals and assumes that people will adopt it and all the actions are requested to reach those goals. The measures are to take people toward the overall vision. Companies look and move-forward instead of backward with balanced scorecard (Kaplan and Norton, 1992). The balanced scorecard points out three purposes; first, it monitors performance as a measurement system. Second, it provides diagnostic feedback of their performance as a communication tool; and lastly, it focuses on the small business visions as a strategic management system (Ratnasingam, 2009). The balanced scorecard has a holistic point of view for the firms by simultaneously monitoring its performance from learning and growth, internal business processes, customer, and financial perspectives (Ratnasingam, 2009). The four dimensions constitute the main framework of the system and include many factors that are different and unique from traditional measurement systems. These factors are summarized as follows. Balance (balance between performance dimensions, intangible assets (financial and non-financial assets), cause-effect relation, double cycle learning, achieving strategic success and

excellent performance, holistic approach, antecedent-consequent indicators, and balanced scorecard strategy map. The basis of these concepts, which can be expressed as the factors of the balanced scorecard, allows the organisation to track it to be used as both a performance measurement and a strategic performance management tool (Gençay, 2011).

4. Humanitarian Aid Logistics and Disaster Management

Humanitarian aid was focusing only on the transfer of aid to the victims until the Tsunami disaster in the Indian Ocean in 2004 and Katrina in 2005. The sudden suppression of disaster and the urgent need for help to those in needs were not allowing the organizations to establish, evaluate and implement a careful supply chain plan (Fernandez and Suthikarnnaruai, 2011). There are some difference between commercial supply and humanitarian supply chains in their point of view by means of objective, demand pattern, supply pattern, flow type, lead time, delivery network structure, inventory control, technology information systems, equipment and vehicles, human resources and stakeholders. Ertem *et al.* (2010) summarized the characteristics of commercial supply chain management and humanitarian supply chain management.

The operations of humanitarian organizations in disaster management can be divided into four main phases called as response, recovery, mitigation and preparedness. There are a number of overlapping activities at different phases during humanitarian operations. It can be thought that there is a separate transition phase between response and recovery. The humanitarian supply chain has to supply the survivors at each phase. Although the volume, variety and urgency of the proposal vary according to the phase, these activities require logistical support. Humanitarian logistics information systems can enhance the effectiveness of logistics units during the disaster management cycle and provide continuity throughout the entire process (Howden, 2009). Figure 1 shows the disaster management cycle beginning with the emergence of disaster.

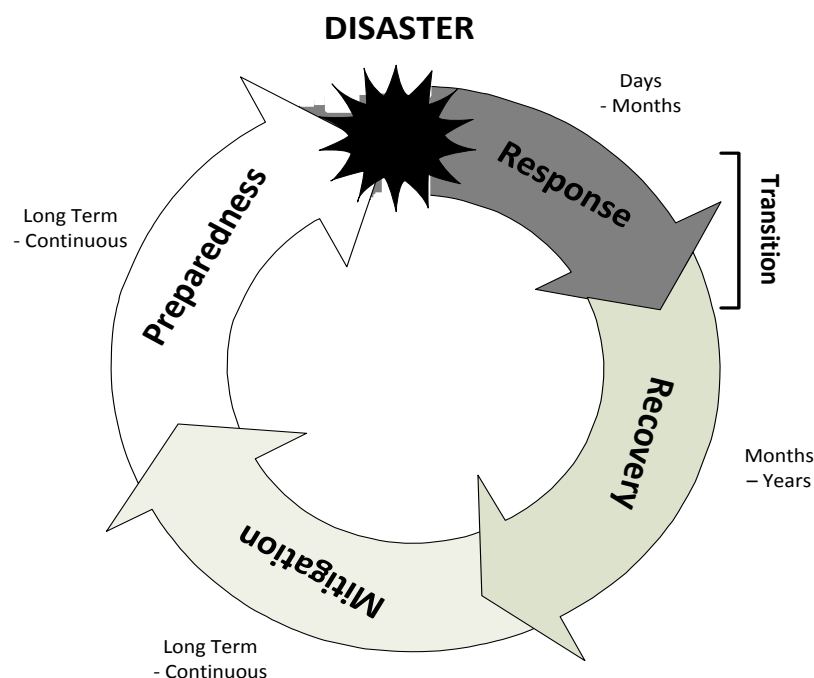


Figure 1. Disaster Management Cycle (Haddow and Bullock, 2004; by Howden, 2009)

First, response phase occurs immediately after disaster, activities are focused on saving lives and preventing further harm. Humanitarian logistics depend on logistics throughout its response, depending on the distribution of food, the supply of medical supplies, the other vital needs of the victims and the speed of survival logistics activities. The response may take days or months, depending on the size of the disaster.

Throughout the transition phase, NGOs constantly try to help in the resurrection of temporary shelter and social services. NGOs prepare a strategic plan from response phase to transition phase, from long term recovery to mitigation. For a smooth transition, suppliers should be defined in local and international markets for logistics activities. Second, recovery phase involves helping societies to return to

previous states of the disaster. It involves training people in a process that may last from months to years, distributing materials that provide people with a living, rebuilding homes, buildings, and infrastructure. The activities between these phases depend on the social, cultural, economic, geographical conditions of the affected society. It shows big differences in different disasters. Third, mitigation phase is to increase community resistance to natural risks in order to reduce societal vulnerability to disasters. Activities against security gap, planting trees in order to protect the coastline against tornado, building dams and strengthening the buildings are among the works carried out at this stage. Humanitarian organizations that engage in these activities do not need much logistical support as in other phases (Howden, 2009). Fourth preparedness phase has 5 factors namely human resources, knowledge management, process management, resources and community (Wassenhove, 2006).

Selected and trained people should have the planning and co-ordination skills as well as being involved in the events. The fundamental principle in the humanitarian aid system is the assumption that people and countries can help themselves at the highest level. Good training and a well preparation with local teams ensure success in disaster management. Knowledge management is to learn logistics activities by systematizing it and transferring the information from previous disasters to future planning. In process management, logistics should be set as the stage of preparation of the main task. It is to prepare the goods, tools and agreements in order to carry these resources quickly. This also refers to alternative suppliers in supply chain management. Resources imply to arrange financial resources which mean preparing enough money to start operations and ensuring that they work as smoothly as possible. Community is to find effective ways to cooperate with the governments, military, national and international organizations. This can be achieved through mutual framework agreements (Wassenhove, 2006).

5. Humanitarian Aid Logistics in Terms of Balanced Scorecard

This study focuses on the balanced scorecard from multidimensional performance appraisal models. Humanitarian aid logistics has been studied on the basis that it is from managing and optimizing the organization to best measure and analyse the organization, intra-organizational processes and organizational performance, and summarizing the most important processes, measured by balanced scorecard frame. Measuring the performance of humanitarian aid logistics with balanced scorecard approach is examined with this study. It is to set a link between the primary objectives of humanitarian logistics and balanced scorecard. A similar study by Brewer and Speh (2000) shows that supply chain management is associated with balanced scorecard. Tuygun Toklu and Toklu (2014) modelled the relationship between humanitarian aid logistics and balanced scorecard. Figure 2 shows that the humanitarian aid logistics consisting of process, beneficiary, finance, and innovation and learning dimensions are expressed as balanced scorecard. The model is based on the study of Brewer and Speh (2000) for supply chain management. The new performance model in the study is adapted for humanitarian aid logistics. The model defines 24 key success factors for performance indicators. Figure 2 demonstrates the details of the model.

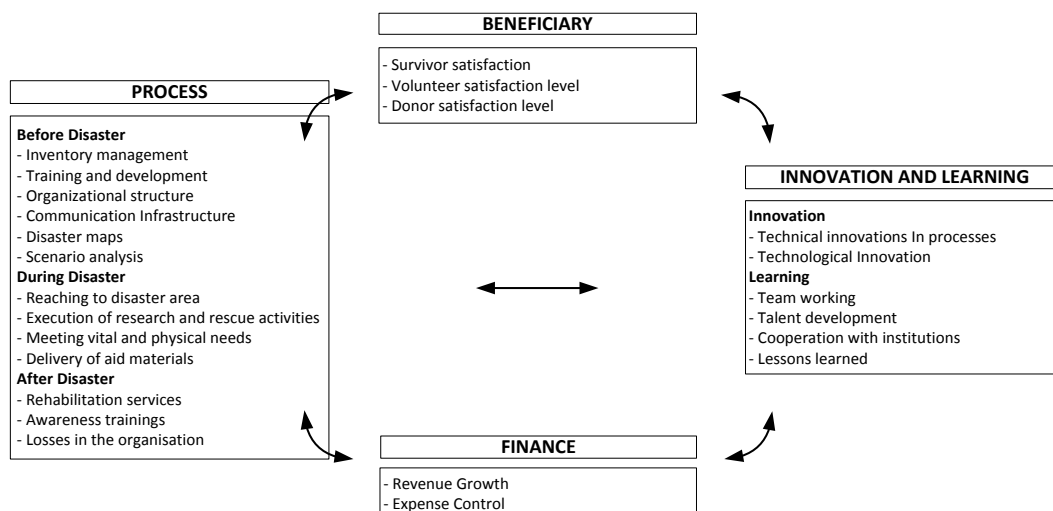


Figure 2. The expression of humanitarian aid logistics in the form of balanced scorecard

The performance indicators defined for each dimension of balanced scorecard are presented in Table 1 in details.

Table 1. A sample of balanced scorecard for humanitarian aid logistics

DIMENSION	KEY SUCCESS FACTORS	PERFORMANCE INDICATORS	UNIT
FINANCE DIMENSION	Revenue Growth	Donations collected	\$
		Collected aid supplies	Piece/\$ worth
		Income from assets	\$
	Expense Control	Inventorying expenses (Warehousing etc.)	\$
		Transportation expenses	\$
		General and administrative expenses	\$
PROCESS DIMENSION	1. BEFORE DISASTER		
	Inventory management	Stock compliance	Not good/Good/Better
		Inventory update	1-3 month/ 3-6 month/ 6 month-1year
	Training and development	Number of trainings	Piece
		Participation rate to trainings	%
	Organizational structure	Very skilled employees / If so, how many?	Yes/No
	Communication infrastructure	State of the art equipment used for communication (Wireless, Satellite Phone etc.)	Piece
	Disaster maps	Are disaster maps ready? If so, how any?	Yes/No
	Scenario analysis	Scenario analysis ready? If so, how many?	Yes/No
	2. DURING DISASTER		
	Reaching to disaster area	How many hours did it take to reach the scene after disaster?	Hour
		Arrival order of the research and rescue units?	Order
	Execution of research and rescue activities	Number of households in research area	Piece
		Number of rescued people	Piece
	Meeting vital and physical needs	Number of people served by food service	Piece
		Number of people served by health service	Piece
		Number of people provided accommodation by the welfare service	Piece
	Delivery of aid materials	Delivery period of aid materials	Hour
		Sufficiency of the aid materials	Not good/Good/ Better
	3. AFTER DISASTER		
	Rehabilitation services	Number of employees of the rehabilitation service	Piece
		Number of the survivor getting rehabilitation service	Piece
	Awareness trainings	Number of people who are conscious about disaster	Piece
Number of awareness meetings		Piece	
Losses in the organisation	Number of human loss	Piece	
	Number of equipment loss	Piece	
INNOVATION AND LEARNING DIMENSION	1. INNOVATION		
	Technical innovations in processes	New techniques learned in last one year	Piece
	Technological innovation	New technological devices owned in last one year	Piece
	2. LEARNING		
	Team working	Number of research and rescue teams	Piece
	Talent development	Average training time per capita	Hour
		Number of educational issues given	Piece
	Cooperation with institutions	Number of cooperated local institutions	Piece
		Number of cooperated foreign institutions	Piece
	Lessons learned	Lessons extracted from disaster for future planning	Yes/No
Lessons transferred to the members		Yes/No	

DIMENSION	KEY SUCCESS FACTORS	PERFORMANCE INDICATORS	UNIT
BENEFICIARY DIMENSION	Survivor satisfaction	Variety of services offered	Piece
		Saved number of survivor in critical period (the first 72 hours)	Piece
		Timely delivery of aid materials	Yes/No
		Adequacy of aid Materials (variety, number, etc.)	Yes/No
	Volunteer satisfaction level	Satisfaction rate for the organization works and its efficiency	Not good/Good/Better
	Donor satisfaction level	Satisfaction rate for the organization works and its efficiency	Not good/Good/Better

Table 1 explains the performance indicators for humanitarian logistics. This is achieved by elaborating the balanced scorecard framework of the humanitarian aid logistics given in Figure 2. Financial dimension, process dimension, innovation and learning dimension, and beneficiary dimension were used in humanitarian aid logistics balanced scorecard. The following questions have been answered in order to determine performance measures with the dimensions. For instance, which specific targets will the organization achieve? How should the organization be perceived by the beneficiaries to achieve for the vision with its mission and values? In which processes should the organization target excellence to satisfy beneficiaries? What kind of institutional learning and development model should the organization have to achieve for the vision? This table shows the key success factors and performance indicators for each performance dimension. The expectation from balanced scorecard is to ensure that every individual involved in the humanitarian logistics process are in the same direction as the strategic goals.

6. Conclusions

Measuring performance for humanitarian logistics is critical in terms of securing the donation collected by means of accountability and improving aid by means of saving lives and reducing human suffering. The aim of this study is to develop performance indicators for the humanitarian aid chains by comparing performance measures in the commercial supply chain with performance measures in the aid chain and to provide performance measurement indicators for humanitarian logistics.

The careful follow-up of the process and adequate preparation before a disaster may result in less damage in such incidents. In this study, performance indicators were defined by using the balanced scorecard approach to improve organizational performance in the humanitarian logistics process. Four dimensions are defined in creation of the performance track for humanitarian aid logistics. These are classified as finance dimension, process dimension, innovation and learning dimension, and beneficiary dimension. Increasing the incomes and controlling the expenses are classified as the main success factors under finance dimension. The main indicators of success in the process are considered as before-disaster, during-disaster and after-disaster. Inventory management, training and development, organizational structure, communication infrastructure, preparation of disaster maps, and scenario analysis are performance indicators for before disaster; reaching to disaster area, execution of research and rescue activities, meeting vital and physical needs, and delivery of aid materials are the indicators for during the disaster; rehabilitation services, awareness trainings and losses in the organization are the indicators as success factors for after the disaster.

Two main success indicators are defined as innovation and learning in innovation and learning dimension. Technical innovation in processes and technological innovation are conceptualized under the process of innovation; Team working, talent development, cooperation with institutions, and lessons learned can be qualified as success factors within the scope of learning. In the beneficiary dimension, satisfaction levels of the survivors, the volunteers working for the organization and the donors are determined as success factor and identify the variables used in the performance measurement.

This recommended performance measurement system can be used as a basis for the performance measurement system in the humanitarian aid sector. Organizations are thought to be able to follow and improve their performance on yearly basis by making the necessary adaptations based on their own structure, flexibility and experience. This study is a conceptual work that suggests a basic point of view for measuring the performance of the humanitarian logistics. It has a limitation as a theoretical study since the

approach based on the balanced scorecard has not been applied to any organization yet. The scales can be elaborated with the possible improvements in the applications based on organisations experience. It can be accepted as a basic model for the future studies.

References

1. Beamon, B.M. and Balcik, B. (2008). Performance measurement in humanitarian relief chains. *International Journal of Public Sector Management*, 21 (1), 4-25.
2. Brewer, P.C. and Speh, T.W. (2000). Using the Balanced Scorecard to Measure Supply Chain Performance. *Journal of Business Logistics*, 21 (1), 75-93.
3. Charles, A., Lauras, M. and Wassenhove, L.V. (2010). A model to define and assess the agility of supply chains: building on humanitarian experience. *International Journal of Physical Distribution & Logistics Management*, 40 (8/9), 722-741.
4. Davidson, A. L. (2006). *Key Performance Indicators in Humanitarian Logistics*. Master of Engineering in Logistics at the Massachusetts Institute of Technology. http://www.fritzinstitute.org/PDFs/findings/XS_Davidson_Anne.pdf
5. Ertem, M.A., Buyurgan, N. and Rossetti, M.D. (2010). Multiple-buyer procurement auctions framework for humanitarian supply chain management. *International Journal of Physical Distribution & Logistics Management*, 40 (3), 202-227.
6. Fernandez, T.E. and Suthikarnnaruai, N. (2011). The Main Aims of Humanitarian, Business and Military Organizations and the Resulting Possible Synergies in Logistics. *Proceedings of the World Congress on Engineering and Computer Science*, Vol II WCECS San Francisco, USA.
7. Gençay, İ.C. (2011). Kurumsal Performans Karnesini Farklı Kılan Unsurlar - Amaç ve Ölçütler. *Sosyal Bilimler Araştırmaları Dergisi*, 1, 204-225.
8. Haddow, G.D. and Bullock, J.A. (2004). *Introduction to Emergency Management*. Butterworth-Heinemann, Amsterdam.
9. Howden, M. (2009). How Humanitarian Logistics Information Systems Can Improve Humanitarian Supply Chains: A View from the Field. *Proceedings of the 6th International ISCRAM Conference – Gothenburg, Sweden*, J. Landgren and S. Jul, Eds.
10. IFRC (2006). Current Status of Logistics Strategy Implementation, Internal Presentation. Aktaran: Schulz ve Heigh, 2009.
11. Kaplan R.S. and Norton D.P. (1992). The Balanced Scorecard: Measures That Drive Performance. *Harvard Business Review*, 70 (1), 71-79.
12. Moreira, M. and Tjahjono, B. (2016). Applying performance measures to support decision-making in supply chain operations: a case of beverage industry. *International Journal of Production Research*, 54:8, 2345-2365.
13. Ratnasingam, P. (2009). Service quality management applying the balanced scorecard: an exploratory study. *International Journal of Commerce and Management*, 19 (2), 127-136.
14. Schulz, S.F. and Heigh, I. (2009). Logistics performance management in action within a humanitarian organization. *Management Research News*, 32 (11), 1038-1049.
15. Tatham, P. and Spens, K. (2008). The Developing Humanitarian Logistics Knowledge Management System - A Proposed Taxonomy. *Poms 19th Annual Conference*, La Jolla, California, May 9 – 12, USA.
16. Tuygun Toklu, A. and Toklu, I.T. (2014). İnsani Lojistik Sürecinde Örgütsel Performansın Geliştirilmesi: Kurumsal Performans Karnesi Yaklaşımı. [Improving Organisational Performance during Humanitarian Logistics: A Balanced Scorecard Approach]. *QUO VADIS: Social Sciences –Hopa International Social Sciences Conference*, Artvin Coruh University, Oct. 15-17, Hopa-Artvin, Turkey.
17. Van Wassenhove, L. N. (2006). Blackett Memorial Lecture - Humanitarian aid logistics: supply chain management in high gear. *Journal of the Operational Research Society*, 57(5), 475-489.