

Outsourcing of trucking activities by relief organisations

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Abstract *This paper analyses the role of outsourcing of trucks in the famine in Ethiopia in 2000. Using a Delphi approach, it takes the opinion of experts in humanitarian aid logistics to assess the potential benefits of outsourcing of the main mode of transport used in developing countries for distributing aid. A detailed review of the literature in outsourcing of trucking and its application to humanitarian aid forms the basis for a series of statements that are presented to the expert panel through the Delphi process. Conclusions are reached that indicate that outsourcing does have major benefits but also some drawbacks that need to be carefully accommodated.*

Introduction

Environmental famines are caused by natural phenomena that result in a lack of food grown or available (Long and Wood, 1995). Political famines are more complex and costly because food can be viewed as a weapon (Masefield, 1963). In the case of the Ethiopian famine 2000 the situation was more problematical since an environmental famine was exacerbated by war to prevent the population from dealing with the situation (USAID, 2002a). In a country as vast as Ethiopia, humanitarian aid delivery problems were immense not only in terms of logistics but with respect to the methods of actual distribution (Kuppens, 2001). This paper examines the role of outsourcing trucking in the context of the famine in Ethiopia in 2000.

Outsourcing of trucking activities

Management of logistics functions in modern organisations involves decision making for the complete distribution of goods and services with a view to maximising value and minimising cost (Razzaque and Sheng, 1998). The need for sustainable competitive advantage, the growing emphasis on providing good customer service effectively and efficiently and the strategic value of focusing on core business and re-engineering, resulted in the evolution of outsourcing logistics (Hill, 1994; Lieb and Randall, 1999; Reilly and Tamkin, 1996).

Consultants A T Kearney defined outsourcing as multiple logistics services provided by a single vendor on a contractual basis. They offer 'at least two services that are bundled and combined, with a single point of accountability using distinct information systems that are dedicated to and integral to the logistics process' (Bradley, 1994). Characteristics usually include duration, joint efforts to develop further co-operation, a personalised solution and a fair share of the benefits and risks (Skjoett-Larsen, 1999).

The idea of outsourcing isolated logistics activities such as transportation to external services providers is not a new phenomenon but in today's business environment, outsourcing is one more approach that can lead to greater competitiveness (Bowersox, 1989) and competitive, reliable transportation enables manufacturers to manage their distribution system with lower inventory in fewer locations and with increased confidence (Bardi and Tracey, 1991).

Strategic literature often recommends that firms concentrate on their core competencies and outsource other activities. In most firms logistics is not considered to be a core activity (Bowman, 1994). Thus logistics decisions are often not provided in-house but outsourced (Razzaque and Sheng, 1998). However, as products are increasingly viewed as commodities with little difference in features from one to the next, distribution service has taken on greater strategic significance. Manufacturers focus on distribution service to compete on availability, delivery speed, and reliability (Candler, 1994; Goldsmith, 1989).

Benefits and problems of outsourcing

Outsourcing offers many advantages to those using it. Primarily it reduces capital investment and costs in facilities for organisations, as third-party companies are able to provide transportation at a lower cost due to the economies of scale associated with providing their same core business services to other companies. The decision to utilise logistics companies is also fostered in part by the interest in reducing asset investment to improve productivity (Fantasia, 1993; Rothery and Robertson, 1995), information technology (Berglund *et al*,

2000; Davis, 2000; Fantasia, 1993), and manpower. This allows the organisation greater flexibility in adapting to changes to meet current demand. When demand surges beyond the capability of a firm, a third-party may be called in to help. Thus a fixed cost may be converted to a variable cost for users (Bradley, 1994). Using quantitative research methods Lieb *et al* (1992), note that third-party logistics users commonly agree that it costs less to use such firms than to carry out the same functions in-house. In addition, since the use of an outside multiple service provider reduces contacts for a firm to a single point, it thus simplifies the logistical process (Ruston *et al*, 2000).

Just as there are many reasons that favour outsourcing, there are many others that discourage its use. Loss of control to third-party provider(s) appears to be the most commonly cited reservation that inhibits firms from using contract logistics (Byrnes, 1993). This concern is amplified by the third-party's lack of understanding of the buyer's business needs and the difficulty of changing providers (Domberger, 1998) although in reality firms do not totally relinquish their control as outsourcing does not absolve firms of the need to monitor their vendors. The two sides need to meet frequently to compose strategy and resolve problems as they arise. Byrnes (1993) adds that the lack of advanced information technology linking manufacturer, carrier, warehouse and customer operations has often caused hindrance to contract logistics management. Besides losing control, losing touch with important information (Evans, 2000), failure to select or manage providers, unreliable promises of the providers, and their inability to respond to changing requirements have also been cited as potential problems by users (Davies, 1995).

The role of relief organisations during the Ethiopian famine 2000

Famine is perceived as an abnormal event with distinctive and dramatic characteristics yet it has proven strangely difficult to provide a robust distinction between famine and other symptoms of deprivation. For the purpose of this paper famine is characterised by primarily a severe disruption in normal economic activity, principally but not exclusively brought about by vagaries of climate which leads to expectations of future scarcities of food among producers, traders and consumers (Chapman, 1999). This in turn leads to modes of social behaviour such as asset sales, hoarding, speculation and the erosion of traditional social bonds which themselves contribute to famine conditions (Devereux, 1993). When famine conditions have become fully established, so that large numbers of vulnerable people have become stripped of their assets and have begun to starve, there is widespread mortality unless outside agencies intervene with effective relief and rehabilitation (Albala-Bertrand, 2001; Cutler, 1985; Devereux, 1993).

The 2000 famine had deep and widely spread roots (USAID, 2002e). Many factors were at work in ensuring that it was exceptionally severe. Of these, the indifferent and slow international response was amongst one of the most important, since had it been quicker, tens of thousands of lives could certainly have been saved (UNDP, 2002). It is wrong however, to blame Ethiopia's troubles entirely on the international community.

The state of political and economic disruption within the country in 2000, which created vulnerable refugees and internally displaced populations also played a major role in ensuring the famine was worse than it otherwise might have been (Save the Children, 2002; UNICEF, 2002; Christian-aid, 2002). Neither should the role of natural factors be forgotten. In fact, it was three years of successive drought that triggered the 2000 famine (USAID, 2002d). Drought became a killer in this case because it occurred in a desperately poor and

underdeveloped country that was, at the same time, acutely destabilised internally by secessionist wars (Godfrey, 2001). In addition it occurred in a country where environmental degradation, in the form of erosion and deforestation has been going on for centuries (FAO, 2002). In every sense, Ethiopia was a country that was ripe for ecological disaster, with little done to reduce its vulnerability.

During January 2000, in response to the cumulative effects of recurrent drought, the erosion of local sustainability and the provision of inadequate relief, the government launched an appeal for 900,000 metric tonnes of assistance to provide food, water and healthcare (ICRC, 2002b). It was to cover the needs of 10 million people affected by the drought and 349,000 internally displaced persons from the conflict with Eritrea (USAID, 2002f). Two areas were particularly badly affected - the Highlands and the South. According to USAID's Famine Early Warning System (FEWS), in the greatly populated Highland areas the crisis was the result of a complete failure of the rains in February-May 1999 (ECHO, 2002). Consequently well over 60-80% of crop and livestock losses occurred in the Northern and Eastern highlands (North and South Wollo, South Tigray, North Shoa, East and West Haraghe) (Figure 1). The drought also had an impact on the pastoral rangelands in the South of the country. By April 2000, the International Committee of the Red Cross (ICRC) reported there was an advanced emergency in parts of the Somali Region and the Borena and Bale Zones of Oromiya (Daily Mail and Guardian, 2002a) (Figure 2). Rough estimates indicate that the mortality rate in this area was around 3.5/10,000 people per day. Normally a mortality rate above 1/10,000 people per day is indicative of an emergency situation (ICRC, 2002a).

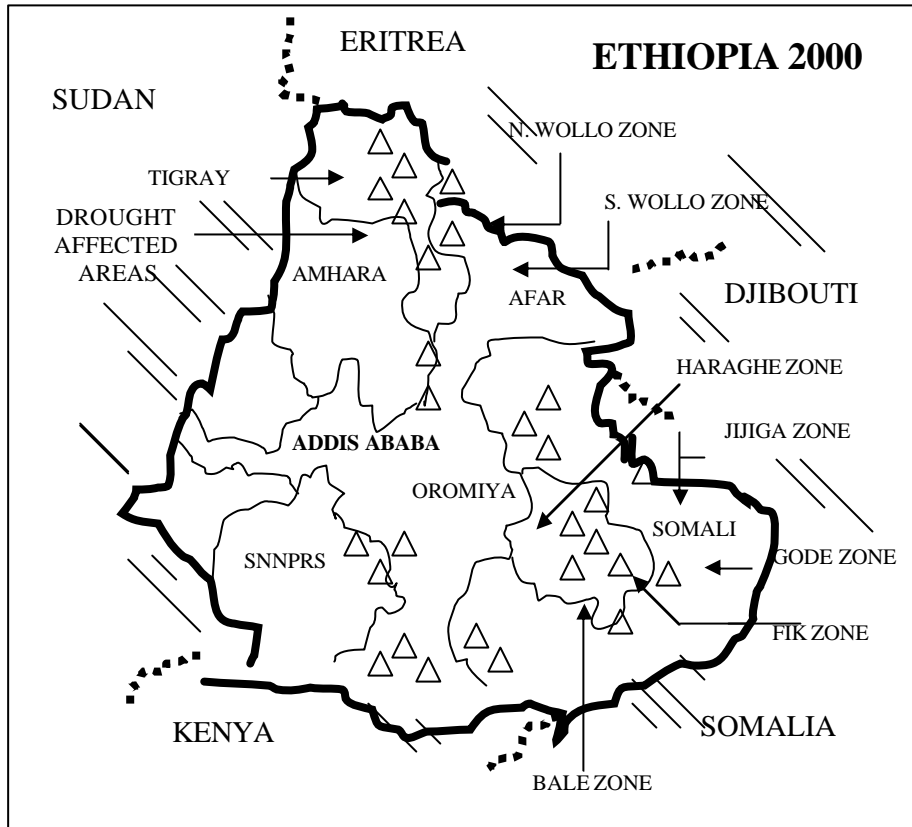


Figure 1
Drought affected areas; Ethiopian famine 2000 (Authors, 2002)

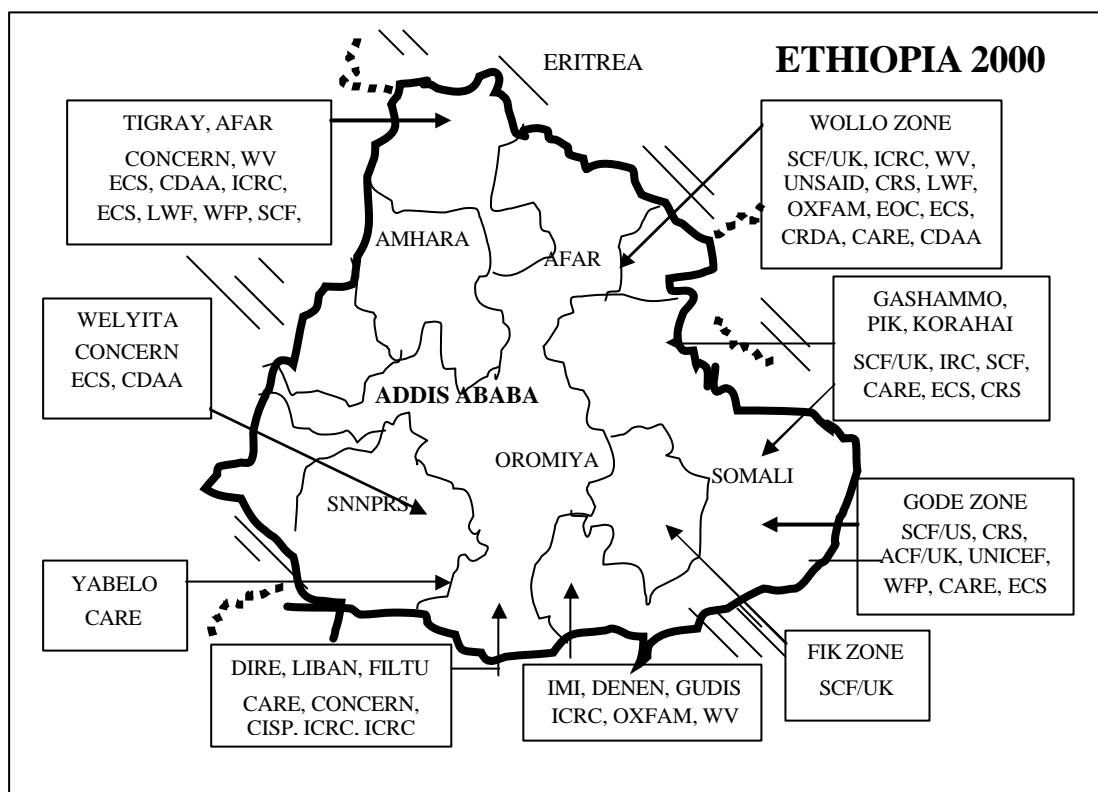


Figure 2
Major NGOs and IGOs and their main province of activities, 2000 (Authors, 2002)

In the aftermath of the famine the Government of the Federal Democratic Republic of Ethiopia (GFDRE) established that over 12.5 million people faced shortages of food and water, raising the death toll into the many thousands (USAID, 2002c). It was documented that the famine was a result of an extreme food shortage, war, displacement, ignorance and a breakdown of governance and social infrastructures, resulting in widespread hunger and an increase in the death rate caused by starvation and widespread disease (Regan, 2001).

Logistical techniques used by relief organisations during the Ethiopian famine 2000

In 1991 the Council of Logistics Management defined logistics as ‘the process of planning, implementing and controlling the efficient, effective flow and storage of goods, services and related information from point of origin to point of consumption for the purpose of conforming to customer requirements’ (Coyle *et al*, 1996). This concept is now being applied to non-profit associations such as relief organisations, since an essential aim of any relief programme is to deliver the right relief items to the right people in the right quantity at the right time (Community Aid Oxfam, 2002; Dell, 2001; WFP, 2002a).

The logistics of famine relief in Ethiopia 2000 were unique for four reasons. First, the famine occurred in a less developed region, which had inadequate infrastructure (Kent, 1987). Second, the consumer of the final product was not the customer of either the supplier or the carrier (Long and Wood, 1995). Thirdly, the logistics modelling employed combined elements of military and commercial application, and finally the political environment made

the famine relief different from commercial logistics, as the operation was an emergency situation (Presente, 2002; Reliefweb, 2002).

During the Ethiopian famine the United Nations organisations, USAID, UNDP, UNHUR, WFP and FAO supported by the Disaster Prevention Commission (DPPC) took a central role in logistical leadership (Goodhand, 2001). International NGOs referred to these authorities and endeavoured to support their efforts (USAID, 2002e). The logistics of relief operations employed were based on contingency approach modelling, which is used for supply chains that must be able to be turned on or off at very short notice and when the origin and destination of supplies can change quickly (Hailegabriel, 2001; Long and Wood, 1995).

Relief organisations had to manage the supply chain, which included procurement, transport, storage and handling from point(s) of origin to final destination(s) or distribution(s), of commodities safely, efficiently and effectively (Save the Children, 2002). In the majority of cases delivery of commodities from donor countries to the Extended Delivery Point (EDP), an inland destination close to the affected area (Gregory, 2001) was undertaken by UN core agencies and NGOs were responsible for its actual dispersion to a targeted population (Guardian Archive, 2002).

In February 2000 UNDP and USAID deployed logistics teams to Ethiopia to access infrastructural capacity for seaport and airport discharging capabilities. Through regional monitors they established some clear idea of NGO emergency capabilities and local networks (USAID, 2002d). As Ethiopia is a land-locked country, food and relief commodities had to be trucked from the ports of Djibouti and Berbera (Somalia) to the Ethiopian borders (Chaikin, 2002). The teams determined that, given planned improvements to the port of Djibouti, the port and long haul truck capacity in the country was sufficient to handle transportation of humanitarian commodities to main distribution points (Hill, 2001) (Figure 3).

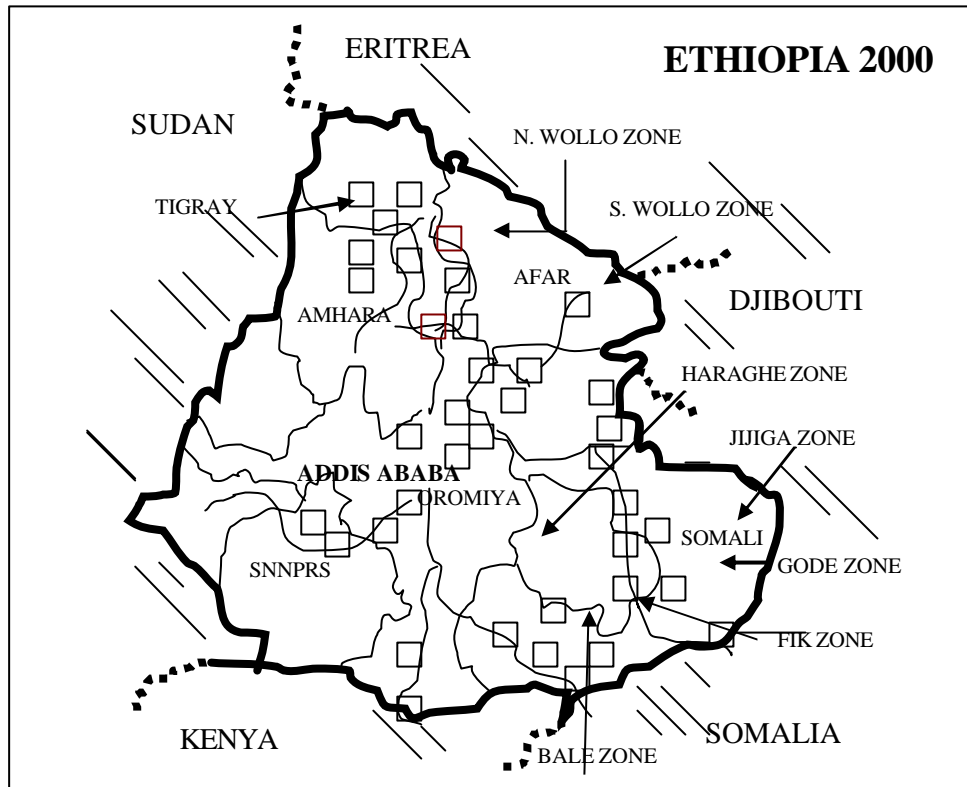


Figure 3
Major distribution points with regular supply (Authors, 2002)

A high level of logistical coordination was necessary as supplies came from various locations and funding sources; however commodities were sourced as close as possible to the famine zone in order to minimise transport requirements (Getahun, 2001). Most commodities were shipped into Ethiopia by ocean freight due to the benefit of capitalising on economies of scale and thus a reduction in cost to the shipper (Stopford, 1998). When relief aid had to move more swiftly into the remote regions of Ethiopia that lacked roads, air transport was used (UNDP, 2002), although this mode was the most expensive and thus used the least.

From the EDP, road transport was the main internal delivery method in Ethiopia due to its availability, flexibility and economic efficiency. However, this mode exhibited serious weaknesses as Ethiopia has one of the poorest road networks in the world with a total of little over 30,000 km of primary, secondary and feeder roads of which less than half are all weather asphalt or gravel roads (Christian Aid, 2002).

Trips were lengthy and dangerous, taking up to 10 hours for the 190 kilometres from Gode to Eastern Imi, one of the worst drought scenes (Guardian Unlimited, 2002). The general poor condition of the roads and the difficult terrain in the highlands made for heavy wear and tear on vehicles (Save the Children, 2002).

These conditions were bad enough in normal circumstances but in the famine, transport was affected by political and tribal tensions (Daily Mail and Guardian, 2002b). The political conflict led to the loss of access to Massawa and Assab ports in Eritrea stretching Djibouti

and Berbera port capacities beyond their limits to handle the influx of food and relief commodities (USAID, 2002b). The congestion at Djibouti throughout the relief operation was not due to unloading problems but to a shortage of trucks, resulting in transport out of the port area being unable to match the rate of unloading. Furthermore the number of lost shipments was high, with vehicle pilfering accounted for one third of all loss due to theft (WFP, 2002a).

Outsourcing trucking activities by relief organisations during the Ethiopian famine

Events such as the Ethiopian famine 2000 cause a sudden acceleration in the demand for transport by relief organisations (TRANSAID, 2002). Many NGOs often do not have effective expertise to organise and oversee their logistics requirements and thus many companies came into the market to fill the surplus of the demand to deliver humanitarian goods from their point of origin to their final destination (Atlas Logistique, 2002).

Road transport was the main delivery method used in the Ethiopian famine programme (WFP, 2002b). Relief organisations noted that it was not practical to buy and operate a fleet of trucks unless the programme was to continue for a number of years. Oxfam state that the setting up of a truck fleet requires specialist advice and a lead-time of about six months (Chaikin, 2002). During the Ethiopian famine 2000, the crisis was imminent and consequently relief organisations were not afforded this luxury (Save the Children, 2002).

In many cases, relief organisations used local transport contractors rather than setting up a new fleet. In the event, their knowledge of local conditions was to prove invaluable (ICRC, 2002a) and the trucks hired were able to handle rougher roads with higher clearance requirements and fewer refuelling facilities (Long and Wood, 1995).

Trucking operations are smaller in Ethiopia than in industrialised countries. Often the owner will ply for hire individually and operate the truck (Chaikin, 2002). It can be time consuming to assemble a fleet, as each truck may have to be negotiated for separately. Hence, most NGOs passed on the task of finding sufficient trucks to an agent, who sub-contracted to individual owner-drivers. The number of trucks that were used and for how long depended on the goods to be moved, and the distance and quality of roads to be travelled.

Long and Wood (1995) suggest an alternative option; to outsource transport companies that exclusively serve relief operations resulting in improvement of the overall efficiency of projects. As relief supplies face the same paperwork requirements as commercial shipments, relief organisations use freight forwarders to fulfil documentation requirements and arrange for transport. Vehicles are also shared between several relief agencies (Long and Wood, 1995). During the Ethiopian famine the majority of outsourcing occurred in this way. When drawing up contracts with the transport firm, relief organisations had to ensure that it conformed to any legislation or to local practice concerning freight rates. Contracts agreeing to pay for deliveries (either per ton or per trip) provided an incentive for the contractor to complete the job more quickly (Moody, 2001).

Not all experiences with outsourcing were positive, since many relief organisations did not have the expertise to oversee their logistics needs. Some local transport contractors on whom relief organisations relied, employed badly maintained, haphazard trucking fleets and additionally the lack of spare parts and the age of the trucks meant that their reliability was poor (Gregory, 2001). Furthermore some companies were prone to disproportionately inflate

their prices at time of crisis (UNICEF, 2002). Other issues included the frequent disappearance of local trucking and warehousing companies (WFP, 2002b). This meant that some relief organisations had to create their own transport and warehouse facilities in some regions of Ethiopia, which was very costly.

The context for the research

In order to address the research issue, eight conceptual categories were drawn up from the literature review. Each of these conceptual categories leads to a set of conceptual assumptions. The conceptual assumptions form a set of hypotheses, which are unproven statements of a relationship between two or more variables that carry clear implications for testing statements (Davis, 2000). The empirical work introduced subsequently will be investigated with the aid of the hypotheses; thus they will be tested in order to support or reject them.

Conceptual category (one)

The quandary of humanitarian aid distribution by relief organisations.

Conceptual assumption / hypothesis one

Humanitarian aid from secondary relief organisations often encounters complexities in reaching the extended delivery point due to the lack of in-house logistics knowledge and thus organisations will often rely on assistance from third-party logistics providers.

Statements

- It has often been debated that the real problem behind supplying aid to those in need is not what to provide first, but the logistics of getting it to them in a crisis situation.
- All too often aid received by smaller charities is delayed within the donor country while the charities involved struggle to find transportation to the end user.
- Many IGOs and NGOs use third-party logistics providers to achieve the conveyance of the right relief items, to the right people, in the right quantity and at the right time.

Conceptual category (two)

Relief organisation limitation of liability during the physical distribution phase.

Conceptual assumption / hypothesis two

During the Ethiopian famine 2000 the task of the relief organisations was to transport aid from the seaports, Djibouti and Berbera and the various airlift centres to the extended delivery point, an inland destination close to the affected regions.

Statements

- During the Ethiopian famine 2000 relief organisations and agencies were responsible for the dispersion of aid to the regional affected areas.
- Relief organisations were not responsible for the distribution supply chain from the donor country to the Ethiopian borders.
- Relief commodities are distributed directly to the beneficiaries and this is usually done through the community representative structures.
- The task of the relief organisations was to transport aid to the nearest warehouse, other organisations dealt with the distribution to the final beneficiaries.

Conceptual category (three)

Reasons for outsourcing trucking activities during the famine by relief organisations.

Conceptual assumption / hypothesis three

During the Ethiopian famine, outsourcing of trucking activities offered the benefits of reduction in capital investment and increased flexibility to improve efficiency in the supply chain.

Statements

- The decision to utilise logistics companies by relief organisations is fostered in part by the interest in reducing asset investment to improve asset productivity.
- The main reason for relief organisations to outsource trucking activities during the Ethiopian famine was to reduce response time and utilise local knowledge.
- Outsourcing trucking to local companies increased the regional economy and also reduced the number of aid vehicles stolen.

Conceptual category (four)

Obstacles to outsourcing trucking activities by relief organisations during the famine.

Conceptual assumption / hypothesis four

During the Ethiopian famine the outsourcing of trucking activities often equated the inability to primarily select a suitable provider at the right cost and when selected, relief organisations experienced a substantial loss of control to the third-party provider(s).

Statements

- The main problem relief organisations met when contracting out trucking activities during the famine was finding the right contractor who understood the relief organisations needs.
- When limited vehicles were available or when warlords controlled the transport sector, exorbitant prices were charged, thus it was not desirable to outsource trucking activities.
- The lack of technology linking the relief organisation to the third-party transport provider and warehouse had a hindrance on the logistics management.
- Rapid fluctuations in demands often left relief organisations with unreliable contractors.

Conceptual category (five)

Experiences relief organisations had when outsourcing trucking during the Ethiopian famine.

Conceptual assumption / hypothesis five

On the whole relief organisations had good experiences with outsourcing activities during the Ethiopian famine 2000, and thus they would consider outsourcing again in the future.

Statements

- Organisations were satisfied with the experience; however the communication between the relief organisation and the third-party provider could be improved.
- In the majority of cases commodities were delivered to the right region, in the right quantity, to the right people at the shortest possible lead-time, thus completing the logistical objective of the relief organisation and gaining customer loyalty to the third-party operator.

Conceptual category (six)

The desirability of outsourcing trucking during the Ethiopian famine 2000.

Conceptual assumption / hypothesis six

It was desirable for relief organisations to outsource their trucking activities for the purpose of humanitarian aid delivery during the Ethiopian famine 2000.

Statements

- It was desirable to outsource trucks since the government policy towards the subject was encouraging the private fleet, thus relief organisations could benefit.
- Outsourcing logistical activities was economical, and as most the famine affected regions had road facilities it was suitable for relief organisations to take advantage.
- Commercial trucks always operated because of knowledge of local conditions while international fleets were stopped by any of the frequent security alerts.
- The minority of relief organisations preferred to control all aspects including securing the integrity of their organisations, however in doing so a heavy cost was attached.

Conceptual category (seven)

The type of commodity most regularly transported during the Ethiopian famine 2000.

Conceptual assumption / hypothesis seven

The Ethiopian famine was a problem essentially of food deficit, thus relief organisations transported mainly food and water during the famine.

Statements

- Predominately trucks transferred food however, clothing, housing equipment, medicine and personnel was also distributed during the Ethiopian famine 2000.
- Much needed water, was transported using outsourced vehicles throughout Ethiopia.

Conceptual category (eight)

Most suitable third-party logistics provider and contractual conditions.

Conceptual assumption / hypothesis eight

During the Ethiopian famine most of the time relief organisations outsourced trucking activities from local companies by means of commercial contracts.

Statements

- Local entities, most frequently used, due to their knowledge and location.
- During the famine, relief organisations outsourced trucking activities mainly by commercial contracts, however letters of assist and subcontracting were also used.
- Key elements were the capacity of the local transport market, the haulage prices, the willingness of local transport operators and governance polices throughout Ethiopia.

The research approach

The Delphi technique was selected for the analysis because it was the most suitable method for collecting opinion. It has been defined by Linstone and Turoff (1975):

‘... as a method for structuring a group communication process. The technique is an ‘interactive opinion questionnaire, with anonymous statistical feedback after each iteration, applied to a panel of experts until optimal consensus is reached among the panellists’ (Chaffin and Talley, 1980).

Woudenberg (1991) describes the Delphi technique as a process of anonymity, iteration and controlled feedback. There are two main types; Conventional and Policy. Conventional

Delphi tends to deal with technical topics and seeks consensus among a homogeneous group of experts, whereas Policy Delphi seeks to generate the strongest possible opposing views on the potential resolution of a major policy issue. Policy Delphi is a tool for the analysis of policy issues and not a mechanism for making decisions (Linstone and Turoff, 1975). The empirical study in this research is conducted by means of a combination of Policy and Conventional Delphi. On the one hand the enquiry tries to generate different ideas and opinions from both commercial logistics providers and relief organisations and on the other hand, the author tries to reach consensus among participants upon the desirability of outsourcing trucking activities during the Ethiopian famine 2000.

There are a number of reasons why the Delphi technique was chosen for the empirical study:

1. the panellists selected for this study are mainly located throughout Europe, America and Africa, this necessitates such an approach due to time and cost considerations (Woudenberg, 1991);
2. its nature as an appropriate method to collect opinions and judgements, in particular in areas where there is a lack of empirical data such as the logistics of relief organisations during the famine;
3. the competition between relief organisations and the importance of company image requires anonymity of opinions;
4. it is expected that the response rate for a Delphi survey will be higher than for a normal questionnaire, as panel members agreed to participate in the survey and they receive feedback afterwards.

The Delphi process

In this study the Delphi technique is used to discover a casual relationship (the influences of improving physical distribution by outsourcing to a third party provider) in a complex political and social phenomenon (the Ethiopian famine 2000). The process consisted of two questionnaires (rounds) in which participants were invited to comment on the eight main conceptual categories, and the assumptions relating to the use of outsourcing by relief organisations during the famine were used to formulate a list of statements. Experts were asked to state whether they 'agree', 'disagree' or were 'unable to comment' upon the statements. In either case of the comment being 'agree' or 'disagree', the participants were asked to explain their comment.

After the panel's responses to the first round questionnaire were collected and analysed, any comments provided were refined to eliminate duplications and used to amend statements which did not reach consensus or majority consensus in the first round, thus formulating the second round statements. In the second round the statements that did not achieve consensus were reformulated and the participants are asked to comment on them again. Each panellist was given the opportunity to refine their position on the issue if they wished, perhaps following another member's opinion or even formulating a completely new opinion. Once the second round was analysed, consensus or stability on statements was reached and the feedback was shared.

Number and selection of panellists

Davis (2000) speaks of the importance of choosing prospective panel members to ensure they are representative of their profession. Therefore it was decided that the panel should include:

professionals from commercial providers, humanitarian officials from multilateral IGOs and NGOs who worked in the Ethiopian famine 2000, and academics. Furthermore, Kent (1999) suggested that a positive relationship between group size and performance in the Delphi studies cannot be recognised. Thus in this research two panels were to be formed with an overall total of 50 members, 12% commercial, 14% academic and 74% humanitarian relief. The Delphi survey was sent to four different groups related to both commercial logistics and relief organisations in Europe, North America and Africa.

Consensus

In most Delphis, consensus is assumed to have been achieved when a certain percentage of the votes fall within a prescribed range (Linstone and Turoff, 1975). Consensus means that there is general agreement about a statement. According to Kapoor (1987), the prescribed range is determined by the Average Percent of Majority Opinions (APMO) which produces a cut off rate that determines whether consensus has been achieved.

$$\text{APMO} = \frac{\text{Majority Agreements} + \text{Majority Disagreements}}{\text{S opinions expressed}}$$

In order to reach consensus a statement must achieve a percentage for 'agree' or 'disagree' that is higher than the APMO cut-off rate. Statements that do not reach consensus in the first round proceed to the second round (Kapoor, 1987).

Analysis of the first Delphi round

The respondents were given three weeks to comment on the statements of the first round. After two weeks a prompting letter was sent to those who had not yet replied. The results of the first round were analysed, by establishing which statements reached consensus.

It was expected that the response rate of the Delphi survey would vary between 75-100% (Abdel-Fattah, 1997). However, due to limited availability of time, not all parties were asked in advance to participate in this survey. This had a considerable negative influence on the response rate. The overall response rate of the first round questionnaire was approximately 36%. Some 50 questionnaires were sent to different groups related to relief organisations and third-party logistics (Table I).

Table 1
Analysis of answers to first round statements in order to determine consensus

Hy	No	Statements	Agreed		Disagreed		UAC		Opinions	Consensus
			#	%	#	%	#	%		
1	1	It has often been debated that the real problem behind supplying aid to those in need is not what to provide first but the logistics of getting it to them.	14	77.8	2	11.1	2	11.1	16	Yes
2	2	During the Ethiopian famine 2000 secondary relief organisations and agencies were responsible for the dispersion of aid to the regional affected areas.	15	83.3	2	11.1	1	5.6	17	Yes
2	3	Secondary relief organisations were not responsible for the distribution supply chain from the donor country to the Ethiopian borders.	5	27.8	12	66.7	1	5.6	17	No
3	4	The decision to utilise distribution companies by relief organisations is fostered in part by the interest in reducing asset investment to improve asset productivity.	16	88.9	1	5.56	1	5.6	17	Yes
3	5	The main reason for relief organisations to outsource trucking activities during the Ethiopian famine was to utilise local knowledge.	8	44.4	5	27.7	5	27.7	13	No
4	6	The main problem relief organisations met when contracting out trucking activities during the famine was the extortionate prices for hire.	4	22.2	12	66.7	2	11.1	16	No
4	7	The main problem relief organisations met when contracting out trucking activities during the famine was finding the right contractor.	15	83.3	2	11.1	1	5.6	17	Yes
5	8	Organisations were satisfied with the experience of outsourcing trucking activities to third-party operators.	14	77.8	5	27.2	1	5.6	17	Yes
5	9	Humanitarian aid was delivered to the right region, in the right quantity, to the right people in the shortest possible lead-time thus completing the central logistical objective of relief organisations and gaining customer loyalty to the third-party operator.	8	44.4	8	44.4	2	11.1	16	No
6	10	During the famine it was desirable for relief organisations to outsource trucks since the government policy towards the subject was encouraging the private fleet, thus relief organisations could benefit.	14	77.8	1	5.6	3	16.7	15	Yes
6	11	During the Ethiopian famine 2000, it was desirable to outsource trucking activities under the condition that the right contractor was used.	16	88.9	1	5.6	1	5.6	17	Yes
7	12	Predominantly trucks transferred food, however water, clothing, housing equipment, medicine and personnel were also transported during the Ethiopian famine.	15	83.3	1	5.6	2	11.1	16	Yes
8	13	During the famine the most frequently used contractors were local entities due to their knowledge of regional access and convenience of location.	16	88.9	1	5.6	1	5.6	17	Yes
8	14	During the famine relief organisations outsourced trucking activities mainly be letters of assist and sub-contracts.	7	38.9	8	44.4	3	16.7	15	No
Total			135		24				228	

The relatively poor response rate to the second round of the Delphi survey was felt to have been caused by the very tight time frame in which the research had to be undertaken which restricted the period within which the Delphi survey had to be conducted. This precluded sending letters in advance to potential respondents which might have aided the process and if used again, this is certainly something that should be encouraged. On reflection, in these circumstances, the Delphi technique might not have been the best approach to have taken for practical reasons and if the research was to be repeated use of a statement rating scale (for example use of Likert Scales) which necessitate less commitment from respondents and thus can be processed more quickly, might be more suitable. They do not involve more than one round of commitment and completion by respondents can be much quicker than the Delphi approach. However, even with the relatively low response rate, the results achieved were still felt to provide useful indication of the attitudes of experts to the logistical issues of humanitarian aid.

Whether a statement has reached consensus or not depends on the APMO cut off rate. In order to calculate this rate, the numbers of majority agreements and disagreements have to be calculated. This is achieved by expressing the participant's comments 'agree', 'disagree' and 'unable to comment' in percentages per statement. A comment has reached majority in the case when its percentage is larger than 50. After totalling the majority agreements and disagreements, their sum is divided by the total number of opinions expressed. The APMO cut off rate in the first round Delphi in this study is 135 majority agreements + 24 majority disagreements divided by the 228 opinions, which equates to an APMO rate of 69.7%.

Nine statements during the first round reached a percentage of agreement that was higher than 69.7% and thus reached consensus.

Statement one

A large majority of the panellists agreed that there is an aid logistics problem. Comments suggested that the difficulties arise because of inadequate infrastructures, finance and the short lead times required in emergency situations. Members stated that since logistical activities are not their core competency, they often found difficulty 'in turning on the transportation tap in order to get aid to the field,' thus they would prefer to buy in the expertise for the distribution process.

Statement two

The arguments for agreeing with this statement arise because most respondents had the responsibility for transporting the commodities to the affected regions, with the majority of them also distributing up to the final end users. Some relief organisations organised the international transport to Ethiopia and their implementing or local partners took over from the airlift centre or EDP and distributed to the final beneficiaries; thus hypothesis two must be modified. The organisations responsible for the final distribution conducted this through their own programme structures, NGO conduits or community and district structures.

Statement four

The main reason panellists agreed with the statement is because the land transportation segment is where most of the costs are incurred and where the political and environmental risks are at the greatest. Only a few organisations owned their own trucks because of the large amount of capital they tie up, and the fact that nobody knows whether or where they will need the vehicles afterwards. Panellists stated that since the Ethiopian infrastructure made heavy wear and tear on the trucking fleets it led to extortionate maintenance costs.

Therefore where capital investment was avoided by the outsourcing of trucking, the flexibility of the organisation increased.

Statement seven

Most participants agreed with this statement, which works in correlation with hypothesis four. The results indicate that during the Ethiopian famine, relief organisations on some occasions struggled to find a contractor that understood the full needs of the organisation. A central facet of this was the high prices imposed by third-party providers, who tried to take advantage of the situation and promote competition between organisations. Panellists also suggested that the key elements of finding the right contractor were the capacity of the local transport market, the haulage prices, the willingness of local transport operators and government policies in Ethiopia.

Statement eight

Almost all the panellists agreed with this statement, which works in collaboration with hypothesis five. Respondents stated that the outsourcing of trucking activities during the Ethiopian famine did meet with the expectations of the relief organisations. Relief organisations stated that usually the contractors performed in time and with a high quality of service and as a result they were pleased with the outsourcing and the experience from the third-party provider. However, this was under the condition that firstly the right contractor was found and secondly that their relationship was good so that planning and communication went well, resulting in a sound delivery system.

Statement ten

The main research study is stated as hypothesis six, which in turn was tested by this statement in the questionnaire. A very high percentage responded positively to the statement and thus it was accepted. The arguments for agreeing with this statement stemmed from the introduction of the Ethiopian government's policy towards encouraging the private fleet sector by reducing fiscal charges and promoting domestic business exchange. Respondents declared that relief organisations were able to outsource from a greater private fleet capacity than might otherwise have existed, resulting in extended choice and healthy competition promoting greater service.

Statement eleven

A very high majority accepted the statement and thus it can be claimed it was desirable for relief organisations to outsource their trucking activities. Respondents stated that the benefits of outsourcing from a good contractor were only reaped when a high level of commitment, resolution, communication and customer focus were employed by both parties to the contract. Only then did the relief organisations harness the benefits of outsourcing and develop good relationships that manifested the many advantages that are possible with third-party providers.

Statement twelve

Respondents agreed with the statement by suggesting that the distribution of aid during the famine involved mainly the allocation of food and water since the nature of the disaster was a shortage of food. However the political and climatic situation in Ethiopia meant that many refugees had left their homes; thus in addition they required housing, clothing, medicine and agricultural tools to work the land.

Statement thirteen

By agreeing with this statement respondents affirmed that since relief organisations are located in various parts of the world, the closest took care of the trucking activities during the famine. However when their local partners had a shortage of trucks, they outsourced from local commercial companies. Commercial trucks always operated because of their knowledge of local conditions while in contrast international commercial trucks were stopped by the frequent security alerts. IGOs tended to select a contractor on rapid response time and political acceptability, whereas NGOs gave priority to local companies so as to benefit the economy.

Reformulating statements for the second Delphi round

The statements that did not reach consensus after the first round were reformulated and included in the second Delphi round. The reformulated statements of the second Delphi round must accurately convey the meaning which respondents attempted to communicate by means of the first round questionnaire (Delbecq *et al*, 1975).

Statement three

Original: Secondary relief organisations were not responsible for the distribution supply chain from the donor country to the Ethiopian borders.

Reformulated: During the Ethiopian famine 2000, most relief organisations were responsible for the dispersion of aid from the donor country, airlift centre or EDP to the final beneficiaries.

Argument(s): Many relief organisations were responsible for aid distribution from the donor country internationally, to the domestic arrival of aid through the seaport of Djibouti and Berbera and the various airlift centres. Relief organisations used either the extended delivery point or the final end user as the limitation of responsibility for physical distribution.

Statement five

Original: The main reason for relief organisations to outsource trucking activities during the Ethiopian famine was to utilise local knowledge.

Reformulated: During the Ethiopian famine 2000, relief organisations outsourced trucking activities for cost and flexibility reasons with the additional benefit of utilising local knowledge, thus improving the service.

Argument(s): The main reason for utilising logistics companies by relief organisations was the reduction in asset investment to improve asset productivity. However exploiting local knowledge had great benefits, as the Ethiopian terrain was arduous and not all routes were accessible, thus it reduced the lead times as operators had details of possible routes and potential hazards.

Statement six

Original: The main problem relief organisations met when outsourcing trucking activities during the famine was the extortionate prices for hire.

Reformulated: When limited vehicles were available or when warlords controlled the transport sector, exorbitant prices were charged, thus it was not desirable to outsource trucking activities.

Argument(s): A central facet of the decision to outsource trucking activities by relief organisations was the problems associated by the high prices imposed by third-party providers. They took advantage of the situation and promoted competition between

organisations making it sometimes undesirable to outsource trucking activities during the Ethiopian famine 2000.

Statement nine

Original: Humanitarian aid was delivered to the right region, in the right quantity, to the right people at the shortest possible lead-time thus completing the central logistical objective of relief organisations and gaining customer loyalty to the third-party operator.

Reformulated: Relief organisations had good experienced with outsourcing trucking activities during the famine, as it improved the flow of commodities around the country and increased the organisations flexibility. This would encourage them to use third-party logistic operators in the future.

Argument(s): On the whole relief organisations had good experiences when outsourcing activities during the Ethiopian famine 2000, and thus they would consider outsourcing again in the future. However it is not accurate to state that aid was always delivered to the right region, in the right quantity and to the right people. It is more accurate to state that outsourcing contributed to the diminishing of lead times and better logistical operations.

Statement fourteen

Original: During the famine, relief organisations outsourced trucking activities mainly by letters of assist and sub-contracts.

Reformulated: During the famine, relief organisations outsourced trucking activities mainly by commercial contracts, however letters of assist and subcontracting were also employed.

Argument(s): It was not right to state that the main methods of outsourcing trucking activities was by means of letters of assist and sub-contracts, although these were on occasion employed. It is more precise to state that when local partners of relief organisations had a shortage of trucks, they outsourced from local companies, which were commercial companies and thus employed commercial contracts.

Analysis of the second round Delphi

After reformulating the statements they were included in the second round questionnaire and sent to the panellists who were asked again to give their comments (Table II). After the closing date of the second round (three weeks later) the results were analysed again.

Table 2
Reformulation of the statements for second round Delphi

	Statements
3	During the Ethiopian famine 2000, relief organisations were responsible for the dispersion of aid from either the donor country, airlift centre or EDP to the final beneficiaries.
5	During the Ethiopian famine 2000, relief organisations outsourced trucking activities for cost and flexibility reasons with the additional benefits of utilising local knowledge, thus improving the service.
6	When limited vehicles were available or when warlords controlled the transport sector, exorbitant prices were charged, thus it was not desirable to outsource trucking activities.
9	Relief organisations had good experience of outsourcing trucking activities during the Ethiopian famine 2000, as it improved the flow of commodities around the country which reduced the lead-times and increased the organisation's flexibility. This would encourage them to use third-party logistic operators in the future.
14	During the famine, relief organisations outsourced trucking activities mainly by commercial contracts, however letters of assist and subcontracting were also employed.

Table 3
Analysis of the second round Delphi questionnaire

Hy	No	Statements	Agreed		Disagreed		UAC		Opinions Expressed
			#	%	#	%	#	%	
2	3	During the Ethiopian famine 2000, relief organisations were responsible for the dispersion of aid from either the donor country, airlift centre or EDP to the final beneficiaries.	14	77.8	2	11.1	2	11.1	16
4	6	During the Ethiopian famine 2000, relief organisations outsourced trucking activities for cost and flexibility reasons with the additional benefits of utilising local knowledge, thus improving the service.	8	44.4	8	44.4	2	11.1	16
3	5	When limited vehicles were available or when warlords controlled the transport sector, exorbitant prices were charged, thus it was not desirable to outsource trucking activities.	15	83.3	2	11.1	1	5.6	17
5	9	Relief organisations had good experience of outsourcing trucking activities during the Ethiopian famine 2000, as it improved the flow of commodities around the country which reduced the leadtimes and increased the organisation's flexibility. This would encourage them to use third-party logistics operators in the future.	16	88.9	1	5.6	1	5.6	17
8	14	During the famine, relief organisations outsourced trucking activities mainly by commercial contracts, however letters of assist and subcontracting were also employed.	8	44.4	8	44.4	2	11.1	16

The participant's answers to the second Delphi round are given in Table III. Initially the answers to the second Delphi round were tested for individual stability. A χ^2 test for independence was used to test the following hypotheses:

H0: Individual responses of round i and $i + 1$ are independent.

H1: Individual responses of round i and $i + 1$ are dependent.

Consequently by rejecting H0 (thus accepting H1) it could be concluded that there would be no significant difference between individual responses in the different rounds and thus that there would be individual stability.

The χ^2 test was formulated as:

$$\chi^2 = \sum_{i=1}^m \sum_{j=1}^n \frac{(O_{ij} - E_{ij})^2}{E_{ij}}$$

In order to calculate the χ^2 value for each statement, the answers of both the first and the second Delphi round are required.

However during the calculation for the χ^2 values of each statement it appeared that the χ^2 test for stability was an inappropriate test for statements 3, 6, 5, 9 and 14, since all the expected values (E_{ij}) were smaller than five. In order to assess which statements reached individual stability there were two possibilities (Chaffin and Talley, 1980); increase the number of Delphi respondents or measure the extent of individual stability between successive Delphi rounds by means of a non-parametric comparison test of two paired samples.

Increasing the number of Delphi respondents was not possible due to the limited availability of time for this enquiry, thus using a non-parametric comparison of two samples was adopted. According to Triola (1998) rank correlation uses ranks as the basis for measuring the strength of the association between two variables. This technique allows the use of more of the information contained in the distribution; the stability measure is relatively simple to calculate and has much greater power and validity than parametric tests of variance; and one of the original objectives of Delphi was the identification of areas of difference as well as areas of agreement within the participating group.

The procedure used for the non-parametric test is based upon the principle that if two samples are drawn from identical populations and the individual scores are ranked as one combined collection of values, using the sum of these values will suggest group stability of statements. According to Chaffin and Talley (1980) if individual responses of round one and round two are dependant then one should be able to predict the responses of round two from the responses of round one. This will provide a stopping technique for the second round of the Delphi survey.

The non-parametric test technique was employed for statements 3, 5, 6, 9 and 14. The method involved ranking the qualitative responses (agree, disagree and unable to comment) in order to create quantitative results for statistical evaluation. This was achieved by assigning a score of 1 to responses of disagree and 2 those responses that agreed with the statement. Where individuals were unable to comment, their inputs were removed from the results. By subtracting the ranked scores of the second round from those of the first round (whilst removing any signs), the differences show the variation between responses. Thus the percentage change (index of predictive association for group stability) is determined by the dividing net changes by the number of participants. When the rank index approaches one there is no predictive association and thus no group stability. However, when the index approaches zero there is complete predictive association and thus stability. Conversely

individual stability of statements is simply established when each respondent votes successively over both rounds.

The rank index of predictive associate for statement three is 0.25 (Table IV), five 0.23 (Table V) and fourteen 0.19 (Table VI). Thus, these statements have reached individual stability and therefore no further Delphi rounds are required. Unfortunately statements six and nine did not reach stability, thus they require further investigation by means of additional Delphi rounds. Perhaps the reason why only some of the statements reached stability in the second round is due to the application of two different methods (consensus and individual stability) for analysing the Delphi rounds. After the first round Delphi, in accordance with panel comments, statements six and nine were changed quite dramatically. As a result the respondents changed their answers in the second round from ‘disagree’ and ‘unable to comment’ to ‘agree’. Thus when employing the non-parametric test for paired samples, these statements were not able to reach stability as members had not voted dependently.

Table 4
Rank index of predictive association for statement 3

Panellist	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Group 4/16 = 0.25 Individual Stable 12 Unstable 4	
Delphi Round 1	1	1	2	1	1	1	2	1	1	2	1	1	2	1	1	2		
Delphi Round 2	1	1	2	2	2	1	2	2	1	2	1	2	2	1	1	2		
Differences	0	0	0	1	1	0	0	1	0	0	0	1	0	0	0	0		

Table 5
Rank index of predictive association for statement 5

Panellist	1	2	3	4	5	6	7	8	9	10	11	12	13	Group 3/13 = 0.23 Individual Stable 10 Unstable 3	
Delphi Round 1	1	2	2	1	2	1	1	2	1	2	2	2	2		
Delphi Round 2	1	2	2	2	2	2	1	2	2	2	2	2	2		
Differences	0	0	0	1	0	1	0	0	1	0	0	0	0		

Table 6
Rank index of predictive association for statement 14

Panellist	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Group 3/15 = 0.20 Individual Stable 12 Unstable 3	
Delphi Round 1	2	1	2	2	1	2	2	1	1	2	2	2	1	1	1		
Delphi Round 2	2	1	1	2	2	1	2	1	1	2	2	2	1	1	1		
Differences	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0		

Conclusions

The outsourcing of logistics functions involves the use of external companies to operate functions that traditionally have been performed within an organisation. Benefits of outsourcing centre upon the reduction of complexities in international distribution channels, reduction in capital occupied and the third party's ability to reconfigure the distribution system to adjust to changing markets or technological advantages. Just as there are many reasons that favour outsourcing there are many that discourage its use - loss of control to the provider, lack of technology linking the manufacturer, carrier, warehouse and customers operations, difficulty in selecting a suitable provider and extortionate charges sometimes imposed upon the customer.

Famine occurs not because there is not enough food in the world, but because the food is not where it is needed. In April 2000 over 12.5 million people faced shortages of food and water in Ethiopia. A major humanitarian relief effort combined with the eventual delivery of food aid averted a crisis at that time, but the danger is far from over as the physical distribution process continues to face obstacles. A multitude of relief organisations participated in the Ethiopian famine 2000. Their aim was to provide succour in the form of food, medicines, clothing and shelter to the victims of the famine with the overall objective of future self-sufficiency.

The distribution of humanitarian aid to millions of people was no simple task. In a country as vast as Ethiopia effective logistics was central to famine relief since the greatest task in providing aid was getting the food to the people who were in need. Crucial to the success of humanitarian aid in Ethiopia were the delivery systems of which land transport dominated. Trucks were the most common mode of land transport. Political and environmental risks were great, making the maintenance costs high. With this in mind numerous relief organisations chose to partially or wholly outsource their trucking activities to third party providers.

Relief organisations outsourced their trucking activities from both international companies that exclusively served relief organisations and local commercial entities. Relief organisations mainly used commercial contracts; letters of assist and subcontracting were also employed. Not all experiences with outsourcing were positive. Some of the local transport companies on whom relief organisations relied, employed badly maintained, haphazard trucking fleets and the lack of spare parts and the age of the trucks meant their reliability was poor.

The Delphi survey analysed expert opinions. However since there were only 18 respondents the statements produced low inferential powers and this made it is statically difficult to find evidence to reject the null hypotheses.

89% of relief organisations in the survey outsourced their trucking activities, although each of them did to a different extent. Relief organisations were largely responsible for the transportation of aid to the extended delivery point(s) in Ethiopia, where their partners would take over and distribute the aid to the final beneficiaries using programme structures of either their own, locally or from NGOs.

Relief organisations suggested the central benefits for outsourcing were the reduction in costs and the increase of flexibility which corresponds with the main reason commercial companies

outsource. In addition, the government's policy of encouraging the private haulage fleet, the third-party's knowledge of the local conditions and the reduction in vehicle theft also encouraged organisations to outsource.

Relief organisations stated that there was no particular problem with their outsourcing policy during the famine although higher expenses, dependency on a single service provider and finding a suitable contractor were mentioned. One member suggested that the rapid changes and fluctuations in demand for trucking facilities often left their organisation with unreliable contractors and thus they would generally choose not to outsource again. However on the whole relief organisations affirmed that once the difficulty of finding a suitable transport contractor had been overcome they were satisfied with trucking activities.

When relief organisations outsourced their trucking activities during the famine, it was usually achieved by commercial contracts and by sharing with other organisations. The three major contractors employed were commercial companies, freight forwarders and local companies. Local companies also created additional employment and supported the local economy. This way, relief organisations placed their investment in people who knew the local environment and conditions. However, these investments sometimes fuelled local conflict as warlords controlled some areas of the transport sector.

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