



## LEAN AND AGILE PARADIGMS IN HUMANITARIAN ORGANIZATIONS' LOGISTICS AND SUPPLY CHAIN MANAGEMENT

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**ABSTRACT. Background:** Humanitarian organizations (HOs) have funding constraints, and pressure from donors and other stakeholders, on matters of accountability, transparency and efficient utilization of resources. Humanitarian organizations need to learn from the business sector and adopt strategies to address and resolve issues of inefficiency in resource consumption. In the HO sector, logistics and supply chain management is a critical area which consumes more than 80% of total relief budgets and therefore needs to be handled both effectively and efficiently. An integrated Lean and Agile management model, which has been successfully implemented in the business sector to achieve effective and efficient utilization of resources, is one strategy proposed for implementation by humanitarian organizations. To that end, this study carries out the important initial work of defining the boundaries between Lean and Agile operations in Humanitarian Organization Supply Chains in order to build a model that increases both effectiveness and efficiency.

**Methods:** The Lean & Agile Decoupling Point (LADP) model has been developed after researching the scope and thematic areas of 88 international humanitarian organizations. Seven humanitarian logistics and supply chain management (HL-SCM) professionals were interviewed at length to accurately identify key processes and establish optimal decoupling points in accordance with the priority and scope of each thematic area.

**Results:** Of the 88 HOs researched, 79 were doing both developmental and emergency work, so the LADP model is designed for such dual-purpose organizations. The LADP model is built on a flowchart for handling key processes, divided between developmental and emergency operations. Optimal decoupling points are identified starting from an organization's broad scope and extending to the details of HL-SCM. The model accurately reflects the experience and recommendations of the seven HL-SCM professionals consulted and is applicable to a wide variety of HOs.

**Conclusions:** The LADP model provides the critical groundwork that can renew and strengthen HO operations, leading to reliability in which donors, beneficiaries and other stakeholders will have confidence. This study is another step forward toward sustainable resource consumption that will save lives and serve disaster-affected people more effectively and efficiently.

**Key words:** Humanitarian Logistics and Supply Chain Management (HL-SCM); Lean and Agile boundaries, Lean and Agile Decoupling Point (LADP) Model, Efficiency and Effectiveness.

### INTRODUCTION

Historically, provision of humanitarian services was closely associated with the political situation in the recipient country, with humanitarian services being provided more as 'vote catchers' than systematic provision of services. These services evolved into systematized Humanitarian Organizations (HOs) and eventually transformed into a formal professional humanitarian services

industry [Davies 2014]. The primary goal of HOs has been to serve deprived and deserving community without any profitable motives [Doyle, Gorman, Mihalkanin 2016, Vojvodic, Dujak, Plazibat 2015]. HOs are recognized as professional bodies with disaster management skills and often extensive supply chain networks [Vojvodic et al. 2015]. The most crucial part of an HO's operations is logistics and supply chain management which utilizes 80% of an HO's budget [Van Wassenhove 2006a].

Humanitarian Logistics and Supply Chain Management (HL-SCM) operations involve the processes of procurement of resources and goods, the curating and safe keeping of these goods, and the proper, efficient, effective and timely supply of these goods and services as and when required [Cozzolino 2012]. Supply chain management is a process of integration of departments, institutions, and stakeholders (government, donors, vendors and community) to meet the vulnerable and affected community's requirements, whereas, humanitarian logistics management includes the processes of planning, implementing, and controlling of the flow and storage of goods, materials, and information in an efficient and cost-effective manner from point of origin to point of consumption [Van Wassenhove 2006b].

The sudden onset of an emergency or disaster is the defining characteristic of the humanitarian logistics and supply chain problems faced by HOs but are not usually relevant to the long-term developmental operations of humanitarian organizations. With globalization, HOs have extended their services internationally and their operations scope have been expanded from disasters management relief services (food, shelter, health, etc.) to long-term developmental operations such as reconstruction and social development by the provision of education, infrastructure construction, and social and political awareness and capacity building programs. HOs long-term operations have very similar characteristics as are found in commercial and business organizations, with the significant exception of manufacturing operations that are not usually part of HOs operations. Like any organization, commercial, governmental or otherwise, humanitarian organizations are always under pressure to maximize their performance and to deliver the best results to justify and maintain their funding. Pressures come from various stakeholders, including donor agencies, government organizations', communities and business investors [Cairns 2005] who must be confident that their funds are spent efficiently and in a transparent and accountable manner [ChangeUp 2004, Eisinger 2002, Paton 2003, Wing 2004], and who must also be assured that the organizations which have tax exempt status

are utilizing their resources conscientiously [Commission 1996, Hoefler 2000]. HOs need to adopt optimal solutions and strategies for efficient resource utilization in line with business organizations, without compromising the HOs vital role [Blumenthal 2003, Cairns 2005, Murray 2015], being to provide services to more target groups with the utilization of fewer resources such as the effective management of costs and time.

According to Drew et al., [2016] both Lean and Agile management have proven to be successful approaches for businesses with significant improvements in profits, cash flow, customer satisfaction, and market share as a result [Drew, McCallum, Roggenhofer 2016]. Evidence for this supposition can be seen in several cases of successful businesses which have adopted Lean and Agile management techniques, e.g. Hewlett-Packard, Toyota, Zara fashion design and World Vision [Christopher, Towill 2001, Parris 2013]. There seems to be no reason to suggest that applying both Lean and Agile management techniques to HOs will be any less beneficial in the management of cost and time by reducing waste, increasing customer value and improving overall financial and production capacity of the HO, a position supported in [Cozzolino, Rossi, Conforti 2012, Oloruntoba, Kovács 2015] who suggest that, notwithstanding that Lean and Agile are different approaches, with clearly identified boundaries between the two paradigms, both can be applied to the same HL-SCM operations, in both disaster emergency relief operations and on-going developmental operations, projects and aid administration. The boundary between these is the point where the application of one paradigm, Lean or Agile, ends, and the other starts, which we have designated as the decoupling point, and have developed into the Lean and Agile Decoupling Point (LADP) Model. An important observation is that, while the existing studies present the Lean and Agile paradigms focusing on disaster management [Cozzolino et al. 2012, Oloruntoba, Gray 2006], the developmental operations of HOs remain largely ignored.

Given this discrepancy in the research, the purpose of this study was to develop an

integrated Lean and Agile Management Paradigm framework based on the common elements found in the separate paradigms that would be applicable to both the emergency and the developmental operations of HL-SCM. The integrated framework was developed by identifying and prioritizing the HL-SCM processes and thematic areas. The HO thematic areas indicate the products (services, goods, and works) which are being offered by the HO for humanitarian reasons, such as education, health, livelihood support, disaster management, human rights recognition, women's empowerment, old age rights, child care, sustainability and poverty reduction. Organizational thematic areas were explored using the information provided on the websites of international humanitarian organizations. HL-SCM processes were identified and were optimized for LDAP model by interviews of HO professionals. The Lean and Agility paradigms, the decoupling points, are defined in broad terms, and then detailed, through two matrix models and the Lean and Agility Decoupling Point (LADP) model. The Lean and Agility framework that has been developed in our study will improve the effectiveness and efficiency of HL-SCM's resource utilization.

## LITERATURE REVIEW

Humanitarian organizations (HOs) are different from private and public sector organizations inasmuch as they act autonomously, meaning that they do not need to seek government support or have economic power. As well, the nature of their workforce, which is usually and predominantly volunteer, rather than being attracted by remuneration, or being coerced, is an employment model different to private and public sector organizations.

In our literature review, we sought and identified information on the various aspects of interest, relevant to HO operations, to develop our LADP model these include:

- Humanitarian logistics and supply chain management (HL-SCM),
- Difference between Developmental, emergency, and business logistics & supply chain,
- Efficiency in humanitarian logistics and supply chain management,
- Effectiveness in humanitarian logistics and supply chain management,
- Lean management in humanitarian logistics and supply chain management,
- Agility management in humanitarian logistics and supply chain management,
- Leagility in humanitarian logistics and supply chain management,
- Decoupling models in humanitarian logistics and supply chain management.

### **Humanitarian logistics and supply chain management (HL-SCM)**

Logistics and supply chain management is the backbone of humanitarian organizations' operations, which includes the processes of planning, implementing and controlling the efficient and cost-effective flow of goods, services, and information, and as well as the storage of goods, materials, and equipment from point of origin to point of consumption, sufficient to meet the beneficiaries' requirements [Vojvodic et al. 2015]. Humanitarian supply chain management includes the establishment of an integrated network of relationships among different actors e.g. suppliers, government, military, partner organizations and community, for the efficient and effective delivery of goods and services [Vojvodic et al. 2015].

Specifically, logistics is focused on moving something or someone from a point of origin to a destination, whereas supply chain management mainly focuses on the relationships among the actors that make such movement possible [Cozzolino 2012]. Logistics and supply chain management are both crucial to support a timely response to a disaster. Thus, the concept of HL-SCM is the provision of goods and services, maximizing cost efficiency and speed effectiveness, achieved by close and effective coordination of activities and supply. HL-SCM is a distinctive unit of any HO, and the success or failure of any humanitarian operation is highly dependent on this unit [Cozzolino 2012].

### Difference between Developmental emergency, and business logistics & supply chain

In the main, HL-SCM functions are the same as the logistics and supply chain functions in any business organization that involve a range of activities, including preparedness, planning, procurement, transport, warehousing, tracking and tracing, and customs clearance. Normally HL-SCM deals with two types of operations; developmental humanitarian response operations and emergency response operations. Developmental operations refer to the development of education, health, environment, socio and economy system of a particular region, country and community,

while emergency or disaster management operations deal with the fulfilment of urgent needs created by disasters, including search and rescue, food, water, sanitation, medicine and shelter [Bhimani, Song 2016]. Disasters can be further divided into two types; sudden onset disasters and slow onset disasters. Sudden onset disasters are usually natural disasters such as earthquakes, floods and tsunamis that are devastating events that occur with little or no forewarning. Slow onset disasters, on the other hand, include the occurrence of devastating events that develop over a period of time, slowly, and include droughts, heat waves, desertification, and more recently, land encroachment by rising sea levels.

Table 1. Difference between normal, emergency and business logistics & supply chain

No.	Distinctive point	Emergency HL-SCM operations	Normal HL-SCM operations	Business logistics and supply chain operations	Reference
1	Objectives	To help people and save lives without the objective of profit-making	To help and develop the people, environment, and nature without profit	To maximize profit	(Cozzolino, 2012; Ertem, Buyurgan, Rossetti, 2010)
2	Demand pattern	Unknown and irregular demand	Predictable with forecasting techniques	Predictable with forecasting techniques	(Christopher, Tatham, 2014; Ertem et al., 2010)
3	Supply pattern	Non-predictable mixed patterns with cash or kind, and in-kind donations	Predictable mixed pattern of cash or kind and in-kind donations	Predictable pattern with a specific product	(Christopher, Tatham, 2014; Ertem et al., 2010)
4	Flow type	Flow of fundamental resources, e.g. vehicles, peoples, food and shelter	Flow of fundamental and specific resources e.g. education, health and awareness	Flow of commercial products	(Cozzolino 2012; Ertem et al., 2010)
5	Lead time	Immediate demand with no lead time	Predictable lead time	Predictable lead time	(Christopher, Tatham, 2014; Ertem et al., 2010)
6	Delivery network structure	Dynamic structure, voluntary and ad hoc facilitator	Pre-established network with voluntary and ad-hoc facilitator	Pre-established network with location, warehouses and distribution centers	(Ertem et al., 2010; Scholten, Sharkey Scott, Fynes, 2010)
7	Inventory control	Challenging to maintain inventory level	Easy to manage, predetermined demand and supply	Easy to manage, have safety stock and demand patterns	(Ertem et al., 2010; Van Wassenhove, 2006a)
8	Technology and Information	Comparatively low technology, less use of software	Comparatively low technology, less use of software	Highly developed technology with software utilization	(Christopher, Tatham, 2014; Pettit, Beresford, 2009)
9	Performance evaluation	Time of response and number of lives saved	Time of response and number of people helped	Based on standard supply chain matrices, profitability	(Ertem et al., 2010; Scholten et al., 2010)
10	Equipment and vehicles	Robust equipment required	Both robust and ordinary equipment's are required	Ordinary equipment required	(Dufour, Laporte, Paquette, Rancourt, 2018)
11	Human resources	High-employee turn-over	Project-based high-employee turn-over	Stable, permanent respected career paths	(Kovács, Tatham, Larson, 2012)
12	Stakeholders	Donors, governments, military, community and partner NGOs	Donors, governments, military, community and partner NGOs	Shareholders, customers and suppliers	(Ertem et al., 2010; Nurmala, de Leeuw, Dullaert, 2017)

The functions imperative in disaster operations are more challenging than developmental HL-SCM operations, and also

quite distinct from the logistics and supply chain management operations of commercial businesses. Some of the important distinctive

points about emergency HL-SCM, Developmental HL-SCM and business logistics supply chain management, derived from the literature, are shown in Table 1.

HL-SCM studies found in the literature are mainly focused on the relevant operations demanded by natural and man-made disasters and discuss the processes involved in the disaster management cycle. Disasters impact directly on the life, infrastructure, and economies of communities and countries, and there seems to be a general perception that HO functions are only about disasters and disaster relief [Bhimani, Song 2016]. Developmental HL-SCM operations are often ignored and these have not attracted sufficient research attention, given their importance.

### **Efficiency in humanitarian logistics and supply chain management**

Efficiency management in HL-SCM is the ability to minimize waste, avoid redundancy and duplication of activities, conserve energy, and maximize efforts, while minimizing both times taken and overall operational costs [Provan, Kenis 2008]. In other words, efficiency means "doing the thing right" that is applicable in Developmental HL-SCM operations. Efficiency in HL-SCM processes and actions can be achieved through the most common practices which are as much as 50% of the solution to any problem. Some of the common practices can be, have been, developed as a standard set of guidelines, training syllabi, certification processes and process alignment, especially with appropriate IT systems [PH Tatham, Spens, Kovács, Payne 2013].

HL-SCM efficiency means ensuring cost savings that can result in more supplies being available and delivered, resulting in more lives being saved and more people being helped [Cozzolino, 2012]. Efficiency can be achieved through standardization of processes and systems [Bhimani, Song 2016]. Thus, to bring both Effectiveness and Efficiency by the understanding of, and application of, both the Lean paradigm and the Agile paradigm, will enhance competitiveness, cost efficiency and time effectiveness in the overall HL-SCM

processes [Gligor, Holcomb 2012, Ismail, Sharifi 2006].

### **Effectiveness in humanitarian logistics and supply chain management**

Effective management in HL-SCM is defined as ensuring the quickest delivery of humanitarian goods, services, and other relief items, within the shortest time-frame [Cozzolino 2012]. Effectiveness means "doing the right thing" when an emergency situation arises, which is usually without warning, is sudden, and often devastating [Provan, Kenis 2008]. HL-SCM effectiveness is based on strong coordination between stakeholders, which includes donors, government, military, vendors, communities, and local community-based organizations [Tatham, Spens 2016]. To enhance stakeholder coordination and to meet the HOs common goal, many organizations have developed their clusters for cooperating and coordinating during a disaster, for the provision of humanitarian services. Some examples of such clusters are: the UN logistics cluster, the international search and rescue group (INSARAG), and the urban search and rescue group (USAR) [Tatham, Spens, 2016].

In HL-SCM operations, effectiveness must be a "Plug and Play" concept, meaning pre-determined, well-organised operations that can be put into place with immediate affect, which can only be possible through a well-coordinated, effective flow of information. HL-SCM effectiveness means significant savings in goods and services delivery time, which means that more lives are saved [Cozzolino 2012].

### **Lean in humanitarian logistics and supply chain management**

Lean management is the provision of maximum customer satisfaction by reducing waste through optimum utilization of resources such as financial and human resources [Womack, Jones 2010]. Lean management also refers to doing more and better things with less utilization of resources when demand is relatively stable and predictable [Cozzolino 2012]. HOs have pressures from stakeholders to improve their performance and to deliver the

best value for money. Stakeholders want to be able to assess whether or not their funds are being spent on the right people, in the right way, through the right source, at the right time, at the right cost, with effectiveness, accountability and according to best practice standards [Paton 2003]. They also want to know that funded organizations have the capacity to serve marginalized communities in an effective and efficient way [Eisinger 2002, Wing 2004]. Lean management is the optimization of resources which ensures that all the relationships among the actors involved are managed through an integrated approach to efficiently and effectively coordinate inter-organizational performance, eliminate redundancy, and maximize efficiency along the entire emergency and Developmental supply chain management.

A sustainable, successful, Lean adoption strategy requires maintenance of continuity between the existing and the evolving organizational cultures and management processes. Thus, for successful Lean management implementation, the LM qualifiers that have been identified are: positive organizational culture with improved processes, discipline, and committed leadership to overcome internal and external challenges [Lassiter 2007].

### **Agility in humanitarian logistics and supply chain management**

Supply chain agility is the organizational ability to respond promptly to any uncertainty of future demand, or changes in current demand. Humanitarian organizations must be able to respond rapidly and effectively during disaster operations, and the major purpose of Agile supply chain management is to handle the external disruptions that almost inevitably occur, and to respond quickly to short term demands with flexibility [Lee 2004, Sheffi 2005]. In any disaster, the primary priority of HOs is to serve humanity, and to save the maximum number of lives in the disaster. To meet immediate and short term demands, Agile supply chain requires interim sources of supplies and employment, immediately available [Christopher, Towill 2002, Lapide 2006]. Agility can be achieved through stakeholder coordination and overall supply

chain efforts with the utilization of the organization's redundant capacity [Christopher, Towill 2002, Cozzolino et al. 2012]. Agile management requires some qualifiers for achievement of successful results. These qualifiers in HL-SCM agility management have been identified as preparation of emergency plans, networking with suppliers, contingency stockpiling of equipment and goods, postponement of routine projects, low-cost stocks, creation of a stable network of third-party logistics services, and formation of a relief emergency implementation team [Christopher, Towill 2002]. As has been observed previously, Agility management has been the greater focus in recent academic research and in professional circles, due to increases in the number of disasters [Cozzolino et al. 2012]. In the disaster management context it is much more important to ensure timely (effective) delivery of goods and services, as distinct from the emergency and developmental operations context in which it is necessary to achieve efficient, cost optimized, delivery of goods and services as well [Cozzolino 2012].

### **Leagility in humanitarian logistics and supply chain management**

Learning from the corporate sector for performance improvement, HOs are recommended to implement Lean and Agility management system together [Murray 2015, Scholten et al. 2010]. Lean management was developed in response of old strategies to reduce waste and unsatisfactory quality, while Agile was a response to continuous changes and fluctuations in customer demand and preferences. Some authors have considered agility to be associated with lean thinking and have been stated as the next step after lean principles implementation. Total logistics and supply chain management efficiency and effectiveness are based on a combined Lean and Agile paradigm. This combination is termed 'Leagility Management'. Within the Leagility Management paradigm, the Lean and Agile paradigms are separated by a strategic point which is called the "decoupling point", which delineates the boundary of Lean and Agile paradigm.

## **Lean and agile decoupling point models in humanitarian logistics and supply chain management**

Agile management does not necessarily exclude Lean Management principles. Agile can be appropriate for Developmental HL-SCM operations, while Lean can also exist in emergency HL-SCM operations [Aitken, Christopher, Towill 2002, Christopher 2005, Scholten et al. 2010]. The boundaries between Lean and Agile are defined through the decoupling point approach, and postponement strategy has been applied when lead times are long and demand is unpredictable [Christopher 2005]. Leanness needs to be decoupled and Agility should be applied when the market is volatile or uncertain [Childerhouse, Towill 2000]. Apart from the decoupling point, some other techniques for defining the Lean and Agile boundaries have been considered: the Pareto curve approach and the separation of base and surge demands [Christopher, Towill 2001]. In HL-SCM, prioritization of needs is the most important factor for assessment of required resources, implementation of immediate solutions and to decide on the necessary shift from effectiveness (Agile) management to efficiency (Lean) management [Merminod, Nollet, Pache 2014a, Tomasini, Van Wassenhove, Van Wassenhove 2009]. Thus, humanitarian organizations need to prioritize these demands and to implement an immediate solution as per available resources [Merminod, Nollet, Pache 2014b, Tomasini, Van Wassenhove, 2009].

In the literature, HL-SCM Lean and Agile boundaries are considered in terms of being applied in emergency operations, within the disaster management cycle: mitigation, preparedness, response and recovery phases. The Lean and Agile paradigm boundaries are also applied to emergency supply chain management processes, while the normal or developmental scope of HL-SCM has been largely ignored [Cozzolino et al. 2012, Oloruntoba, Gray 2006]. Thus, this study is focused on drawing HL-SCM boundaries as a broad level concept, and as can be applied in detail in both emergency and normal, or developmental, types of operations. Data were gathered by survey and interview.

## **METHODOLOGY**

Our study comprised two steps; the first step being the identification and justification of the need for the Lean and Agile paradigms in the HO sector. The second step was the development of the Lean and Agile paradigms in terms of the HO sectors particular requirements.

In Step 1, the potential for the Lean and Agile paradigms were determined by collecting, analysing and comparing the information from the websites of different HOs on the operational and thematic areas described or implied in those websites. The HOs included in the search included only International Non-Governmental Organizations (INGO's), 88 in all randomly selected from the results of a search on Google, and from the United Nations Organization website.

A comparative descriptive analysis was derived, based on the Lean and Agile qualifiers and enablers identified, together with the scope and thematic areas indicated. These were divided into two major categories; the developmental operations, and the emergency operations (see Table 2). Based on this analysis, the Lean and Agile paradigms particularly applicable to HOs were designed. These were then decoupled utilizing the two-matrix model approach and a broad level Lean and Agile decoupling model.

Second step of the study was development of Lean and Agile paradigms by mapping HOs logistics and supply chain management processes involved in both disasters/emergency supply chain management and developmental logistics and supply chain management. To map the HL-SCM processes, interviews and discussions were held with seven professionals experienced in HO logistics and supply chain management, who were selected on the basis of having more than 5 years' experience in these operational areas in international humanitarian organisations. Each professional was interviewed for up to an hour. The information elicited in these interviews regarding the development operations of the HO was characterised as, and divided into hard components and soft components, and the

emergency operations were divided into sudden onset disasters and slow onset disasters.

Using the decoupling points approach, a detailed Lean and Agile Decoupling Point (LADP) model was developed. In this model, HL-SCM activities were identified in detail and the areas of HL-SCM that had been previously overlooked in the literature were highlighted.

## RESULTS AND DISCUSSION

### HOs scope and thematic areas

A thematic area or scope of a HO denotes all the products which may be included in the processes of delivery, both in the short term and long-term, of services, goods and works for the fulfillment of their humanitarian objectives. Traditionally, the scope and thematic areas of international HOs were limited to deal disaster (natural & manmade) responses in affected countries through the provision of relief supplies and services

essential as basic life necessities (e.g. food, water, shelter and health) [Doyle et al. 2016]. With globalization, the scope and thematic areas have been extended toward non-disaster related development of deprived communities through education, infrastructure development, awareness of civil and political rights, and social capacity building.

The priority of the application of Lean or Agile thinking in the delivery of products and services can therefore be decided through the identification and categorization of thematic areas.

For identifying HOs scope/thematic areas, we carried out a survey of HOs websites, and relevant information was identified and categorized in (Table 2). The websites of organizations that we reviewed showed that at least 79 of the 88 organizations reviewed are engaged in both disaster management and long-term development operations. A sample of the information extracted from 10 of the 88 organizations is shown in Table 2.

Table 2. International HO's thematic areas

Name of HOs	Web address	Scope/thematic areas	
		Developmental	Emergency
Sight Savers	<a href="http://www.sightsavers.org">www.sightsavers.org</a>	Protecting sight & fighting for disability	Not specified
SIF	<a href="http://www.secour-islamique.org">www.secour-islamique.org</a>	Providing people with the means to be independent	Responding to basic needs
Muslim.H	<a href="http://muslimhands.fr">muslimhands.fr</a>	Supporting communities in the long run	Providing immediate help
Relief Int	<a href="http://www.ri.org">www.ri.org</a>	Education, economic opportunity	Providing health and emergency basic needs
Action Against Hunger	<a href="http://www.actionagainsthunger.org">www.actionagainsthunger.org</a>	Supporting communities against hunger	Provision of basic necessities including food, water and shelter
Care International	<a href="http://www.care-international.org">www.care-international.org</a>	Supporting in long-term development work including education, economic opportunity, gender ethnicity and equity and health	Responding to basic emergency needs and rehabilitate services for affected people
Concern world wide	<a href="http://www.concern.net">www.concern.net</a>	Protecting sight & fighting for disability	Not specified
Plan-international	<a href="http://plan-international.org">plan-international.org</a>	Providing people with the means to be independent	Responding to basic needs
World Vision	<a href="http://www.worldvision.org">www.worldvision.org</a>	Supporting communities in the long run	Providing immediate help

Our analysis shows that the role of HOs is not limited to disaster response but is extended to strategic partnerships for long-term development of society. Examples of strategic partnerships are the United Nations Organization (UN) partnership with HOs for

the achievement of sustainable development goals and partnerships with corporate logistics companies for the enhancement of HOs' response capability (e.g. Agility, TNT and UPS) [Vojvodic et al. 2015]. The extension of the scope of operations into long-term and

developmental operations now requires efficient (Lean) management rather than the traditional requirement for effectiveness (Agility). As discussed previously, Lean management is focused on reducing waste together with cost savings in the delivery of aid to the maximum number of people, whereas Agile management is more focused on the timely delivery of goods and services to the maximum number of people affected in an emergency. It can therefore be concluded that HOs should not be focused only on rapid (effective) delivery but also must focus on efficient delivery to satisfy fund donors.

### Lean and Agile paradigms priorities based on HOs thematic areas

In disaster/emergency situations, Agility paradigms is required in terms of time effectiveness. In such situations, search, rescue and provision of basic life necessities with precise time management is essential. As well as involvement in emergency situations, HOs are now involved in developmental activities to uplift deprived (socially, economically) communities (Table 2), in this situation the Lean paradigm is required essential.

The major scope found on international HOs websites encompasses developmental projects e.g. education, poverty reduction, livelihood, child care, woman's empowerment, youth leadership, and support to disabilities. To achieve cost efficiency and sustainability in the HO's operation Lean management can play an important role through implementation of strategic partnerships and developmental projects. A two-matrix model to decide the paradigms between Lean and Agile is shown in Figure 1. This model explains that the emergency scope of HOs operations requires a high level of Agility, as presented in the Agile paradigm, whereas, developmental scope requires the substantial application of the Lean paradigm.

The requirement for Lean and Agile in both emergency and developmental HL-SCM operations is presented in detail in the LADP model.

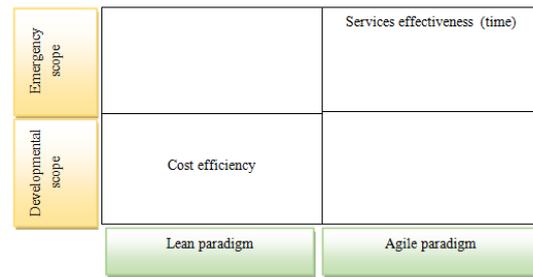


Fig. 1. Lean & Agility paradigms priorities based on two matrix model

### Lean and Agile Decoupling Point (LADP) models

It is the decoupling point that recommends the most suitable supply chain processes and practices. When the priorities of the processes, and their boundaries, are well defined, the real opportunity of Lean and Agile strategies becomes apparent for employing hybrid Lean and Agile supply chain management [Christopher, Towill 2001], which has been termed in the literature as Leagility.

In our study we developed a decoupling model appropriate for both developmental and emergency HL-SCM operations in the broader terms of HOs' scope of operations, which is more detailed than the various HL-SCM processes which were identified from the information gained through the interviews that we conducted.

#### *LADP model based on organizational scope in broader terms*

Thematic areas/scope analysis found that about 90% of HOs are involved in both emergency and developmental activities. Following the prioritization of needs, the developmental thematic areas and emergency thematic areas, urgency of needs was considered as the basic yardstick. The decoupling of HL-SCM, as we propose in broad terms, is shown in Figure 2.

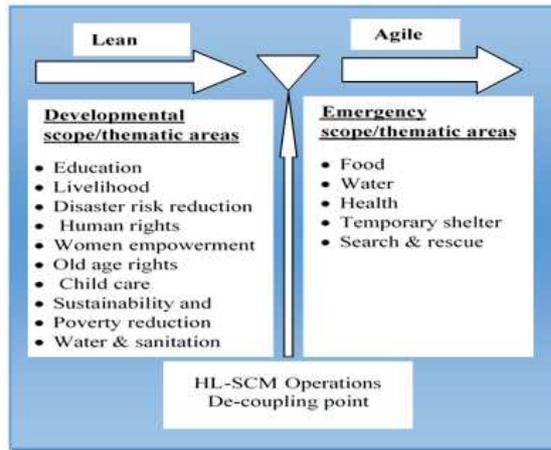


Fig. 2. Lean & Agility Decoupling Point (LADP) Model based on organizational scope

The boundary between emergency and developmental areas for Lean and Agile application is defined through the de-coupling point approach. For carrying out emergency

operations Agile application is more appropriate, while, Lean management paradigms should be applied for developmental scope. While considering the broader scope of HL-SCM Lean and Agile application, the internal processes of both emergency and developmental scopes have not been explored in this part of model.

*LADP detailed model based on HL-SCM processes*

To map HL-SCM processes and identify efficiency and effectiveness priorities seven international HO professionals were contacted and agreed to participate in interview. These professionals were rich in HL-SCM experience, having a minimum experience of 8 years and level of responsibility commensurate with their job titles. These are summarized in Table 3.

Table 3. Summary of the HO professionals' interviews

No.	Gender	HO experience in years	Position, title	Education relevant to Supply Chains
1	Female	10	Operation Officer	No
2	Male	11	Admin & Logistic Officer	No
3	Male	9	Supply Chain Officer	Yes
4	Female	8	Admin, Logistics and H.R Officer	Yes
5	Male	14	Director, operations	No
6	Male	12	Supply Chain Officer	Yes
7	Male	9	Senior Admin and Logistics Officer	Yes

From the discussions with these HO professionals, the developmental and emergency HL-SCM processes of HOs were identified. Based on those interviews and discussions, the HL-SCM decoupling points were defined according to the urgency of each process. The HO professionals also explained the two categories of hard components and soft components. HL-SCM hard components include the obvious and identifiable logistics and supply chain management processes and infrastructure that include the deliverables relevant to materials, equipment and other supplies. The soft components were explained as including those deliverables that are less visible and less physical, such as capacity building, policy making, human rights campaigns, education and health services etc., that have long-term impacts on the

development of communities, Though, HL-SCM hard component processes are the same as soft components, with the addition of warehousing activities, as depicted in Figure 3.

Lean and Agile paradigms priorities placed on the HOs developmental operations by interviewed professionals was emphasized to brought efficiency management in supply chain components. The supply chain components defined by the professionals are includes: procurement, warehousing and fleet management. Due to time constraints, especially related to perishable goods, and considering the urgency of demands and minimizing warehousing costs, the distribution component of goods and services requires effectiveness, meaning a shift to the Agility paradigm. Thus, Lean (which gives efficiency)

is proposed to be used for developmental processes from procurement to fleet management and transportation needs, after which it should be decoupled and Agile (which

gives effectiveness) is applied to the subsequent distribution related processes (Figure 3).

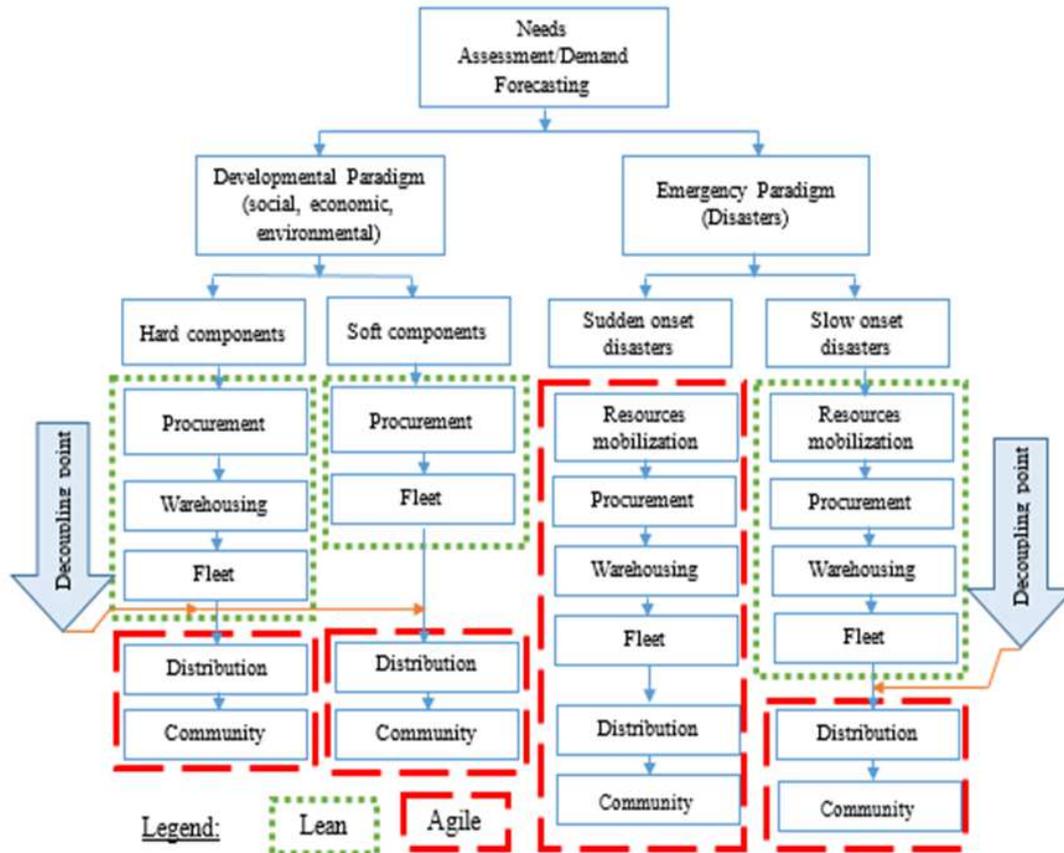


Fig. 3. Lean & Agility Decoupling Point (LADP) Model based on detailed HL-SCM processes

The emergency thematic area of HL-SCM processes was also divided by professionals into two categories sudden onset disasters and slow-onset disasters. Earthquakes, explosions, fire, landslides etc. are considered sudden onset disasters, whereas droughts, diseases, and climate change were suggested to consider as slow onset disasters. The HL-SCM professionals proposed that in sudden onset disasters, Agility is essential, especially in the initial 90 days, as the prime priority is timeliness of intervention, and cost considerations are not of interest. After the initial period of great urgency, the priority may change to allow application of the Lean paradigm for certain processes like procurement, warehousing and fleet management. Slow onset disasters, however, require the adoption of the Lean paradigm for the efficient management of transportation and

fleet management prior to the commencement of the distribution process and community follow-up, in which case the shift to the Agility paradigm is appropriate.

A detailed Lean and Agile Decoupling Point Model was developed as a comprehensive model with recommendations on where HOs need to adopt the Lean strategy and where to adopt the Agile strategy, with the overall goal of this model being to improve the efficiency and effectiveness of the HO logistics and supply chain management operations (Figure 3).

## CONCLUSIONS

Nearly 90% of humanitarian organizations (HOs) are involved in both developmental

activities and emergency response. While the developmental scope is of greater importance to HOs than the emergency scope, it has been the latter that has received most attention from academics and researchers, and the developmental scope must be seen as a neglected area of research. It is in the development scope of operations, in the HL-SCM, that the Lean paradigm is considered to be most appropriate, whereas the Agility paradigm becomes prominent in the emergency scope/thematic areas, where the time is of the essence, and where immediate and effective measures are required.

The contribution of our research is that by identifying the boundaries between Lean and Agility, and the decoupling points between the developmental and emergency HL-SCM processes, we have provided a model that will enable HL-SCM operations to be more effective and useful. This model was developed using a two-matrix model and the decoupling point approach, in which the decoupling points are framed in the comprehensive LADP model.

We are confident that the appropriate application of the Lean management (cost efficiency) paradigm in the HL-SCM of HOs can bring many benefits and should be explored further to make HOs operations more efficient and sustainable. This study indicates the importance of comparing Lean with Agility and extracting a comprehensive Lean/Agile paradigm to fill the gap that is identifiable in the traditional approach to HO sector operations. The areas defined show where HOs should focus on Lean and to what point HOs should place importance on the Agile paradigm. We suggest that the practical implications of implementing the Lean paradigms in the HO sector, including the assessment of the readiness of any HO to adopt the combined paradigm, requires further studies.

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## PARADYGMATY LEAN I AGILE W ZARZĄDZANIU ŁAŃCUCHEM DOSTAW I LOGISTYKĄ ORGANIZACJI HUMANITARNYCH

**STRESZCZENIE. Wstęp:** Organizacje humanitarne charakteryzują się pewnymi ograniczeniami w zakresie transparentności i efektywności wykorzystywania zasobów, wynikającymi z przyczyn ich istnienia, oczekiwań darczyńców lub innych udziałowców. Organizacje te powinny przyswajać wiedzę z sektora działalności komercyjnej w celu poprawy efektywności wykorzystywania dostępnych zasobów. W działalności charytatywnej, zarządzanie łańcuchem dostaw oraz logistyka są obszarami krytycznymi, które pochłaniają ponad 80% całego budżetu i dlatego też powinny cechować się efektywnością i sprawnością. Zintegrowany model zarządzania Lean and Agile, które był z powodzeniem wdrożony w sektorze komercyjnym w celu poprawy efektywności zarządzania, jest strategią proponowaną dla wdrożenia również w organizacjach humanitarnych. Prezentowana praca jest początkowym etapem zdefiniowania granic pomiędzy operacjami Lean oraz Agile w łańcuchach organizacji humanitarnych w celu zbudowania modelu zwiększającego efektywności i wydajność ich operacji.

**Metody:** Model Lean & Agile Decoupling Point (LADP) został opracowany po dokonaniu analizy obszarów wydzielonych tematycznie w 88 organizacjach humanitarnych. Przeprowadzono wywiady z siedmioma specjalistami z zarządzania łańcuchem dostaw z obszaru HL-SCM w celu precyzyjnego zdefiniowania kluczowych procesów oraz wyznaczenia optymalnych punktów rozdziału w zależności od priorytetów i zakresu każdego z obszarów tematycznych.

**Wyniki:** W obrębie 88 poddanych badaniom organizacji humanitarnych, 79 z nich prowadzi działalność zarówno kryzysową jak i zapobiegawczą, tak więc model LADP został opracowany dla organizacji o podwójnych celach działalności. Model LADP jest zbudowany w oparciu o schemat przepływu dla kluczowych procesów, podzielonych pomiędzy operacjami o charakterze zapobiegawczym jak i kryzysowym. Optymalne punktu rozdziału zostały określone począwszy od zakresu ogólnego i następnie do coraz bardziej szczegółowego. Model odzwierciedla dokładnie doświadczenia i rekomendacje siedmiu specjalistów, z którymi przeprowadzono wywiady. Jest on możliwy do zastosowania w wielu typach istniejących organizacji humanitarnych.

**Wnioski:** Model LADP dostarcza gruntownej bazy, która w istotny sposób może przyczynić się do przemodelowania i wzmocnienia działalności operacyjnej organizacji humanitarnych, zwiększając ich wiarygodność w oczach darczyńców oraz innych udziałowców. Praca ta jest kolejnym etapem wspomagającym wzmocnienie całego łańcucha zasobów przeznaczonych niesieniu pomocy poszkodowanych i potrzebującym w sposób jeszcze bardziej efektywny i skuteczny.

**Słowa kluczowe:** logistyka i zarządzanie łańcuchem dostaw organizacji humanitarnych (HL-SCM); ograniczenia Lean oraz Agile, model Lean and Agile Decoupling Point (LADP), wydajność i efektywność

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