Research paper

Humanitarian aid: an agile supply chain?

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Abstract
Purpose – The purpose of this article is to investigate the nature of the humanitarian aid supply chain and discuss the extent to which certain business supply chain concepts, particularly supply chain agility, are relevant to humanitarian aid.
Design/methodology/approach – The paper identifies elements of good practice in conventional business supply chains and applies them to the humanitarian aid supply chain, making use of published practice-based literature and web sites associated with humanitarian aid. Particular emphasis is placed on the concept of "agility" in supply chain management. A model of an agile supply chain for humanitarian aid is developed.
Findings – Humanitarian supply chains have similarities with business supply chains, but there are significant differences. Many humanitarian supply chains have a short and unstable existence with an inadequate link between emergency aid and longer-term developmental aid. Unlike many business supply chains, typical emergency aid appeals assign inventory to a particular destination at the supply chain source.
Practical implications – This research note is a starting-point for empirical studies to test the agile humanitarian supply chain model.
Originality/value – This paper seeks to integrate humanitarian aid practice with concepts in the academic supply chain literature. In particular, proposes that humanitarian donors need convincing of the value of supply chain processes.

Keywords Aid agencies, Supply chain management

Paper type Research paper

Introduction

An extensive humanitarian relief community has developed since the second world war (Therien and Lloyd, 2000). It includes multilateral agencies such as the United Nations High Commission for Refugees (UNHCR), and the World Food Programme (WFP)[1] which is supported entirely by voluntary contributions, mainly by governments both in cash and in kind, as well as a wide range of non-governmental organisations (NGOs) both national and international.

Humanitarian aid is prone to political and military convenience of both donor and recipient countries and to the exigencies of the "donor industry", and often lacks a coordinated plan. NGOs often compete with each other for donations, with donors generally more sympathetic to emergencies than longer-term aid and development leading to wide divergence in levels of funding (Munslow and Brown, 1999; Bookstein, 2003). However, coordinated supply chains are well-established in business, and this paper seeks to apply key assumptions of business supply chain management and to determine their suitability for the analysis of humanitarian supply chains.

The current issue and full text archive of this journal is available at
www.emeraldinsight.com/1359-8546.htm

Supply Chain Management: An International Journal
11/2 (2006) 115–120

[DOI 10.1108/13598540610652492]

The humanitarian supply chain

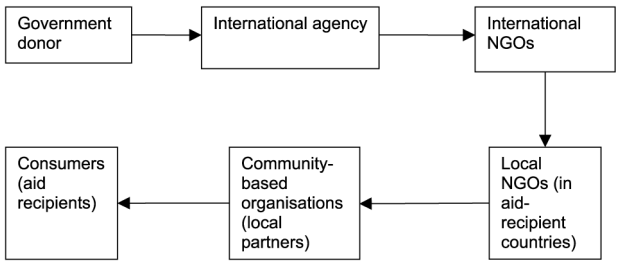
There is no single form of humanitarian supply chain, although a typical supply chain could follow the sequence in Figure 1.

The supply chain in Figure 1 describes a multilateral approach through international agencies and NGOs, although aid is often given on a bilateral country-to-country basis, and delivered in a number of ways. Unlike most business supply chains, the humanitarian aid supply chain is often unstable. Sometimes, the supply chain breaks down at the receiving end (Munslow and Brown, 1999; Stewart, 1998; Byman *et al.*, 2000), but it may also be unstable at its origin for two main reasons: politicised donations by governments and the competitive nature of fund-raising from private donors (Ebersole, 1995; Oloruntoba and Gray, 2002; Bennett and Daniel, 2002).

Supply chain management and humanitarian aid

The parameters of supply chain management are a subject of some debate (e.g. Mentzer *et al.*, 2001; Cooper *et al.*, 1997; Croom *et al.*, 2000), but for the purposes of this paper we shall make certain assumptions about good practice in supply chain management. They are that there should be a planned approach; that a longer-term, strategic perspective is adopted; and that it is important to coordinate functions. If we attempt to apply such concepts from the "business model" to the humanitarian aid supply chain, we find many parallels but also important differences.

Figure 1 A typical humanitarian supply chain



A planned approach

There is evidence of a frequent lack of planning in humanitarian supply chains, resulting in inefficiencies, e.g. overuse of expensive and unsafe air charter, failure to pre-plan stocks, congestion caused by unplanned deliveries (Byman *et al.*, 2000), and a lack of inter-organisational collaboration for information systems (Long, 1997; Long and Wood, 1995). Nevertheless, steps are taken to anticipate events (Byman *et al.*, 2000; Oxfam, 1999)[2]. The WFP or the relevant UN agencies, such as UNICEF or UNHCR, usually play a key role in the mobilisation of aid and in primary logistics in large-scale disasters. The WFP, for instance, may be responsible for all food aid logistics up to the extended delivery points (EDPs) at inland destinations close to the affected area with other humanitarian agencies or governments of recipients responsible thereafter (UNHCR, 1997)[1]. Logistics coordination between NGOs has improved in recent humanitarian operations (Van Wassenhove and Samii, 2003) with shared equipment, assets or resources such as aircraft, trucks, food stocks, forklifts etc., and with some agencies or even individuals designated as having the best local knowledge and contacts.

A longer-term, strategic perspective

Despite some improved coordination, evidence suggests that the humanitarian aid programme has become less strategic in the past decade (Byman *et al.*, 2000)[1], and development agencies are contrasted with disaster-oriented agencies (Long, 1997). Some argue that a better model would be a "relief to development continuum" where there is a transitional stage (Munslow and Brown, 1999), similar to the changing marketing and logistics strategies required for different stages of the product life cycle (Bowersox and Closs, 1996). Aid organisations may also be issue-related and therefore exist only temporarily, with each humanitarian effort requiring a new supply chain (McEntire, 1999).

The importance of coordinated functions

Emergency humanitarian logistics operations frequently require the involvement of several governments and independent NGOs, as well as the use of a number of transport modes (Beresford and Rugamba, 1996). International humanitarian operations may be hindered by administrative and logistical bottlenecks because of poor infrastructure in the aid-receiving region and the multiplicity of agencies and governments (Van Wassenhove and Samii, 2003), and are often in conflict zones, thus hindering efficient delivery and distribution of relief cargoes to the needy (Van Wassenhove and Samii, 2003). Coordination may be inadequate (Auf der Heide, 1989; Mileti, 1999) because of geographical dispersion, insufficient or inaccurate communication between the field and the head offices of humanitarian organisations, and between different organisations. Some organisations may exceed their authority and act in a controlling or domineering manner (Dynes, 1994).

Some aid organisations are highly structured functionally, whereas others are highly decentralised although with strong informal networks. Byman *et al.* (2000) provide an extensive review of NGO structures, although largely from the perspective of potential collaboration with the US military. They claim that there are too many participants in the field without a clear division of labour, and refer to differences between the focus of NGO headquarters and their field workers, with the former more concerned with relationships with donors than with delivery to aid recipients.

Commercial aspects of humanitarian supply chains

Commercial supply chains focus on the final customer as the source of income for the entire chain. However, in humanitarian supply chains the end user (the recipient or consumer of aid) seldom enters into a commercial transaction and has little control over supplies. Instead, "customer service" or "marketing" of the humanitarian service may need to target the supplier/donor, who has to be convinced that humanitarian action is taking place. For example, there may be greater "humanitarian visibility" in providing food or medicine before basic logistical equipment such as forklifts, although the latter may be necessary for effective delivery of the former (Byman *et al.*, 2000).

Humanitarian aid: the potential for an agile supply chain

The concept of "agility" is more frequently applied to manufacturing (Goldman and Nagel, 1993; Goldman *et al.*, 1995), but is also relevant to supply chains (Christopher and Towill, 2000). Agility has been defined as "the ability to thrive and prosper in an environment of constant and unpredictable change" (Maskell, 2001); as "all about customer responsiveness and mastering market turbulence" (Van Hoek *et al.*, 2001); and as "a business-wide capability that embraces organisational structures, information systems, logistics processes and, in particular, mindsets" (Christopher and Towill, 2000). The issue of customer responsiveness is problematic when considering the humanitarian supply chain. As stated earlier, the "customer" to be satisfied in the humanitarian supply chain is in effect the donor. Therefore, agility in the context of humanitarian supply chains must address the unstable nature of funding (Bennett and Kottasz, 2000), where institutions such as charities are regularly required to raise large amounts of money at short notice to provide emergency assistance. Concern by donor governments for certain aid to be used for specific relief operations in particular countries drives humanitarian organisations to focus on short term direct relief and distribution, rather than long term investment in logistics systems and processes.

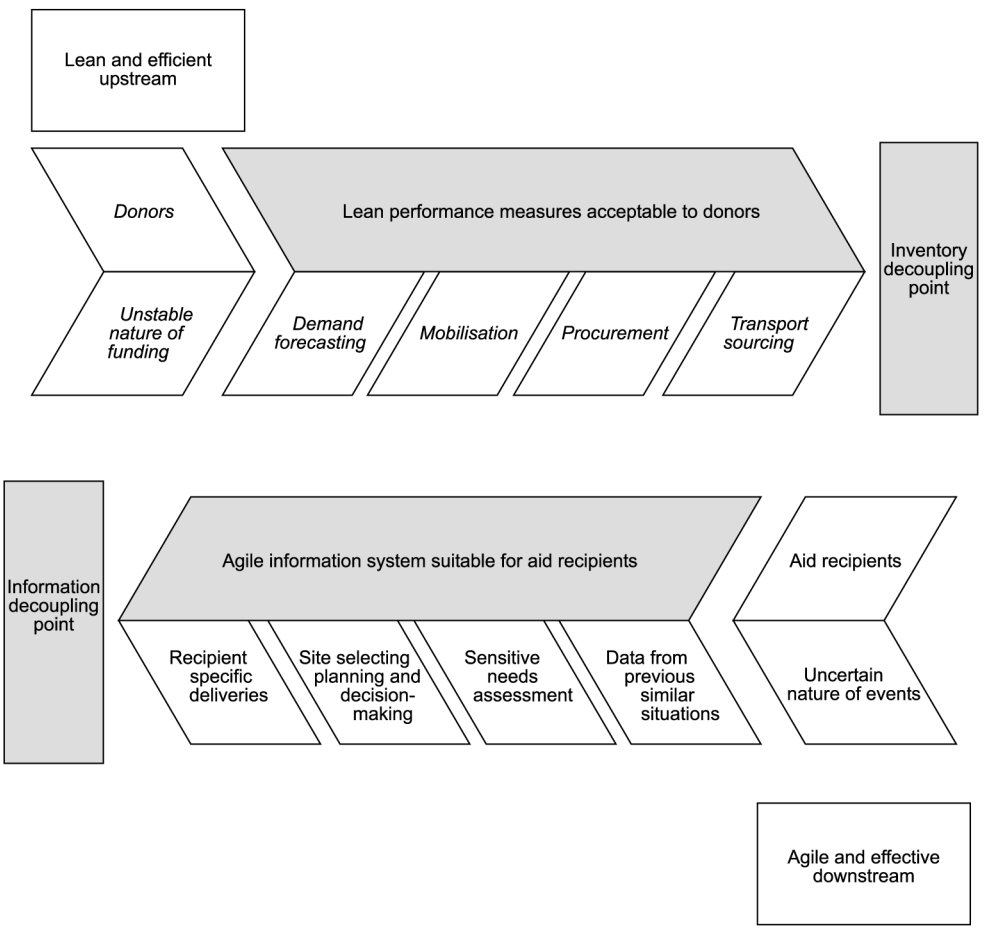
International humanitarian supply chains are clearly unpredictable, turbulent, and requiring flexibility, and therefore insights are to be gained from assessing their potential as agile supply chains. Figure 2 presents the issues raised in this section. The authors propose that the shaded areas in Figure 2 are where academic supply chain research can play an important role in concept development. The following discussion considers some of the issues relevant to Figure 2.

The decoupling point is where a product in the supply chain ceases to be forecast-based and becomes a specific customer order (Van Hoek, 1997), or where market "pull" meets upstream "push" Christopher and Towill (2000). The latter suggest that there are two decoupling points: for strategic inventory, maintained in a generic form as far downstream as possible (the principle of postponement); and for demand information, which should move as far upstream as possible. They propose that the proper location of decoupling points for material and information flows can produce a hybrid supply chain that combines a lean and efficient supply upstream and an agile and effective supply downstream.

Applying this principle, the humanitarian supply chain at the level of the international donor in developed countries should be lean for upstream activities such as needs assessment (remote demand forecasting), mobilisation of sufficient financing, people, skills and goods, procurement, transportation sourcing, disaster preparation and planning and related upstream supply chain activities. Since the introduction of the concept of leanness (Womack *et al.*, 1990; Womack and Jones, 1994), different authors have adopted varying interpretations of the lean supply chain approach (Lamming, 1996; New and Ramsay, 1997). This research note adopts the definition of Lamming (1996, p. 184) of "value-adding processes unencumbered by waste". However, upstream activities in the humanitarian supply chain are usually lauded for their "agility". For example, credit is given to the speed with which a particular appeal can be instituted, and how generously and quickly donors can respond to a one-off event. Attraction of donors to a cause is largely based on such "agility appeal", and it may prove difficult to convince donors of the desirability of the routines and procedures necessary for longer-term supply chain efficiency and the waste elimination associated with leanness, but which have low media impact.

The inability of international humanitarian organisations to make particular relief items available is critical for many suffering people. Therefore, pre-positioning aims to position supplies or other resources at or near places where they are likely to be required. As a form of advanced planning, pre-

Figure 2 An agile supply chain for humanitarian aid



positioning occurs in both military (Chilcoat and Henderson, 1994) and humanitarian logistics[1]. The concept of postponement, which is in some respects the opposite of pre-positioning, has been associated with the decoupling points of supply chains in various articles (e.g. Van Hoek, 2001; Christopher and Towill, 2000). Postponement is intended to reduce the "anticipatory risk" of logistics, postponing commitment of inventory (both in form and in time) until customer orders are received (Bowersox and Closs, 1996). Applying effective demand-led inventory management through the principle of postponement may prove a cost-effective substitute for pre-positioning, enabling assignment of relief supplies to be as rapid as appropriate. These supplies, held as generic "strategic inventory", are then distributed according to the evolving needs of the end users. The postponement of commitment of inventory to final delivery results in the use of more accurate data and reliability of information about recipients' immediate needs. Maintenance of generic inventory may also help overcome security risks, including the risk of diversion away from aid recipients or the potential for violence.

The generic stock should be converted into recipient-specific deliveries in an agile way. Site selection planning and decision making derives from information input by local people regarding, for example, accessibility, terrain, weather and available facilities. The principle of postponement as a field level supply chain strategy should have a positive impact on the speed of response and flexibility, and thus agility in meeting the changing needs of end users.

The humanitarian supply chain, through an effective information infrastructure and sensitive needs assessment mechanism at the field level, would enhance supply chain agility by being very responsive to the changing needs of end users, and by being able to respond almost immediately to those changes. The agile supply chain is capable of reading and responding to real demand as it is demand driven and activated with a "feed forward mechanism" (Chandra and Kumar, 2001) from the field for data on actual end user requirements. The need and scope for "remote forecasting" of needs in the international donor countries would be much diminished, hence waste and costs from inaccurate forecasting and forecasting errors are reduced. The humanitarian supply chain thus becomes more information-based.

The integration of the supply chain is critical to the success of a global, responsive and agile humanitarian supply chain. The integration of internal capabilities and processes of organisations in the supply chain enhance the agility of the supply chain. However, the development of a more complex supply chain system to increase agility may add to the complexity of the problems encountered (Prater *et al.*, 2001). Inability to manage all humanitarian eventualities at the field level dictates a focus on the most important and feasible aspects of an agile supply chain, i.e. an optimal and realistic level of complexity that reflects an adequate degree of supply chain agility. There is little time to reflect on and improve supply systems, and therefore the lessons learnt from one disaster to the next are often lost (Van Wassenhove and Samii, 2003). Logistical experience is difficult to transmit from one field situation to the next.

The nature of humanitarian personnel, their diverse backgrounds and the organisational climate in many humanitarian organisations act against process integration. A survey of 45 international aid organisations found that over 80 per cent of all respondent organisations had a member of staff specialising in logistics and transport duties, but only 45 per cent had someone with a formal qualification in logistics, transport or related areas (Oloruntoba and Gray, 2003). Nevertheless, there are positive aspects in the development of the humanitarian supply chain, particularly in logistics. In major international humanitarian operations there is a general tendency towards more coordination and asset management, and less duplication of effort (UNJLC, 2003; Pan American Health Organisation, 2001)[3,4,5,6,7].

Conclusions

There is a growing body of practice-based literature on humanitarian supply chain management and logistics, but which seldom refers to well-established concepts in the academic supply chain literature. The aim of this paper has been to examine the applicability to the humanitarian aid supply chain of certain supply chain concepts normally applied in a business context. Although humanitarian supply chains have similarities with business supply chains, there are significant differences. Many humanitarian supply chains have a short and unstable existence, and there appears to be an inadequate link between emergency aid and longer-term developmental aid. Nevertheless, there are some encouraging examples of supply chain planning and coordination, and the development of a humanitarian logistics knowledge-base. It is understandable that donors prefer their money to be spent on tangible direct relief materials rather than information systems, or even logistics equipment. At present, a typical emergency aid appeal assigns inventory to a particular destination at the supply chain source. In other words, the inventory is committed to the donor's desired destination. Perhaps the supply chain academic community has a role to play in disseminating the concepts of its discipline in a way that convinces humanitarian donors of the importance and value of providing resources for appropriate information systems and supply chain processes as much as for tangible relief supplies.

Web sites

1 World Food Programme website: www.wfp.org/index.asp?section = 1 (accessed May 2004).
2 Reliefweb website: wwww.reliefweb.int/w/rwb.nsf/s/814BB7BD4FA5C90185256C590077F940 (accessed May 2004).
3 Fritz Institute website: www.fritzinstitute.org/fact_sheets/f_s-overview.html (accessed May 2004).
4 TPG website: www2.tpg.com/wfp/index.phtml (accessed May 2004).
5 Transaid website: www.transaid.org/ (accessed May 2004).
6 Atlas-Logistique website: www.atlas-logistique.org/ (accessed May 2004).
7 Global Hand website: www.globalhand.org/ (accessed May 2004).

References

Auf der Heide, E. (1989), *Disaster Response: Principles of Preparation and Co-ordination*, CV Mosby, Toronto.

Bennett, R. and Daniel, M. (2002), "Media reporting of third world disasters: the journalist's perspective", *Disaster Prevention and Management*, Vol. 11 No. 1, pp. 33-42.

Bennett, R. and Kottasz, R. (2000), "Emergency fundraising for disaster relief", *Disaster Prevention and Management*, Vol. 9 No. 5, pp. 352-9.

Beresford, A.K.C. and Rugamba, A. (1996), *Evaluation of the Transport Sector in Rwanda*, UNCTAD, Geneva.

Bookstein, A. (2003), *Beyond the Headlines: An Agenda for Action to Protect Civilians in Neglected Conflicts*, Oxfam Publishing, Oxford, pp. 40-1.

Bowersox, D.J. and Closs, D.J. (1996), *Logistical Management: The Integrated Supply Chain Process*, McGraw-Hill, New York, NY.

Byman, D., Lesser, I., Pirnie, B., Benard, C. and Waxman, M. (2000), *Strengthening the Partnership: Improving Military Coordination with Relief Agencies and Allies in Humanitarian Operations*, Rand, Washington, DC.

Chandra, C. and Kumar, S. (2001), "Enterprise architectural framework for supply-chain integration", *Industrial Management & Data Systems*, Vol. 101 No. 6, pp. 290-303.

Chilcoat, R.A. and Henderson, D.S. (1994), "Army prepositioning afloat", Defense Technical Information Center, Fort Belvoir, VA, available at: www.dtic.mil/doctrine/jel/jfq_pubs/jfq1004.pdf

Christopher, M. and Towill, D.R. (2000), "Supply chain migration from lean and functional to agile and customised", *Supply Chain Management: An International Journal*, Vol. 5 No. 4, pp. 206-13.

Cooper, M.C., Lambert, D.M. and Pagh, J.D. (1997), "Supply chain management: more than a new name for logistics", *International Journal of Logistics Management*, Vol. 8 No. 1, pp. 1-14.

Croom, S., Romano, P. and Giannakis, M. (2000), "Supply chain management: an analytical framework for critical literature review", *European Journal of Purchasing and Supply Management*, Vol. 6, pp. 67-83.

Dynes, R.R. (1994), "Community emergency planning: false assumptions and inappropriate analogies", *International Journal of Mass Emergencies and Disasters*, Vol. 12, pp. 141-58.

Ebersole, J.M. (1995), "Mohonk criteria for humanitarian assistance in complex emergencies", *Disaster Prevention and Management*, Vol. 4 No. 3, pp. 14-24.

Goldman, S.L. and Nagel, R.N. (1993), "Management, technology, and agility: the emergence of a new era in manufacturing", *International Journal of Technology Management*, Vol. 8 Nos 1/2, pp. 18-38.

Goldman, S.L., Nagel, R. and Preiss, K. (1995), *Agile Competitors and Virtual Organizations*, Van Nostrand Reinhold, New York, NY.

Lamming, R. (1996), "Squaring lean supply with supply chain management", *International Journal of Operations & Production Management*, Vol. 16 No. 2, pp. 183-96.

Long, D. (1997), "Logistics for disaster relief", *IIE Solutions*, Vol. 29 No. 6, pp. 26-9.

Long, D.C. and Wood, D.F. (1995), "The logistics of famine relief", *Journal of Business Logistics*, Vol. 16 No. 1, pp. 213-29.

McEntire, D.A. (1999), "Issues in disaster relief: progress, perpetual problems and prospective solutions", *Disaster Prevention and Management*, Vol. 8 No. 5, pp. 351-61.

Maskell, B. (2001), "The age of agile manufacturing", *Supply Chain Management: An International Journal*, Vol. 6 No. 1, pp. 5-11.

Mentzer, J.T., DeWitt, W., Keebler, J.S., Min, S., Nix, N.W., Smith, C.D. and Zacharia, Z.G. (2001), "Defining supply chain management", *Journal of Business Logistics*, Vol. 22 No. 2, pp. 1-25.

Mileti, D. (1999), *Disasters by Design: A Reassessment of Natural Hazards in the United States*, Joseph Henry Press, Washington, DC.

Munslow, B. and Brown, C. (1999), "Complex emergencies: the institutional impasse", *Third World Quarterly*, Vol. 20 No. 1, pp. 207-21.

New, S. and Ramsay, J. (1997), "A critical appraisal of aspects of the lean chain approach", *European Journal of Purchasing and Supply Management*, Vol. 3 No. 2, pp. 93-102.

Oloruntoba, R. and Gray, R. (2002), "Logistics for humanitarian aid: a survey of aid organisations", in Griffiths, J., Hewitt, F. and Ireland, P. (Eds), *Proceedings of the Logistics Research Network 7th Annual Conference, Technology Innovation Centre*, Birmingham, 4-6 September, pp. 217-22.

Oloruntoba, R. and Gray, R. (2003), *Humanitarian Aid Organisations and Logistics*, The Institute of Logistics and Transport, Corby.

Oxfam (1999), *Oxfam Logistics Handbook*, internal document, Oxford.

Pan American Health Organisation (2001), *Humanitarian Supply Management and Logistics in the Health Sector*, PAHO, Washington, DC.

Prater, E., Biehl, M. and Smith, M.A. (2001), "International supply chain agility: tradeoffs between flexibility and uncertainty", *International Journal of Operations & Production Management*, Vol. 21 Nos 5/6, pp. 823-39.

Stewart, F. (1998), "Food aid during conflict: can one reconcile its humanitarian, economic and political economy effects?", *American Journal of Agricultural Economics*, Vol. 80, pp. 560-5.

Therien, J.-P. and Lloyd, C. (2000), "Development assistance on the brink", *Third World Quarterly*, Vol. 21 No. 1, pp. 21-38.

UNHCR (1997), *Handbook for Emergencies*, UNHCR, Geneva.

UNJLC (2003), "The United Nations Joint Logistics Centre concept", available at: www.unjlc.org/content/item.phtml?itemId=12038&nodeId=file 4027648f2945f&fn=UNJLC_Concept%20 _18_Feb_2003.pdf (accessed May 2004).

Van Hoek, R.I. (1997), "Postponed manufacturing: a case study in the food supply chain", *Supply Chain Management*, Vol. 2 No. 2, pp. 63-75.

Van Hoek, R.I. (2001), "The rediscovery of postponement: a literature review and directions for research", *Journal of Operations Management*, Vol. 19, pp. 161-84.

Van Hoek, R.I., Harrison, A. and Christopher, M. (2001), "Measuring agile capabilities in the supply chain",

International Journal of Operations & Production Management, Vol. 21 Nos 1/2, pp. 126-47.

Van Wassenhove, L.N. and Samii, R. (2003), *The United Nations Joint Logistics Centre (UNJLC): The Genesis of a Humanitarian Relief Coordination Platform*, INSEAD, Fontainebleau.

Womack, J.P. and Jones, D.T. (1994), "From lean production to the lean enterprise", *Harvard Business Review*, Vol. 72 No. 2, pp. 93-103.

Womack, J.P., Jones, D.T. and Roos, D. (1990), *The Machine that Changed the World*, Rawson Associates, New York, NY.

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