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GLOBAL SUPPLY CHAINS: THE COST OF SOURCING?

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Abstract

Today's business world relies on strategies that have gone beyond the geographical boundaries of one country to become International and in many cases "global". This has only been made possible by a logistics industry that has not only learnt to manage with lower levels of inventory, smaller batch sizes and more frequent deliveries, shorter lead times and how to do it all at lower transport and storage costs, but to do so on a global scale. The success of global logistics and global sourcing has enabled concomitant success within multinational businesses, but has done so at a cost. Recently people have become more aware of those costs and have begun to try to understand, classify and quantify them as a step towards controlling their impact in the future.

The aim of this paper is to revisit some of the perceived benefits of globalisation and look at some of the recent attempts to begin to evaluate the possible downsides associated with our ever increasing dependence on global supply chains and the products/materials they make available to us. Whilst it generally accepts the previously posed suggestion that global supply chains can be seen as "sinners" (Griffiths and Savage, 2007), it looks forward to ways of moving them towards "sainthood".

Keywords: Global supply chains, negative impacts, environmental, risk, sourcing, econopolitical

Introduction

The very word 'globalization' evinces overtly enthusiastic responses either for or against the concept. Those in favour wheel out a string of benefits that include: Variety & choice: products from different countries, All-year availability : global supply, Cost savings sourcing from cheapest places, Expansion and growth of the world economy, Development of more nations, Raising living standards for beneficiaries, Risk spreading, Support of corporate global purchasing strategies, Ability to exploit new & / or wider market opportunities and Promotion of global products and usually cite the heightening of upward social mobility in developing countries. Detractors often make unqualified statements about the possible environmental degradations and inequities that it precipitates. One factor that many people miss is that although globalization may bring choice to the few "Yes madam, you may have Kiwi fruit for breakfast if you wish", it also lessens choice on a macro-scale for many countries and organizations who enter the global world late or are simply weaker than their competitors. Such countries are forced to adopt trading patterns operating methods laid down by earlier entrants rather than choosing which issues they want to address and devising their own solutions to those problems.

Fortunately, academics and other writers have been more specific and less emotive in their comments; the following review looks at some recent work from various sources, together with sample case studies and attempts to summaries issues identified and suggestions for the way forward.

Review

Mena et al (2007) identify cost reductions as the primary reasons for global sourcing but suggest that other potential benefits of global sourcing could include:

- Better process and product technologies
- Better quality by allowing access to the world's leading producers
- High speed and flexibility
- Access to emerging markets
- Securing availability of limited resources
- Access to unique resources only available in certain parts of the world
- Introduce competition to the domestic supplier base

They go on to say that although all of these benefits are possible, they are not guaranteed and further that global sourcing can expose firms to risks and costs that are not initially apparent (Christopher and Lee, 2004).

In "Moveable Feasts", Sarah Murray (Murray, 2007) itemises a range of the foodstuffs available in a typical UK supermarket and by doing so shows that the average Britain's diets has been enhanced to include exotic fare such as high (and less high) quality olive oil and strawberries at any time of the year. She proceeds to dissect them to reveal how they came to be "on the shelf" both historically and currently. This shows the benefits to the consumer fairly and demonstrates the expertise of logisticians (albeit as almost en-passant) but it also exposes some of the problems caused along the way.

As most global logisticians are aware, there are several factors which work against the benefits and may reduce their efficacy. "Trade-offs" will need to be managed, for example, to achieve the benefits of low-cost global sourcing at the same time as working towards JIT (Das and Handfield, 1997). Griffiths and Savage (2007) accept that there are many advantages to be gained by globalization, but suggest that there is doubt that the supply chains that support them can be regarded as all good (saints). Rather their analysis suggests that there are many ways in which they are less than wholesome and might be regarded as "sinners". In order to try to understand and analyse the problems arising from them they identify and classify a number of these factors, referring to them as "downsides", with a view to demonstrating that the true cost of global sourcing or exporting may be greater than the perceived financial and social benefits. The classification uses the following categories:

- Technical/financial – where the product or material fails to meet specification whether technically or financially, resulting in additional processing and/or expenditure
- Environmental – where the global process has a serious impact on the environment - NB these are often not hypothecated to the product concerned but are absorbed by the world population at large
- Econopolitical – where global activity which benefits the perpetrator disadvantages others in a disproportionate manner and/or leads to their disenfranchisement.

Case Studies and Examples.

In all of the following, although the term "Global Supply Chain" may not be mentioned specifically, the operations they describe would not be possible without them.

Technical / Financial

Factors at work here include; off-shore sourcing, incomplete specification, inaccurate costing, ineffectual transfer of facilities and faulty manufacture, different systems, standards and cultures.

Case i) a steel manufacturer

A UK based manufacturer discovered that they could re-source their steel bars from the Far East, even allowing for the cost of shipping. As part of the agreement the steel was ordered and made in much larger batch sizes (the company had been running a JIT system). Prior to shipping it was realised that the steel was not colour coded and the bars were bound with wire instead of straps; contrary to UK standards. This led to extra charges and delays in shipping. Further, unplanned, issues occurred such as the need to protect the steel from salt water damage while at sea and when the product eventually arrived at the company's UK warehouse there was insufficient room to store the new batch size. Each problem raised the true delivery cost but the company still made a profit. However a number of actions such as increased management and communication requirements and risks (e.g. quality was around the lower limit of that specified) were not costed. The manufacturer is continuing with this form of off-shore sourcing - part of its strategy to reduce manufacturing costs.

Case ii) a mobile telephone manufacturer

A Scandinavian based manufacturer decided to manufacture units in Brazil to take advantage of low skilled labour and material costs. To increase the benefit, it was further decided to outsource some components to Argentina where the costs seemed to be even lower than those locally sourced. Although this was true, the parent company failed to take account of some "South American cultural issues". A tariff barrier between Brazil and Argentina meant that the delivered price of components to the Brazilian factory increased several fold.

The overall effect was that, because all cultural and financial aspects of the sourcing operation had not been thoroughly researched, the parent company turned a potential profit into a loss. The manufacturer continued with the strategy but was forced to re-source the components in question.

Case iii) an electronic document handling company

A multinational electronic equipment manufacturer set up a final integration & configuration operation in the Netherlands that brought agility and efficiency to their manufacturing process. Components & sub-assemblies were shipped from many parts of the world to produce “vanilla” machines using “lean techniques”, these were then customised after a decoupling point by configuring them to meet country and customer specification, once demand figures were known.

This was so successful, that it became part of a number of joint venture “badging” operations where machines were produced, sold and distributed on behalf of a partner company. The majority of this company’s profit was made on the sale of after sales consumables. A source was found in Taiwan to maximize the profit on these consumables; when an important new product was to be launched. The initial samples were fine and so several container loads were ordered well before the launch. Unfortunately, when the shipment arrived the components were out of specification. Even more unfortunately, it was by then too late to ship replacements by sea if the launch date was to be met. Instead a quantity was flown in at considerable expense. This expense was sufficient to eat away the planned profit for the first period of the joint venture. Perhaps because of this issue, trust was damaged and the venture did not prosper.

Environmental

Factors at work here include; resource depletion, direct damage to environment – greenhouse effect, land take, oil dependency and intensive use of transport.

Case iv) Norwegian Salmon

According Murray (2007), a typical Norwegian salmon destined for a supermarket in AMERICA OR Europe may undertake a journey after death even greater than that during its amazing lifecycle. Once harvested it is frozen, packed into boxes on a small feeder vessel, shipped to Rotterdam or Hamburg to be transhipped to a large container vessel heading for the Far East (stored at -23° Celsius). About a month later it will arrive in China (probably Qingdao) where it will be trucked to a fish processing plant. Here it is thawed and moved to an hygienic factory floor where huge teams of nimble fingered Chinese operators skin the fish, remove all of the bones and portion them to suit Western supermarket requirements. The portions are then packed and refrozen ready for the long journey back to the West and the waiting consumer.

Case v) - Rolls Royce wheels

The Rolls Royce Motor Car assembly plant was built on a greenfield site near Goodwood in West Sussex. The buildings were designed by world-leading architects, Sir Nicholas Grimshaw & Partners, to be “eco-friendly” and have many environmentally desirable features, for example they were built low to minimise the impact on the surrounding countryside. The largest single-span ‘living roof’ in Europe is covered in countless thousands of sedum plants, which change colour with the seasons. It renders the buildings almost invisible from the air, and provides a natural habitat for insects and rare breeds of bird. The outside is clad in cedar louvers, which serve two functions: softening the exterior aspect and, by adjusting automatically to ambient light levels, shield workers inside from the glare of the sun. Thanks to the extensive use of glass in the building’s construction, the assembly line is bathed in huge amounts of natural light, minimising the need for artificial lighting and thereby reducing the consumption of electricity. Much of the water used in the building is recycled, while clever design, such as the use of the large ornamental pond as a means of cooling the building’s air-conditioning heat exchangers, means the building exceeds current environmental standards. They also use water based paints and have a component collection centre, set up at BMW Group’s Oxford hub, to ensure heavy goods traffic is kept to a minimum (Rolls Royce, 2007).

Despite all this effort, the environmental ethicalness of their production methods can be called into question. Leaving aside the fact that both bodies and powertrains are made in Germany and shipped to the UK for assembly, there are specific issues, for example chrome plated wheels for the “Phantom”. These alloy wheels are cast in Germany and shipped when needed to Canada to be plated in a particular factory and then shipped back to the UK to be married up with a customer’s vehicle. BMW, who own Rolls Royce motor cars, say that this is essential to achieve the chromium plate quality they require. Environmentalists would surely question whether this justifies the wheels being taken on a journey of some 7,000 miles before they are even fitted to the car they are destined to support.

Econopolitical

This, by its nature, is a much more difficult and potentially emotive area. Significant issues here include: the use of “unfair” subsidies designed to benefit particular sectors of trade (usually in the developed countries) that has a potentially disastrous effect on other (usually developing) countries; the “boutiquifying” of commodities e.g. bottled water. Some writers suggest that this goes much further and suggest that the power wielded by multi-national companies (enabled by globalization / global logistics) can override or control government decision making and thereby tend to disenfranchise the voting population (Hertz, 2001) leading to damage to people and the environment (e.g. by the products of global arms industries (Kaplan, 2006).

Case vi) Italian tomatoes

Through the Common Agricultural Policy (CAP) Brussels provides €40bn agricultural subsidies per year for European farmers producing: Dutch milk powder; Italian tomato concentrate; French wheat, sugar and sunflower oil; Irish beef, and; German pork. This allows the production and export of agricultural produce at artificially low prices. For example in West Africa, cheap (mainly Italian) tomatoes undermine local processing with disastrous results. In Senegal one of the two tomato canneries closed whilst the other, in order to survive, imported triple concentrate from Italy to make double concentrate sold locally. Thousands of local farmers lost market outlet and many were forced into liquidation. Similar events happened in Burkino Faso, Mali & Ghana (TWN, 2007)

Case vii) Cheap Clothing for Western Consumers (USA cotton subsidies / Chinese sweat shops)

The combination of subsidies and sweated labour supported and integrated by global logistics provide consumers with very low cost products, but the true cost is hidden. For example; take a simple black T-shirt selling in the UK for £1.50. The cotton used in its manufacture is grown in the USA costing about 80c to produce yet is sold for 48c/pound. This is enabled by the US government paying cotton farmers \$3.9bn/yr in subsidies, three times the level of US aid to Africa. The greatest subsidies go to Texan farmers - one receives \$17m/year. The T-shirts are made up in China by Chinese workers who earn less than £1/day. Benin which relies on cotton for 60% of its exports has been hit badly by the subsidised cotton. The impact is staggering - Benin had 80,000 farmers in 2000 this was reduced to 26,000 in 2005. The country, which is the world's 6th poorest nation, is losing 1.4% of its GDP per year and 33% of the population live in poverty. Life expectancy is 48 years. By contrast the price of clothing in Britain fell by 14.7% between 2000 & 2005 (Frith, 2005).

Case viii) “Shop & Drop”

Major UK retailers are proud of this slogan which encourages consumers to “save their feet” by shopping on line, whilst the retailer will deliver low cost goods to their home. Unfortunately, the manufacture of such products is often only achieved by the exploitation of developing world workers, again made possible by effective and efficient global logistics. For example many clothes & toys in UK stores are made in Chinese factories some of which operate under illegal, exhausting & dangerous conditions. One could claim that the Chinese economic miracle has been founded on an “army of powerless, rural migrants” toiling 14 hours a day in Dickensian conditions (mainly in Guangdong) earning less than £50 month. The workers live twelve to a room with only an outside cold tap for washing and “soupy water” for food. Such operations have allowed China to undercut developed countries by 60% and make 90% of the world's toys (50% of Europe's) and still maintain 9% annual growth. They also provide UK retailers with a profit margin of (for example) £3-£4 on a pair of Jeans (Hickman, 2006).

Mitigation & Control

Corporate governance in global business is far more complicated than in domestic firms (Luo, 2007) and evaluating global supply chains is often very low on the list of priorities but, as the above examples demonstrate, there are many ways that global supply chains can go wrong and turn from “Saints to Sinners”.

The key to setting up a successful, environmentally “clean” and ethical global supply chain is through research tempered with restraint from greed. The former should focus on product and supply chain design (including reverse logistics) to ensure maximum efficiency is achieved, while the latter is not simply to reduce the impact on other people, but also to prevent project failure due to under-scoped or overambitious costing. Once an operation has been set up perhaps the two most important ongoing

factors that allow good supply chain performance are visibility and flexibility. The former gives the information to manage the supply chain, whilst the latter enables supply chains to react to changes in demand and thereby prevent obsolescence. Flexibility in this context includes both agility (Vinod et al., 2006) and the ability to restructure/reorganise the supply chain when necessary.

The maxim “Think Globally, Act Locally” (Dubos, 1972) was probably coined to suggest that ecological consciousness should begin at home, but has more recently been adopted by global supply chain advocates. Often contentiously referred to as ‘glocalisation’ (Gabardi, 2000), it implies that one must take a global view when forming strategy and carrying out high level management, but allow local people to manage issues on the ground (whether sourcing/exporting or manufacturing /importing). This can be a very successful approach since, if visibility is in place, it allows strategic decisions to be made by managers with a high level, long term view. Local action can be determined by people who know the culture, climatic and other issues that, if not understood, can cause disaster. Unfortunately, another even greater risk occurs when some companies try to “morph” their local practises into global operations, often without fully understanding those processes in local, “stand alone” mode; let alone when exacerbated by being applied on a global scale. Poor levels of integration and collaboration and unnecessary cost at a local level are hardly likely to improve at a global level. Even the use of a 3PL to manage the transformation will be handicapped by such inherent business problems. As the impacts of globalization are increasingly felt by the people it has been developed to serve, awareness of the negative aspects and indeed of technical failures is growing. People, particularly those in more developed countries, are experiencing pangs of guilt at such impacts. Further, these “pangs” are starting to be reflected in legislation being drawn up and/or executed by governments and organizations. In turn, this legislation tends to compound the difficulties imposed by the technical ones. This concern has been reflected in the work of journalists, academics and logisticians who have variously sought to condemn or outlaw globalization or, more realistically, to understand and therefore control global logistics.

Conclusions.

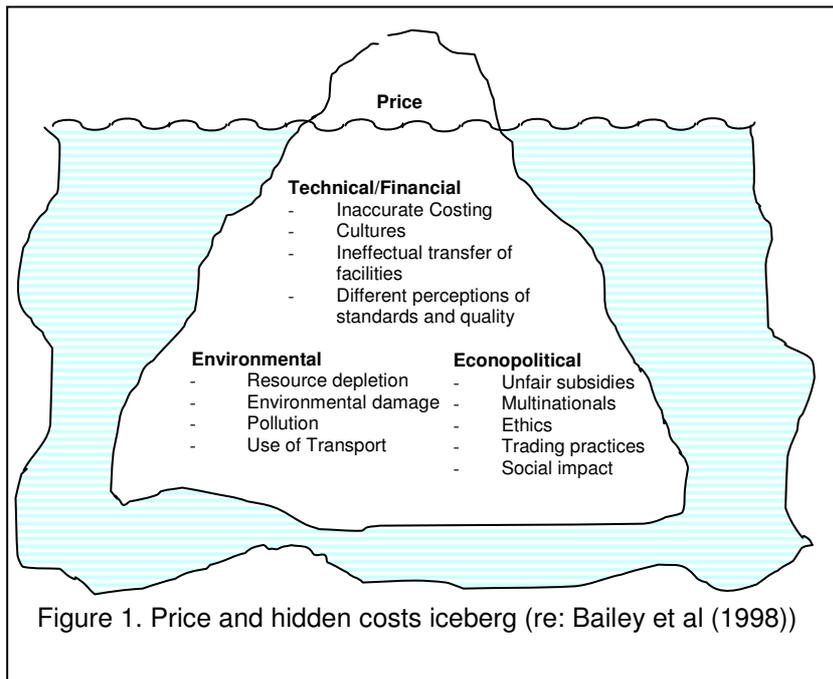
Mena et al (2007) primarily concentrate on the identification of hidden costs and risks and seek to address issues such as increased response time, loss of sales, loss of trust among supply chain partners, loss of intellectual property and increased vulnerability. In doing so their focus is on the “Technical / Financial” category, but as they cover transport and CO₂ emissions they also attend to many of the “Environmental” factors as well. The paper develops and advocates the use of a Comparative Global Sourcing (CGS) Model which takes into account four key elements of sourcing decisions; costs, risks, time and environment.

They conclude that cost reduction is a primary motivator for global sourcing, but that the definition of “cost” used by many sourcing operations is somewhat limited. The development and use of the CGS model is potentially a major step forward, but it will need further development and research (and probably continual refinement) to become fully functional.

After examining a plethora of foods from around the globe and even dipping into virtual worlds, Murray(2007) concludes that until someone develops a *Star Trek-style* transporter to beam solid objects across time & space, we will continue to rely on boxes, barrels, cartons, containers on ships, trains, planes and trucks for the peregrinations of our moveable feasts. But, that we must do so with greater efficiency and more care for the environment.

Griffiths and Savage (2007) concluded that although global supply chains can bring great benefits in terms of greater choice, cost savings and developing trade the problem is to develop an acceptable method that would allow them to be evaluated and managed. A great deal of further work would be needed to do this, but perhaps a start could be made by evaluating all proposed globalisations using a variant of the “Cost – Price Iceberg” proposed by Bailey et al (1998). See Figure 1.

In this case the apparent ‘Cost’ would reflect the savings generated by the proposed operation. The price, however will need to reflect the true ‘Costs’, often hidden from view below the surface. As can be seen in the cases above these can include technical, environmental and econopolitical costs.



This approach although less specific and developed than that of Mena et al (2007) seems to stem from the same principles. Both teams have independently agreed that part of the key, at least, is in identifying the true costs. The main difference, apart from the state of technical development, is the range and extent of the costs that might be included. This would probably vary from case to case and is in itself an indication of the complexity of the issues involved.

It is certain in the first decade of the 21st century that, aided by global logistics and information technology, whether intended to be taken seriously or not, Marshall

McLuhan's vision of a "Global Village" has become reality. It is not possible or desirable to go back to the primitive supply chains of 50 years ago, but unless we manage and control the future of Global Logistics, we could face a loss of credibility due to technical and cost issues, be adding to global warming and other environmental issues, helping to condemn poorer countries to permanent poverty and enabling multi-national companies to take away our ability to stop it through the ballot box (Hertz, 2001). To be sustainable, supply chain design should incorporate 'triple-bottom-line thinking', a concern about People and the Planet as well as Profit, into the culture, strategy and operations of companies. That way, perhaps we could enjoy the benefits of the Global Village and worry less about the inheritance we leave for our grandchildren.

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