

Measuring humanitarian supply chain performance in a multi-goal context

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Abstract

Purpose – The purpose of the paper is to deepen the understanding of supply chain performance objectives in the humanitarian context by striving to understand the underlying goals and conceptual variables behind the measurement of performance, such as efficiency.

Design/methodology/approach – The research is an in-depth case study with one humanitarian organization. The data are gathered with mixed methods over a two-year period. Interviews were conducted in August 2010 and April 2012, and a survey conducted in October 2012.

Findings – Misalignments are detected among different groups in humanitarian operations and between their goals and processes. These misalignments could possibly be corrected through long-term thinking in short-term operations by considering sustainability aspects throughout humanitarian assistance, for example. In addition, efficiency was a commonly identified objective in the case organization, although the definition varied widely and extended beyond the traditional definition of productivity to include planning, accountability and quality.

Practical implications – Better communication and definition of terms is necessary to align goals and the power hierarchy in humanitarian supply chains, where operations seem to be structured more according to donor requirements than beneficiary needs.

Originality/value – This is an in-depth case study, applying goal-setting theory to study supply chain performance. The study further responds to the public “aid efficiency” discussion by striving to recognize how efficiency is understood and how it can be measured in a humanitarian supply chain.

Keywords Performance measurement, Humanitarian logistics, Humanitarian supply chain

Paper type Case study

Introduction

The guiding beliefs in humanitarian operations are that “those affected by disaster or conflict have a right to life with dignity and, therefore, a right to assistance; and second, that all possible steps should be taken to alleviate human suffering”. Furthermore, the goal of humanitarian organizations is to save lives (Beamon, 2004; Kovács and Spens, 2007), decrease human suffering (International Committee of the Red Cross (ICRC), 2010), and contribute to development (United Nations Development Programme (UNDP), 2013). In spite of this benevolent mission, the humanitarian response has been criticized for its lack of positive impact on societies receiving aid and more precisely, for the lack of aid effectiveness. At the core of the aid effectiveness discussion, researchers have found that humanitarian actions often operate under short-term goals, which can



potentially lead to unintended, negative long-term effects on societies. For instance, a negative impact can be seen in the form of market distortion and aid dependency, in harming the natural environment, or even prolonging conflict. Operating under the assumption that people who are suffering need help, while still realizing that humanitarian actions might lead to unintended, long-term adverse outcomes, the humanitarian community follows the concept of “do no harm,” with the idea that all operations, however short, should consider the long-term aid impact. Anderson extended this idea of “do no harm” to acknowledge that the manner of aid delivery and the operations behind it are instrumental in supporting or hindering larger societal developments.

A humanitarian action’s longevity is reviewed by several major donors (e.g. the US Agency for International Development (USAID) and the European Community Humanitarian Office) as a requirement of: first, a structured reflection on an action’s expected impact when an organization requests funds; and second, a rigorous monitoring and evaluation (M&E) process throughout a program’s activity cycle. In addition to these requests for considering long-term goals, such as the millennium development goals and the aim to “do no harm,” donors also require humanitarian operations to be efficient and transparent.

The aid effectiveness discussion has seemingly been incorporated at the operational level as an increased focus on cost and time efficiency; on the other hand, it is criticized, since this can lead to overlooking other considerations, such as equity (Balcik *et al.*, 2010) and sustainability (Haavisto and Kovács, 2012). However, efficiency should not be disregarded, since humanitarian organizations are also required to demonstrate efficient operations from the beneficiary side, especially when a rapid-onset disaster occurs, since operational efficiency can be vital and lead to saved lives (van Wassenhove, 2006). In addition to the beneficiary there are multiple actors, such as humanitarian organizations, donors, implementing partners, and local governments (Kovács and Spens, 2007) who are interested in the performance of humanitarian supply chains, both to understand how it can be improved and to gain knowledge of how the funds were used in the operations. Humanitarian organizations have also recognized that if supported by data, funding appeals are more likely to reach a wider audience; and they have started to value information based decision making, instead of anecdotal. The performance measurement of humanitarian activity can thus be in line with both humanitarian organizations’ and donors’ desire to improve the transparency of operations and preferably lead to a better level of accountability.

Similar to the practitioners, researchers have recently begun paying attention to humanitarian performance measurements, and several metrics have been developed to apply to the humanitarian context (Tatham and Hughes, 2011; Blecken *et al.*, 2009; Beamon and Balcik, 2008; de Brito *et al.*, 2007). According to Davidson (2006), performance measurement metrics are recommended to be aligned with organizational goals in order to push supply chains toward the right goals and thus improvement. However, Abidi *et al.* (2013) highlighted that one of the challenges in measuring performance in the humanitarian setting is a misfit between short-term operative goals and long-term strategic goals. Most challenges in developing and implementing humanitarian performance measurement are results of the complex operative environment, with limited ability and motivation of humanitarians to gather accurate data before saving lives, for example (Tatham and Hughes, 2011). Related challenges involve criticism that humanitarian actors only implement measurements of

the process and output, not the outcome or impact of humanitarian activities. Thus a broader scope is called for that not only considers processes when measuring performance but also both short- and long-term goals (Abidi *et al.*, 2013).

However, we know very little about the methods of defining goals and setting up performance measurement in humanitarian organizations. In spite of literature developing and defining performance measurement metric in the humanitarian setting there is a lack of empirical studies to explore how humanitarian organizations go about setting goals, supply chains strategies, and eventually how they measure their performance. This study strives to better understand how supply chain performance objectives can be developed and measured for humanitarian organizations through the following research question:

RQ1. How can supply chain performance be measured in a humanitarian context where operations simultaneously have multiple goals?

To investigate this question we conduct a longitudinal (two-year) case study to analyze and further develop a method for supply chain performance measurement in a humanitarian organization.

The structure of the paper is as follow: first, we present the core assumption of the study, the goals setting theory, assuming that organizations need to set goals and measure the work towards achieving the set goals to prosper and develop. Second, the three-phase research design is outlined. Third, the results are presented, starting with preliminary semi-structured interviews, followed by a structured survey. Finally, a method to develop performance measurement metric in a humanitarian organization is presented and discussed.

Goals and performance objectives in a humanitarian context

This study leans on the assumptions that: first, for an organization to prosper, goals needs to be set towards what the organization is to direct its achievements; and second, in order to know whether the organizations activities are moving towards the goals its actions needs to be measured. The assumption leans on the goals setting theory by Locke and Latham who stated that organizations should strive to set challenging, yet attainable, goals. The importance of setting goals and actions for organizations was originally theorized in the 1960s by Locke who stated that the performance of an organization is enhanced by setting (measurable) goals. According to Locke the definition of a goal was the aim of an action that one consciously desired to achieve or obtain. Goal-setting theory consequently suggests that a conscious goal will regulate behavior of organizations and individuals in organization. Goal-setting theory has been applied in the humanitarian sector by Duke and Long, for example, who strived to predict success in “achieving sustainable agricultural systems in developing communities.”

While goal-setting theory explains the relationship between goal-setting and performance, performance management strives to explain the relationship between goals and the strategic management of activities towards these goals (Lempinen, 2013). Performance management facilitates the creation of an organization’s strategic goals and supports the management toward those goals through measurement, among other activities. Performance management is in this study understood as a series of organizational processes and applications designed to execute organizational strategy (Ariyachandra and Frolick, 2008). The classical approach to strategy is that strategy aligns organizational “strengths” (competences and resources) with the environment

(opportunities and threats). Thus, strategy is viewed as a pattern or stream of decisions to make to be able to, as an organization, align with internal structures and processes as well as the environment.

In the 1980s, research began to criticize the view that one organization had one goal or strategy that fit a static environment. Research by Chakravarthy, Lawrence and Osborn described strategy as a process (of chance) in which the environmental and the organization needed to be matched on an on-going basis to cope with changes in demand. The view of strategy since the 1980s has been that several levels of goals exist in an organization. One primary goal enacts the environment and therefore defines the domain of the organization, and a secondary strategy helps the organization function in the defined domain. Perez-Franco came to the conclusion in their research that even though the supply chain strategy was articulated by a company, the policy and practices were not necessarily aligned with the strategy. They claim in their research that the articulation of the strategy is imperative for the strategy to “flicker down” to a tactical and operative level in the company following a top-down bottom up-view, assuming that to set measurable goals the goals and strategy need to be aligned with the activities and process in an organization (see Appendix 1).

Performance objectives in a humanitarian organization

The lack of performance measurement in humanitarian organizations has been recognized by both Davidson (2006) and Blecken (2010). In Blecken’s (2010) findings, only 20 percent of humanitarian organizations measure their performance consistently. Literature review by Abidi *et al.* (2013) identified the challenges for measuring the supply chain performance in a humanitarian setting as: difficulty of obtaining accurate data, limited information technology, chaotic environment, lack of motivation, potential negative media exposure, human resource issues, general reluctance, conflict between long-term vs short-term goals, and lack of internal recognition of the importance of supply chain management. Performance measurement in this study is defined as: a process of collecting, analyzing, and/or reporting information to manage the performance of an organization. Further, performance measurement is perceived as a set of metrics used to quantify the performance and as the reporting process that gives feedback on the outcome of the actions (based on Franco-Santos *et al.*, 2007).

Performance measurements for the humanitarian sector have been developed (Table I) where most frameworks (de Leeuw, 2010; Schulz and Heigh, 2009; Moe *et al.*, 2007) are based on the balanced score card introduced by Kaplan and Norton. However, Davidson (2006) saw the balanced score card unfit for the humanitarian sector due to the rigidity of the framework and the complexity of the humanitarian context. Common to most studies on performance measurement in the humanitarian context is the notion of efficiency (Abidi *et al.*, 2013; Santarelli *et al.*, 2015; Gralla *et al.*, 2014). Similar findings can be seen in Table I, where studies on performance measurement acknowledge efficiency either take a cost or time perspective (Beamon and Balcik, 2008; Blecken *et al.*, 2009; Davidson, 2006). If supply chain performance were to be defined in terms of how it is measured in the humanitarian sector, the most common meaning would be financial performance (Beamon, 1999) and time- and volume-related performance with indicators such as lead-time and fill rate. While performance could mean the final output and the impact on the society or the environment of the supply chain, this holistic perspective is not much considered in performance measurement of humanitarian supply chains (Haavisto and Kovács, 2012). Holguín-Veras *et al.* (2012) present the use of

Table I.
Proposed
humanitarian supply
chain performance
measures

Humanitarian supply chain performance measure	Author
Output	Beamon and Balcik (2008), Blecken <i>et al.</i> (2009)
Flexibility	Beamon and Balcik (2008)
Efficiency (resources)	Beamon and Balcik (2008), Blecken <i>et al.</i> (2009)
Cost	Blecken <i>et al.</i> (2009)
Service level (customer/beneficiary/donor)	Schulz and Heigh (2009), van der Laan <i>et al.</i> (2009), de Leeuw (2010)
Accuracy	Davidson (2006), van der laan <i>et al.</i> (2009)
Financial control and efficiency	Davidson (2006), Schulz and Heigh, 2009; de Leeuw (2010)
Process adherence	Schulz and Heigh (2009)
Time (e.g. donation-to-delivery)	Davidson (2006)
Coverage, equity	Davidson (2006), Balcik <i>et al.</i> (2010)
Utilization	Blecken <i>et al.</i> (2009)
Innovation and learning	Schulz and Heigh (2009), de Leeuw (2010)
Quality of life and well-being	Tatham and Hughes (2011)

the concept of social costs, i.e., the summation of the logistic and deprivation costs to be used in in humanitarian supply chain models. However, the broader concept of performance and the expectations of the performance are rarely discussed in humanitarian logistics literature. Research rather directly addresses questions on performance metrics (de Brito *et al.*, 2007; Beamon and Balcik, 2008; Blecken *et al.*, 2009). Performance measures in humanitarian settings have been suggested as the output, resources and flexibility (Beamon and Balcik, 2008) or as customer service, financial control and process adherence (Schulz and Heigh, 2009). Blecken *et al.* (2009) argued that in relief supply chains donation-to-delivery time, output and resources should be measured. Beamon and Balcik (2008) take into consideration the output along with population coverage or order fulfillment rate. More specifically, the actual measurements are suggested to be: order fulfillment cycle time, supply chain adaptability, asset accuracy, coverage rate, order fulfillment rate, on time delivery, cost efficiency, resource efficacy, and system utilization rate (Beamon and Balcik, 2008; Blecken *et al.*, 2009).

Davidson (2006) argued that performance metrics should be aligned with the organizations goals, and further stresses that the measurement system should push the supply chains toward the right goals, pursuing the idea that the performance that is being measured actually improves. de Leeuw (2010) focused on the learning perspectives of performance measurement, arguing that more attention should be paid to expanding skills and the implementation and use of humanitarian supply chain performance measurement as key for improving performance. Learning is, according to Caplice and Sheffi (1994), one of the main goals for measuring the performance. Organizations such as Oxfam, the Red Cross, and International Rescue Committee (IRC) have realized that measuring their supply chain performance is not only a necessity for the donor, but also lead to internal development International Rescue Committee (IRC), 2010). Furthermore, large donors such as USAID and ECHO require humanitarian organizations to report on their performance through a M&E process. However, the reporting can take up resources in the organization, and humanitarian organizations claim that heavy reporting requirements can counteract requirements for efficiency (IRC, 2010).

Research design: case study

Case study research, which allows for flexible data collection, is appropriate when studying managerial issues (Seuring, 2005). Case study research can be used to identify and describe critical variables (Stuart *et al.*, 2002), identify links between variables, test developed theories, and predict future outcomes or theory extension and refinement (McCarthy and Golicic, 2005). Case studies can contribute to an in-depth understanding of an emerging phenomenon, particularly when conducted as longitudinal studies (Eisenhardt, 1989) and when proper data validation takes place, e.g. in the form of triangulation of data (Meredith, 1993).

Since this study focuses on how humanitarian organizations define goals and set up performance measurement for logistics, which is a fairly unexplored research area (Beamon and Balcik, 2008), a case study was chosen as the research method. The case study was designed to be longitudinal to increase the understanding of the phenomena through concurrent nested design. Data were gathered over a two-year period. Initial interviews were held in August 2010, a second set of interviews was held in April 2012 (see Appendix 3), a survey was conducted in October 2012, and a verification discussion was held in May 2013. The data gathering methods are qualitative and quantitative; they comprise empirical data gathered through a survey in the last phase of the study (see Figure 1), thus implementing a concurrent nested design.

The mixed methods approach has a long history, particularly in the field of ethnography in which several data sources are commonly used in studies. A fairly wide consensus exists that mixing methods can strengthen a study. Quantitative and qualitative methods have critics, and studies mixing methods strive to use the best from both methods to eliminate weaknesses. Mixing methods can neutralize or cancel some drawbacks when a single method is used. Fielding and Fielding define mixed method research as involving a mix of quantitative and qualitative methods of data collection and analysis in one study. Arguments for using mixed methods include the validation, verification, complementing, development, initiation, and expanding of the research. Due to the different reasons for using mixed methods, the actual sequence of the methods used varies. When different methods are used in sequence, this is referred to as concurrent nested design, in which one design is predominant and the other method is complementary: “a quantitative strand/phase is embedded within a predominantly qualitative study (quan+QUAL) or vice versa (QUAN+qual)”. In this study, the mixed methods approach follows a concurrent nested design since the methods are applied in sequence and complement each other. This study sets out to generate knowledge of supply chain performance in a humanitarian context, but not to falsify or verify findings in studies through the use of several methods.

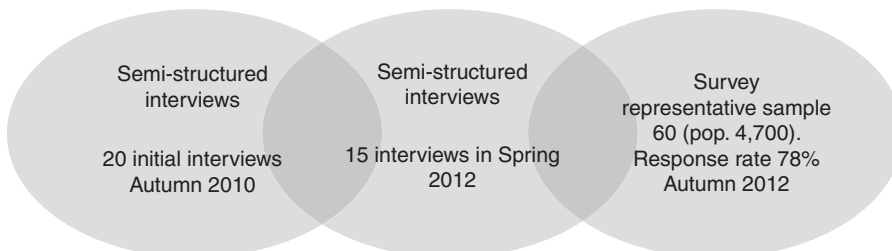


Figure 1.
The research process

The research process

The case organization is the IRC, a large-scale, international humanitarian organization that responds to humanitarian crises in over 40 countries. IRC states that their aim is to restore safety, dignity and hope, and to lead a way from harm to home. IRC focuses its operations on immediate relief but state that they stay in the field “as long as needed,” thus both operating with immediate relief and development aid. The organization faced challenges common to humanitarian organizations in designing, managing, and measuring their logistics processes.

The research began in the Autumn of 2010 when supply chain processes were identified, and 20 semi-structured initial interviews were conducted over Skype with managers and field staff. Ten of the interviewees were management staff at headquarters and ten were field staff ranging from the country director to warehouse manager. Further secondary data were analyzed, including an internal logistics survey conducted in 2009, previously mapped process charts, and supply chain manuals (procurement manual; inventory management manual; vehicle and equipment management manual; and asset, property and inventory management manual). In the second phase of the research, the organizational goal and the supply chain performance objectives were studied through content analysis of the organization’s annual report, analysis of internal documentation on strategy, and in-depth discussions with the core supply chain group and 15 semi-structured interviews over Skype with IRC staff (held between February and May 2012). Semi-structured interviews were chosen to remind the respondents of the topic while providing latitude for the responses. While unstructured interviews are often in-depth and the interviewer adheres to a script in structured interviews, semi-structured interviews are a mix of these two approaches (Fisher, 2010). The semi-structured interviews also include some characteristics of the critical incident approach, in which respondents are asked to think of a particular situation (Fisher, 2010).

The data were furthermore triangulated with a third data gathering phase (see Figure 1) in the form of a survey. The survey was structured based on findings from interviews in phases 1 and 2. As a data gathering method, surveys are a structured form of data collection (Fisher, 2010; Saunders *et al.*, 2003). The survey was used to verify initial findings from the interviews and the process mapping and to validate data through triangulation. It focused on findings regarding the organizational process, the supply chain strategy, and the performance objectives. The survey was designed with structured questions (tick the box), rankings, and open-ended questions, in which the respondents could write freely. The survey sample was representative comprising 60 field staff members in the case organization from a population (IRC field staff) of 4,700. The overall response rate was 78 percent (47 responses) of which the usable responses per question fluctuated between 19 (31 percent) and 32 (53 percent). Out of the 32 responses that could be analyzed, 11 respondents stated that they were part of the supply chain department in the organization, while 21 stated that they were in another department (grants, finance, or programs).

IRC supply chain performance objectives

Unlike most companies (Perez-Franco, 2010; Harrison and New, 1999), IRC actually has an articulated supply chain performance objective and strategy. The supply chain strategy was developed and articulated in Autumn 2011 and launched throughout the organization thereafter. The organization’s supply chain strategy had been in place for five months before the interviews in Spring 2012 were conducted. The supply chain

strategy states that the IRC supply chain should be “efficient,” innovative’ and “integrated.” Therefore, the study considered not only the organizational structure and strategy but also the humanitarian context when examining performance and performance objectives. The study followed a top-down/bottom-up approach (see Appendix 1), in which the structure in the organization was first identified through process mapping, and the goals and strategies were then identified through semi-structured interviews (Appendix 2). The interviewees were first asked to state in their own words the overall strategy of IRC (the goal) and then to state what their expectations of IRC’s supply chain performance. Further, the interviewed were requested to state examples of IRC supply chain success and failure. They were in addition shown a picture with IRC’s new supply chain strategy and asked to describe each theme in the strategy. Further, the interviewees were asked to state other important themes that were not articulated in the supply chain strategy but should nevertheless be recognized. The understandings based on the interviews appeared fairly unified. The most commonly used definitions of the strategy articulations were efficiency, integration, innovation, and other strategy themes mentioned where quality, accountability, and reliably.

The supply chain strategy themes for the case organization differ to some extent from the themes raised in supply chain literature, such as responsiveness and efficiency (Chase *et al.*, 2001), efficiency and flexibility (Russell and Taylor, 2003), cost reduction (Ballou, 2004), and integration. The common denominator is efficiency. All interviewed agreed that efficiency is an important objective of the supply chain.

Interestingly, interviewees defined efficiency very differently. As expected, traditional definitions regarding productivity were stated: “Efficiency is using your resources as effectively as possible, to get the most outcome with the input in terms of money/staff/time. Get more done with the resources you have” (GSC staff, 2012). Time was commonly included in definitions of efficiency: “Being efficient is carrying out things in a manner where they’re done in a time sensitive and cost effective way” (Roving Logistics coordinator, 2012); “Most important is time, and timely actually delivery is key element” (Financial controller, 2012).

However, definitions of efficiency in the case organization extend much beyond productivity. Some included an element of planning: “Efficiency comes from planning, I mean you can’t be efficient without planning and so that’s our focus that’s why we’re focusing on planning so heavily” (GSC staff, 2012). “Efficiency [...] I think of [...] planning, [...] in South Sudan where always fire fighting and if we can get ahead and be more forward thinking and planning oriented that would be, that would make everyone’s life easier [...] I actually say efficiency is about planning and communication” (Director for Programs, 2012).

Efficiency also included the notion of accountability: “To me efficient in this case means that we deliver what we promise at the lowest cost possible and that we do so in a way that is accountable to those who are giving us the money and those who are receiving our services” (Regional director, 2012).

Interviewees also associated efficiency with quality: “I see is efficiency it looks like it is much related in terms of the function of supply chains, throughout the process of the product or the service from the point of production up to the point of consumption so efficiency comes throughout the whole process you use, in another words it is quality, you get a very good quality of a product a service that has been delivered through a very good quality process” (GSC staff, 2012); “To me it’s looking at how things are done and efficiency is how you process something in an effective way. If you look at how

many times do you have to do something vs doing it once or doing it right the first time” (GSC staff, 2012).

For some, efficiency was difficult to define: “Well, being efficient is that everyone has what they want when they want it, that’s to me efficiency, but how do we measure efficiency? Because with every scenario there will be a left or right hand turn, so it’s related to the perception of efficiency, what you class as efficiency may be very different to what I class as efficiency” (GSC staff, 2012).

Additional themes presented as important performance objectives were quality, accountability and reliability. These objectives were seen as equally important to efficiency. Reliability was further viewed as important in the sense that the supply chain should function as expected; a “slow” supply chain could be acceptable if it is expected.

The findings from the interviews were verified in the survey in the second data-gathering phase (Autumn, 2012) of the study. The survey was based on previously identified humanitarian supply chain performance objectives (see Table I) and the previous interviews. It sought to further understand the prioritization of performance objectives in the case organization. The respondents were asked to rank performance objectives, chosen based on the interviews conducted in Spring 2012. The full text for each performance objective option is listed in Appendix 5.

The survey was targeted both towards personnel functioning under the supply chain umbrella (SC Rank) working with operational processes such as: procurement, fleet management, transportation and delivery, warehouse and inventory management, asset management and internal reporting. It also included staff functioning under the finance, grants, or program umbrella (Other Rank). Program staff members are responsible for needs assessment, program planning, program delivery (including final distribution), coordination with implementing partners and other stakeholders, and program M&E (IRC manuals, 2012). The results are grouped accordingly as supply chain (SC) and other.

Respondents were asked to given an ordinal rank to their top five objectives from the list of 12 options. We scored the responses as follows: 1 = 50, 2 = 40, 3 = 30, 4 = 20, 5 = 10, not ranked = 0. We normalized the SC and Other Score for each objective by dividing by the number of respondents (10 SC, 14 Other). The score, and ordinal ranking, for each objective is given in Table II.

Table II.
Ranking of supply
chain objectives
by IRC survey
respondents

	SC Rank	Other Rank	SC Score	Other Score
Quality of supply chain process	1	7	25	11
Quality of delivered services and products	2	3	23	19
Transparency of supply chain	3	11	17	3
Reliability of supply chain	4	4	16	16
Good communication – cross-department	4	5	16	14
Effectiveness	6	2	15	22
Cost efficiency	7	9	10	9
Accountability to beneficiary	7	5	10	14
Accountability to donor	9	8	7	9
Good communication – SC internal	10	10	4	6
Constant development	10	12	4	1
Time efficiency	12	1	3	26

Both groups prioritize quality of delivered services and products. The supply chain group is more concerned with the quality and accuracy of supply chain process than the rest of the organization. Objectives such as reliability, good communication, and transparency (for SC at least) rank higher than the more traditional supply chain performance objective of cost efficiency. Interestingly, the program staff and others rank time efficiency as their highest priority, while the supply chain group ranked it lowest. This finding of radical differences in views on performance objectives support findings by Jahre and Heigh (2008), who also stated that closer internal collaboration between operational program staff is needed.

The respondents were further asked to give examples of what a high quality and an efficient supply chain looks like, with the following question: "In your opinion, what would having a high quality supply chain look like for IRC? What outcomes or outputs would indicate a high quality supply chain?" The open-ended questions in the survey were voluntary to answer; thus, this question only received 15 responses. They are presented here as examples on how field staff in the case organization view quality in the supply chain. Two respondents defined a high-quality supply chain through communication and information sharing among different actors and functions in the supply chain. One respondent defined quality as a combination of various objectives: "delivering quality services and goods in right quantity, time, place with efficiency and along with donor compliance" (Supply chain staff, IRC survey, 2012). Another respondent included the aspect of supply and service quality in the definition: "Items delivered on time or within a margin that is reasonable; staff communicates well and effectively with other teams; items that are procured are high quality or similar to what was requested" (Non-supply chain staff, IRC survey 2012). The respondents were further asked to state examples of how supply chain quality could be measured. The most common suggestion was lead-time, but also measurement such as "spot-checks on correct documentation" and accuracy of order and supplies delivered (see Appendix 4 for all responses).

The same questions were posed to the respondents on what an efficient supply chain look like. Several of the respondents answered "same as in previous question," referring the question about a high-quality supply chain. The 14 respondents that did answer stated that an efficient supply chain would be related to time, with responses such as: "quick turnaround time between request and arrival of goods/services" and "timely delivery of goods" (IRC, non-supply chain staff, 2012). Others related efficiency to process efficiency through IT-tools and integration by stating that: "I believe that the supply system should be an online system that one can push approvals through without requiring printing of procurement requests. Additionally, I think any supply chain system should link to our finance/accounting system directly. Lessening the time spent and increasing the accuracy of data" (IRC, non-supply chain staff, 2012). Furthermore, efficiency was, as in the semi-structured interviews, linked to planning activities: "Efficient participation in needs assessment conduction in identifying of target population needs" (Supply chain staff, 2012).

IRC supply chain performance measurement

We now consider how to measure the supply chain performance in the case organization. The semi-structured interviews in the first phase of data gathering further posed a question of "What information do you miss that would support you in decision making?" The same question was asked as an open-ended question in the survey in the second phase of the data gathering. The optional survey question

resulted in 20 respondents. Out of these, five could not specify information they missed or needed. The ones who did reply had varying answers. Some supply chain staff respondents requested access to program-specific data, such as budget lines, program plans, and more detailed information about grants. Supply chain staff also specified a need for market data, such as information on the availability of local suppliers. Furthermore, lead-time data and exact timelines were requested by such staff that defined themselves as non-supply chain staff, but also supply chains staff requested information about expected lead times on international procurements.

Armistead *et al.* (1999) argued that performance measurement should be derived from performance objectives and from strategy and that performance measures are a basis for improvement. Performance measurements can both be describing process results from the past and the present, and they can be used to set performance goals (Blecken *et al.*, 2009). They can furthermore allow for a simplified view of complex structures and can be formulated by consolidating quantitative or qualitative information (Armistead *et al.*, 1999). Performance measurement can be designed to either measure the performance of a whole organization or a single department, unit (Blecken *et al.*, 2009) or function.

Table III shows the performance objectives for the case organization. Such performance objectives that could be extracted from the data, either as an articulated strategy theme or as an important performance objective mentioned in the interviews or in the survey, were: quality, accountability, transparency, reliability, and integration (defined as communication). The emergency director of IRC suggested the following measurements to measure IRC supply chain performance: “The time it takes to procure

Performance objectives sub-processes	Efficiency KPI	Quality KPI	Reliability KPI	Accountability KPI
Process procurement orders	Process lead-time/benchmark	% procurement request with mistakes; estimated/actual	% procurement requests with confirmed estimated arrival date	Segregation of duties
Inventory management (the stored supplies)	Warehouse fill rate/ warehouse turnover	Warehouse spot-checks conducted; % supplies close to end date	% orders not met on time; no. inventory after grant (or program) close	% of spot-checks with dif.; value of dif. in spot-checks
Conduct market surveys and find potential suppliers	% of supplies with existing pricelist	% of suppliers with due diligence/ anti-terrorism compliance	No. of updates in supplier lists/ (month/year)	No. of suppliers with due diligence/ ATC
Control the quality of the supplies delivered	value of non “usable” supplies or assets	% of complaints, returns		Beneficiary “satisfaction”
Maintenance of fleet and other assets	% of serviceable fleet	% of serviceable fleet; no. of accidents	Availability of fleet	% of reuse of fleet in other programs
General Supply Chain	SC cost (inc. personnel)/total program cost; Process lead-time	Perfect order rate (% of complaints/ returns)	% orders met on time (e.g. with 1-5 days margin)	Internal audit (better than last time or regional benchmark)

Table III.
A method of alignment to define performance measurement for a humanitarian organization with multiple goals

something, that length of time it takes to release that from our warehouse, the frequency with which we lose stuff in the warehouse, or get damaged, the reliability of our record keeping to make sure that we can account for stuff that come to the fields, the amount of time the cars spend off the road, all those metrics we are using in the supply chain when they do it well, the staff gets reposted” (Emergency director, 2012).

Performance measurements or particular key performance indicators (KPIs) for the case organization were extracted from the results of aligning the main supply chain processes with the performance objectives. The data were extracted from the results of the survey conducted in phase 2. Main activities and important supply chain performance objectives were combined into a performance and process table (see Table III). The table entails suggestions, for example for how the sub-process of warehousing could be measured when the objective is to be innovative, integrated, and/or efficient? In Table III, the performance measurements currently in use can be seen through a strategy and process alignment lens.

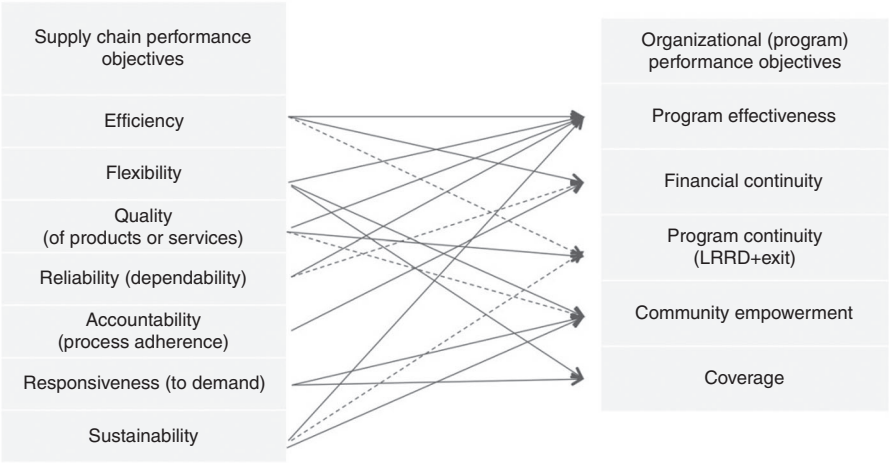
The suggestions in Table III add to the literature of performance measurement in humanitarian supply chains (Schulz and Heigh, 2009; van der Laan *et al.*, 2009; de Leeuw, 2010; Beamon and Balcik, 2008; Blecken *et al.*, 2009; Davidson, 2006), with performance objectives of reliability, quality and accountability, and suggestions that these be measured though, for example “orders met on time,” “perfect order rate” and “beneficiary satisfaction” or “segregation of duties.”

Discussion

As the findings in the case study point out, the ultimate measure of humanitarian assistance would be indicators that connect the operational performance with the goals of the organization, the goals of the operations and with the actual impact of operations. For example, such indicators could measure the quality of the operations that have a direct link to accountability and impact. If the operations are performed using a high-quality process, few mistakes will be made; thus, the outcome will be higher. Other goals that would link short- and long-term goals, particularly in emergency aid, would be indicators measuring equity and coverage. Another such measurement would be sustainability measurement, which is a direct link between short- and long-term goals. This shift from long-term gains (e.g. quality, accountability, and sustainability), ranking high in the organizational hierarchy, to more short-term gains in the actual processes in the supply chain can lead to prioritization difficulties in decision making. The long-term focus on strategy and short-term focus on the processes are common in the commercial sector as well, but should perhaps not be as evident in nonprofit organizations driven by missions such as development (UNDP, 2013), saving lives (Beamon, 2004; Kovács and Spens, 2007), and decreasing human suffering (ICRC, 2010).

Figure 2 portrays how different examples of operational performance objectives support examples of organizational and program goals. The arrows in Figure 2 indicate direct alignments (harmonization and support), and the dotted lines show indirect support. It demonstrates that when efficiency is defined as cost or time efficiency, it can directly support an overall organizational goal such as program effectiveness and financial continuity. Flexibility can directly support program effectiveness, community empowerment, and coverage. Flexible supply chains can be viewed as supporting community empowerment; if the supply chain is decentralized and adaptable to change, it can take local requirements into consideration and empower the local population. It also supports coverage, since in an adaptable supply chain, changes in

Figure 2.
Example of
alignment of supply
chain and
organizational
performance
objectives



modes of transportation, distribution points, and timetables can be made to direct resources more easily than to beneficiaries' locations and improve access to the services and supplies.

The quality of supplies or services can directly support program effectiveness and continuity, since a high-quality supply or service (e.g. durable construction material or professional teachers) enhances the longevity of the program's outcome and could hasten the ability to turn over the program to the local community. The aspect of accountability, here used as process adherence and control in a supply chain, can directly support financial continuity, since it is a requirement by donors; however, accountability can indirectly support all other objectives as well. Responsiveness, particularly demand responsiveness, supports community empowerment. This support can be found if the supply chain is responsive in a manner that includes aspects of decision postponement and the determination of the "real need" of the local community, including its empowerment to participate in decision making. Furthermore, responsiveness can lead to enhanced coverage if the supply chain targets the "real" need and not a forecasted demand. Sustainability as a final supply chain objective can lead to program effectiveness, while an unsustainable supply chain may have the opposite effect on the program outcome. A supply chain that neglects sustainability aspects can do harm in the communities where it operates. An example of this was identified in Afghanistan, where water was distributed to beneficiaries in small bottles (IRC, 2012); in a society without any disposal system, this led to a new problem of empty bottles collecting as waste. Sustainable supply chains can also lead directly to community empowerment through local, small-scale activities such as procurement.

Supporting Fisher's (1997) argument that efficient supply chains "match" stable demand, efficient supply chains here are suggested to align with stable supply markets and predictable demand (Figure 3). On the other hand, flexible supply chains support performance in unstable supply markets where adaptability in procurement processes could be necessary, for example. The procurement processes identified in the case organization were found to be the most inflexible; part of the procurement was conducted centrally, and the local procurement was fairly heavily controlled through due diligence and anti-terrorism compliance checks, for instance. Flexible supply chains could also

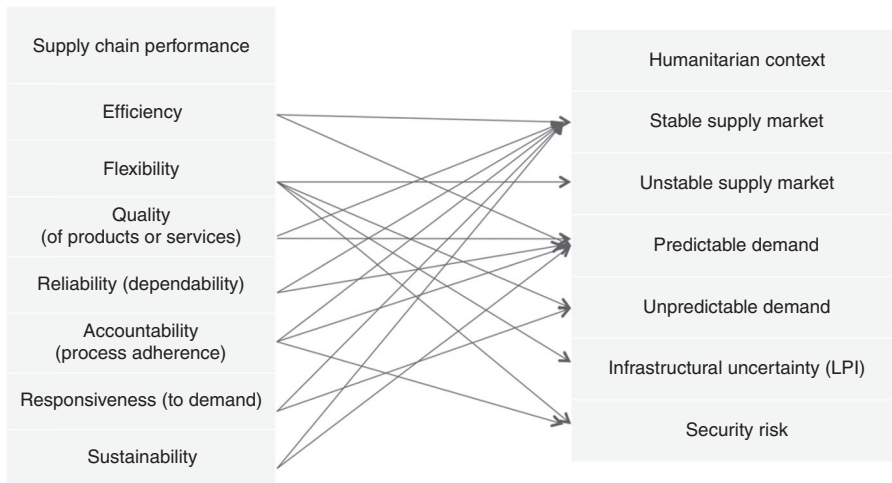


Figure 3.
Example of
alignment of
supply chain
performance
objective and
complex
humanitarian
context

support unpredictable demand and infrastructure uncertainty and could be better suited to cope with risky security situations. A reliable supply chain could support operations in a stable supply market with predictable demand. Accountability, here understood from a supply chain perspective as process adherence and transparency, could support performance in a fairly stable environment but not in an environment with an unstable supply or unpredictable demand, infrastructural uncertainty, or security risk. This is because process adherence requires planning, centralization, or standardization to some extent, which does not work well if sudden changes need to be made.

The first goal of accountability is not stated in the goals for humanitarian assistance but was found as an important aspect in the interviews. The other goal involves cost and time efficiency. Cost efficiency as a strategy particularly requires a light administrative body that contradicts the accountability requirements. Humanitarian organizations document their own performance in their annual reports by providing the percentages of their budgets used for administrative costs. The funding structure thus seems to lead organizations toward a higher focus on accountability to the donors, as well as on efficiency, without considering how other goals are counteracted. This finding supports the study on equity by Balcik *et al.* (2010), which argued that an increased focus on efficiency can lead to overlooking other goals. Both the goals of efficiency and accountability in operations can counteract the overall social mission of humanitarian activity, since other aspects such as equity, quality, and sustainability might be de-prioritized.

Limitations

The weaknesses in goal-setting theory were pointed out by Latham, who argued that the enhanced performance outcome could not be achieved if two or several goals were set at the same time, since a focus on one goal could lead to difficulties in achieving another. According to Latham trade-offs between goals can include trade-offs between quantity vs quality.

What further needs to be noted is that, performance measurements ought not to be thought of as static measures that are in place long term after having been implemented. However, the purpose of measuring performance for the case

organization in this study was stated as the ability to base decisions on data, not anecdotal evidence (IRC, GSC, 2013), and to provide access to shared knowledge across the supply chain. The purpose from the case organizations side of measuring the performance, agrees with initial findings by studies (Brynjolfsson *et al.*, 2011; Lempinen, 2013), which show that data-driven decision making actually improves the performance.

Conclusion

This study found that organizational goals can be misaligned. The overall goals of humanitarian assistance are to save lives (Beamon, 2004; Kovács and Spens, 2007), decrease human suffering (ICRC, 2010), and contribute to development (UNDP, 2013). Program-specific goals seem to be related to program effectiveness and the delivery of supplies and services. Humanitarian supply chain performance objectives are focused on efficiency, quality, flexibility (adaptability to change), but further focus on accountability (process adherence and transparency), reliability, responsiveness (to demand), and sustainability is suggested. Sustainability is a supply chain performance objective that can serve as a mediator between different levels of goals and actors, since it pre-imposes long-term thinking. Misalignment among goals can occur, for example, when accountability and efficiency goals are imposed in a humanitarian context characterized by unstable supply markets, uncertain demand, infrastructural uncertainty, and security risks. The misalignments are identified to originate from conflicting goals set and imposed by donors on their implementing partners, the humanitarian organizations.

Further studies could analyze performance objectives and their role in supply chain decision making. Research on performance measurement again could, in further studies, focus on the actual implementation of performance measurement as also suggested by Gopal and Thakkar. Furthermore, research could be conducted on what sort of information is needed to support decision making at all levels in organizations. Particularly in supply chains it would be beneficial to explore quantitative on-going performance measures or other forms of presentation are most supportive. Finally, the link between supply chain performance objectives and the organization goal and humanitarian mission should be further analyzed.

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Appendix 1

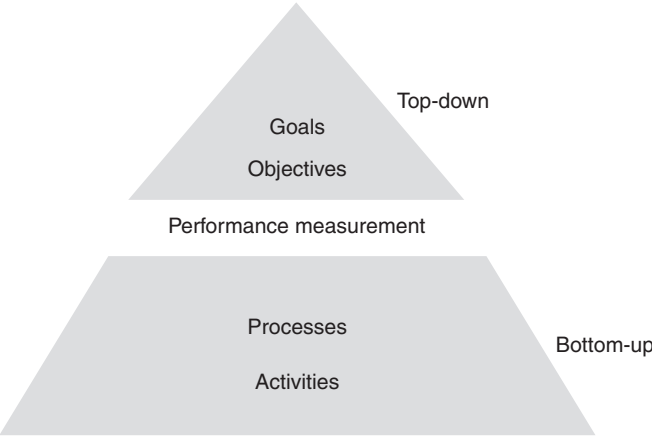


Figure A1.
Top-down/bottom-up
approach

Appendix 2

Phase 1 face-to-face discussions and Skype interviews Conducted in June, 2010

Discussions with IRC Head quarter's personnel, New York, USA

Deputy vice president, field operations

Field operations technical advisor

Director of field operations

Deputy vice president, global procurement

Manager, global procurement

Financial director

Global grants and contracts unit

Global grants and contracts unit

Internal audit unit

Director, emergency response

Phase 1 Skype interviews with IRC field staff

Deputy regional director of operations – Horn and East of Africa

Interim country director, Uganda

TA/environmental health

Deputy director of operations – Burundi and Rwanda

Procurement officer – Sierra Leone

Supply chain manager, Haiti

Procurement officer, Uganda

Logistics manager, Kinshasa

Transport officer, Uganda

Operations and logistics advisor

Phase 2 Skype interviews with HQ and field staff conducted in March, 2012

Director emergency response, HQ

Deputy director, global supply chain (GSC), HQ

Roving logistics coordinator, South Sudan

Deputy vice president, global supply chain (GSC), HQ

Deputy director programs, South Sudan

Advisor, global supply chain (GSC), HQ

Internal audit, HQ

Senior director global supply chain (GSC), HQ

Deputy regional director operations WAGYL region

Deputy director of operations, Afghanistan

Financial controller for Haiti and Côte d'Ivoire

Table AI.
IRC interviewees

Appendix 3. Interview guide for semi-structured interviews Spring 2012

(A) Background

What is your role at IRC?

Where are you currently posted?

How long have you been working in the humanitarian sector?

(B) Opinion on irc supply chain

What would you say is the overall objective of IRCs operations?

What would you say is the goal of the supply chain (logistics) in IRC?

What do you think is good about the IRC supply chain (supply chain design/logistics functions) at the moment?

Do you have an example on when the supply chain has been performing well?
What do you think is “not that good” about the supply chain?
Do you have an example of when the supply chain has been performing badly?
How would you like to change the supply chain (the setup of the logistics activities)?

(C) Other opinions on supply chain performance

How do you think that the expectations of the IRC supply chain performance vary across the organization?
What do you think are the donors’ expectations of IRC supply chain?
What do you think are the beneficiary expectations of IRC operations?

(D) Measuring the supply chain performance

What sort of information do you need to take decisions in your work?
What sort of information would you need to be able to plan?
How would you like to see the field operations be measured and monitored (from H&Q)?
How would you like to see the field operations be measured and monitored by the donors?

(E) IRC supply chain strategy

What are your opinions on the IRC supply chain strategy? (look at Figure 2)
How would you say that the strategy of efficiency is implemented in the IRC supply chain/ IRC operations?
What other supply chain performance objectives are there?
What do you think is the most important objective, the least important?

Appendix 4. Responses

How could supply chain quality be measured?	How could an efficient supply chain be measured?
Post-project monitoring and evaluation	Good quality impact of implemented project
Lead times (mentioned by 7 respondents)	Time it takes to receive goods/services
Timeliness of deliveries	Speed
Through procurement tracking	Through procurement tracking
Procurement	Reliability
Reliability	Lead-time (mentioned by 4 respondents)
How does cost (of supply/service) paid by IRC relate to "market cost"	Quality of goods/services procured (mentioned by 2 respondents)
Value of materials purchased and their quality	IRC and donor compliance
Quality of products for end user	Correctness of orders placed
How often supply chain share warehouse reports	A to Z transparency for staff, donors, and beneficiaries
IRC policy and donor compliance	Transparency
Efficiency and effectiveness	Quality (mentioned by 2 respondents)
How does cost (of supply/service) paid by IRC relate to "market cost"	Ensuring that quality and cost effective services and products get to the beneficiaries
Follow up on procurement requests	Data accuracy
IRC policy and donor compliance	Cost effectiveness
Consistency	Accountability
How quickly logistics (SC) notify requestors on arrival of their materials in warehouse	
Updated asset reports and replacement plans	
For IT-related activities, supporting internet services and regular IT technician training staff on basic computer handling skills, e.g. virus scanning/ reporting, data back-up, etc.	
Getting the job done/service	
Accountability	
Post-distribution monitoring to capture beneficiary satisfaction with the quality of items distributed	

Table AII.
Responses to
questions 10 and
11 in IRC
survey conducted
Autumn 2012

Appendix 5. Performance objective options for survey

- quality and accuracy of supply chain process (tasks are conducted as stated in the manual and with good quality);
- quality (of delivered services or products);
- transparency of supply chain process (the way activities are conducted is visible for others);
- reliability of supply chain (tasks are conducted as expected);
- good communication between supply chain (logistics) and other departments (such as program or finance);
- effectiveness (within expected time and budget);
- cost efficiency (as cheap as possible);

- accountability towards beneficiary;
- accountability towards donor;
- good communication between supply chain (logistics) staff;
- constant development (of IRC supply chain/all logistics activities); and
- time efficiency (as quick as possible).

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