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LEAN MANAGEMENT READINESS ASSESSMENT FRAMEWORK FOR HUMANITARIAN ORGANIZATIONS SUPPLY CHAIN MANAGEMENT

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ABSTRACT

Humanitarian organizations (HOs) are often under pressure from stakeholders to utilize their funds efficiently. Adoption of Lean Management (LM) practices is often an effective way to increase efficiency in the utilization of financial and tangible resources. HOs intending to adopt LM must have certain practices in place before implementation of LM. This research developed a framework to measure the readiness of an HO to adopt LM in logistics and supply chain management (LSCM) system because LSCM is considered to be the most expensive part of HOs operations. The Humanitarian Organization Lean Management Readiness Assessment (HOLMRA) framework has been developed through in-depth interviews with supply chain management professionals in HOs in combination with a detailed review of the relevant literature. The literature review establishes the great value of LM in any organization. Seven factors are found to be the most relevant critical success factors (CSFs) for measuring the HOs readiness to adopt LM. The seven CSFs are: processes management, planning and control management, donor and community relationship management, supplier relationship management, top management, human resource management and communication management. CSFs assessment is associated with LM techniques. Based on discussions with HOs professionals, 7 CSFs and 35 LM elements were subsequently synthesised into the HOLMRA framework. Adoption of the HOLMRA framework provides efficient use of resources for HOs. The seven CSFs identified for assessment of HOs supply chain operations are: Process Management, Planning and Control Management, Donor and Community Relationship Management, Supplier Relationship Management, Human Resource Management, Communication Management, and Leadership Management. Each of these CSFs in turn consists of key Lean Elements. CSFs and their respective Lean Elements, explained and demonstrated with practical examples from the field, form a solid framework for understanding and assessing LM readiness in HOs supply chain operations.

Keywords Humanitarian Organizations (HOs), Islamic Philosophy of HOs, Lean Management Readiness Assessment Framework, Humanitarian Organizations Logistics and Supply Chain Management (HO-LSCM), Lean Philosophy in HOs
JEL Codes: D23, M00

I. INTRODUCTION

The relationship between Humanitarian Organizations (HOs) and Islam has been the subject matter of extensive academic debate with some scholars under the impression that if properly implemented; Islamic philosophy supports strong, effective and flourishing HOs / civil societies. According to Islamic philosophy, an HO is the organization which delivers the goods or services for the betterment of the society without any

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profitable motive. According to the eastern history, HOs started their workings in the late 18th century, and in early 20th century. The concept of HOs became more popular through their political, social, cultural and financial effects during the late 18th century and early 19th century (Harmsen, 2008).

Nowadays HOs are under the financial constraints and require more accountability and transparency in their spending by their stakeholders (Harmsen, 2008). For tackling such issues HOs are required to increase their efficiency and effectiveness and are under pressure to maximize their performance and provide the best value for money against utilization of the funds (Kunz, 2019). Pressures come from government organisations, donor agencies and through other stakeholders including communities and business investors (Cairns, 2005). Stakeholders want the confidence that their donations are spent at the right place through right source in accountable and transparent manner (ChangeUp, 2004; Eisinger, 2002; Khan, Lee, & Bae, 2019; Listani Jayadi, Sadat, & Richit, 2020; Paton, 2003; Wing, 2004). The government also want assurance that the organizations which have tax exemption status because of welfare cause are utilizing their resources diligently (Commission, 1996; Hoefer, 2000). Due to continuous changes in donor requirements, technological developments and increased competition for funding sources, HOs must make continuous improvements for sustainable use of resources (Haavisto & Kovács, 2019; Laguir, Stekelorum, & El Baz, 2020; Lassiter, 2007). HOs can benefit from adopting strategies similar to those of business organizations and by optimizing organizational culture and management techniques for the efficient utilization of scarce resources (Blumenthal, 2003; Cairns, 2005; Murray, 2015). Lean Management (LM) has been proven as a successful tool for businesses by which the organizations significantly improved their profits and market share (Drew, McCallum, & Roggenhofer, 2016; Khan et al., 2019). Examples of businesses that have adopted lean management techniques to their advantage included Zara Fashion Design and Toyota (Christopher & Towill, 2001; Parris, 2013; Ali and Naeem, 2017; Ali, 2011; Ali, 2015; Ali, 2018; Ali and Bibi, 2017; Ali and Ahmad, 2014; Ali and Audi, 2016; Ali and Audi, 2018; Ali and Rehman, 2015; Ali and Senturk, 2019; Ali and Zulfiqar, 2018; Ali et al., 2016; Ali et al., 2021; Ali et al., 2021; Ali et al., 2015; Audi et al., 2021;Sajid and Ali, 2018; Senturk and Ali, 2021).

The activities of HOs are both similar, and very different in some important aspects, from businesses. The sudden onset of an emergency situation, such as an earthquake, flood or other catastrophic event, demanding their involvement in the shortest possible time, must be accommodated, as well as their day-to-day activities (Sigala & Wakolbinger, 2019). LM techniques in HOs help to increase the effectiveness and efficiency of HOs logistics and supply chain management (LSCM) in both aspects, resource utilization and sustainability but particularly in emergency situation where immediate action is required (Altay, Gunasekaran, Dubey, & Childe, 2018; Gligor, Gligor, Holcomb, & Bozkurt, 2019). However, before an HO implements the lean management system; its readiness needs to be assessed. Advance assessment will reduce waste during implementation and minimize disruption to the organization. This study developed a framework to measure an organization's readiness before the implementation of LM techniques. We call this framework the Humanitarian Organizations Lean Management Readiness Assessment (HOLMRA) framework. HOLMRA is a conceptual framework comprised of LM critical success factors (CSFs) and LM techniques, both of which were identified through a comprehensive analysis of the peer-reviewed literature that was focused on existing LM assessment frameworks and LM elements (e.g. lean principles, lean techniques, lean waste, lean philosophy and Toyota lean culture). The conceptual HOLMRA framework was evolved, validated and refined through in-depth interviews and discussions with HO supply chain management professionals, and with the subsequent analysis of the collected information, by coding and content analysis, resulting into the final HOLMRA framework, including those CSFs and LM techniques considered relevant, and irrelevant ones excluded. The outcome was the HOLMRA framework which can be applied to evaluate an HO's readiness to apply a LM approach to its humanitarian supply chain management. Having this framework, in our view, HOs can save the financial resources and can significantly improve the timely responsiveness in emergency situation which may contribute to the economic sustainability of the HOs.

II. LITERATURE REVIEW

II.I. HUMANITARIAN ORGANIZATIONS LOGISTICS AND SUPPLY CHAIN MANAGEMENT

Humanitarian organizations provide independent, impartial humanitarian relief in the form of goods and services to those who are in need due to disasters or deprivation of resources (Barnett & Duvall, 2005; Gunasekaran et al., 2018; Liker & Hoseus), and are therefore different in culture, organisation and purpose from commercial and public-sector organizations in many aspects. HOs can act autonomously and independently from any government or economic power, whereas commercial and public-sector organizations are intrinsically tied to government or other economic powers, limiting their operational scope (Najam, 1996; Nerfin, 1987; Power, Maury, & Maury, 2002). HOs' common mission is to provide independent, impartial humanitarian relief, and this can be strengthened through efficient management of supply chains, which account for more than 80% of the total budget for relief efforts (Kent, 2004; Van Wassenhove, 2006). The processes of HOs' Logistics and Supply Chain Management (HO-LSCM) are almost same to the processes of corporate logistics and supply chain management, however manufacturing of goods is not a part of the processes of HO-LSCM. The term supply chain management has been defined by the Council of Supply Chain Management (CSCM) as the "integration of supply and demand management within and across the companies and stakeholders", while the term logistics management (HLM) is defined as "moving of goods, information, and services from point of origin to final destination" (Cooper, Lambert, & Pagh, 1997; Cozzolino, 2012). The Fritz Institute, a humanitarian logistics services specialist organization has defined Humanitarian Logistics Management as "the process of planning, implementing and controlling an efficient, cost-effective flow and storage of goods, materials, and related information from the point of origin to the point of consumption for alleviating the suffering of vulnerable people". The key to an organization's sustainable consumption of resources is efficiency, which can be brought about by lean management and its integral focus on continuous improvements. (Achanga, Shehab, Roy, & Nelder, 2006).

II.II.LEAN MANAGEMENT

The term "lean management" was initially coined by John Krafcik in 1988, when he wrote the article "Triumph of the Lean Production System", derived from his master's thesis at the MIT Sloan School of Management. Krafcik was an engineer at the GM-Toyota joint venture in California before studying for his MBA at MIT. Thus, lean management itself originated from the Toyota automotive company's shop floor (Ohno, 1988). Toyota introduced lean management as an holistic philosophy rather than as a rigid tool to get instant results (Fujimoto, 1999). Many researchers have defined lean management in a variety of ways but generally it is now understood to mean the reduction in waste through a continuous improvement process (Hayes & Pisano, 1994; Papadopoulou & Özbayrak, 2005; Shah & Ward, 2003; Upadhye, Deshmukh, & Garg, 2010; Wong, Wong, & Ali, 2009). So, we can define LM as a systematic approach to eliminate the sources of loss from the entire value stream in order to close the gap between actual performance and the requirements of customers and shareholders. LM addresses the elimination of three key sources of loss from the operating system, which are waste, variability and inflexibility.

Waste management is the elimination of non-value adding activities from processes (Benson & Kulkarni, 2011; Myerson, 2012; Shah & Ward, 2003). Generally, lean supply chain management is intended to identify and address three activities: non-value adding activities that are not essential, non-value adding activities that are essential and necessary value-adding activities. In order to identify non-essential non-value adding activities, the value placed by customers on the activity is important, because they indicate the willingness-to-pay for product (Benson & Kulkarni, 2011). HOs customers can be divided into upstream donor customers (who provide funding to HOs) and downstream community customers or ultimate customers (where the funding is spent by HOs) (Antai, Mutshinda, & Owusu, 2015; Oloruntoba, Glenn Richey, & Gray, 2009). In lean management systems, the elimination of waste from both, up and down streams are considered to be important (ChangeUp, 2004; Eisinger, 2002; Paton, 2003; Wing, 2004). Academic and professional circles of HOs have given less attention to LM when compared to corporate organizations (Cozzolino, Rossi, & Conforti, 2012). Efficient and sustainable use of financial and other tangible resources in HOs can be achieved through lean implementation with an assessment of organizational culture in conjunction with an organization's strategic planning (Murray, 2015; Suifan et al., 2020). The LM ensures that HOs are saving expenses and time by reducing waste. In an HO, saving time represents saving more lives and saving expenses represents helping more lives (Cozzolino et al., 2012).

Toyota inspired many companies (manufacturing, services and works) to adopt the lean management system, but companies did not succeed in all cases, for a variety of reasons. Examples of such reasons were ignorance of the lean philosophy/concept itself and consideration of insufficient CFSs (Emiliani, 1998).

II.II.I. Lean Philosophy and Toyota Lean Management Culture

According to Lander et al., (2007), two essential aspects of the Toyota lean philosophy are continuous improvement and continuous learning. Continuous improvement is a sustainable, long term process of innovation which involves the whole organization for the purpose of eliminating waste, preferably without making any large capital investment (Bessant, Caffyn, Gilbert, Harding, & Webb, 1994; Bhuiyan & Baghel, 2005; Liker, 2004; Liker & Hoseus, 2009). Lean management is based on having a supportive organizational culture, which arises from the organization's structure and management practices (i.e. leadership, organizational values, etc.) (Jabnoun, 2001). Toyota attained continuous improvement through a supportive organizational culture, which is considered to be a key factor for successful implementation of the lean management system and it is a significant extension of management practices. Toyota organizational culture demonstrates the value of maintaining a positive relationship between all stakeholders (suppliers, workers and customers) through strong communication and responsiveness (Toyota, 2005; Vaghefi, Woods, & Huellmantel, 2000). In Toyota's lean management culture, they have respect for all people which implies mutual understanding between employees in the workplace and doing one's best to build mutual trust among workers, management and stakeholders. Toyota cultivated this atmosphere in order to make its employees feel an essential part of the company, like an owner: the employer can buy the employee's time but cannot buy their brain. This approach is crucial to encouraging innovation in the workplace (Badurdeen, Wijekoon, & Marksberry, 2011; Covey, 2011; Liker & Hoseus, 2009; Yoshimori, 2005). Continuous improvement and supportive organization culture are pivotal elements for the management of organizational operations. In lean management, CSFs represent management practices (i.e. human resource management) which require special attention to achieve high performance (efficiency and effectiveness) (Al-Najem, Dhakal, Labib, & Bennett, 2013). Lean philosophy and Toyota lean culture both can be applied in HOs sector following the lean management principles.

II.II.II. LEAN PRINCIPLES

Lean management describes how to prevent waste and to create value for customers. Successful implementation of LM requires an understanding of organizational needs, in order to establish a healthy, supportive culture conducive to LM (e.g. trusting employees and empowering them during decision making). Employees who feel valued will be able to participate in the principles of LM, namely: to *specify the value*, to *identify the value stream*, to *create smooth flow*, to *respond to customer pull*, and to *strive for perfection* (Jones, Medlen, Merlo, Robertson, & Shepherdson, 1999; Womack & Jones, 2010). A *value* is the capability of time, cost, quality and services. The value is the most critical factor in LM and can only be specified by the customers (who have to pay for the product) (Liker, 2004; Womack & Jones, 1996, 2010). The *customer value* in HOs varies with the nature of the operation. For example, in emergency relief operations, the customer's value is "time" (quick delivery of supplies and services), whereas, in normal relief operations the customer value is "cost and time" (delivery of services to maximize the number of people helped at a minimal cost) (Cozzolino, 2012). *Identification of a value stream* refers to the detection of problems and establishment of guidelines to overcome the non-value adding activities through process mapping from point of origin to point of consumption, including information management and the physical transformation of resources (Al-Najem, 2012; Al-Najem, Dhakal, & Bennett, 2012; Womack & Jones, 2010). *Smooth flow* means smooth production procedures from the point of origin to the point of consumption with minimal disruption or stoppage. A continuous flow with customized tools and techniques facilitates smooth coordination among departments and stakeholders, thereby improving the overall value stream (Oppenheim, Murman, & Secor, 2011; Rother & Harris, 2001; Womack & Jones, 2010). *A Pull system* is the application of inventory on an as-needed basis, in nimble response to customer demand, in order to save resources for alternate opportunities (Hopp & Spearman, 2004; Womack & Jones, 2010). We see this in terms of having a Just-in-Time application of resources, as distinct from a Just-in-Case accumulation of resources. *Striving for perfection* in processes involves diligent and consistent implementation of lean management techniques (Womack & Jones, 2010). For the implementation of lean

principles, a positive organizational culture is required which can be developed through management practices and improvement of lean CSFs.

II.III. LEAN MANAGEMENT READINESS ASSESSMENT FRAMEWORKS

The leading lean system expert firms (Lean Enterprise Inc., Stratergos Inc., and Industrial solutions) and academic researchers have worked on the subject of lean assessment and organizations' lean readiness assessment, but their area of focus was the corporate sector (Al-Najem et al., 2013; Elnadi & Shehab, 2014; Furlan, Vinelli, & Dal Pont, 2011; Nordin, Deros, & Wahab, 2010; Shah & Ward, 2003; Tawfik Mady, 2009). Lean assessment is the evaluation of organizations as to what extent (stated perhaps as a percentage) the organization is lean. Such evaluation is usually performed after the application of the lean techniques. However, lean readiness assessment is the evaluation of any organization, prior to adoption of lean management techniques, to assess the organization's readiness and potential or ability to successfully implement lean techniques. Both assessments require the identification of the CSFs which often represent organizational culture and management techniques. Conventional *lean assessment models* found in the literature include Throughput solutions, Sai Global assessment, Lean Self-Assessment, and Shingo assessment (Al-Najem et al., 2013). To measure the degree of leanness, 9 CSFs are presented by Soriano-Meier & Forrester, (2002) in their framework, namely; the elimination of waste, continual improvement, zero defects, just in time deliveries, pull of materials, multifunctional teams, decentralization, integration of functions, vertical information systems and managerial commitment (Soriano-Meier & Forrester, 2002). Anand (2009) described 8 CSFs which are: elimination of waste, order-based production, focus on continuous incremental improvements, zero defects, respect for humanity, focus on customers and supplier partnership and visual management systems. Denison & Mishra, (1995) presented 8 CSFs for lean assessment which are: employee empowerment, training and development, involvement of top management, fostering suppliers and customer relations, leadership, departmental relations and teamwork (Denison & Mishra, 1995). Achanga et al., (2006) emphasized that lean management depends on organizational culture. The basic CSFs of an organizational culture are organizational leadership, top management attitudes, financial position, and employees' skills (Achanga et al., 2006). A sense of commitment from staffs, admiration for employees' skills and contributions, equal treatment in provision of promotional and developmental opportunities, and involvement of workers in decision making, are also key CSFs of lean management (Angelis, Conti, Cooper, & Gill, 2011). Meredith et al., (1991) suggested that lean management CSFs include employees commitment, ownership and support from the top management. Zu et al., (2010) described the CSFs for lean assessment as, strong customers' relationships, and workforce efficiency, strong supplier relationships and support by top management. Modifying the lean assessment model of Denison & Mishra et al., 1995, yielded a *lean readiness assessment model* for assessing the lean culture readiness before implementation of LM in small and medium enterprises of Kuwait (Al-Najem et al., 2012). The CSFs recommended in this model are process management, supplier management, customer relationships, human resource management, top management and management control.

II.III.I. LEAN MANAGEMENT TECHNIQUES

The lean system provides useful tools which can reduce waste in an organization, support continuous improvement (CI), and create value for customers as the result of lean principles. Selection of the lean tools, appropriate for a particular organization, is an important step, because the optimal combination of tools will be different for each organization and industry and even vary from the region to region. That is because not every industry is the same in its production processes, so proper assessment is vital before the implementation of any techniques (Karim & Arif-Uz-Zaman, 2013). Therefore, researchers and even experts use different tools, depending on the organizational culture. There is no universal, prescribed, set of lean tools that can be adopted. There are, however, certain tools that tend to be used more frequently than others (Ferdousi & Ahmed, 2010; Kilpatrick, 2003; Pojasek, 2003). The most common lean management techniques which are widely discussed in the literature, and which are often chosen for their effectiveness in reducing waste and creating value in an organization, are shown in Table 1.

Table 1: Lean Management Techniques

Sr. #	Lean Management Techniques (Tools)	References																												
		Furlan et al. (2011)	Liker, (2004)	(Miltenburg, 2001)	(Pettersen, 2009)	(Saurin, Marodin, & Ribeiro,	Shah (2003)	(Spear & Bowen, 1999)	Nordin et al. (2010)	(Forza, 1996)	(Hunter & Black, 2007)	Almstro¨m and Kinnander	Yoshimori (2005)	(Salaheldin & Mukhalalati,	(Gurumurthy & Kodali, 2009)	(Knuf, 2000)	(Smalley, 2004)	(Radnor & Walley, 2008)	(Salem, Solomon, Genaidy, &	Golicic and Medland (2007)	(Bhasin, 2011)	(Birgün Barla, 2003)	(Kundu & Manohar, 2012)	(Radeka, 2010)	(Myerson, 2012)	(Anholon & Sano, 2016)	(Losonci & Demeter, 2013)	(Kumar, Antony, Singh,	(Hooi & Bakar, 2015)	(Belekoukias, Garza-Reyes, &	(Coetzee, Van der Merwe, &
1	Housekeeping (5s)	✓	✓	✓	✓	✓	✓	✓	✓	✓																		✓			
2	Cellular manufacturing	✓	✓	✓	✓	✓	✓		✓	✓																✓					
3	Skilled workers on place		✓		✓	✓																									
4	Total Production Management (TPM)			✓			✓	✓			✓																	✓			
6	Documentation					✓						✓														✓					
7	Production based on pull						✓																								
8	Problem solving	✓					✓		✓				✓																	✓	✓
9	Benchmarking		✓			✓								✓	✓	✓	✓														
10	Standardized activity		✓			✓										✓	✓														✓
11	Visual management						✓											✓	✓												✓
12	Understanding the customer						✓							✓						✓	✓	✓	✓	✓		✓					
13	Customer involvement and feed back						✓		✓					✓						✓						✓				✓	

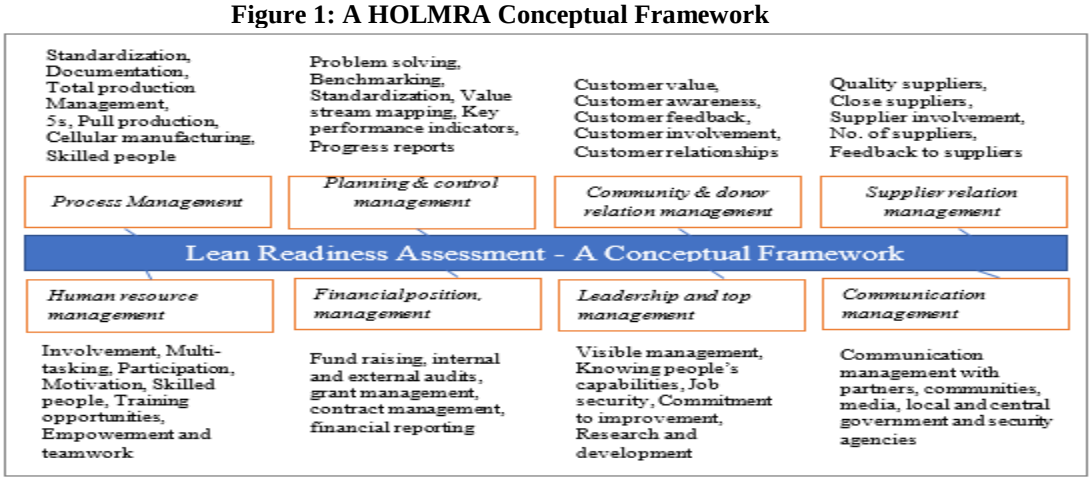
14	Quality suppliers						✓		✓					✓																	
15	Supplier location						✓														✓	✓	✓	✓		✓				
16	Number of suppliers						✓															✓	✓	✓						
16	Supplier relationship						✓		✓											✓						✓				✓	
17	Supplier involvement						✓		✓																	✓				✓	
18	Supplier feedback						✓																			✓					
19	Participation of employees						✓		✓	✓				✓		✓										✓					✓
20	Skilled and multi-skilled workers								✓	✓	✓																				
21	Training								✓	✓						✓					✓					✓				✓	
22	Motivation		✓			✓			✓		✓			✓						✓						✓					✓
23	Teamwork	✓							✓							✓				✓						✓				✓	
24	Visible management								✓	✓																					
25	Knowing people's capabilities									✓													✓	✓							
26	Job security																							✓							
27	Just in time (JIT)									✓																					
28	Cellar design	✓																			✓								✓		
29	Point of use storage	✓																									✓	✓	✓		
30	Reduction in the batch sizes	✓				-														✓								✓			
31	Communication Management	✓							✓																✓	✓					
32	Process integration																								✓						
33	Management of																								✓				✓	✓	✓

	employees																													
34	Risk management																							✓						
35	Stakeholders management																							✓						
36	Top management																							✓	✓			✓		
37	Value stream mapping																							✓	✓	✓	✓			
38	Dominant Characteristics																							✓	✓	✓	✓	✓		
39	Leadership																							✓	✓	✓	✓	✓		✓
40	Organization glue																							✓	✓	✓	✓	✓		
41	Strategic emphases																							✓	✓	✓	✓	✓		
42	Criteria of success																							✓	✓	✓	✓	✓		
43	Continuous improvement																											✓	✓	✓
44	Respect for people																													✓

III. DEVELOPMENT OF A CONCEPTUAL FRAMEWORK FOR HUMANITARIAN ORGANIZATION LEAN MANAGEMENT READINESS ASSESSMENT (HOLMRA)

A shared goal of HOs is to serve many people, serve them well, using resources efficiently and effectively, with no profit motive, in coordination with numerous stakeholders (community, donors, government and corporate sector). An HO's operations involve all the supply chain functions of a corporation, like warehousing, logistics, distribution, sourcing, sharing of information and human resource management, with the notable exception of manufacturing processes. Using the lean readiness assessment models of Denison and Mishra, (1995) and Al-Najem et al., (2012) as a starting point, this study features 8 CSFs (1 process management, 2 planning and control management, 3 customer relation management, 4 supplier relation management, 5 human resource management, 6 financial managements, 7 leadership and top management, 8 and communication management) integrated into the HOLMRA conceptual framework, as presented in Figure 1. Communication management and financial management are introduced as additional factors which have not been considered before in prior studies. An HO's often irregular source of funding, or its dependency on donations, makes sound financial management vital. Communication management is introduced into the framework because of its particular importance in an HOs' structure, which is complex and by nature often operating in the environment of an emergency, where timely communication is crucial. As can be seen, the eight CSFs and more than forty-three lean management techniques that are featured in HOLMRA, and that are intrinsically linked and bound to the elements of Lean Management (lean philosophy, principles, techniques, wastes, frameworks) are conceptualized. Lean management techniques/tools are chosen from the list previously identified in Table 2. Through discussions with HOs professionals, the conceptualised CSFs and specific lean management techniques were validated and are re-grouped (shown in Figure 3) to be better able to assess the readiness of HOs supply chain management operations to become lean.

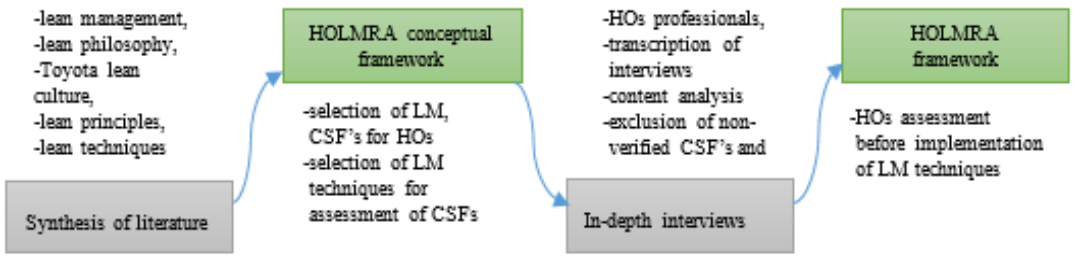
Figure 1: A HOLMRA Conceptual Framework



IV. METHODOLOGY

This study used a qualitative approach which is comprised of three steps. The first step was a comprehensive literature review of 71 peer-reviewed articles on the topics of Lean Management elements (i.e. LM, definitions, philosophy, Toyota lean culture, lean principles, and lean techniques) and existing Lean assessment and Lean readiness assessment frameworks (shown in Figure 2). Using the literature review as a foundation, the second step was the development of a new, conceptual framework to assess the readiness of a humanitarian organization to adopt LM. The third step was the series of in-depth interviews with HO supply chain professionals, which were designed to assess, refine and reinforce the second step's conceptual framework and to reproduce the final completed humanitarian organization lean management readiness assessment (HOLMRA) framework, as depicted in Figure 2.

Figure 2: Research methodology schematic diagram



The literature review, Step 1, was conducted by searching for relevant studies in "Science direct", Emerald", "Scopus", "Web of Since", and "Google Scholar" databases, using the keywords: "humanitarian logistics and supply chain management", "lean management in humanitarian organizations", "lean management in humanitarian logistics and supply chain management", "lean management assessment frameworks", "lean management readiness assessment", lean management techniques", "Lean management elements", "lean management measurement", "lean management critical success factors", "lean management in humanitarian organizations", and "lean management principles". All studies found were initially screened by reviewing the title of the study, and the studies apparently of interest were further screened for final inclusion or exclusion by reviewing the abstracts of the studies. All the screening processes were undertaken in accordance with a pre-established set of inclusion and exclusion criteria, described in Table 3.

Only published studies were considered for review, with unpublished studies excluded. Lean management CSFs and LM techniques described in the studies, shown in Table 1 & 2, were used as input into Step two for the initial development of the conceptual framework of HOLMRA. The LM CSFs and LM techniques that were selected were considered to be appropriate for HOs logistics and supply chain operations, given that the non-manufacturing and non-profitable motives of an HO are different from corporate logistics and supply chain operations. In Step three, the CSFs and LM techniques that had been identified were used in new conceptual framework developed for HOLMRA, having been refined and validated by the interviews carried out, an important focus of which was the review and refinement of the Critical Success Factors and the Lean Management Techniques as they appeared in the preliminary conceptual framework (Step 2, Figure 1). The HOs professionals who provided this data were knowledgeable, experienced supply chain management professionals. Specifically, it was decided that they should be supply chain expert currently working for HOs, and having a minimum of 5 years of experience in this area. Using the author's professional relationships within the HO sector, and applying snowball sampling techniques, more than 15 HOs professionals were contacted for interviews and 6 of them agreed to be interviewed. Interviews were recorded as audio, and were usually just under an hour long for each respondent. The recorded comments and views were then fully transcribed verbatim. Various aspects of the preliminary conceptual HOLMRA framework, initially created through the literature review, were tested during the interviews, and transcripts were iteratively analysed using open, axial and selective coding techniques.

In order to code the interview contents and to analyse the resulting categories and to identify the conceptual themes, the Content Analysis method (a set of rigorous research procedures leading to the emergence of conceptual categories) was applied. Overall, multi- strategy approach was applied, analysing both primary and secondary sources of data, which proved to be a useful research method, allowing the intrinsic cross-checking of the various findings. The HOLMRA Framework is the first tool developed specifically for the purpose of assessing the readiness of an HO to implement a Lean Management System. The HOLMRA Framework included the assessment of an HO's degree of readiness, existing foundations for LM

implementation and, if the HO is not yet ready to adopt LM, the distance from LM implementation.

Table 2: Inclusion and exclusion criteria

Inclusion criteria	Exclusion criteria
• Relevant research into lean management assessment/ measurement/ evaluation frameworks, tools/techniques, Toyota lean philosophy, Toyota lean culture, lean principles, lean critical success factors and relevant to HOs lean operations	• Studies focussing on Agility and Leagility management
• Contribution of theoretical and empirical research of peered reviewed published studies	• Research which did not match the quality of assessment, such as the consideration of peer reviewed and published studies only
• Both academic and practitioners research studies which fall under the scope of described map	• Studies which were out of the scope of developed map

V. RESULTS AND DISCUSSIONS

Qualitative data derived through the interviews was analysed by applying content analysis technique. Content analysis is a systematic means by which valid inferences from verbal, visual, or written data are derived, in order to describe and quantify specific phenomena (Saunders et al., 2009). Themes relevant to the conceptual framework are synthesised through the content analysis of the transcripts of the recorded interviews. Each interview with an HO professional began with a formal introduction between the interviewer and the interviewee, and the purpose of the study was then briefly explained, and the conceptual framework was presented. A summary of the respondents' interview findings is shown in Table 4.

Table 3: Summary of the HOs Professionals' Interviews

No.	Gender	Age	HO experience in years	Current Position	Degree relevant to Supply Chains	Type(s) of HO in work experience
1	Male	42	15	Operations director	No	Both International & National
2	Male	38	12	Admin and Logistic Officer	No	International
3	Female	39	12	Research Officer	No	Both International & National
4	Female	28	7	Admin, Logistics and H.R Officer	Yes	International
5	Male	32	10	Supply Chain Officer	Yes	International
6	Male	35	11	Senior Admin and Logistics Officer	Yes	National

V.I. RESULTS OF HOS PROFESSIONALS' INTERVIEWS

Interviewees agreed that every HO is not ready to implement the LM system and agreed that an assessment of an HO's LM readiness is essential prior to, and to prepare an HO for the successful adoption of the Lean Management System. The conceptual framework has been refined, verified, and solidified based on themes derived from the interviews. The details of each CSF with its necessary lean elements appear below:

V.I.I. PROCESS MANAGEMENT

Process management is considered as a vital factor for implementation of LM and for improvement of overall performance of the organization. The non-value-adding activities can badly affect employee efficiency (Gotzamani & Tsiotras, 2001; Lewis, Pun, & Lalla, 2006; Q. Zhang et al., 2012; Z. Zhang, Waszink, & Wijngaard, 2000). The HO professionals compiled a list of processes which are often involved in HO-LSCM that included *distribution processes, financial processes, safety processes, warehousing processes, inventory processes, security processes, procurement processes, monitoring and evaluation processes, logistics processes, information and administrative and coordination processes*. All interviewees spoke of process management as a key prerequisite for bringing efficiency to the HOs sector. Three of the six interviewees mentioned that HOs are involved in *two types* of processes. The *first* is relevant to *normal operations* of the HOs, while the *second* is relevant specifically to *emergency operations*. The processes related to *emergency operations* are, by necessity and design, relaxed in terms of policy, since they must focus on timely effectiveness, i.e. how quickly the supply chain department can respond to and meet the often sudden and extreme demand for humanitarian goods and services. On the other hand, supply chain processes during *normal operations* are stricter in implementation, focussing on minimal waste and greater enforcement of transparency and accountability. It is clear that when assessing the readiness of HOs for LM, process management plays a vital role. The various elements of process management assessment expressed by HOs professionals fall into the following themes: *standard documentation, implementation of 5S techniques, smooth flow of goods and information, skilled workers, and sourcing of material/supplies/services based on pull techniques*. One of the interviewee voiced the concern that international and national HOs supply chain management departments tend to be habitually ignored and often have not been given the amount of leverage reasonably required for effective planning and strategic decision making.

V.I.II. PLANNING AND CONTROL MANAGEMENT

The function of planning and control management is to push an organization to continually improve on itself and to monitor the progress of planned improvements. One of the prime functions of planning and control management, as articulated by the HOs professionals, is to continue the equal level of quality of humanitarian services as well as ensuring a high satisfaction level in the community and donors. Further comments from the participating HOs professionals indicated that the important role that the logistics and supply chain management staff have in the organization has often been overlooked and undervalued, leading to Supply Chain Management (SCM) staff often being left out of strategic planning important to the HO, for example planning of budgets, project implementation, and training and development. Logistics and supply chain professionals being left out of important planning matters, without an opportunity to contribute their experience, ideas, and concerns, can have disastrous consequences for the organization and the people they serve. Shutting out the logistics and supply chain department can cause serious budget issues and unnecessarily delay the delivery of critical humanitarian goods and services. It has also been pointed out that in too many HOs, non-technical people (with no relevant education or experience) have been assigned to HO-LSCM departments, resulting in a burdensome waste to the organization. Clearly, planning and control can be improved and HOs can identify and solve many of these problems through *value stream mapping* techniques. Some of the important planning and control management elements include standardization and supply chain benchmarking etc.

V.I.III. CUSTOMER RELATIONSHIP MANAGEMENT

Any organization needs to attain and maintain the satisfaction of their customers (who are paying for the product) while at the same time optimizing utilization of resources (Golicic & Medland, 2007; Gossler, Wakolbinger, & Burkart, 2020; Zu, Robbins, & Fredendall, 2010). Naturally customer satisfaction is easier to attain if the organization is very knowledgeable about their customers' requirements. The HOs professionals interviewed explained that the aim of humanitarian organizations is to provide humanitarian services to their specified communities and satisfy the expectations of both *beneficiaries* and *donors*. The

interviewees pointed out that since HOs are non-profit organizations, the term "*customer*" does not really fit in this sector. Instead, the HOs sector usually uses words like "*community"*, and *"beneficiary"*. The organization's relationships to both their beneficiaries and their donors need to be strong to minimize waste and increase organizational efficiency through LM. One of the interviewees illustrated and highlighted the importance of the relationship with beneficiaries by illustrating a case from his own practical experience wherein, during the 2010 flood response in Pakistan, his organization procured toothbrush/toothpaste sets as part of a health and hygiene kit, without knowing much about the beneficiaries' requirements. Much to the HO's surprise, they then found out that the specified community were not accustomed to that method for cleaning their teeth, and the toothbrush/toothpaste sets remained unused and were simply a waste. Through feedback from quick interviews with beneficiaries, the HO came to know that those peoples were used to a traditional brushing method which is known as *"miswak"*. After realizing their mistake, they replaced the earlier toothbrush/toothpaste sets with miswak (twigs of the 'Salvadora persica' tree) and in this way they prevented further waste. Good knowledge of local customs, religious inclinations, social mores and traditional beliefs and practices would seem to be essential. The professionals mentioned that the keys to donor satisfaction include strong documentary evidence, accountability, transparency and maximum relief for the community, while keys to community/beneficiary (customer) satisfaction include maximizing quality, quantity and timely delivery of required products (supplies, works and services). The elements recommended by HOs professionals for assessment of donor and customer relationships are: *Awareness of donors and community, Feedback from donors and community, Involvement of donors and community, Understanding the donor and community, and Organizational relationship with donors and community*.

V.I.IV. SUPPLIER RELATIONSHIP MANAGEMENT

Access to quality suppliers can enable organizations to deliver quality products within a stipulated time period (Found & Harrison, 2012; Golicic & Medland, 2007; Zu et al., 2010). Interviewees pointed out that in the HOs sector, supplier relationship management is considered equally important as the management of donor and community relationships. It was explained that in the HOs sector supplier management is a challenging task, due to the wide variation of types of procurement. HOs need to procure different types of items (e.g. equipment, supplies, works, services and inventory) which may belong to different cadres (e.g. food, health, education, shelter and consultancy services). Such diversified procurement requires the HOs to maintain relationships with a wide array of cadres of suppliers. For the sake of efficiency, the HOs professionals recommended keeping the number of suppliers low within each cadre. They commented that if HOs encourage their good suppliers instead of dividing business between many suppliers then it will promote a positive organizational relationship and HOs will gain more negotiation power. Working with fewer suppliers can result in a larger volume of business for existing suppliers, which can particularly motivate them to provide goods and services of high quality. But, in the case of disasters, the professionals recommended maintaining larger number of suppliers, because that strategy would be more flexible and could provide the goods and services more quickly and effectively. Thus, whether in normal situations or disaster situations, in both cases the supplier relationship is an important factor. Some important elements for suppliers and HOs relationship assessment, which have been pointed out by the professionals are: *Quality suppliers, Supplier involvement, Number of suppliers, Suppliers feedback, and framework agreements.* It is worth noting that often government regulations, and indeed internal guidelines, demand access by a wide variety of potential suppliers, with an often arduous and lengthy tender and procurement process, to ensure at least an appearance of fair and open access to all suppliers.

V.I.V. HUMAN RESOURCE MANAGEMENT

Human resource management (HRM) is an important function recognized by HOs professionals to raise the overall efficiency in an organization. Well trained and knowledgeable employees must be seen as an asset for any HO to bring innovation and efficiency to the humanitarian supply chain management system. Unfortunately, it is reported that this has not been the case for HOs logistics and supply chain management employees, and they have often not been given the necessary training and development opportunities. This

is seen as being one of the common reasons for waste and lack of efficiency in the HO-LSCM field. In contrast, United Nations Agencies are considered comparatively well organised, and UN logistics and supply chain management staff are empowered and also given equal learning opportunities. Another common grievance expressed during the interviews was that high employee turnover was common at many HOs, with employees leaving for various reasons that included the short term of project based employment, closures of job contracts, job insecurity generally, and inconsistent salaries both within an organization and between organizations. The resulting turnover of employees generates much waste. The elements proposed by the HOs professionals for readiness assessment of the HRM CSFs are: *participation of employees, skills and multi-skilled workers, training & development, appreciation/motivation, and teamwork.*

V.I.VI. FINANCIAL POSITION

HOs professionals commented that some financially strong organizations might be in a convenient position to adopt the efficient resource consumption model of LM but that some other organizations of similar financial strength may not be ready to adopt that model, so financial strength is not a reliable predictor of readiness. Two interviewees who were experienced with both national and international organizations pointed out that there are many organizations with huge budgets, and yet their spending habits are constraining as well as traditional and include no innovative aspects. On the other hand, some organizations that are comparatively weak in their financial position are notably more innovative in their management of supply chain operations. Thus, out of six professionals interviewed, four pointed out that a strong financial position, while of course always desirable, is not actually necessary for the initiation of the efficiency techniques of LM. After careful consideration of the interviewees' comments, this factor was ultimately removed from the HOLMRA Framework.

V.I.VII. INTERNAL AND EXTERNAL COMMUNICATION MANAGEMENT

In supply chain management the communication and coordination is sharing, goal congruence, decision synchronization, resource sharing, and joint knowledge creation (Cao, 2010). The HOs professionals were cognizant of the key role of communication and coordination in enhancing the organizational performance of the HO, and for developing closer relationships with and between the stakeholders (suppliers, government, donors, media, security agencies, and the community at large). The internal and external communications within the HO, both vertically up the chain of management, and horizontally between departments and divisions, (e.g. procurement department, program department, human resource department, logistics department, finance department and security department), were equally important for organizational performance. The HOs professionals commented that, without proper communication and coordination, it would not be possible to achieve the 7R's (right goods, right time, right place, right source, right cost, right condition and right quantity). Of the various stakeholders identified, the role of the media is of particular importance, by highlighting and publicising poor-quality services or the low quality of goods provided by the various stakeholders, thereby bringing pressure to bear on the HOs to ensure the accountability and transparency in overall resource consumption. Of growing importance around the world are matters of public safety and security, and the need for strict accountability, requiring greater involvement of stakeholders, which has also enlarged the importance of communication, coordination and good relationships between the stakeholders. When assessing the communication and coordination factors readiness, the HO professionals identified these factors as being of significance: *vertical communication, horizontal communication, media coordination, coordination with security agencies and governmental relations*.

V.I.VIII. TOP MANAGEMENT AND LEADERSHIP

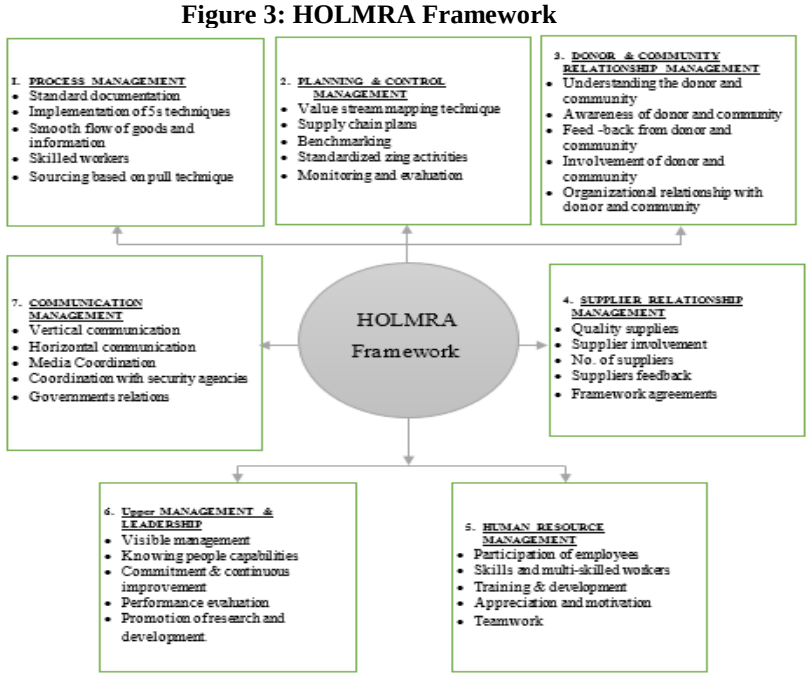
The HO Professionals indicted in the interviews that the success of any HO can be measured by the amount and quality of the humanitarian services delivered, and the efficiency of delivery, which is only possible to be achieved through commitment and organizational vision. To set and promote the organization's vision is the responsibility of the organisational leaders and of top management, and which provides important

objectives for HOs sector efficiency management. The HOs professionals also commented that the leadership provided by top management sets the basis of the organization's culture, encompassing ethical and proper relationships with and between subordinates, as well as with external stakeholders. A supportive, respectful and caring organizational culture will lead the organization towards efficient and effective performance and achievement of goals. One of the interviewees at a national organization commented that the CEO of his organization is very kind and humble, always encouraging the involvement of middle and lower level staff, including drivers, cooks and office boys. He sought and encouraged feedback and followed up on lessons learned with meetings where staff recommendations were always given the equal weight to those of senior officers and managers. Another interviewee said that in his organization there is no concept of boss and subordinate; everyone is respected in their role, and their performance. This interviewee also commented that his organization head often served him tea, and he has also done the same with the staff under his supervision. This indicated that no activity or staff member was too trivial or unimportant within the larger activities of the organisation. They commented that the actions given as examples provided a good environment for successful teamwork, contributed to organizational efficiency, and reduced waste. The most significant elements for assessment of leadership and top management, identified by the HOs professionals, are: *visible management, knowing people capabilities, commitment & continuous improvement, performance evaluation, and promotion of research and development.*

V.II. DEVELOPMENT OF HUMANITARIAN ORGANIZATIONS LEAN MANAGEMENT READINESS ASSESSMENT (HOLMRA) FRAMEWORK

The Lean Management Readiness Assessment Conceptual Framework was refined, verified, and consolidated based on themes derived from the interviews, presented as a new framework, titled the Humanitarian Organizations Lean Readiness Assessment (HOLMRA) Framework, which is presented below in Figure 3. This new framework is a consolidation of 7 critical success factors and 35 lean elements. Adoption of this HOLMRA framework provides more efficient use of resources without compromising the organisation's goals and integrity, thereby increasing the organization's ability to respond to the needs of the people it aids.

Figure 3: HOLMRA Framework



VI. CONCLUSION

The literature review made clear that the nature of LM is more philosophical than technical, and LM should not be implemented like a plug and play system. An HO really needs to understand the comprehensive philosophy of the lean system for its successful implementation. The HOLMRA framework is an effective way to help humanitarian organizations do just that, thereby maximizing their readiness to gain the benefits of the LM system in the organization. The HOLMRA framework measures HOs' readiness to implement LM in their processes. The framework is constructed from LM practices expressed in the form of CSFs, which were developed from in-depth interviews with experienced HOs supply chain professionals following a comprehensive literature review on LM elements and existing assessment frameworks. The seven CSFs identified for assessment of HOs supply chain operations are: *Process Management, Planning and Control Management, Donor and Community Relationship Management, Supplier Relationship Management, Human Resource Management, Communication Management, and Leadership Managemen*t. Each of these CSFs in turn consists of key Lean Elements. Together the *CSFs* and their respective *Lean Elements*, explained and demonstrated with practical examples from the field, form a solid framework for understanding and assessing LM readiness in HOs supply chain operations. This study has served to build practical awareness in the HOs sector about LM readiness. Moreover, HOLMRA framework can be applied to evaluate an HO's readiness to apply a LM approach to its humanitarian supply chain management. Having this framework will, in our view, contribute significantly to savings in time and money, and thereby contributing to the economic sustainability of the HOs.

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