Services operations management and humanitarian logistics

Graham Heaslip
School of Business, National University of Ireland Maynooth, Maynooth, Ireland

Received 14 December 2012
Accepted 15 December 2012

Abstract

Purpose – This paper aims to examine the nature of service operations management and its application to the field of humanitarian logistics. The purpose of this paper is to assess developments in the humanitarian logistics (HUMLOG) literature over the last six years and to lay out some opportunities for the HUMLOG academic community in the area of services operations management.

Design/methodology/approach – A systematic, quantitative review, consistent with suggestions that the methodological rigor of reviews of the management literature should be strengthened, was undertaken.

Findings – The paper suggests that there is an opportunity for HUMLOG academics to engage in the service operations management arena and apply their knowledge and skills to answer fundamental questions in the areas of servitisation, service developments, service standardisation, and the role of humanitarian aid (HA) organisations as logistics service providers and to apply their expertise in business services.

Research limitations/implications – The analysis was limited to 15 peer-reviewed journals with the word "humanitarian" and/or any of the phrases "disaster", "humanitarian aid", "humanitarian logistics", "humanitarian operations" or "humanitarian supply chains", in either their titles, abstracts or full texts. The results of this review and analysis, however, provide sufficient evidence to support the main arguments advanced in the paper.

Originality/value – The paper contributes to the knowledge and applications of services operations management in HUMLOG research.

Keywords Humanitarian logistics, Operations management, Services management, Services

Paper type Viewpoint

Introduction

The mismatch between global humanitarian needs and the resources available (Department for International Development, 2011), together with chronic vulnerability in many parts of the world, continues to have a direct bearing on the lives of millions of people in need of assistance (Humanitarian Policy Group, 2012). In this context, there is a growing understanding within the international humanitarian community of the need to further emphasise preparedness and resilience (Tatham, 2012) and fine-tune appropriate assurances on the quality and efficiency of the humanitarian response (Apte, 2009). This paper considers these gaps in terms of the servitisation of humanitarian logistics (Kovács and Spens, 2011).

In today's logistics world freight forwarding, transportation and other logistic contributions have become so well defined that the service component has in effect been productised. In other words, the intangible contributions of logistics have become so well defined and understood by customers and suppliers that in effect they are sold as a product (Johnston, 2005). As logistics providers struggle to differentiate themselves from their competition they have sought to become more and more integrated with their customer's processes. This trend becomes apparent when we look at industry leaders in humanitarian logistics such as DHL, Kühne + Nagel and UPS, all of which position themselves as providers of integrated services or solutions.

Journal of Humanitarian Logistics and Supply Chain Management
Vol. 3 No. 1, 2013
pp. 37-51

2042-6747
DOI 10.1108/20426741311328501

This paper examines the nature of service operations management and its application to the field of humanitarian logistics. Its main aim is to stimulate a debate on the growing influence services operations management is having on humanitarian logistics. The paper argues that by paying closer attention to the service humanitarian logistics provides we could make an important contribution to theory development in humanitarian logistics and services operations management.

The paper is organised into four sections. The next section provides some background on recent trends in humanitarian logistics literature. Included in this section is a description of the systematic review protocols used in collecting data. To increase understanding of how services operations management can be applied to humanitarian logistics examples of services operations management literature is then presented. This leads to a discussion of new opportunities for humanitarian logistics while the final section closes with a discussion, including implications for practitioners, and suggestions for future research.

Trends in humanitarian logistics research

Understanding and applying supply chain principles and concepts to service-based supply chains has been an emerging area of interest and investment within academia (Oloruntoba and Gray, 2009; Taylor and Taylor, 2009; Johnston, 2005, 2008). The growth in the service sector has seen the service industry expand to a point where it has become the dominant industry in many countries (Paton and McLaughlin, 2008). The service operations sector and service activity more generally have been increasing in terms of the number of people employed and relative contribution to the economy. Improvements in productivity for some service industries (government, healthcare, education, etc.) have not kept pace with those for manufacturing (Taylor and Taylor, 2009; Johnston, 2005, 2008). Raising productivity for the service sector is becoming an urgent issue for all industrialised nations.

At the same time, performance in the service operations sector is based largely on the intuition and experience of employees, and investment in research and development for services remains disproportionately low (Sampson and Froehle, 2006). Where services knowledge has been codified, firms have found substantial opportunities for value creation, from both process improvements and export of services (Taylor and Taylor, 2009; Johnston, 2008).

In humanitarian logistics[1] Oloruntoba and Gray (2009) were the first to highlight the gap in addressing the effectiveness of humanitarian supply chains through enhanced customer service and satisfaction in the supply chain. The paper demonstrated the value that a customer service analysis could provide in understanding, designing and implementing effective emergency relief chains and to identify potential research opportunities. As well as outlining a pathway for potential research in the area of customer service the paper concluded that customer service is a necessary attribute for effective and efficient emergency relief chains (Oloruntoba and Gray, 2009).

Due to the perceived paucity of academic papers in humanitarian logistics on the application of service operations management concepts a systematic, quantitative review, consistent with suggestions that the methodological rigor of reviews of the management literature (e.g. Denyer and Neely 2004; Thorpe *et al.*, 2005; Tranfield *et al.*, 2003) was undertaken. The decision to review the humanitarian logistics literature from a services operations management perspective entailed one selection decision, limiting the review to double-blind reviewed journal papers published in this field's top-tier journals, as described further below.

The review focused on non-invited peer-reviewed journal papers, omitting books, book chapters and other non-refereed publications, because journal papers can be considered validated knowledge and are likely to have the highest impact on the field (Ordanini *et al.*, 2008). Established influential journals tend to shape the theoretical and empirical work in a field by setting new horizons for inquiry within their frame of reference (Furrer *et al.*, 2008, p. 2). Therefore it was felt that this approach provides an accurate and representative picture of relevant scholarly research.

The most influential journals in the humanitarian logistics field were identified using McKinnon's (2013) citation-based study of renowned logistics management journals. To ensure that a broader spectrum of humanitarian operations literature was reviewed additional journals were incorporated. The review thus covers the following 15 journals: *Disaster Prevention and Management*, *International Journal of Disaster Resilience in the Built Environment*, *International Journal of Logistics Management*, *International Journal of Logistics: Research and Applications*, *International Journal of Operations and Production Management*, *International Journal of Physical Distribution & Logistics Management*, *International Journal of Production Economics*, *International Journal of Public Sector Management*, *Journal of Business Logistics*, *Journal of Humanitarian Logistics and Supply Chain Management*, *Journal of the Operational Research Society, Journal of Supply Chain Management*, *Management Research News*, *Supply Chain Management: An International Journal* and *Transportation Research E: Logistics and Transportation Review*. This wide range of journals also allows provides a broad and deep analysis given that prior reviews in the humanitarian logistics field only considered subsets of these journals (e.g. Tatham, 2012; Balcik *et al.*, 2010).

A three-stage selection process to identify relevant papers from these journals was formulated. First, a search of all issues of these journals from 2006 to the last issue of 2012 that was available online on 6 December 2012, using various electronic databases (Business Source Premier, JSTOR and the journals' homepages). The year 2006 was chosen as the cut-off point for the past, because the seminal paper on humanitarian logistics, "Humanitarian aid logistics: supply chain management in high gear" by Van Wassenhove (2006) was published at this time. Consistent with prior approaches to identifying relevant papers, such as: Nielsen (2010), Rashman *et al.* (2009), Thorpe *et al.* (2005) and Tranfield *et al.* (2003) keyword searches were performed and those papers that contained the word "humanitarian" and/or any of the phrases "disaster", "humanitarian aid (HA)", "humanitarian logistics", "humanitarian operations" or "Humanitarian supply chains", in either their titles, abstracts or full texts were retained. Table I categorises the different areas that have been researched in humanitarian logistics in the last six years.

It is clear that within humanitarian logistics research the area of services operations management has been neglected. In overview, research in the areas of: foundations in humanitarian logistics; processes, modelling and performance; and cooperation, coordination and collaboration has been prolific. The area of information flow would appear to be the less covered.

Trends in service operations management research

The word service means many different things to different people, and even within the service operations management community there is no commonly agreed definition (Sampson and Froehle, 2006). This is due in no small way to the many different industries that perceive themselves as providers of services in one form or other. Irrespective of the type of industry (finance, healthcare, education, manufacturing,

Foundations in humanitarian logistics	Tatham (2012), Overstreet *et al.* (2011), Tatham and Pettit (2010), Apte (2009), Jahre *et al.* (2009), Natarajarathinam *et al.* (2009), Littieri *et al.* (2009), Kovács and Spens (2007), Shaluf (2007), Van Wassenhove (2006)
Phases in disasters	Chang *et al.* (2010), Richey *et al.* (2010), Kovács and Tatham (2009), Richey *et al.* (2007)
Processes, modelling and performance	Besiou *et al.* (2011), Adivar *et al.* (2010), Banomyong and Sopadang (2010), Blecken (2010), Nilsson *et al.* (2010), Oloruntoba and Gray (2009), Pettit and Beresford (2009), Shultz and Heigh (2009), Beamon and Balcik (2008)
Cooperation, coordination and collaboration	Akhtar *et al.* (2012), Heaslip *et al.* (2012), McLachlin and Larson (2011), Jahre and Jensen (2010), Shultz and Blecken (2010), Carroll and Neu (2009), Maon *et al.* (2009), Rietjens *et al.* (2007), Stewart *et al.* (2009)
Challenges in humanitarian logistics	Sandwell (2011), Balcik *et al.* (2010), Oloruntoba (2010), Kovács and Spens (2009)
Information flow	Pourezzat *et al.* (2010), Walker and Harland (2008)
Activities in supply chains	Sohrabpour *et al.* (2012), Lodree (2011), Chandes and Pache (2010), Ertem *et al.* (2010), Beamon and Kotleba (2006)
Agility and responsiveness	Cozzolino *et al.* (2012), Charles *et al.* (2010), Scholten *et al* (2010), Oloruntoba and Gray (2006)
Disaster management and strategy	Rutner *et al.* (2012), Eriksson (2009), McLachlin *et al.* (2009), Perry (2007)

Table I.
Topics covered in humanitarian logistics/ supply chain management

shipbuilding, HA) all organisations need to consider how best to meet their customers service requirements. Therefore, it is important to realise that a "service industry" is not simply, by default, any industry not engaged in the manufacturing of a tangible product (Paton and McLaughlin, 2008).

A more specific definition limits a service industry to those focused on providing customers with the product they require, and delivering that product in a manner acceptable to the customer (Taylor and Taylor, 2009). Any organisation that develops their service as a core competitive strength can, and should, be considered part of the service industry (Johnston, 2008).

Vandermerwe and Rada (1988) describe how companies initially considered themselves to be in goods or services (e.g. product manufacture or insurance), and then moved to offering goods combined with closely related services (e.g. products offered with maintenance, support and finance), and finally to a position where "firms offer 'bundles' consisting of customer focused combinations of goods, services, support, self-service and knowledge". They termed this movement the servitisation of manufacturing. In management-related literature, servitisation development is commonly traced back to the early 1990s. However, Davies *et al.* (2006) point out that the industrial marketing literature suggests that pioneering applications originated in the 1960s with the introduction of "systems selling" strategies. In the evolution of servitisation, many manufacturing companies have moved dramatically into services and so caused the boundaries between products and services to become blurred.

Innovations in supply chain services are particularly important because they take place not in discrete operations but across the complete supply chain (Paton and McLaughlin, 2008). When examining the term "service" in this context it takes on a very important "primary" role for the organisation. Many organisations still

relegate "service" led activity to a support role such as customer care, complaint management or some other "cost-centric" role. In doing so, organisations are missing a clear opportunity to use their service capabilities to drive revenue (Taylor and Taylor, 2009).

The failure to correctly capture customer requirements is inherent in organisations that have a dominant "product-focus", as opposed to a "customer focus". The characteristic of the product-focused organisation is one that develops a product first and then looks to match that product to a market. This differs from a customer-focused organisation in that this type of organisation strives to understand the needs of the market, and then develops the right product or service for that market (Johnston, 2005, 2008). This is a subtle difference but one that can mean the success or failure of a service organisation. Considering the fluid and dynamic nature of many markets the need to establish a clear customer perspective is vital if an organisation is to be competitive (Oloruntoba and Gray, 2009). Therefore, any organisation that fails to understand and respond to the changing needs of their customers will fail to provide services that stand any chance of meeting their customers expected levels of quality and satisfaction (Oloruntoba and Gray, 2009; Haskett *et al.*, 2008).

The provision of services has now turned into a conscious and explicit strategy with services becoming a main differentiating factor in a totally integrated products and service offering (Baines *et al.*, 2009). The value proposition often includes services as fundamental value-added activities (Gebauer *et al.*, 2006; Vandermerwe and Rada, 1988) and reduces the product to be just a part of the offering (Gebauer *et al.*, 2006; Oliva and Kallenberg, 2003). Indeed, some companies have found this to be a most effective way to open the door to future business (Wise and Baumgartner, 1999).

In his paper "Service operations management: return to roots", Johnston (2005) charted the development of service operations management from its manufacturing roots. He emphasises that services are different, from the development of service-specific concepts, through to the more recent emergence of service management as a subject in its own right. More specifically, he identifies nine areas as ripe for operations management thinking to be applied. These included:

(1) linking operations performance to business drivers;

(2) performance measurement and operations improvement;

(3) guarantees, complaints and service recovery – tools for improvement;

(4) people management;

(5) service design;

(6) service technology;

(7) the design of internal networks;

(8) the service encounter; and

(9) managing service capacity (Johnston, 2005, p. 1299).

So where is the subject of services operations management within humanitarian logistics going and what are the challenges for the future? There is clearly work to be undertaken from a humanitarian logistics perspective, which requires underpinning and strengthening by our supply chain tools and approaches.

New opportunities for humanitarian logistics

Bask *et al.* (2010) observed that logistics and transportation services have been changing and diverging into several service segments. The multiple services provided earlier by transport and trucking companies have been broken down into several specialised services to attain lower costs (cut-rate trucking) or to offer value-added services (warehousing, packaging, price ticketing, final assembly, etc.) through third-party and fourth-party arrangements and alliances (Bask *et al.*, 2010; Lieb, 2005).

As logistics is receiving increasing recognition as a competitive parameter, the focus is shifting to more strategic considerations of service response and flexibility instead of simple make-or-buy decisions (Bask *et al.*, 2010; Skjoett-Larsen, 2000). Bask *et al.* (2010) demonstrate the many good reasons to focus on research regarding logistics services. First, the outsourcing of logistics services is expected to increase; second, the logistics service industry is an emerging industry which promises a positive future and new roles in supply chains and value networks for the logistics industry. Third, value added logistics services seem to be the fastest growing part of the transport industry. Moreover, as highlighted by Skjoett-Larsen *et al.* (2007) e-commerce has created major changes in the structures and processes of distribution. To summarise, in the future, logistics service providers (LSPs) are likely to continue to strengthen their value creation in supply chain networks both at global and local levels.

Reflecting on these applications in humanitarian logistics it can be observed that information technology has enabled new channels such as online services, for example the UNHRD web site facilitates purchasing non-food items through and real-time tracking of cargoes enabling customers to monitor their deliveries using data networks. Interestingly, this is also an area that has received relatively little attention in the systematic review performed for this paper.

At the other end of the spectrum, the management of customer relationships is the driving force of development (Oloruntoba and Gray, 2009). Customer service management is the supply-chain management process that represents the organisation's face to the customer (Oloruntoba and Gray, 2009; Bolumole *et al.*, 2003; Croxton, 2003), and delivering superior customer service has become a fundamental strategy to achieving competitive advantage in supply-chain management (Oloruntoba and Gray, 2009; Collins *et al.*, 2001; Porter, 1985). Commercial supply chains focus on the final customers as the source of income for the entire supply chain. In humanitarian logistics, the originating supplier may also be a donor who has to be convinced that humanitarian action is taking place at the most efficient cost. Thus, as observed by Oloruntoba and Gray (2009) measures of "customer service" are perhaps, overly aimed at the supplier/donor. This is because, mostly, donors are the "customers" to whom NGOs (and other agencies) are accountable and have a reporting responsibility. Therefore, the "key customers" – the victims of crises – and their perspectives and requirements may become of secondary importance because donors are usually more powerful than those affected by disasters (Benini *et al.*, 2009; Oloruntoba and Gray, 2009).

Contract logistics services with third and fourth parties such as those offered by UNICEF and IFRC, include shared facilities, outsourcing and alliances to provide a wide service mix from JIT deliveries and distribution to full-scale services and supply chain solutions replacing the HA organisation order processing and warehousing functions.

The continuing consolidation and deregulation within the logistics service industry has also resulted in the emergence of large companies (DHL, Kühne + Nagel and UPS) that have the capabilities to offer sophisticated logistics solutions on a continental or even global scale. Recently, these LSPsstrive to achieve a strategic role within the supply chain of clients, expanding their scale and scope of operations (Tatham, 2012; Kovács and Spens, 2011; Selviaridis and Spring, 2007). Consequently, it can be expected that these services provide a good setting for the analysis of service repositioning and new business models in humanitarian logistics.

Applications of services management in humanitarian logistics

Using Johnston's (2005) identified nine areas of services operations management as the starting point, this paper now formulates four areas that humanitarian logistics academics could apply to services in humanitarian logistics:

(1) servitisation in humanitarian logistics;

(2) service developments in humanitarian logistics;

(3) HA organisations as logistics service providers; and

(4) service standardisation.

Servitisation in humanitarian logistics

Servitisation, the term coined by Vandermerwe and Rada (1988), is now widely recognised as the process of creating value by adding services to products. There are a variety of forms of servitisation with the features differing for each. The literature identifies potential applications along the so-called "product-service continuum" (Gebauer *et al.*, 2008; Gebauer and Friedli, 2005; Neu and Brown, 2005). This is a continuum from traditional manufacturer where companies merely offer services as add-on to their products, through to service providers where companies have services as the main part of their value creation process. As observed by Gebauer *et al.* (2008), companies have to look at their unique opportunities and challenges at different levels of "service infusion" and deliberately define their position. This is envisioned to be a dynamic process, with companies redefining their position over time and moving towards increasing service dominance.

Baines *et al.* (2009) describe how commercial companies are moving to exploit downstream opportunities from services. They demonstrated that these opportunities fall into four categories: embedded services, comprehensive services, integrated solutions, and finally distribution control. Applying these criteria to humanitarian logistics shows that HA organisations are to the fore in adopting servitisation techniques:

1. embedded services which allow traditional downstream services to be built into the product (e.g. WFP stock lists for monitoring of non-food items);
2. comprehensive services such as those offered by DHL around its product markets (e.g. DHL's comprehensive logistics solution);
3. integrated solutions where companies look beyond their traditional product base to assess the overall needs of customers (e.g. UNHRD's move to network-infrastructure solutions); and
4. distribution control as used by WFP with its high-volume low-margin non-food items.

Service developments in humanitarian logistics

Adopting a downstream position, such as the provision of installed base services, organisations have to be service oriented and value services (Oliva and Kallenberg, 2003). In humanitarian logistics this could be the tracking and tracing of relief goods. These organisations provide solutions through product-service combinations and tend to be client-centric and providing customised, desirable client outcomes organised around particular capabilities competences and client requirements (Miller *et al.*, 2002). For example, WVI Canada has been working on a tracking and tracing system that they intend to offer to other HA organisations for a fee (WVI, 2012). Similarly, in the beginning of the Haiti earthquake, WFP acted as a consignee for other HA organisations who had not been registered in Haiti previously (WFP, 2012 or Besiou *et al.*, 2011). Kovács and Spens (2011) observed that HA organisations not only started to develop new technology but also services for each other, such as, specialised systems for tracking and tracing and fleet management. At the same time, social media applications have entered the scene not just for fundraising but through applications including searching for missing relatives to matching donations with demand, for example ALAN's Aid Matrix (Kovács and Spens, 2011).

HA organisations as logistics service providers

The general notion of HA organisations functioning as LSPs needs further research. This lends to an important perspective on HA organisations in research aside from the more common focus on how HA organisations use companies as LSPs. For example, WFP transports and distributes items belonging to HA organisations, and UNHRD hubs items for HA organisations, i.e. they act as a logistics service provider. IFRC perform a similar role with their hubs. This is an emerging trend in the field and demands more research.

Service standardisation

The first editorial (Kovács and Spens, 2011) of the *Journal of Humanitarian Logistics and Supply Chain Management* (*JHLSCM*) outlined a few topics related to product/service development for humanitarian purposes (p. 9). Expanding on this Kovács and Spens (2011) identified (service) standardisation and modularisation, improving the interoperability of humanitarian operations and the role of humanitarian organisations as service providers as a gap in current humanitarian logistics research.

This is an important issue, in particular it may facilitate the use of services across HA organisations. For example, the Logistics Operational Guide (Log Cluster, 2012) of the Logistics Cluster to Sphere Standards (2011) to the use of items catalogues (WFP, 2012; IFRC, 2012). The WHO has adopted a logistics standardisation for not only equipment but also standard operating procedures in Ethiopian labs (WHO, 2012).

A solid foundation, expertise and a body of knowledge exists in humanitarian logistics, such as, managing information flows, lean thinking, efficient process management and process design but this needs to be examined through the lens of services operations management.

Conclusions

Services have always been an essential part of logistics; they are becoming increasingly important in today's world, especially in humanitarian logistics. Considering the interaction of different kinds of organisations and the globalisation of relief efforts, it is imperative that the humanitarian relief community embrace new

strategies, techniques and technologies for improving productivity and quality in services operations. The service operations of the logistic function starts well before a disaster strikes and continues past the occurrence of the crisis and the direct response to it.

Similarly to humanitarian logistics service operations management involves anticipating impending disasters, trying to prevent them from occurring, mitigating their destructiveness and facilitating the humanitarian actions that are required, and completing the cycle by applying the lessons learned to improve response to future events and to minimise impact. Drawing on the four key areas of service outlined in this paper, the humanitarian logistics community have an opportunity to influence theory development in services operations management. The insights from humanitarian logistics and aid relief can increase the understanding and application of services operations management principles and concepts.

Several important challenges also face the humanitarian logistics academic community. This paper argues that we could make an important contribution by paying closer attention to the service humanitarian logistics provides. If we do not, logistics is at risk of being "left high and dry" like some developed countries' manufacturing sectors. A window of opportunity exists for humanitarian logistics academics to seriously engage in the service arena and apply their knowledge and skills to answer fundamental questions in the areas of quality, productivity and efficiency, drawing in part on expertise in business services (for both internal and external customers).

Note

1. Within the humanitarian logistics community the relabeling category as identified by Larson and Halldórsson (2004) is adopted. Simply put the relabeling perspective renames logistics; what was logistics is now SCM.

References

Adivar, B., Atan, T., Sevil Oflac, B. and Orten, T. (2010), "Improving social welfare chain using optimal planning model", *Supply Chain Management: An International Journal*, Vol. 15 No. 4, pp. 290-305.

Akhtar, P., Marr, N.E. and Garnevska, E.V. (2012), "Coordination in humanitarian relief chains: chain coordinators", *Journal of Humanitarian Logistics and Supply Chain Management*, Vol. 2 No. 1, pp. 85-103.

Apte, A.U. (2009), "Humanitarian logistics: a new field of research and action. Foundations and trends in technology", *Information and Operations Management*, Vol. 3 No. 1, pp. 1-99.

Baines, T.S., Lightfoot, H.W., Benedettini, O. and Kay, J.M. (2009), "The servitisation of manufacturing: a review of literature and reflection on future challenges", *Journal of Manufacturing Technology Management*, Vol. 20 No. 5, pp. 547-567.

Balcik, B., Beamon, B.M., Krejci, C.C., Muramatsu, K.M. and Ramirez, M. (2010), "Coordination in humanitarian relief chains: practices, challenges and opportunities", *International Journal of Production Economics*, Vol. 126 No. 1, pp. 22-34.

Banomyong, R. and Sopadang, A. (2010), "Using Monte Carlo simulation to refine emergency logistics response models: a case study", *International Journal of Physical Distribution and Logistics Management*, Vol. 40 Nos 8/9, pp. 709-721.

Bask, A.H., Tinnilä, M. and Rajahonka, M. (2010), "Matching service strategies, business models and modular business processes", *Business Process Management Journal*, Vol. 16 No. 1, pp. 153-180.

Beamon, B.M. and Balcik, B. (2008), "Performance measurement in humanitarian relief chains", *International Journal of Public Performance Sector Management*, Vol. 21 No. 1, pp. 4-25.

Beamon, B.M. and Kotleba, S.A. (2006), "Inventory management support systems for emergency humanitarian relief operations in South Sudan", *International Journal of Logistics Management*, Vol. 17 No. 2, pp. 187-212.

Benini, A., Conley, C., Dittemore, B. and Waksman, Z. (2009), "Survivor needs or logistical convenience? Factors shaping decisions to deliver relief to earthquake-affected communities, Pakistan 2005-06", *Disasters*, Vol. 33 No. 1, pp. 110-131.

Besiou, M., Stapleton, O. and Van Wassenhove, L.N. (2011), "System dynamics for humanitarian operations", *Journal of Humanitarian Logistics and Supply Chain Management*, Vol. 1 No. 1, pp. 78-103.

Blecken, A. (2010), "Supply chain process modelling for humanitarian organisations", *International Journal of Physical Distribution and Logistics Management*, Vol. 40 Nos 8/9, pp. 675-692.

Bolumole, Y.A., Knemeyer, M.A. and Lambert, D.M. (2003), "The customer service event management process", *International Journal of Logistics Management*, Vol. 14 No. 2, p. 15.

Carroll, A. and Neu, J. (2009), "Volatility, unpredictability and asymmetry: an organising framework for humanitarian logistics operations?", *Management Research News*, Vol. 32 No. 11, pp. 1024-1037.

Chandes, J. and Pache, G. (2010), "Investigating humanitarian logistics issues: from operations management to strategic action", *Journal of Manufacturing Technology Management*, Vol. 21 No. 3, pp. 320-340.

Chang, Y., Wilkinson, S., Seville, E. and Potangaroa, R. (2010), "Resourcing for a resilient post-disaster reconstruction environment", *International Journal of Disaster Resilience in the Built Environment*, Vol. 1 No. 1, pp. 65-83.

Charles, A., Lauras, M. and Van Wassenhove, L. (2010), "A model to define and assess the agility of supply chains: building on humanitarian experience", *International Journal of Physical Distribution and Logistics Management*, Vol. 40 Nos 8/9, pp. 722-741.

Collins, A., Henchion, M. and O'Reilly, P. (2001), "Logistics customer service: performance of Irish food exporters", *International Journal of Retail & Distribution Management*, Vol. 29 No. 1, pp. 6-15.

Cozzolino, A., Rossi, S. and Conforti, A. (2012), "Agile and lean principles in the humanitarian supply chain: the case of the United Nations World Food Programme", *Journal of Humanitarian Logistics and Supply Chain Management*, Vol. 2 No. 1, pp. 16-33.

Croxton, K.L. (2003), "The order fulfilment process", *International Journal of Logistics Management*, Vol. 14 No. 1, pp. 19-31.

Davies, A., Brady, T. and Hobday, M. (2006a), "Charting a path towards integrated solutions", *MIT Sloan Management Review*, Vol. 43 No. 7, pp. 39-48.

Denyer, D. and Neely, A. (2004), "Introduction to special issue: innovation and productivity performance in the UK", *International Journal of Management Reviews*, Vol. 5/6 Nos 3-4, pp. 131-135.

Department for International Development (2011), "Multilateral aid review: ensuring maximum value for money for UK aid through multilateral organisations", Crown Publications, London, available at: www.gov.uk/government/uploads/system/uploads/attachment_data/file/67583/multilateral_aid_review.pdf (accessed 6 November 2012).

Eriksson, E. (2009), "Knowledge transfer between preparedness and emergency response: a case study", *Disaster Prevention and Management*, Vol. 18 No. 2, pp. 162-169.

Ertem, M.A., Buyurgan, N. and Rossetti, M.D. (2010), "Multiple-buyer procurement auctions framework for humanitarian supply chain management", *International Journal of Physical Distribution and Logistics Management*, Vol. 40 No. 3, pp. 202-227.

Furrer, O., Thomas, H. and Goussevskaia, A. (2008), "The structure and evolution of the strategic management field: a content analysis of 26 years of strategic management research", *International Journal of Management Reviews*, Vol. 10 No. 1, pp. 1-23.

Gebauer, H. and Friedli, T. (2005), "Behavioural implications of the transition process from products to services", *Journal of Business & Industrial Marketing*, Vol. 20 No. 2, pp. 70-80.

Gebauer, H., Bravo-Sanchez, C. and Fleisch, E. (2008), "Service strategies in product manufacturing companies", *Business Strategy Series*, Vol. 9 No. 1, pp. 12-20.

Gebauer, H., Friedli, T. and Fleisch, E. (2006), "Success factors for achieving high service revenues in manufacturing companies", *Benchmarking: An International Journal*, Vol. 13 No. 3, pp. 374-386.

Haskett, J., Jones, T., Loveman, G., Sasser, E. and Schlesinger, L. (2008), "Putting the service profit chain to work", *Harvard Business Review*, Vol. 86 Nos 7/8, pp. 118-129.

Heaslip, G., Sharif, A.M. and Althonayan, A. (2012), "Employing a systems-based perspective to the identification of inter-relationships within humanitarian logistics", *International Journal of Production Economics*, Vol. 139 No. 2, pp. 377-392.

Humanitarian Policy Group (2012), "Humanitarian space: a review of trends and issues", Overseas Development Institute, available at: www.odi.org.uk/resources/details.asp?id=6425&title=humanitarian-space-principles-aid (accessed 1 August 2012).

International Federation of Red Cross and Red Crescent Societies (2012), "Annual report global logistics service: January 2011-December 2011", Geneva, available at: www.ifrc.org/en/publications-and-reports/appeals/?ac=&at=55&c=&co=&dt=1&f=&re=&t=&ti=MAA00028&zo (accessed 1 August 2012).

Jahre, M. and Jensen, L.M. (2010), "Coordination in humanitarian logistics through clusters", *International Journal of Physical Distribution and Logistics Management*, Vol. 40 Nos 8/9, pp 657-674.

Jahre, M., Jensen, L.-M. and Listou, T. (2009), "Theory development in humanitarian logistics: a framework and three cases", *Management Research News*, Vol. 32 No. 11, pp. 1008-1023.

Johnston, R. (2005), "Service operations management: from the roots up", *International Journal of Operations & Production Management*, Vol. 25 No. 12, pp. 1298-1308.

Johnston, R. (2008), "Internal service – barriers, flows and assessment", *International Journal of Service Industry Management*, Vol. 19 No. 2, pp. 210-231.

Kovács, G. and Spens, K.M. (2007), "Humanitarian logistics in disaster relief operations", *International Journal of Physical Distribution and Logistics Management*, Vol. 37 No. 2, pp. 99-114.

Kovács, G. and Spens, K.M. (2009), "Identifying challenges in humanitarian logistics", *International Journal of Physical Distribution and Logistics Management*, Vol. 39 No. 6, pp. 506-528.

Kovács, G. and Spens, K.M. (2011), "Humanitarian logistics and supply chain management: the start of a new journal", *Journal of Humanitarian Logistics and Supply Chain Management*, Vol. 1 No. 1, pp. 5-14.

Kovács, G. and Tatham, P. (2009), "Responding to disruptions in the supply network – from dormant to action", *Journal of Business Logistics*, Vol. 30 No. 2, pp. 215-229.

Larson, P.D. and Halldórsson, A. (2004), "Logistics versus supply chain management: an international survey", *International Journal of Logistics: Research and Applications*, Vol. 7 No. 1, pp. 17-31.

Lieb, R. (2005), "The 3PL industry: where it's been, where it's going", *Supply Chain Management Review*, Vol. 9 No. 6, pp. 20-27.

Littieri, E., Masella, C. and Radaelli, G. (2009), "Disaster management: findings from a systematic review", *Disaster Prevention and Management*, Vol. 18 No. 2, pp. 117-136.

Lodree, E.J. Jr (2011), "Pre-storm emergency supplies inventory planning", *Journal of Humanitarian Logistics and Supply Chain Management*, Vol. 1 No. 1, pp. 50-77.

Log Cluster (2012), "Logistics Operational Guide", available at: http://log.logcluster.org (accessed 1 December 2012).

McKinnon, A.C. (2013), "Starry-eyed: journal rankings and the future of logistics research", *International Journal of Physical Distribution & Logistics Management*, Vol. 43 No. 1, pp. 6-17, available at: www.emeraldinsight.com/journals.htm?articleid = 17076410& show = abstract (accessed 17 September 2012).

McLachlin, R. and Larson, P.D. (2011), "Building humanitarian supply chain relationships: lessons from leading practitioners", *Journal of Humanitarian Logistics and Supply Chain Management*, Vol. 1 No. 1, pp. 32-49.

McLachlin, R., Larson, P.D. and Khan, S. (2009), "Not-for-profit supply chains in interrupted environments: the case of a faith based humanitarian relief organisation", *Management Research News*, Vol. 32 No. 11, pp. 1050-1064.

Miller, D., Hope, Q., Eisenstat, R., Foote, N. and Galbraith, J. (2002), "The problem of solutions: balancing clients and capabilities", *Business Horizons*, March/April, pp. 3-12.

Maon, F., Lindgreen, A. and Vanhamme, J. (2009), "Developing supply chains in disaster reilef operations through cross-sector socially oriented collaborations: a theoretical model", *Supply Chain Management: An International Journal*, Vol. 14 No. 2, pp. 149-164.

Natarajarathinam, M., Capar, I. and Narayanan, A. (2009), "Managing supply chains in times of crisis: a review of literature and insights", *International Journal of Physical Distribution and Logistics Management*, Vol. 39 No. 7, pp. 535-573.

Neu, W. and Brown, S. (2005), "Forming successful business-to-business services in goods-dominant firms", *Journal of Service Research*, Vol. 8 No. 1, pp. 3-16.

Nielsen, S. (2010), "Top management team diversity: a review of theories and methodologies", *International Journal of Management Reviews*, Vol. 12 No. 3, pp. 301-316.

Nilsson, S., Sjoberg, M. and Larsson, G. (2010), "A civil contingencies agency management system for disaster aid: a theoretical model", *International Journal of Organisational Analysis*, Vol. 18 No. 4, pp. 412-429.

Oliva, R. and Kallenberg, R. (2003), "Managing the transition from products to services", *International Journal of service Industry Management*, Vol. 14 No. 2, pp. 1-10.

Oloruntoba, R. (2010), "A documentary analysis of the Cyclone Larry emergency relief chain: some key success factors", *International Journal of Production Economics*, Vol. 126 No. 1, pp. 85-101.

Oloruntoba, R. and Gray, R. (2006), "Humanitarian aid: an agile supply chain?", *Supply Chain Management: An International Journal*, Vol. 11 No. 4, pp. 115-120.

Oloruntoba, R. and Gray, R. (2009), "Customer service in emergency relief chains", *International Journal of Physical Distribution & Logistics Management*, Vol. 39 No. 6, pp. 486-505.

Ordanini, A., Rubera, G. and DeFillippi, R. (2008), "The many moods of inter-organizational imitation: a critical review", *International Journal of Management Reviews*, Vol. 10 No. 4, pp. 375-398.

Overstreet, R.E., Hall, D., Hanna, J.B. and Kelly Rainer, R. Jr (2011), "Research in humanitarian logistics", *Journal of Humanitarian Logistics and Supply Chain Management*, Vol. 1 No. 2, pp. 114-131.

Paton, R.A. and McLaughlin, S.A. (2008), "Service innovation and the supply chain: managing the complexity", *European Management Journal*, Vol. 26 No. 2, pp. 77-83.

Perry, M. (2007), "Natural disaster management planning: a study of logistics managers responding to the tsunami", *International Journal of Physical Distribution & Logistics Management*, Vol. 37 No. 5, pp. 409-433.

Pettit, S. and Beresford, A. (2009), "Critical success factors in the context of humanitarian aid supply chains", *International Journal of Physical Distribution and Logistics Management*, Vol. 39 No. 6, pp. 450-468.

Pourezzat, A.A., Nejati, M. and Mollaee, A. (2010), "Dataflow model for managing urban disasters: the experience of Bam earthquake", *International Journal of Disaster Resilience in the Built Environment*, Vol. 1 No. 1, pp. 84-102.

Porter, M. (1985), *Competitive Advantage: Creating and Sustaining Superior Performance*, The Free Press, New York, NY.

Rashman, L., Withers, E. and Hartley, J. (2009), "Organizational learning and knowledge in public service organizations: a systematic review of the literature", *International Journal of Management Reviews*, Vol. 11 No. 4, pp. 463-494.

Rietjens, S.J.H., Voordijk, G. and De Boer, S.J. (2007), "Co-ordinating humanitarian operations in peace support missions", *Disaster Prevention and Management*, Vol. 16, pp. 56-69.

Richey, R.G., Daugherty, P.J. and Roath, A.S. (2007), "Firm technological readiness and complimentarity: capabilities impacting logistics service competency and performance", *Journal of Business Logistics*, Vol. 28 No. 1, p. 195.

Richey, R.G., Roath, A.S., Whipple, J.M. and Fawcett, S.E. (2010), "Exploring a governance theory of supply chain management: barriers and facilitators to integration", *Journal Of Business Logistics*, Vol. 31 No. 1, pp. 237-256.

Rutner, S., Aviles, M. and Cox, S. (2012), "Logistics evolution: a comparison of military and commercial logistics thought", *The International Journal of Logistics Management*, Vol. 23 No. 1, pp. 96-118.

Sampson, S.E. and Froehle, C.M. (2006), "Foundations and implications of a proposed unified services theory", *Production and Operations Management*, Vol. 15 No. 2, Summer, pp. 329-343.

Sandwell, C. (2011), "A qualitative study exploring the challenges of humanitarian organisations", *Journal of Humanitarian Logistics and Supply Chain Management*, Vol. 1 No. 2, pp. 132-150.

Scholten, k., Scott, P. and Fynes, B. (2010), "(Le)agility in humanitarian aid (NGO) supply chains", *International Journal of Physical Distribution and Logistics Management*, Vol. 40 Nos 8/9, pp. 623-635.

Selviaridis, K. and Spring, M. (2007), "Third party logistics: a literature review and research agenda", *The International Journal of Logistics Management*, Vol. 18 No. 1, pp. 125-150.

Shaluf, I.M. (2007), "An overview on the technological disasters", *Disaster Prevention and Management*, Vol. 16 No. 3, pp. 380-390.

Shultz, S.F. and Blecken, A. (2010), "Horizontal cooperation in disaster relief logistics: benefits and impediments", *International Journal of Physical Distribution and Logistics Management*, Vol. 40 Nos 8/9, pp. 636-656.

Shultz, S.F. and Heigh, I. (2009), "Logistics performance management in action within a humanitarian organisation", *Management Research News*, Vol. 32 No. 11, pp. 1038-1049.

Skjoett-Larsen, T. (2000), "Third party logistics – from an inter-organizational point of view", *International Journal of Physical Distribution & Logistics Management*, Vol. 30 No. 2, pp. 112-127.

Skjoett-Larsen, T., Schary, P.B., Hsuan Mikkola, J. and Kotzab, H. (2007), *Managing the Global Supply Chain*, 3rd ed., Copenhagen Business School Press, Copenhagen.

Sohrabpour, V., Hellström, D. and Jahre, M. (2012), "Packaging in developing countries: identifying supply chain needs", *Journal of Humanitarian Logistics and Supply Chain Management*, Vol. 2 No. 2, pp. 183-205.

Sphere Standards (2011), "The sphere project: humanitarian charter and minimum standards in humanitarian response", available at: www.sphereproject.org (accessed 30 July 2012).

Stewart, G., Ramesh, K. and Smith, M. (2009), "Leveraging public-private partnerships to improve community resilience in times of disaster", *International Journal of Physical Distribution and Logistics Management*, Vol. 39 No. 5, pp. 343-364.

Tatham, P.H. (2012), "Some reflections on the breadth and depth of the field of humanitarian logistics and supply chain management", *Journal of Humanitarian Logistics and Supply Chain Management*, Vol. 2 No. 2, pp. 108-111.

Tatham, P.H. and Pettit, S.J. (2010), "Transforming humanitarian logistics: the journey to supply network management", *International Journal of Physical Distribution and Logistics Management*, Vol. 40 Nos 8/9, pp. 609-622.

Taylor, A. and Taylor, M. (2009), "Operations management research: contemporary themes, trends and potential future directions", *International Journal of Operations and Production Management*, Vol. 29 No. 12, pp. 1316-1340.

Thorpe, R., Holt, R., Macpherson, A. and Pittaway, L. (2005), "Using knowledge within small and medium-sized firms: a systematic review of the evidence", *International Journal of Management Reviews*, Vol. 7 No. 4, 257-281.

Tranfield, D., Denyer, D. and Smart, P. (2003), "Towards a methodology for developing evidence informed management knowledge by means of systematic review", *British Journal of Management*, Vol. 14 No. 3, pp. 207-222.

Vandermerwe, S. and Rada, J. (1988), "Servitisation of business: adding value by adding services", *European Management Journal*, Vol. 6 No. 4, pp. 314-324.

Van Wassenhove, L. (2006), "Humanitarian aid logistics: supply chain management in high gear", *Journal of the Operational Research Society*, Vol. 57 No. 5, pp. 475-489.

Walker, H. and Harland, C. (2008), "E-procurement in the United Nations: influences, issues and impact", *International Journal of Operations and Production Management*, Vol. 28 No. 9, pp. 831-857.

WFP (2012), "WFP [World Food Programme] strategic plan 2008-2013", available at: www.wfp.org/content/wfp-strategic-plan-2008-2013 (accessed 30 July 2012).

WHO (2012), "Case study: impact of the ethiopian national laboratory logistics system on the harmonization of laboratory commodities", available at: www.who.int/hiv/amds/amds_impact_ethiopian_lab.pdf (accessed 6 December 2012).

Wise, R. and Baumgartner, P. (1999), "Go downstream: the new profit imperative in manufacturing", *Harvard Business Review*, September/October, Vol. 77 No. 5, pp. 133-141.

WVI (2012), "WVI [World Vision International]", available at: www.wvi.org/wvi/wviweb.nsf (accessed 1 August 2012).

Further reading

Development Initiatives (2012), *Global Humanitarian Assistance Report*, Development Initiatives, Somerset.

ECHO (2012), "Cash and vouchers", available at: http://ec.europa.eu/echo/policies/sectoral/cash_en.htm (accessed 14 August 2012).

EM-DAT (2011), "Natural disaster trends world 1900-2011", available at: www.emdat.be/sites/default/files/Trends/natural/world_1900_2011/eveyr1.pdf (accessed 3 December 2012).

Green, L.V. and Kolesar, P.J. (2004), "Improving emergency responsiveness with management science", *Management Science*, Vol. 50 No. 8, August, pp. 1001-1014.

Irish Aid (2012), "Irish aid annual report 2011: accountable to people, accounting for aid", Government Publications, Dublin, available at: www.irishaid.gov.ie/media/irishaid/allwebsitemedia/20newsandpublications/publicationpdfsenglish/2011-irish-aid-annual-report.pdf (accessed 6 November 2012).

McLaughlin, S.A. and Macbeth, D.K. (2006), "Identifying knowledge transfer barriers within a complex supply chain organization", in Mendibil, K. and Shamsuddin, A. (Eds), *EurOMA: Moving up the Value Chain*, Strathclyde University Press, Glasgow, pp. 21-34.

Pettit, S.J. and Beresford, A.K. (2005), "Emergency relief logistics: an evaluation of military, non-military and composite response models", *International Journal of Logistics: Research and Applications*, Vol. 8 No. 4, pp. 313-331.

Richey, R.G. (2009), "The supply chain crisis and disaster pyramid: a theoretical framework for understanding preparedness and recovery", *International Journal of Physical Distribution and Logistics Management*, Vol. 39 No. 7, pp. 619-628.

Corresponding author
Graham Heaslip can be contacted at: graham.heaslip@nuim.ie