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**ISSUES ON MULTIMODAL TRANSPORT
DEVELOPMENT IN AFRICA:**

**E-commerce in Multimodal Transport/
Freight Forwarding Subsector**

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Preface

With the increasing adoption of the Internet and electronic communication systems the role of Multi-Modal Transport and Freight Forwarding (MT/FF) as the intermediary between buyer and seller is changing, and the industry is having to change with it. Clients need connectivity with the Freight Forwarding systems to access their files for status, to extract reports from Freight Forwarding databases, and have their shipments processed in an error free and timely manner. As a result MT/FF is an activity that is being required to adopt e-commerce to increase efficiency of existing business electronically. In this regard e-commerce should be seen as an ally of the Freight Forwarding, and not an enemy.

This document aims to develop awareness aimed at promoting e-commerce as an ally to Freight Forwarding business for the benefit of the transportation sector in particular, and the African economies as a whole. The MT/FF industry needs to embrace e-commerce strategy as a step towards maintaining a competitive market position similar to those being practiced by their more technologically advanced partners in the developed world.

The document will:

- Review briefly the global developments and applications of e-commerce in general and in particular to the transport sector especially MT/FF services;
- Introduce e-commerce as an integral part of MT/FF activities;
- Highlight e-commerce uses and the range of technologies applicable in MT /FF industry with special attention to those already in use;
- Clarify how a Freight Forwarder can make full use and achieve benefits from e-commerce in transacting with customers on an on-line basis, as a step towards supporting their customer services and saving the Freight Forwarding companies resources on excessive support personnel and mailing costs.
- Specify what e-commerce means to MT Operators and Freight Forwarders in Africa, in terms of benefits associated with its capacity to assist in speedy business transactions, and quicker access to information.
- Explain e-commerce requirements as a modern business methodology that cuts costs and at the same time increases the quality of services, especially where computers are used to process, search, and retrieve information in support of human and corporate decision-making.
- Explain whether Freight Forwarding companies in Africa should run their own network servers and maintain full control over their services and data, or outsource;
- Describe the architecture and framework for establishment of e-commerce in a Freight Forwarding company taking into account the necessary manpower, back-up facilities and equipment; and
- Recommend actions to be taken at national, sub-regional and regional levels, and the parties to be involved, if e-commerce is to be a tool for enhancing activities for the development in MT/FF industry in Africa

Executive Summary

With the increasing adoption of the Internet and electronic communication systems, the role of Multi-Model Transport and Freight Forwarding (MT/FF) as the intermediary between buyer and seller is changing, and the industry is having to change with it. MT/FF is an activity that is being required to adopt e-commerce to increase efficiency of existing business electronically.

It is clear that electronic commerce is no longer an emerging technology option in supply chain management, but that it has in fact already revolutionized logistics globally. While many African countries are not yet fully making use of e-commerce enabled systems, many are now being serviced by organizations that use e-commerce-oriented systems.

In many cases, companies are using e-business portals, also known as electronic marketplaces. The direct benefits offered by such e-marketplaces include:

- i.
 - a) Streamlining the buying and selling process and thus speeding transactions;
 - b) Replacing paper-based/manual systems;
 - c) Replacing obsolete electronic systems;
 - d) Integration into financial and accounting systems;
 - e) Integration into supply chain / logistics systems;
 - f) Integration with other e-marketplaces, including collaborative purchasing and tenders and attracting non-participating suppliers and buyers;
 - g) Better management of cost of interacting with suppliers/customers e.g. Better reconciliation of data with suppliers;
 - h) Providing access to international buyers and suppliers;
 - i) Increased ability to address “vertical” markets specific to industries and sectors.

Traditionally, the transport chain has consisted of various participants, including suppliers or sellers of goods, agents, providers of transport services, retailers and the final consumer. The emergence of e-commerce makes it possible for a given participant in the transport chain to interact quickly and at low cost with any of the participants on the chain, without following the ordered sequence on the chain. The combination of greater speed in commercial transactions and the increase in the number of trade origins and destinations also enhances the creation of new features in transportation systems. As sellers need to respond quickly to orders from buyers, and as direct supplier-consumer interactions increase, sizes of consignments shipped tend to be smaller, but more numerous. An outgrowth of this is the expansion of courier and parcel services, specializing in the transportation of small consignments. There will also be increased demand for home delivery transport services.

Experience has also shown that traders prefer to use service providers that can supply comprehensive and integrated services which traditionally have been supplied individually by forwarders, agents, transport companies, financial and insurance companies, etc. Because of financial and logistics requirements for operating such integrated services, transport service providers are entering into horizontal alliances with other transport service providers and integrating vertically with intermediaries such as forwarders, agents, and insurance and financial institutions.

The United Nations Conference on Trade and Development (UNCTAD) 2003 background paper on ‘developments and main issues in electronic commerce and information and communication technologies’ summarizes the trends in e-commerce and includes the following key points:

- The adoption of B2B e-commerce by developing countries’ enterprises will be linked to their capacity to integrate themselves into regional and global supply chains;
- Successful e-procurement implementation is reported to result in savings in lead times of up to 30 per cent and reductions in transaction processing costs of up to 25 per cent;
- Governments, business players and other stakeholders have a key role to play in the formulation and implementation of national e-strategies to ensure that the new opportunities for creating, transforming, applying and exchanging information and value are used to improve the productivity of developing economies and their enterprises.

The African Development Forum held in Addis Ababa at the Economic Commission for Africa in 1999 (ADF99) held extensive debates on e-commerce. The report on the of the Post-ADF 99 Summit found that:

- E-commerce represents a very real and very significant opportunity for Africa;
- Time is of the essence as the window of opportunity for Africa to achieve a significant level of e-commerce development, and avoid becoming dependent on outside economic actors is very short;
- There are a small number of African e-commerce ventures currently in operation;
- There are few, mainly donor-sponsored, programs aimed at providing training and/or assistance to e-commerce pilot projects.

The effects of Internet-induced changes in the global economy and their implications for African countries will depend to a significant extent on factors that policy-makers, business players and other stakeholders can influence. Statutory, regulatory and licensing requirements often form a barrier against online transacting and other barriers to electronic commerce can arise from a lack of uniformity in policies, laws, standards and trade practices in different jurisdictions.

International efforts have addressed the most important policy issues relating to e-commerce and, worldwide, numerous initiatives and regulatory actions have been launched at national and regional levels. The United Nations Commission on International Trade Law (UNCITRAL) drafted the Model Law on Electronic Commerce in 1996. Numerous jurisdictions have shaped their enabling instruments on the Model Law.

The main barriers to e-commerce identified in the Post ADF99 report were:

- The African infrastructure is not sufficiently e-commerce friendly because:
 - The physical infrastructure is insufficient;
 - The electronic transaction infrastructure is deficient;
 - The legal and regulatory framework is still inadequate.
- The African e-commerce environment is not supportive because:

- The level of awareness of e-commerce is not high enough;
- African entrepreneurs need training in using Internet for business;
- African Internet support professionals need training to be able to support E-Business oriented ventures.

Action was proposed in several distinct areas relating to the freight forwarding sector:

- There is a need to provide local and regional markets with all possible assistance to promote and accelerate their development;
- Government E-procurement should be made a priority;
- There is an urgent need for intervention in the areas of infrastructure, regulations, training and education;
- There is currently no African institution, either public or private with the resources and the specific mandate to undertake coordinating activities regarding e-commerce;
- Supporting actual demonstration projects and other means such as internships and mentoring is needed to better provide Africans with the knowledge and experience required to create and manage e-commerce ventures;
- African Governments that do not today have equivalent national sources of advice on e-Commerce policy and practice should launch such initiatives at the national level.

A variety of other factors also place constraints on the logistics sector in Africa. For example, air freight, Africa is characterized by:

- a better connection with European countries than between African countries; and lack of frequent flights between African capital cities;
- the high cost of air freight (one of the highest in the world);
- limited capacity relative to demand;
- higher risk of loss.

Express couriers in developed countries play a key role in streamlining e-commerce and many have their own air freight cargos which contribute significantly to the expansion of e-commerce. Unfortunately these facilities often can't benefit African countries because of the many monopolies in the air transport systems at national and/or regional level.

Nevertheless growing numbers of local exporters are establishing low-cost web sites, often hosted in the US or Europe with the aim of presenting a window to world markets. This is usually the first step, followed by joining a consolidation of suppliers in a virtual 'electronic-mall' or 'industrial park' that brings more traffic and attracts a greater critical mass of potential customers. These can take many forms, some of which are various trade opportunity networks, the most well know of which is the UNCTAD Trade Point Development Centre (UNTPDC)'s ETO System.

In the area of customs clearance and delivery services the Advance Cargo Information System (ACIS) developed by UNCTAD is being adopted by about 15 African Countries. ACIS is a logistics information system designed to improve transport efficiency by tracking equipment and cargo on transport modes providing information in advance of cargo arrival.

Regional economic bodies such as ECOWAS, SADC, COMESA have more general economic and trade co-operation programmes, but modernisation of these for e-commerce is only beginning to be discussed and there is no continent-wide forum for promoting common e-commerce policies. SADC has

begun to lay some of the groundwork for an e-commerce policy with its Theme Document - SADC in the Next Millennium

The main sectors in which African countries are most likely to experience entry constraints are the business-to-consumer services, such as express and parcel delivery services where a large consumer market is essential to support large service networks. In such areas, enterprises could participate by complementing services offered by global service providers of the developed countries. This could be in the form of providing agency services or forming alliances or partnerships with them. Airlines, freight forwarders and other intermediaries who currently provide services for e-commerce tend to encounter stiff competition from integrated carriers who appear to be better equipped for handling e-commerce shipments. As a result some have considered the creation of alliances (between airlines, freight forwarders, etc) as a means of offering services that can compete effectively with services offered by integrated carriers.

A more promising area of involvement for Africa, however, appears to lie in business to-business transactions of services, especially in domestic markets. The main examples that offer promise would include operations in maritime ports, airports, rail services, maritime shipping lines, container leasing and terminals. Significant gains in productivity can be achieved by having transactions performed using the Internet and other information technologies. The transactions could include invoicing, bills of lading, cargo information, customs clearance, etc.

In assessing the impact of e-commerce on transport services, it should be borne in mind that the transport industry has, over decades, been undergoing organizational and technological changes independent of any influence from electronic commerce, especially from the use of the Internet, which is quite a recent phenomenon. Particularly, developments in industrial production systems and globalization of economic activities have had profound effects on transport. Thus e-commerce tends to reinforce developments that have already started in the transport industry.

1. The e-commerce environment –Globally and in Africa

1.1 E-commerce – general trends and impacts

1. Electronic commerce is defined as the electronic exchange (delivery or transaction) of information, goods, services, and payments over telecommunications networks. E-commerce activities include establishing and maintaining online relationships between an organization and its suppliers, dealers, customers, strategic partners, regulators, and other agents related to (or in support of) traditional delivery channels (Tarasewich, 2002). This began with business-to-business (B2B) transactions in the 1970s using Electronic Data Interchange (EDI). Large companies such as carmakers used this technology but lack of common standards led to various and non-compatible e-commerce systems. With the advent of Information and Communication Technologies (ICTs) and specially the Internet over the last seven years, e-commerce has grown exponentially due to the convergence of technological developments, the merging of the telecommunications and computing industries, and globalised business models. The universal adoption of the Internet not only led to further rapid growth of the B2B sector, but also created a new business-to-consumer (B2C) market. E-commerce now touches virtually all aspects of economic and social life.

2. In many cases, companies are using e-business portals, also known as electronic marketplaces. The key benefits of this strategy are:

- a) Improved productivity - reduced staffing requirements/ man-hour costs
- b) Paperwork reduction
- c) Reduced general operating costs
- d) Increased revenues & profit
- e) Improved Return on Investment
- f) Increased ability to compete in the market and potential to grow market share

3. The more direct benefits offered by such e-marketplaces include:

- a) Streamlining the buying and selling process and thus speeding transactions
- b) Replacing paper-based / manual systems
- c) Replacing obsolete electronic systems
- d) Integration into financial and accounting systems
- e) Integration into supply chain / logistics systems
- f) Integration with other e-marketplaces, including collaborative purchasing and tenders and attracting non-participating suppliers and buyers
- g) Better management of cost of interacting with suppliers/customers e.g. Better reconciliation of data with suppliers
- h) Providing access to international buyers and suppliers
- i) Increased ability to address “vertical” markets specific to industries and sectors.

4. Traditionally, the transport chain has consisted of various participants, including suppliers or sellers of goods, agents, providers of transport services, retailers and the final consumer. The emergence of e-commerce makes it possible for a given participant in the transport chain to interact quickly and at low cost with any of the participants on the chain, without following the ordered sequence on the chain. Thus, for example, a carrier can deal online directly with shippers, without using the services of agents. A manufacturer of a product may sell directly to a distant final consumer without going through retailers or sales agents. This clearly opens totally new types of relationships and competitive forces between carriers, shippers and middlemen in the transportation chain.

5. The combination of greater speed in commercial transactions and the increase in the number of trade origins and destinations will also enhance the creation of new features in transportation systems. As sellers will need to respond quickly to orders from buyers, and as direct supplier-consumer interactions increase, sizes of consignments shipped will tend to be smaller, but more numerous. An outgrowth of this will be the expansion of courier and parcel services, specializing in the transportation of small consignments. There will also be increased demand for home delivery transport services. These types of services have enjoyed fast growth in the past and they are expected to receive a further boost as e-commerce expands.

6. As e-commerce traders have to deal with numerous customers around the world, their transport requirements can be met by accessing global transport and logistics networks. Experience has also shown that traders prefer to use service providers that can supply comprehensive and integrated services which traditionally have been supplied individually by forwarders, agents, transport companies, financial and insurance companies, etc. Because of large financial and logistics requirements for operating such integrated services, transport service providers are now entering into horizontal alliances with other transport service providers and also integrating vertically with intermediaries such as forwarders, agents, and insurance and financial institutions. There has also been growth of third party logistics service providers (see below).

7. The scope and range of these benefits makes it clear that e-commerce in the form of e-business processes and systems can have an enormous impact in terms of benefits to the entire supply chain. Clearly, this does not end with the supply chain within an organization, but also extends to the supplier and customer ends of the chain. This, in turn, requires integration of fulfillment and payment services into e-commerce processes, which in turn requires the use of electronic commerce mechanisms into the transport and freight forwarding industries. Due to the immaturity of implementation of such processes across Africa, however, the options and opportunities must be seen in the context of the international e-commerce environment.

8. In the business-to-business environment, it has become impossible to measure the level of commerce occurring, due to the blurring of the boundaries between traditional transaction processing and electronic transaction processing. Billions of dollars in procurement is now conducted either online or through systems that use applications over the Internet as a communications and transaction medium.

9. The United Nations Conference on Trade and Development (UNCTAD) held the seventh session of the Trade and Development Board's Commission on Enterprise, Business Facilitation and Development in Geneva in February 2003, which issued a "Background paper on developments and main issues in electronic commerce and information and communication technologies". Their summary of trends in e-commerce included the following key points:

- In spite of the collapse of many highly visible "dotcom" businesses and the serious difficulties that most of the major global players in the ICT-related sectors have experienced for the last two years, the number of people using the Internet around the world and the value of the goods and services traded online have continued to grow rapidly. Thus, the effects of the Internet and e-commerce on the organization of the global economy continue to spread and reshape the context in which enterprises, including those from developing countries, must compete in domestic and in international markets. Such changes relate to, inter alia, the streamlining of existing business processes, more effective responses to customer requirements in terms of speed and cost, and improved access to new markets.
- According to most estimates, the number of Internet users around the world will be about 655 million at the end of 2002. This means that the "Internet population" of the world is growing by about 150 million people a year, about a third of whom live in developing countries. The share of

developing countries in the global Internet population will keep growing, and although the differences in terms of “Internet penetration” will remain very large, the absolute numbers of Internet users in developing countries will soon be high enough to represent a significant factor in global Internet usage.

- The fact that more and more people are using the Internet, which is a prerequisite for the expansion of e-commerce, does not necessarily indicate that e-commerce is expanding or that the pace of expansion is quickening. Furthermore, while the number of Internet users may be a determinant of B2C e-commerce volumes, it is B2B e-commerce that represents by far the largest share of global e-commerce and has the most important implications for productivity and improved economic performance. In this regard, the gap between developed and developing countries in terms of e-commerce activity seems to be much larger than the one that exists in terms of access to the Internet.
- Many widely differing estimates of the value of the goods and services traded online around the world are regularly issued by private research firms. For 2002, they range from less than \$1,000 billion to close to \$2,300 billion.³ While differing in their estimates of the value of e-commerce, practically all forecasts point to a trend towards rapid growth in e-commerce.
- On current growth trends, e-commerce could come to represent between 15 and 20 per cent of global sales (domestic and cross-border) by 2006.
- Very little statistical information is available about e-commerce transactions in developing countries. However, e-commerce operations in those countries worth about \$100 billion would seem to be a reasonable estimate. Most of these transactions are concentrated in the Asia-Pacific region. E-commerce in this region is generally expected to grow at a pace similar to that in the developed countries. In the remaining developing regions, and in spite of higher rates of e-commerce expansion, the respective shares in global online trade are expected to remain below 1 per cent. The amount of online trade in developing countries will thus remain modest in comparison with global figures; however, on current growth trends and measured in absolute terms, in the medium term e-commerce in developing countries is expected to represent a magnitude of the same order as today’s global e-commerce.
- The growth of e-commerce in developing countries and the ability of enterprises to benefit from the efficiency gains in their production and distribution processes will be largely dependent on their adoption of B2B e-business practices. It is through these that e-commerce can contribute most to development, because they translate into improved competitiveness for enterprises and higher levels of productivity, and hence incomes for the economy as a whole. The adoption of B2B e-commerce by developing countries’ enterprises will be linked to their capacity to integrate themselves into regional and global supply chains. Other important determinants of the growth of B2B e-commerce in developing countries will be foreign direct investment (FDI) flows and the linkages between local producers and transnational corporations.
- Online procurement and, on a larger scale, supply chain management are often quoted as the most common sources of savings generated by e-commerce. If accompanied by the necessary organizational changes, they can dramatically improve a company’s competitiveness. For example, successful e-procurement implementation is reported to result in savings in lead times of up to 30 per cent and reductions in transaction processing costs of up to 25 per cent.
- Another B2B trend that is gaining momentum in the more advanced markets is the deployment of demand-chain information technology (IT) solutions. The objective is to enhance the efficiency of the interaction between a company and existing customers and/or the various players along its

distribution channel and to enable it to reach a larger number of potential customers. Web-enabled demand-side applications help companies achieve this objective through a wide range of possibilities, such as new, more valuable services for customers based on online availability of information, economically viable product customization, better understanding and predictability of customer needs and behavior, or making it possible to work online with smaller customers at a reasonable cost.

- Many of the changes brought about by the Internet in the global economy that have been mentioned above will have implications for the competitiveness of the enterprises of developing countries. While some of the factors affecting the evolution of global e-commerce (such as technological change) do not respond directly to the national policies of developing countries, Governments, business players and other stakeholders have a role to play in the formulation and implementation of national e-strategies to ensure that the new opportunities for creating, transforming, applying and exchanging information and value are used to improve the productivity of developing economies and their enterprises.

10. When all these trends and their implications are taken together with other findings, it becomes clear that the use of e-commerce in logistics is changing the face of multimodal transport. For example, the three items that topped a list formed by an A.T. Kearney global survey concerning 13 shippers' expectations of "value from logistics suppliers" in the future were global access, supply chain integration facilitation and supply chain integration implementation. This implies both significant internal efficiencies, and also signifies the greatest ways suppliers can differentiate themselves from others in the market.

11. The message that emerges most clearly through an overview of the commercial and e-commerce landscape is that the e-commerce enablement of multimodal transport is not only a priority for Africa, it is also essential.

1.2 E-commerce and development

12. The effects of Internet-induced changes in the global economy and their implications for developing countries will depend to a significant extent on factors that policy-makers, business players and other stakeholders can influence. According to UNCTAD's E-Commerce and Development Report 2002, policies must be designed, articulated in coherent e-strategies and implemented in partnership with all the relevant players to ensure that the new opportunities for creating, transforming, applying and exchange information and value are used to improve the productivity of developing economies and their enterprises.

13. Difficulties arise when concepts such as "writing," "document" or "signature" are applied to information that is communicated in digital format. Statutory, regulatory and licensing requirements form a barrier against online transacting and other barriers to electronic commerce can arise from a lack of uniformity in policies, laws, standards and trade practices in different jurisdictions.

14. International efforts have addressed the most important policy issues relating to e-commerce and, worldwide, numerous initiatives and regulatory actions have been launched at national and regional levels. Decision makers in the public and private sectors have made efforts to achieve greater consistency in national and regional approaches and the United Nations Commission on International Trade Law (UNCITRAL) drafted the Model Law on Electronic Commerce in 1996. The model law aims to create a more secure legal environment for electronic commerce by providing a tool for states to enhance their legislation as regards paperless communication and storage of information. Numerous jurisdictions have adopted legislative measures to facilitate e-commerce and have shaped their enabling instruments on the Model Law.

15. The key factors which determine the adoption of e-commerce in developing countries are:

1. Penetration of Telecommunications infrastructure, the range of telecommunications services available and the costs of telecommunications services. These are in part related to the management and regulatory regime of the telecommunications system and in part through the choice of technologies used in the delivery of those services has a great impact on the potential of e-commerce in a developing country;
2. Availability of computers equipped with Internet /network access and appropriate software, and the trained capacity to use them.
3. Availability and cost of investment capital which affects the general expansion of the economy and ICT sector in particular;
4. Presence of Electronic Payment Systems. Online access to banks other payment services using credit cards for consumers or other funds transfer instruments, or at the least, access to offline means of payments for online transactions;
5. Warehousing and Physical Distribution. Rapid delivery is one of the major advantages of e-commerce. Similarly, this needs fast, reliable, economical fulfillment logistics systems capable of delivering physical goods in a timely fashion and cost effectively on a regional and international basis;
6. Customs clearance procedures. Physical distribution problems can be compounded by long and complex customs clearance procedures which become a bottleneck for the movement of goods;

7. Availability of trained people at all levels in the economy, and in government, which is in turn affected by the quality and quantity of the outputs of the educational system;
8. Extent of policy research capacity in e-commerce, in the public, private and academic sectors;
9. The existence of a 'business culture' and a spirit of entrepreneurship within the national economy;
10. The legal and policy environment established by government for the facilitation of commerce in general and e-commerce in particular—both of which have direct effects on trust accorded to electronic transactions. Lack of government financial resources often severely limits implementation of policy and thus has a negative impact on e-commerce;
11. The establishment of integrative mechanisms between government departments, and between government, industry and citizens. E-commerce touches on many Ministerial jurisdictions, so the lack of established traditions of inter-Ministerial co-operation within government has a direct bearing on e-commerce policymaking. It also affects attempts to introduce e-Government within a national government.

16. The key policy issue to be addressed is whether enterprises in developing countries should endeavour to develop in their countries transport and logistics services that are needed to handle e-commerce, or whether developing countries should depend on global services being provided by enterprises of developed countries. There is no reliable data on enterprises in developing countries which provide Internet based transport services on a significant scale. At the global level there is clear evidence that most service providers are based in developed countries.

17. There are a number of factors that may constrain developing countries from becoming major players in the provision of transport and logistics services for e-commerce, at least in the short run. The developing countries generate limited volumes of e-commerce and this means that there is insufficient national or regional e-commerce traffic to support the growth of transport and logistics service providers. As e-commerce traders have to sell to numerous customers on a global basis, their transport and logistics services have to be provided over global networks as well. This has led to the growth of large-scale service providers in the form of large integrated carriers or operations involving horizontal and vertical alliances among carriers, forwarders, delivery service providers and postal service. In view of the small volume of e-commerce in developing countries, enterprises in those countries are unlikely to provide global transport and logistics services in competition with services being provided by enterprises of developed countries. Another constraining factor is the costs of acquiring the necessary information technologies and transport facilities for handling e-commerce shipments. These tend to be quite high and beyond the reach of service providers in developing countries.

18. In the face of the above constraints, developing countries may involve themselves in e-commerce in freight transportation by adopting pragmatic and selective strategies, taking into account their particular infrastructure and technological capacities. In considering possible strategies, it is important to bear in mind that the application of e-commerce in freight transportation covers a wide range of activities. It can therefore be expected that while developing countries may not participate adequately in some activities, there is scope in others.

19. The main sectors in which developing countries are most likely to experience entry constraints are the business-to-consumer services, such as express and parcel delivery services where a large consumer market is essential to support large service networks. In such areas enterprises of developing countries could participate by complementing services offered by global service providers of the developed countries. This could be in the form of providing agency services or forming alliances or partnerships with them. Airlines, freight forwarders and other intermediaries who currently provide services for e-commerce tend to encounter stiff competition from integrated carriers who appear to be better equipped

for handling e-commerce shipments. As a result some have considered the creation of alliances (between airlines, freight forwarders, etc) as a means of offering services that can compete effectively with services offered by integrated carriers. It is therefore possible, for example, for freight forwarders in developing countries to cooperate with global air transport carriers, as a strategy for participating in the transportation of goods in e-commerce.

20. The scope of involvement by developing countries, however, appears to lie in business to-business transactions of services, especially in domestic markets. The main examples that offer promise would include operations in maritime ports, airports, rail services, maritime shipping lines, container leasing and terminals. Significant gains in productivity can be achieved by having transactions in these activities performed using the Internet and other information technologies. The transactions could include invoicing, bills of lading, cargo information, customs clearance, etc. It is expected that major maritime companies, seaports, airports, terminals, etc., in developing countries are now endowed with some form of information technology. This provides great potential for them to focus on the development of systems that can promote greater productivity and lower transaction costs in these service areas.

21. Numerous initiatives to promote the use of e-commerce amongst SMEs are under way in developing countries. While positive signs are already visible, including a high level of acceptance of technology, the presence of many innovative approaches; and initial tangible results in terms of market access and revenue generation, most projects have not yet been deployed on a large scale. It is therefore too early to determine which ones are likely to be most successful.

1.3 E-commerce in Africa

22. Outside of South Africa, only a small proportion of organizations are using the Internet to carry out transactions with their suppliers and customers. This is mainly explained by the limited number of local companies and consumers that have access to the Internet, the lack of online banking or payment systems, credit cards and other funds transfer mechanisms, the limited IT literacy and the high costs of local Internet services.

23. E-commerce in Africa has also been constrained by a variety of government policy issues such as lack of legislation to assist in the acceptance of electronic documents, inadmissibility of digital evidence in court and slow customs clearance and licensing procedures.

24. A variety of factors also place constraints on the logistics sector. Air freight in Africa is characterized by:

- a better connection with European countries than between African countries; and lack of frequent flights between African capital cities;
- the high cost of air freight (one of the highest in the world);
- limited capacity relative to demand;
- higher risk of loss.

25. Express couriers in developed countries play a key role in streamlining e-commerce and many have their own air freight cargos which contribute significantly to the expansion of e-commerce. Unfortunately these facilities often can't benefit African countries because of the many monopolies in the air transport systems at national and/or regional level.

26. Nevertheless growing numbers of local exporters are establishing low cost web sites, often hosted in the US or Europe with the aim of presenting a window to world markets. This is usually the first step, followed by joining a consolidation of suppliers in a virtual 'electronic-mall' or 'industrial park' that brings more traffic and attracts a greater critical mass of potential customers. These can take many forms, some of which are various trade opportunity networks, the most well know of which is the UNCTAD Trade Point Development Centre (UNTPDC)'s ETO System, which is arguably the largest in terms of message volume. Over 10,000 organizations worldwide receive ETOs via e-mail.

27. The Uganda Trade Point is one example, initiated by the local Trade Efficiency Association, and supported by a variety of partners such as the Chamber of Commerce, the Uganda, Clearing and Forwarders Association, Uganda Tourist Board, Uganda Manufacturers Association, Uganda Investments Authority and the Exports Promotion Board, Bankers Association and Insurers Association. The Senegal Trade Point is one of the most extensive, with satellite access points being established in each region.

28. Another common trade opportunity network is the World Trade Centers Association - WTCA On-line. There are 15 WTC Trade Centers in Africa - Alexandria, Algiers, Cairo, Casablanca, Dar Es Salaam, Hurghada, Johannesburg, Lagos, Maputo, Nairobi, Port Said, Rabat, Tripoli and Tunis.

29. There are also various informally produced directories of businesses on the web, notably in Egypt, Kenya, South Africa, Senegal, Tunisia, Uganda, Swaziland. A growing number of countries also have guides for foreigners in doing business locally, either produced by business consulting groups, (such as Mbendi and Ernst & Young), or by national Investment Promotion Centers (e.g. Kenya, Cote d'Ivoire, Ghana, Senegal, South Africa), and also most notably by the US Dept of Commerce and US Embassies in various African countries.

30. While a variety of B2C opportunities have been identified in the online and offline services sectors, the factors outlined above have also meant that business-to-business (B2C) e-commerce outside South Africa has so far been almost negligible. In South Africa, which has the most developed sector and the largest economy on the continent, the total consumer spend on online retail goods in 2001 was only R162-million (about R3/person). This was almost exactly double the amount reported for 2000, namely R82-million, and is expected to have doubled again in 2002. But this is still a very small proportion of the total retail spend which was worth R173 337,9 in 2000 and R188-billion in 2001. Given an online retail market of R84-million for 2000 and R162-million for 2001, online retail accounted for less than 0,05% of total retail sales in 2000 (0,047%) and less than 0,1% in 2001 (0,086%), or about R4000/person.

31. By contrast, the total online retail market in the United States was worth \$32.6 billion in 2001, out of a total retail market worth \$3,167,842,000 (i.e. \$3,167-trillion). Online retail thus accounted for 1.0 percent of total sales. In 2000, online retail reached \$27,3 billion, accounting for 0.9 percent of total sales.

32. Contrasting these proportions, it is clear that online retail is still at a very early stage of its market penetration, and remains deeply immature in its implementation, even in South Africa, and this is far more the case in the rest of Africa.

33. Universal smart card and e-commerce legislation is beginning to gain attention in a some countries such as Mauritius and South Africa which are planning a single smart card that will allow the public to hold their drivers licence, small amounts of funds that can be used for small transactions, and their health and other social security information. Harmonization of e-commerce policies is also on the agenda in a number of countries, so that, for example, electronic evidence is upheld in court.

34. In the area of customs clearance and delivery services the Advance Cargo Information System (ACIS) developed by UNCTAD is being adopted by about 15 African Countries. ACIS is a logistics information system designed to improve transport efficiency by tracking equipment and cargo on transport modes (rail, road, lake/river) and at interfaces (ports, Internal Clearance Depots) providing information in advance of cargo arrival. The project started in 1988 and is operational or being installed in Burkina Faso, Cameroon, Côte d'Ivoire, Ghana, Kenya, Malawi, Mali, Mozambique, Senegal, Sudan, Uganda, United Republic of Tanzania, Zambia and Zimbabwe (interconnecting with South Africa).

35. Regional economic bodies such as ECOWAS, SADC, COMESA have more general economic and trade co-operation programmes, but modernisation of these for e-commerce is only beginning to be discussed and there is no continent-wide forum for promoting common e-commerce policies. SADC has begun to lay some of the groundwork for an e-commerce policy with its Theme Document - SADC in the Next Millennium - The Opportunities and Challenges of Information Technology. The document, which was endorsed by the SADC Consultative Conference in February 1999, focused on strategies to improve the information infrastructure in the sub-region and also made specific reference to exploiting the possibilities of electronic commerce for small and medium sized enterprises, and harmonising rules for doing business in the new electronic environment.

36. The African Development Forum held in Addis Ababa at the Economic Commission for Africa in 1999 (ADF99) held extensive debates on e-commerce. Reporting on the situation and potential in Africa at the Post-ADF 99 Summit, the ECA found that:

- E-commerce represents a very real and very significant opportunity for Africa.
- Africa has unique competitive advantages in some key areas of e-commerce, namely in the area of B2B export teleservices, an area which happens to be one of the fastest growing markets.
- The potential economic and social impact of e-commerce is, on balance, very positive.

- Time is of the essence as the window of opportunity for Africa to achieve a significant level of e-commerce development, and avoid becoming dependent on outside economic actors is very short.
- There are a small number of African e-commerce ventures currently in operation. However their existence proves that well informed African entrepreneurs can be successful and that Africa does indeed have competitive advantages, especially in export oriented Business to Business teleservices.
- There are several programs aimed at bringing the Internet to the rural areas and to disenfranchised groups.
- There are several programs aimed at providing access to the Internet and e-commerce via voluntary and community based associations.
- There are a few, mainly donor-sponsored, programs aimed at providing training and/or assistance to e-commerce pilot projects

37. The main barriers identified in the report were:

- The African infrastructure is not sufficiently e-commerce friendly, mainly because:
 - The physical infrastructure is insufficient
 - The electronic transaction infrastructure is deficient
 - The legal and regulatory framework is still inadequate
- The African e-commerce environment is not supportive, mainly because:
 - The level of awareness of e-commerce is not high enough
 - African entrepreneurs need training in using Internet for business
 - African Internet support professionals need training to be able to support E-Business oriented ventures

38. The report found that Africa's E-Commerce priorities should be focused in several distinct areas:

- Export markets are more attractive in the short term but there is a need to provide local and regional markets with all possible assistance to promote and accelerate their development. Two main market niches with equal priorities were proposed: the African Diaspora market and the overseas B2B teleservices market.
- Government E-procurement should also be made a priority.
- There is an urgent need for intervention in the areas of infrastructure, regulations, training and education.
- There is currently no African institution, either public or private with the resources and the specific mandate to undertake the assignment of coordinating activities and that there are major deficiencies in terms of structured resources capable of handling such tasks as legal and regulatory reform and payment processes, to name only a few.
- Supporting actual demonstration projects and other means such as internships and mentoring is needed to better provide Africans with the knowledge and experience required to create and manage e-commerce ventures.

39. The report proposed that:

- The African Business Round Table and the International Chamber of Commerce, working jointly, take the appropriate steps to launch an *African Forum on e-Commerce Policy and Practice*;

- African Governments that do not today have equivalent national sources of advice on e-Commerce policy and practice should launch similar initiatives at the national level.

40. As a good example of the latter, the Tunisian Government has paid a special attention to electronic commerce and a National Commission for Electronic Commerce and EDI was set up in November 1997. Made up of several working groups, the Commission was given the task of establishing an electronic commerce strategy and infrastructure development programmes.

41. The commission's initial recommendations were adopted in mid May 1999 when a variety of announcements were made aimed at boosting electronic commerce in Tunisia. Augmented by additional initiatives, these include:

- 1) Revision of procedure connected with foreign trade with a view to boosting exports via the Internet network and facilitating the action of electronic commerce operators.
- 2) Launching of pilot projects that will open virtual shopping centers to export tourist products, craft work, certain finished products and agricultural and industrial goods.
- 3) Implementing of "strategy of awareness and training", via periodic seminars and study days on electronic commerce.
- 4) Further developing the national communications network with a view to adapting it to the demands of electronic exchange as regards to speed of data transmission, while simultaneously working to develop transport and express mail services.
- 5) Putting the finishing touches to the legal framework regulating this activity so that Tunisian law will be in tune with new modes of commercial transaction, particularly as regards to legalization of the electronic means of identification (digital signature and certification) and Trusted third parties.
- 6) Creation of a permanent ministerial committee, supported by a technical commission of experts and specialists, to guarantee permanent follow-up of these recommendations and ensure coordination among all stakeholders.

42. Six pilot projects were launched and put in operation in 1999 comprising a set of virtual stores offering a range of Tunisian products, such as crafts, goods, clothing, foodstuffs, tourism packages and hotel reservations. The stores are accessible through the web site "Tunisia E-Shopping Center" (<http://www.ecom.tn>) which has a secure credit card ordering facility using the VeriSign system.

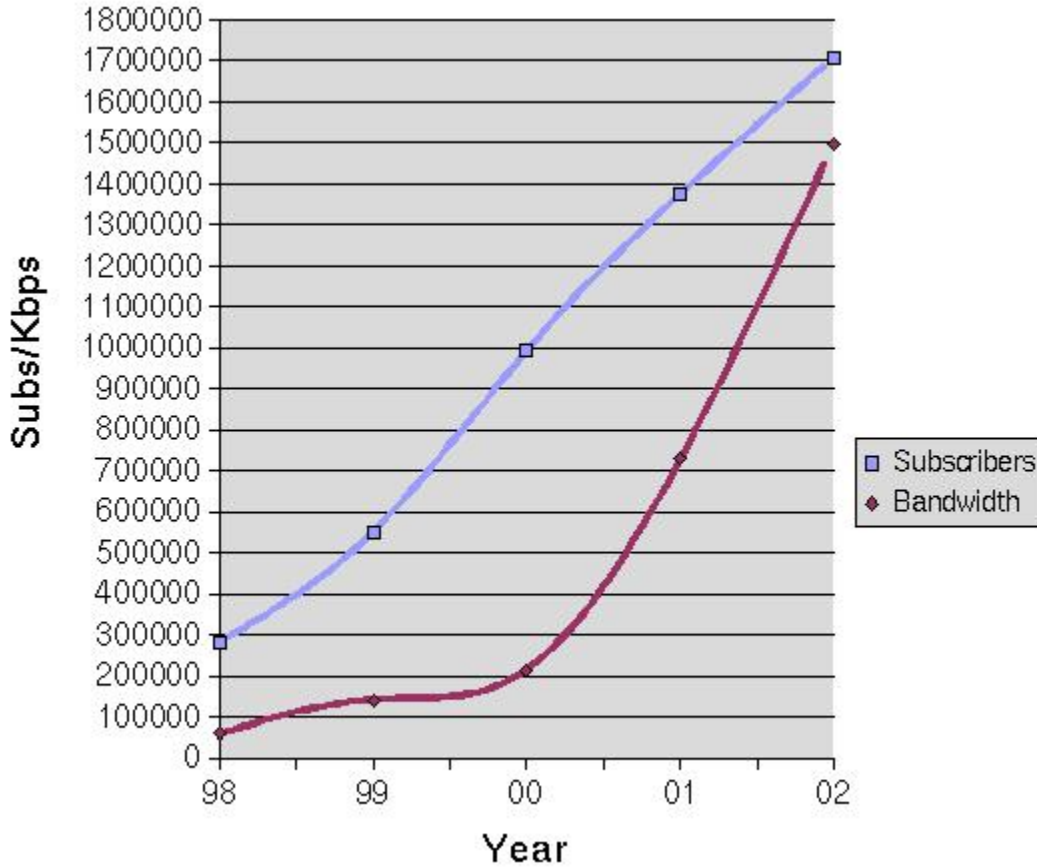
43. EDI projects are being studied in various sectors such as banking, textiles and telecommunications. One of the EDI main projects is the "Single Batch" project aimed at facilitating foreign trade procedures by setting up an EDI Server center to allow various agents (trade organizations, customs, banks, forwarders) to exchange foreign trade operations documents. A Web/EDI interface is aimed at permitting importers, exporters and forwarders to carry out foreign commerce operations via the Internet without needing expertise in EDI. An "E-commerce and Digital Signature" and an "Electronic Commerce and Exchanges" law were adopted by the government in mid 2000.

44. An awareness campaign entitled "Internet Caravans" started in September 1999 which visits all Tunisian governorates. Each visit includes a one day program with Internet and Electronic Commerce seminars and workshops. A web site <http://www.caravanes-internet.tn> gives information and news of the caravans.

1.4 African Connectivity

45. The availability of low cost and reliable access to the Internet is clearly a key factor in the adoption and utility of e-commerce in Africa. Fortunately, the penetration of the Internet has grown relatively rapidly in most urban areas in Africa. Five years ago, only a handful of countries had local Internet access, now it is available in every capital city. As the graph below shows, both the number of Internet users and the amount of international bandwidth is still growing strongly across the continent.

Chart 1. African Internet subscribers and bandwidth



46. However as the table below shows, sub-Saharan Africa, along with South Asia, remain at the bottom of the list of developing regions in Internet usage surveys around the world, while in South Asia, Internet use is growing more rapidly.

Table 1. Internet Users as percentage of Total Population

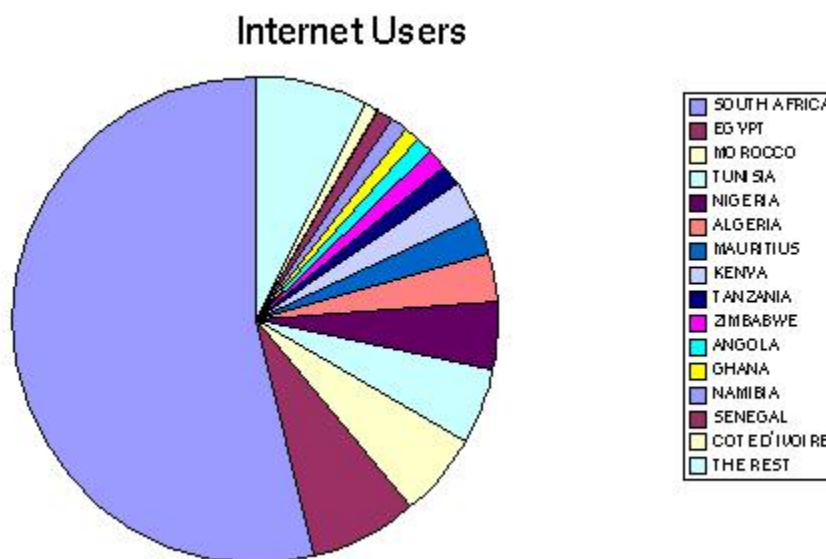
Region	1998	2000
United States	26.3	54.3
High-income OECD (excl.US)	6.9	28.2
Latin America and the Caribbean	0.8	3.2
East Asia and the Pacific	0.5	2.3
Eastern Europe and CIS	0.8	3.9
Arab States	0.2	0.6
Sub-Saharan Africa	0.1	0.4
South Asia	0.04	0.4
World	2.4	6.7

Source: UNDP World Development Report 2001

47. The divide between the urban areas and the rural areas is usually greater. Most of the services and users are concentrated in the towns, while the majority of Africans are scattered in communities spread-out across the rural areas. Limited perfusion of the telecommunication networks into rural areas (often over 75% of the country's telephone lines are concentrated in the capital city) and irregular or non-existent electricity supplies are also common feature and a barrier to use of ICTs, outside the major towns. In 2002, the number of dialup Internet subscribers was rose to about 1.8 million, 20% up from 2001, mainly bolstered by growth in a few countries such as Nigeria, North Africa and South Africa. Of the total subscribers, North Africa and South Africa are responsible for about 1.3 million, leaving about 500,000 for the remaining 49 sub-Saharan African countries. As a rule of thumb each computer with an Internet or email connection supports a range of three to five users, putting current estimates of the number of African Internet users at about 5 to 8 million. About 1.5–2.5 million of the users are outside North and South Africa, or about 1 user for every 250 to 400 people. This compares with a world average of about 1 user for every 15 people, and a North American and European average of about 1 user in every 2 people.

48. Public access and the use of corporate networks is continuing to grow at greater rates than the number of dialup users. This can be seen in the deployment of international Internet bandwidth, which is still expanding substantially — up over 100%, from 700 Mbps of available outgoing bandwidth in 2001 to 1500 Mbps in 2002. However, this is still slower growth than the rest of the world, which averaged 174% in 2001.

Chart 2. Countries with more than 10 000 Internet subscribers



49. Telecommunication infrastructure is increasingly seen as the key barrier to improved connectivity. Although the number of main lines grew about 9 percent a year between 1995 and 2001, this is off a very low base - the overall fixed line teledensity as of 2001 is still only about one per 130 inhabitants in Sub-Saharan Africa (excluding South Africa), and taking into account population growth, the effective annual increase in lines is only 6%. However there has been a marked improvement in the availability of high-bandwidth fibreoptic links between many African countries, and between Africa, Latin America and Asia, following the commissioning of the Atlantis-2 and SAT-3/WASC marine fibre cable projects.

50. The situation is also not quite as bad as it might appear because of the penetration of mobile networks, where subscribers have now surpassed fixed line users in most countries, underlining the pent-up demand for basic voice services. As a result, the potential for using SMS-based information and e-commerce services (m-commerce) is now attracting serious attention with most operators beginning to role out services.

51. Most recent estimates for the number of personal computers in Africa put the total at about 7.5 million for 2001 — an average of about 1 per 100 people. But due to limited capacities for industry monitoring and the large numbers of machines smuggled in to avoid duties, these figures are notoriously unreliable. Some studies indicate that official figures may be an overestimate by between 3 and 6 times, making the average closer to 1 per 500 people. Conversely, account also needs to be taken of the number of users sharing a single computer, which is much greater than in the more developed regions.

52. Many tax regimes in Africa still treat computers and cell phones as luxury items, which makes these imported items more expensive. Although there have been notable efforts in some countries to reduce duties on computers, however communications equipment and peripherals are still often charged at higher rates.

53. Another systemic factor is that the road, rail and air transport networks are limited, costly to use and often in poor condition, resulting in barriers to the increased movement of people and goods, needed both to implement and support a pervasive ICT infrastructure, but also for the increased economic and social activity which would be stimulated through greater use of ICTs. Perhaps a greater problem is that the brain drain and generally low levels of education and literacy amongst the workforce has created a great scarcity of ICT skills and expertise (at all levels, from policy making down to end-user).

54. Efforts to promote the adoption of ICTs in Africa have been discussed among high-level policymakers since the early 1990s. Official recognition was given to the issue in 1996 when the Conference of African Ministers of Social and Economic Planning requested the ECA to set up a “high-level working group” to chart Africa’s path onto the global information highways. An expert group developed a framework document entitled the African Information Society Initiative (AISI), which was adopted by all of Africa’s planning ministers.

55. AISI called for the formulation and development of a national information and communication infrastructure (NICI) plan that would be driven by national development priorities in every African country. AISI also proposed cooperation among African countries to share experiences. Since then, communications ministers from over 40 African countries have provided high-level endorsement for AISI, along with specific telecommunications development policies encapsulated in their common vision document, *African Connection*, which was published in 2001 (<http://www.africanconnection.org>).

56. Most countries have begun the process for developing NICI plans, and in May 2002 17 countries had already finalized their strategies — Benin, Burkina Faso, Cape Verde, Cote d’Ivoire, Egypt, Gambia, Mauritania, Mauritius, Morocco, Mozambique, Rwanda, Senegal, Seychelles, South Africa, Sudan, and Tunisia.

57. The impact of much of these efforts will depend largely on the extent of improvements to the telecommunication infrastructure on which use of ICTs depends. Liberalisation of the telecommunication sector and the introduction of competition is seen as a key to driving down prices and increasing the quality of service. However while some countries have begun to open up their markets, few have taken steps to introduce full competition. While there are a variety of efforts underway to restructure national telecom operations and build better national and international infrastructure, many of these lack a cohesive approach built on a clear understanding of the dynamics and impact of new communications technologies such as WiFi and satellite data.

58. The high costs of connectivity in remote areas is now being addressed by the low-cost two-way Ku-band VSAT satellite-based Internet services that have been launched this year by companies such as Afsat and Web-Sat, which make use of the new high-powered satellite footprints now covering Africa, similar to services currently available in the United States and Europe. Costs are about USD 1500–2500 for the VSAT equipment and USD 200-400 per month for “better than dialup” speeds (i.e. 56 Kbps outgoing and 200–400 Kbps incoming). These services are a major boon to rural users outside the local telecommunication infrastructure and are expected to see rapid uptake wherever regulations allow. Unfortunately, most countries in Africa either charge excessively high license fees or do not allow these services at all, as they compete with the state run monopoly telecom operators.

59. Many of the systemic issues are being addressed by the African Union and their programme, the New Partnership for African Development (NEPAD), supported by the international community. This many-faceted effort is aimed at accelerating Africa's development and should as a result help to create an environment more conducive to the rapid adoption of ICTs.

2. Understanding E-commerce in the supply chain

2.1 Key concepts in MT/FF related e-commerce

E-Commerce and Transport

60. Along the chain from customer to supplier are a wide variety of activities ranging from ordering, invoicing, agency functions, warehousing, shipment, insurance, customs clearance, distribution and wholesaling to retailing. The performance of these activities involves many stakeholders who have to exchange data and information and make payments between them. As a whole, these activities constitute complex linkages between different enterprises and involve a variety of types of information to be exchanged. Traditionally, these functions were performed through the transfer of paper documents and manual processes. This was not only slow but it was also difficult to integrate the processes taking place at different points on the transport chain. The introduction of ICTs have brought considerable efficiencies, allowing reduction in the length of time for processing transactions between the different parties on the transport chain. They also make all the processes on the chain more visible to all stakeholders.

61. To relate transport to e-commerce, it is also necessary to identify the types of goods involved. Electronic commerce involves two broad types of goods. First are products for which all elements of transactions (advertising, ordering, billing, purchasing, payment and distribution) may be completed electronically. Examples of these goods are software, newspapers, music, films, customer services, games, videos and so on. The second type includes goods for which some or most transactions can be effected electronically, but the actual delivery to destination requires the use of physical transport facilities. It is projected that in the US, the value of business-to-business trade of hard goods (deliverable via physical transportation) concluded over the Internet will reach US\$ 1.3 trillion by 2003. Other projections show that worldwide Internet commerce (of hard and soft goods) will reach US\$ 3.2 trillion over the same period. These figures suggest that Internet-based trade in goods requiring physical transportation will represent the largest share of total e-commerce.

Multimodal Transport

62. The carriage of goods by at least two different modes of transport on the basis of a multimodal transport contract from a place in one country at which the goods are taken in charge by the multimodal transport operator to a place designated for delivery.

Multimodal transport operator (MTO)

63. Any entity who on their own behalf or through another acting on their behalf concludes a multimodal transport contract and who acts as a principal, not as an agent or on behalf of the consignor or of the carriers participating in the multimodal transport operations, and who assumes responsibility for the performance of the contract (United Nations Convention on International Multimodal Transport of Goods).

Logistics

64. According to the Council of Logistics Management, logistics is that part of the supply chain process that plans, implements, and controls the efficient, effective flow and storage of goods, services, and related information from the point of origin to the point of consumption in order to meet customers' requirements.

Supply chain

65. The supply chain is the network of organizations that are involved in the different processes and activities that create products and services of value to the ultimate consumer. Supply chain management can be described as the management of the relationships between the organizations in the supply chain to deliver superior customer value at less cost to the supply chain as a whole.

66. Supply chain management builds upon the logistics framework to achieve linkages within a particular organization, and with the processes of other organizations. Transportation and, increasingly, multimodal transport provides the links between the various logistics activities and enables the movement of goods and services along the supply chain.

Centrality of transportation

67. For most buyers and sellers, transportation is peripheral to their main business; for freight forwarders and multimodal transport operators, it is their main business. Multimodal transport operators aim at integrating different modes of transport, with a view to enhancing the quality and reliability of door-to-door services through better utilization of assets. These factors have all contributed to increasing reliance being placed on MTOs in the trading process.

Transportation exchange agents

68. Traditionally sellers and buyers of transport services have used agents and brokers to seek cargo and shipping space. The role of the agent is to bring together those offering cargo and those offering shipping capacity. This process took much time, as agents had to go back and forth to match the requirements of a multitude of shippers and carriers. A number of firms have now established websites where carriers and shippers can buy or sell transportation services. For example, shippers can bid on container space offered by carriers and provide information on their needs to various carriers. They can search online the offers and select the ones offering the most competitive rates or other transport conditions. Conversely, carriers can bid on shipper's available cargo and provide information on unsold capacity for shippers wanting to buy.

69. Sales of transportation services makes it possible for carriers and shippers to quickly post their offers for cargo and shipping space worldwide at very low costs. The system is also flexible since the shipper or carrier may, for example, make offers only to the parties they designate on the web. Since this type of exchange provides a real-time market, carriers and shippers are able to negotiate offers on the basis of the most up-to-date, market-driven freight rates.

Shipment tracking

70. Shipment tracking is commonly used by transport service providers employing interactive Internet applications. The greatest demand for shipment tracking has developed in express or parcel delivery services. Tracking-related applications now constitute a very significant share of Internet applications used in freight transport services. While it is most widely used in express and parcel delivery transportation, freight forwarders, motor carriers, air cargo carriers, rail carriers, ocean carriers and other transport service providers also use it.

71. Shipment tracking involves global positioning systems, which keep track of vehicles so that customers can find out exactly where the shipment is located at a given time. An integral part of shipment tracking is the use of bar coding that is used to identify individual packages or consignments. Each package can be scanned at various points on the transport chain. Drivers or other delivery employees may use hand-held computers, which scan parcel bar codes, signatures of receivers and the time of delivery. This information is then transmitted directly to the carrier's central computers. Thus records of parcel locations are monitored at all times, from the time of pickup at the origin to the final destination point. In case the package is misplaced and cannot be located, the records make it easy to focus a search.

72. Transport service providers offer customers tracking possibilities through telephone, interactive touch-tone systems or the World Wide Web. To receive information about the status of a package, the customer accesses the service provider's site and types the number of their package. The transmission of the information on shipments may be tailor-made to suit the customer's requirements. For example, a customer may select a high frequency of transmission of shipment status data, such as hourly. At the other extreme, the transmission of the messages may be limited to pick-up and delivery notification.

73. Shipment tracking enhances the ability of the carrier to find consignments and to re-direct stray consignments. It also enhances transport reliability and reduces the incidence of losses or theft. and enables customers to receive accurate information about the movement of their consignments and the expected arrival time.

74. The value of shipment tracking is not limited merely to the ability to know the location of a consignment. In business-to-business transport services it also enables enterprises to manage the flow of shipments electronically and thus achieve more efficient and informed management of inventory and restocking, as well as production-line operations, marketing and customer services. For example suppliers may be able to divert intermediate goods already in the pipeline to locations where supply is more critical.

75. While shipment tracking offers considerable benefits, its technology is relatively costly so that only big carriers or delivery service providers can provide shipment tracking. Also the feasibility of the system is to a large extent governed by the market. It is likely to pay off where customers demand guaranteed delivery at specified times and are prepared to pay the premium. It may also be justified for tracking consignments, which should not be lost or delayed for reasons such as high replacement costs, safety, etc.

Other forms of tracking

76. In addition to shipment tracking, transport enterprises can also use the Internet and other electronic means to enable their customers to track containers and other transport equipment located at various depots, to determine if they are able to meet customers' requirements. In the rail industry, for example, Internet-based applications allow shippers to locate specific freight rail cars, showing their location, and details of the shipper, consignee, commodity shipped, and so on. In maritime transport, a number of large carriers and seaports are introducing Internet applications to track vessels in order to provide real-time information on the location of vessels and departure dates. In airfreight transport, carriers and freight

forwarders are offering customers Internet-based flight tracking, so that it can be combined with shipment tracking.

Bills of lading

77. A bill of lading is a contract between the transport carrier and the shipper and contains details of shipment, including shipper, consignee, freight charges, purchase number; and it may also contain special instructions. Carriers now provide Internet-based systems in which the shipper can prepare the bill of lading, in advance, on computer. The carrier may provide shippers with Internet access to view, print out and submit bills of lading from the carrier's website. The information on the bill of lading can be transmitted to the consignee in advance of the cargo's arrival, thus enabling them to know what is being shipped. The ability to place the bill of lading on the Internet means that in addition to its traditional role as a contract, it provides carriers, shippers and consignees with data and information which they can use to schedule and record shipments and to process transactions through the transport chain.

Tariffs

78. Transport carriers, especially in maritime transport, have traditionally used complex pricing structures and the rates charged to the shipper are a function of many factors, including value, weight, stowage factors, port conditions, etc. Carriers publish tariffs for individual commodities and trades, resulting in the publication of voluminous tariff books. As markets change the tariffs are constantly amended, producing additional costly paper-work which has to be distributed to agents and shippers.

79. Some transport service providers as well as third party firms now offer tariff information on the Internet. The information is made available on the carrier's website and some may also provide online calculators, enabling the shipper to input details such as cargo origin and destination, cargo characteristics, etc., providing the required freight rate instantly. These systems provide considerable benefit to shippers by simplifying and expediting numerous tasks involved in freight rating, which would otherwise involve considerable time, cost and human resources to complete.

Customs clearance

80. Internet technology is being applied by a variety of service providers to provide customs clearance, including airfreight carriers, motor carriers, freight forwarders, customs brokers, express delivery firms, and so on. Electronic customs clearance makes it possible to begin processing clearance before shipment arrives. As a result goods can be cleared through customs almost immediately upon arrival. It also makes it possible to eliminate hardcopy invoices, thus providing cost savings to shippers through faster and more accurate customs entries.

Freight manifests

81. Some service providers employ electronically-based billing and cargo manifests. For example, the US Customs Service supports an EDI-based system for ocean cargo which can report, electronically, the cargo manifest, bill of lading and other shipping-related information. This online data system has proved to be beneficial in permitting quicker cargo release and increased carrier productivity through reduced cargo-processing time. It has also helped some port authorities to become more competitive by reducing cargo customs clearance and processing times.

Port services

82. Several maritime ports around the world, including those of New York, Rotterdam and Hamburg are establishing electronic systems which link up various parties engaged in the movement of freight through

the port, including shippers, forwarders, customs, terminal operators, carriers and other port users (see below).

3PL (Third-Party Logistics Provider)

83. A service provider that manages and executes logistics functions such as courier or freight transport using its own assets and resources, on behalf of another company.

4PL (Fourth-Party Logistics Provider)

84. 4PL is outsourced logistics at the level of total supply chain management of the client's freight and transport needs, usually at a global level, with heavy dependence on IT systems. Having now embraced the Internet age, companies are consequently more willing to recognise the benefits of aggregating and outsourcing areas of their business that were once thought of as core capabilities to Fourth-Party Logistics Providers. Accenture originally trademarked a definition of a 4PL as 'an integrator that assembles the resources, capabilities and technology of its own organisation and other organisations to design, build and run comprehensive supply-chain solutions'. Another definition is that a 4PL provider is a supply chain integrator that assembles and manages the resources, capabilities, and technology of its own organization with those of complementary service providers to deliver a comprehensive supply chain solution. In other words, a 4PL is an entity outside the organisation that assembles and integrates capabilities from other third-parties to achieve transformational efficiencies not attainable by the organisation on its own.

Relationship between 3PL and 4PL

85. The role of the 3PL includes: 1) Resource provider; 2) Resource manager; 3) Problem solver; 4) Transportation Strategist; 5) Distribution Strategist; 6) Supply Chain Strategist; and 7) Orchestrator. According to the Seventh Annual 3PL Study, (John Langley et al).

while the first two will likely remain the role of 3PL and service providers, the later five will probably migrate toward the 4PL or Logistics Integrator. On a limited scale, the Problem Solver and Transportation Strategist roles will also remain with the 3PL providers.

2.2 The role of e-commerce in reducing waste in the supply chain

86. The role of information systems in reducing waste in the supply chain and improving supply chain management has been rigorously documented, and in recent years the introduction of e-commerce in enhancing such improvements has come increasingly into focus. This has provided an increasingly clear understanding of the role of e-commerce and the opportunities it presents in both supply chain enhancements and new business opportunities. These objectives are the goal of Value Stream Management.

What is Value Stream Management?

87. Value Stream Management is a strategic approach to optimising the supply chain through understanding value and waste within the supply chain. For example, the Toyota Production System identifies seven areas of waste in the value stream, namely Overproduction, Waiting, Transport, Inappropriate Processing, Unnecessary Inventory, Unnecessary Motion, and Defects.

88. Each of these areas of waste occur within a company's value activities as defined by Porter and Millar, who describe nine generic activities that fall under two categories:

Primary Activities - those involved in the physical creation of the product, its marketing and delivery to buyers, and its support and servicing after sale;

Support Activities, which provide the inputs and infrastructure that allow the primary activities to take place.

89. When areas of waste are examined in the context of a company's value activities, it becomes clear ICTs play a powerful role in reducing waste in a large number of these activities. ICT has an impact on most individual functional areas, including marketing, purchasing and logistics. Among the remedies for waste that emerges is the use of ICT in increasing visibility of demand throughout the supply chain and electronic linkages to create transparency of orders and operations.

90. Connectivity between supply chain layers and transparency of information can be seen as elements of world class logistics capabilities, but some analysts have pointed out that this requires the establishment of a basic information infrastructure in the supply chain. As examples, Van Hoek states that bar codes as an information source are one example of a possible infrastructure, since they are often used in a warehouse, sometimes stretching as far as final delivery, but for the support of operational systems only. Increasingly, organisations are applying the system throughout the supply chain. Reebok, for example, attaches bar codes in production and uses them all the way through the supply chain until the point of sale.

91. Further, since the operational information about the transportation and distribution stages of the supply chain is recorded, it can be used to monitor transportation links, identify opportunities for lowering costs by shifting volumes between routes or realizing a competitive advantage through differentiating services in response to the market information stored in the databases.

92. This, essentially, is the foundation for the powerful role that e-commerce has played in transforming supply chain management during the 1990s.

How e-commerce reduces waste in the Value Stream

93. As a result of a variety of e-commerce related activities, many of the core supply chain concepts and principles have been put in practice in a much more effective way. These include information sharing, multi-party collaboration, design for supply chain management, postponement for mass customisation, outsourcing and partnerships, and extended or joint performance measures. Moreover, the Internet has allowed companies to come up with highly innovative solutions that have accelerated the widespread adoption of these core supply chain principles.

94. Lee and Whang identify four key areas in which e-commerce has made the greatest impact: information sharing, synchronized planning, workflow coordination, and the evolution of new business models. They also consider Monitoring and Measuring as an additional key area. They have compared these areas with business processes and compiled a matrix of Supply Chain Dimensions on one axis and four central elements of the value stream - Procurement, Order Fulfillment, Product Design and Post-Sales Support - on the other.

95. The result is a comprehensive table (below) of the opportunities for waste reduction and increased efficiency that e-commerce brings to the supply chain.

Table 2. Impact of E-Commerce

Dimensions of SC Integration	Business Processes			
	Procurement	Order Fulfillment	Product Design	Post-Sales Support
Information Integration	Supplier information sharing	Information sharing across the supply chain	Design data sharing, product change plan sharing	Customer usage data linkages
Planning Synchronization	Coordinated replenishment	Collaborative planning and coordination, demand and supply management	Synchronized new product introduction and rollover plans	Service supply chain planning coordination
Workflow Coordination	Paperless procurement, auctions, auto-replenishment, auto-payment	Workflow automation with contract manufacturers or logistics providers, replenishment services.	Product change management automation, collaborative design	Auto-replenishment of consumables
New Business Models	Market exchanges, auctions, secondary markets	Click-and-mortar models, supply chain restructuring, market intelligence & demand management	Mass customization, new service offerings	Remote sensing & diagnosis, auto-test, downloadable upgrades
Monitoring and Measurement	Contract agreement compliance monitoring	Logistics tracking, order monitoring	Project monitoring	Performance measurement and tracking

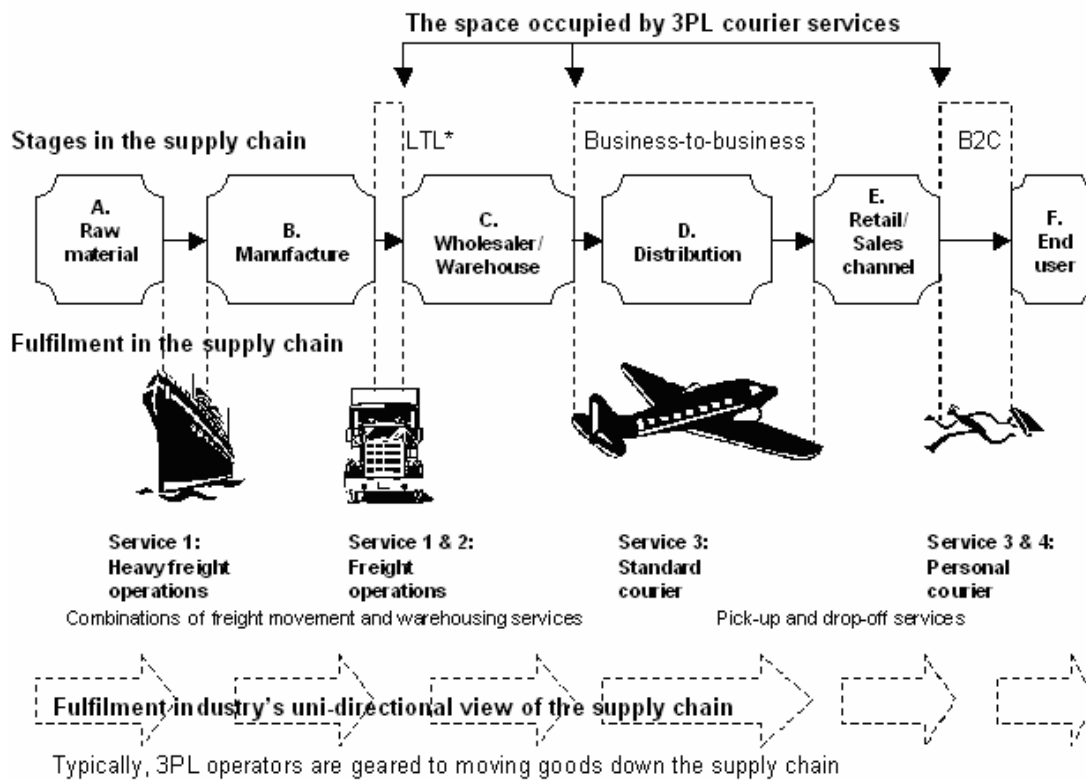
Source: Lee & Whang

96. Lee and Whang conclude that, in the next few years, we will see an explosion of business-to-business applications of the Internet as visionary companies develop new paradigms of e-business for the future. This can be understood also to refer to new technologies that extend the ambit of e-business, such as mobile communications technology.

2.3 Understanding the role of fulfillment in the supply chain

97. The diagram below indicates the role that fulfillment services play in the supply chain, and the areas in the supply chain that are catered for by conventional freight and courier firms. It should be noted that standard courier services operate only in two of the key stages of the supply chain, namely in D - the Distribution segment (business-to-business), which they attempt to make their own, and the space between E. and F., namely delivery to the end user (business-to-consumer), where purchases have been made by phone or on the Internet. To a lesser extent, they also operate in the space between B and C, but usually only in the category known as Less-than-truckload, or LTL (FedEx has two subsidiaries catering only for this class of fulfillment). While other elements and spaces in the supply chain do enter the courier services' ambit from time to time, these are dealt with on an ad hoc basis.

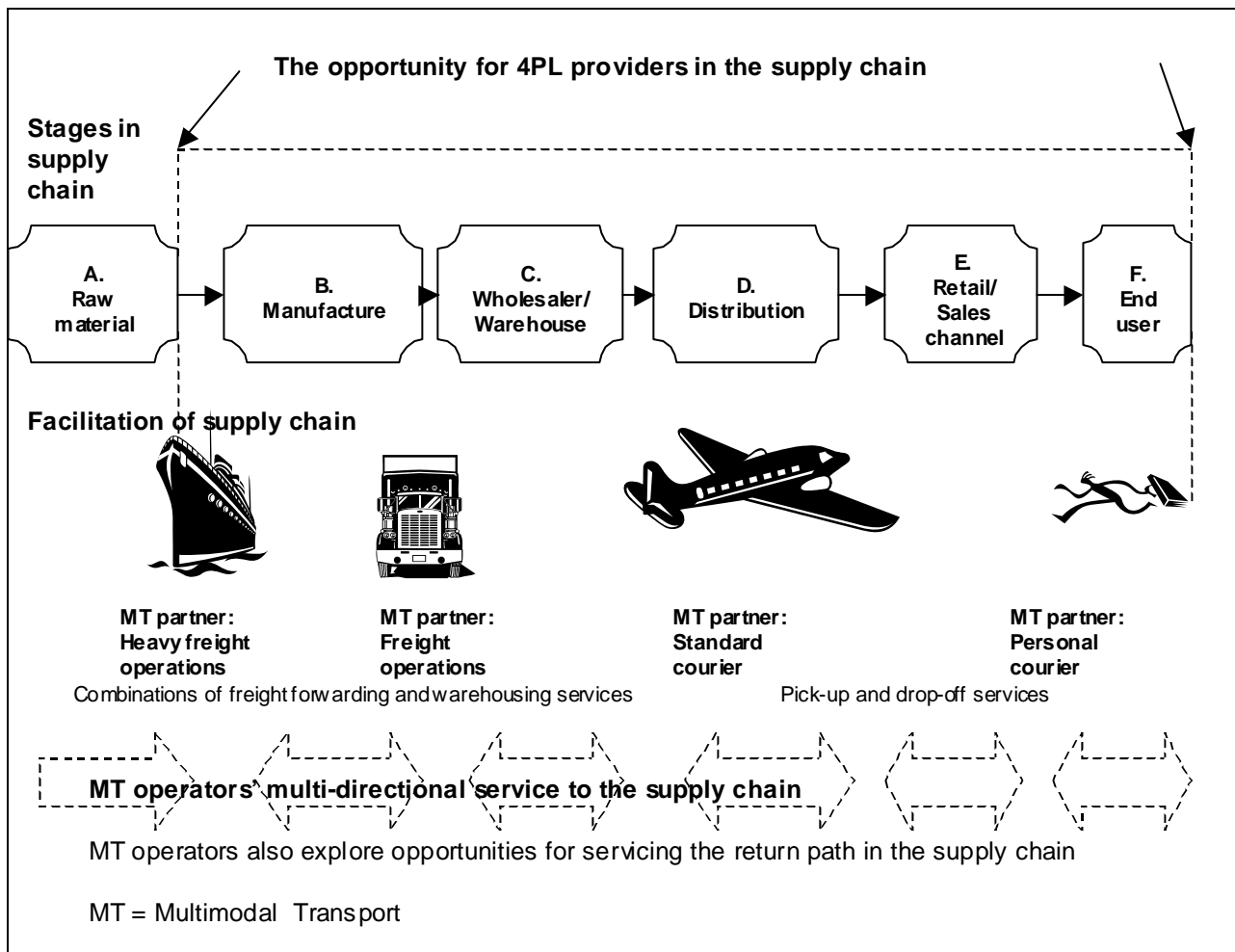
Figure 1. 3PL: 3rd Party Logistics (Outsourced fulfillment)



*LTL = Less-than-truckload

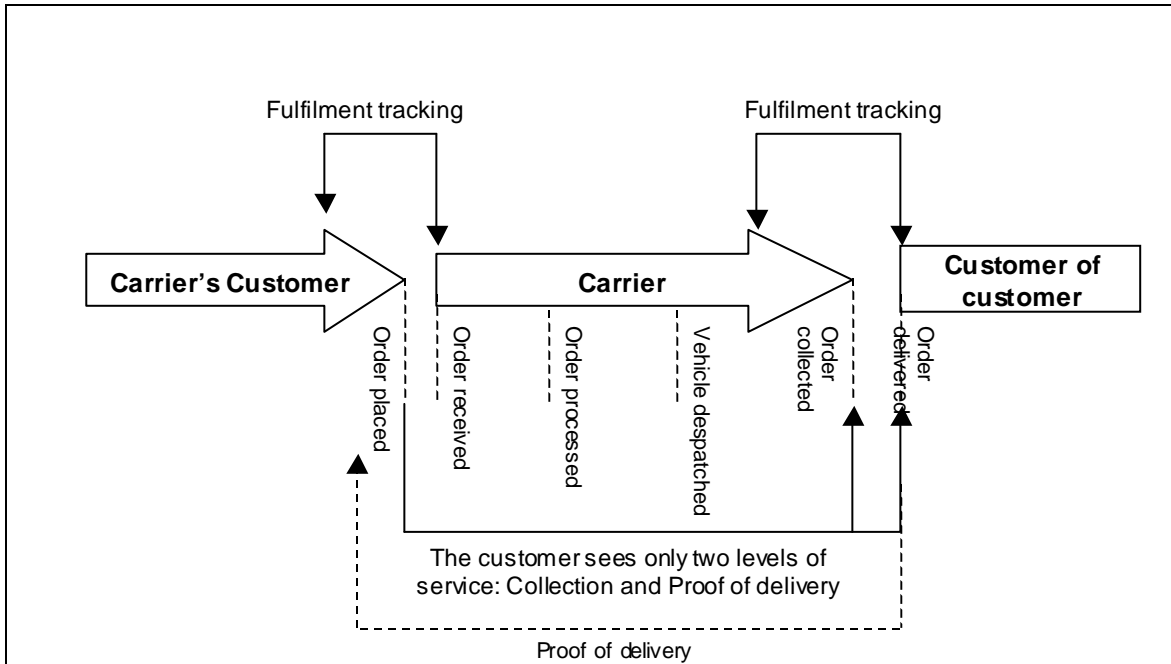
98. Figure 2 below shows how 4PL operators are able to differentiate themselves from any individual fulfillment service, i.e. by offering customers every aspect of fulfillment services through its strategic alliances, as well as by offering a full and coordinated return path back up the supply chain, which no other single fulfillment service is able to offer. Due to their sophisticated IT systems, 4PL operators are also able to offer this service as a seamless, full-spectrum service offering a single point of contact to the client.

Figure 2. 4PL: 4th Party Logistics (outsourced outsourcing)



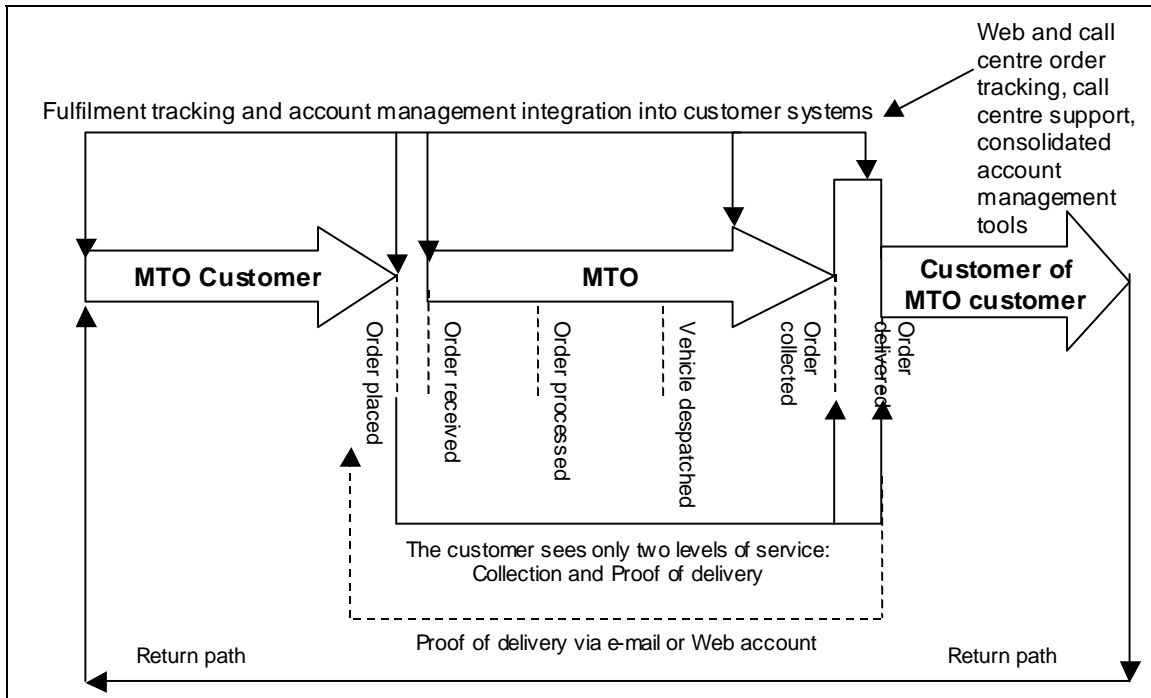
99. The benefits of e-commerce implementations in the supply chain are best clarified by illustrating in Figure 3 below an everyday example of what happens to a consignment sent by a client of the fulfillment operator to the client's own client.

**Figure 3. The typical fulfillment carrier's supply chain
(in the Distribution segment above)**



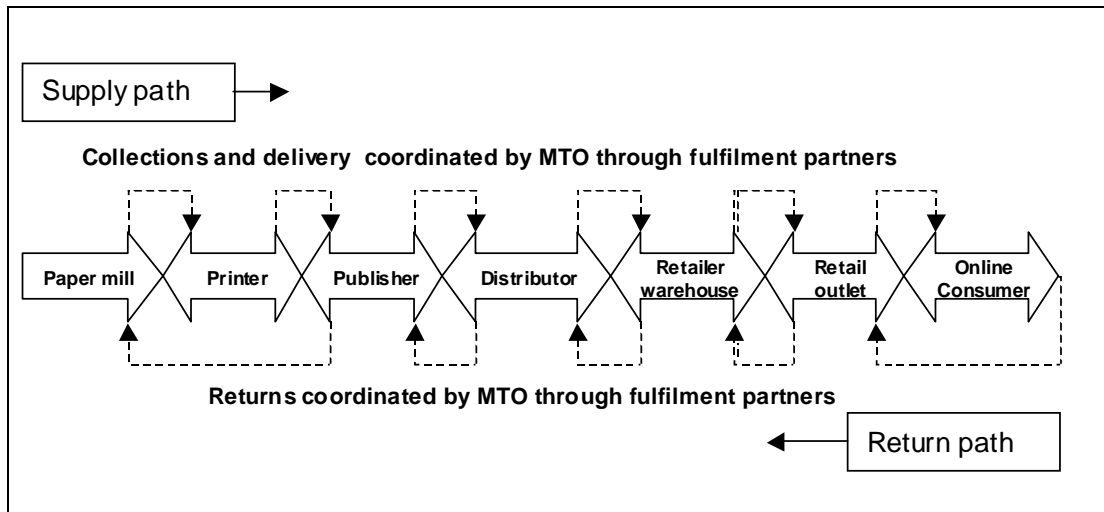
100. Figure 4 below shows how an e-commerce enabled Multimodal Transport Operator's IT systems can allow it to integrate its activities into the management systems of its clients. This provides not only for integrated account management, but also for an integrated relationship that, on the one hand, ties the customer strongly into the MTO's systems and, on the other hand, provides at-a-glance, real-time access to account and fulfillment status at any time. At its most sophisticated level, integration into the customer's back-end ensures seamless supply chain management with regard to fulfillment, and also allows the MTO to exploit further opportunities within the supply chain, as the following example of a vertical market shows.

**Figure 4. The typical e-commerce MTO supply chain
(in the Distribution segment above)**



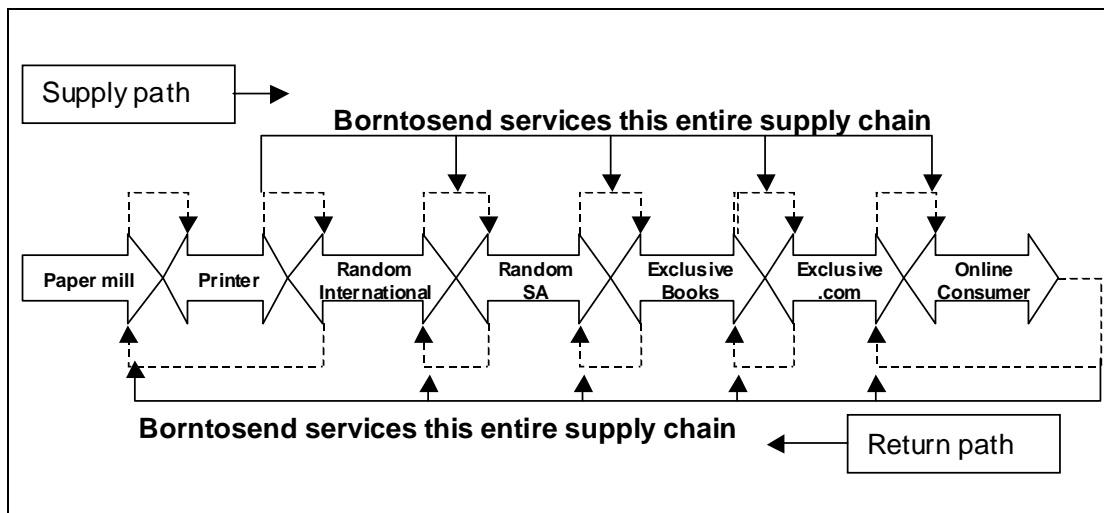
101. To illustrate this in more detail, the analysis can be applied to a particular sector, in this case the book industry, as illustrated in figure 5 below.

Figure 5. Vertical market supply chain and MTOs role: example – books



102. Taking a real-world example, the figure below illustrates the interaction between the South African MTO Bortosend.com, the publisher, Random House, and the book distributor, Exclusive Books.

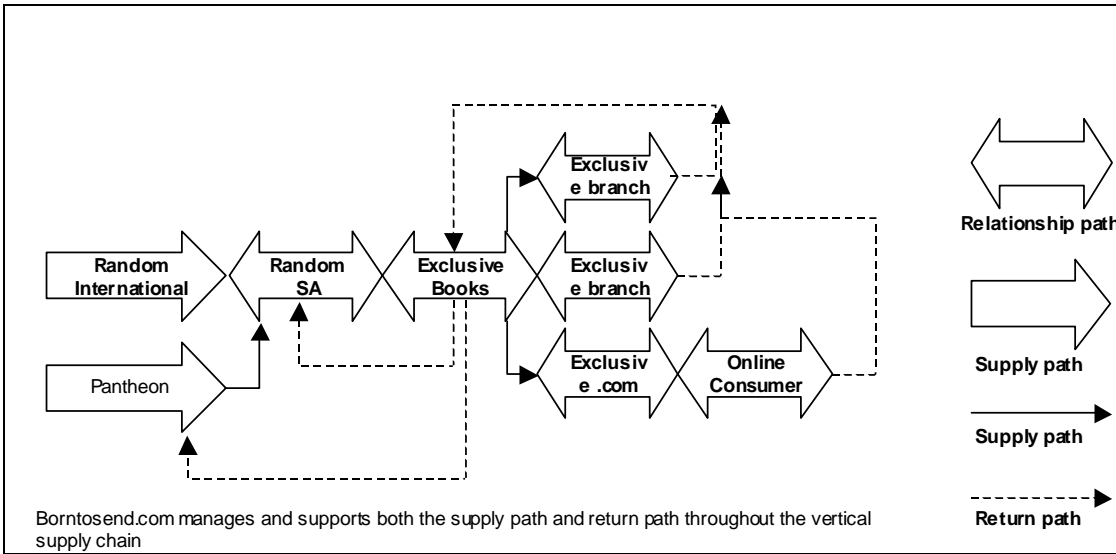
Figure 6: MTO vertical market client example:



103. The MTO not only meets the needs of almost the entire vertical supply chain but also adds value to that supply chain by decreasing inefficiencies and reducing costs. This means that it has become not only a strategic partner to the books trade, but also an industry specialist in understanding its particular needs. This expertise extends to a range of vertical markets, where the e-commerce enabled MTO (in this case, Bortosend.com) adds value not only through basic service aggregation, but also through its understanding of the complexities of the industries.

104. A further illustration of this point related to the example above is the e-commerce enabled MTO's ability to become the equivalent of an internal service provider at various points in the supply chain, such as within the Exclusive Books retail network itself. Figure 7 lays out the interrelationship:

Figure 7: Borntosend.com MTO role within the Exclusive Books supply chain



3. E-commerce in action: Case studies from the world of multimodal transport

105. The following section presents some real-world summaries of the wide variety of new MT/FF related activities taking place world-wide. While most of these are from North America and Europe, many of them could be adopted in Africa.

106. **United Parcel Service of America's** E-Logistics division has partnered with EXE Technologies, Oracle, and Pricewaterhouse Coopers to manage warehousing, order fulfillment, inbound and outbound transportation, returns, and customer service. Through the partnerships, UPS provides services for startups and midsize business-to-business and business-to-consumer companies. EXE Technologies supplies data-warehouse management and its Exceed electronic fulfillment system. Pricewaterhouse Coopers offers systems-integration consulting and project management, while Oracle brings its enterprise resource planning and order-management software. Partnership models like this are often adopted because no single company has the expertise in the broad range of technologies required.

107. **FedEx** has recently launched an E-Commerce Builder program, which offers Web design, hosting, order management, real-time financial settlement, and fulfillment to small and midsize companies, at no cost. FedEx's strategy is to encourage startup companies to use FedEx as their primary packing and shipping provider.

108. **US Freightways** is partnering with companies to provide E-business services such as Web order entry and transportation management, using technology from i2 Technologies Inc. The company provides fulfillment for E-businesses, including back-end transportation, logistics, assembly and shipping and delivery. It is also providing E-commerce applications including payment authorization, online inventory management, and order allocation to retail stores. Customers are able to view reports and documents online using document imaging. Customers can also receive rate quotes and track the status and location of shipments online. In addition, the use of radio-frequency technology in warehouses enables them to maintain real-time inventory, which can be accessed via 4 000 Nextel mobile phones deployed around the country.

109. **Roadway Express** uses an extranet, My.roadway.com, to serve 10 000 less-than-truckload customers. Since traditional technologies are too costly for small companies to implement, the extranet solution is ideal for this market segment. Customers can check invoices and payment history, access shipping rates, and obtain proof of delivery and other shipping documents.

110. **J.B. Hunt** uses wireless technology to help employees communicate better and to provide real-time information to customers. Managers stay in contact with drivers on the road through on-board computers supplied by Qualcomm, and linked to a satellite system. This system is integrated into J.B. Hunt's own systems, so that drivers can access payroll information, check e-mail, and report on shipment status and location. They are also testing wireless trailer tracking through devices mounted on trucks. Linked to a global-positioning system, the devices report daily on the location and capacity status of trailers.

111. **Danzas AEI Intercontinental**, an air-freight forwarder, aims to "make the supply chain more visible" by integration with customer systems. Danzas creates a customized look on the systems of all the suppliers they use, and customers can then manage the data in their own supply chains. Danzas also participates in the ClearCross Network, which connects customers with the information, shipping, and application sources needed to conduct business across borders, and enables Danzas to provide companies with information on international shipping rates, routes, and transportation options. Finally, Danzas has implemented an online Global Resource Guide to notify customers of international regulations and document requirements in advance of a shipment to speed up clearance processes.

112. **Datatrak Corporation**, a software developer and wireless communications solutions provider for the delivery industry, has released a program called eTrac Settlement, a Web-based Electronic Invoice Presentment and Payment (EIPP) solution that streamlines the billing and payment process between freight forwarders and cartage agents. It offers to eliminate the time-consuming task of manually auditing invoices, issuing checks, resolving disputes, and constantly making financial adjustments, enabling freight forwarders to gain control of their payment process. Invoices are paid post-audit, eliminating costly follow-up disputes and adjustments. Cartage agents also benefit by gaining visibility to invoice status information, enabling them to address disputes in real-time, instead of waiting weeks or even months for resolution.

113. **Shipping portals** have become a major strategic positioning exercise by liners, but internal strategies vary. The three major liner shipping portals online at the end of 2001 were:

- GT Nexus, an e-logistics software company, using its portal to drive its strategy of becoming a global leader in e-logistics software and services;
- INTTRA, an industry portal rather than a software provider, aiming to facilitate the interaction between users and their carriers;
- CargoSmart, aiming to add value to core booking and tracking facilities and to provide a more complete solution to users.

114. The **Bolero** project (named after Bill of Lading Electronic Registry Organisation) aims to establish a global electronic network to handle trade documentation such as bills of lading and other non-negotiable documents. The project has launched, on a trial run, a central electronic registry and encrypted digital signatures to replace paper bills of lading.

115. **General Electric Information Services** (GEIS) has in partnership with Ocean Wide, Incorporated, established a marketing a system that provides an e-commerce solution which allows shippers, trucking companies and freight forwarders to exchange trade documents with ocean carriers and the US Customs.

116. The **Microsoft Value Chain Initiative** attempts to bring together software, hardware and supply chain companies to establish an integrated architecture that will promote data sharing among different software applications and among trading partners on a global basis, regardless of the format or communications method, and to integrate these communications with operational systems.

117. The **Port of Buenos Aires** authority (AGP), faced with new regional competition, is to develop as a logistics hub and offer value-added services to help attract new transshipment cargo flows. This will include the roll-out of "Coloba" (Comunidad Logistica de Buenos Aires), which is aimed at developing a new informatics systems to replace much of the millions of paper documents issued and received by the AGP every year.

118. The **American Bureau of Shipping** (ABS), a US-based international classification society, has launched an Internet-based tank container information system for tank owners worldwide. The system, known as E-CIS, provides owners with rapid access to tank inspection reports. Available on the ABS web site at www.eagle.org in the products and services category, the Oracle-based program has a password-protected log-in for clients who need immediate verification that a tank container is "not out of date" or who want to track their periodic inspections.

119. The **Port of Rotterdam** has selected Mercator Software to provide integrated dangerous goods shipment and ship movement data for the live WebJonas website, which monitors harbour traffic. The Mercator system handles messages detailing electronic notifications of arrival, International Forwarding

Transportation of Dangerous Goods Notification (IFTDGN) and declarations to port. This information, along with details of the positions of ships within the port, is integrated into the port's back-end systems by Mercator. The resultant data enables the port guidance control room to monitor the behaviour of ships and is expected to provide an additional level of safety to Rotterdam port operations.

120. Also in Rotterdam, the **Cargo Card** project has been developed in cooperation between Rotterdam's municipal port authority and commercial operators in the port. Most drivers, usually those who use the port most regularly, are given a Cargo Card, a smart card which also contains biometric data about the driver's left hand. This simplifies the work of the stevedores when checking the collection and delivery of containers. All the necessary information on the contents of containers, the sender and recipient, etc., is managed by EDI. Loading and unloading take place automatically as soon as a driver is "legitimized" by holding up his left hand in front of a screen. In principle, not a single document is required for loading or unloading. The driver does not even have to leave the vehicle. The result is that, even if the infrastructure for warehouse space, loading and unloading equipment remains the same, the number of containers handled can be greatly increased. Waiting times are also reduced and the existing vehicle fleet can be used more effectively. The innovation will also lead indirectly to a reduction in pollution.

121. The **Port of New York and New Jersey** has access to real-time information on the status of cargo arriving at terminals, traffic at or around port complexes and ship arrivals on the new Port Authority web site, following the launch of Freight Information Real-time System for Transport, or FIRST (www.firstnynj.com). FIRST was developed by Americas Systems Inc following the award of a US\$1.9 million contract.

122. The **Port of Melbourne** is testing a new electronic receipt system to streamline export container movements through the port. The pilot programme, Electronic Export Receipt Advice (EERA), involves Australia's largest exporter of processed food, dairy giant Murray Goulburn, as well as stevedores Patrick and P&O Ports, ANL Container Line and transport companies. It uses electronic messages developed by Tradegate ECA, which conform to open, international standards.

123. **International Asset Systems** (IAS), operator of the InterBox online container exchange, has expanded its business scope to include a new suite of Internet-based services that will allow shipping lines and their customers and vendors to track containers throughout the transport chain. A data repository captures and organizes equipment "events" such as changes in load status or gate moves in and out of terminals, inland depots, shipper/consignee facilities etc. The services will allow carriers to follow a container's location and status as it moves from point of origin when it is loaded to its destination when it is emptied.

124. **Stef-TFE**, the third biggest logistics service provider in France, specializing in the food industry, has recently replaced its old logistics software with Agrostar II. This software optimizes the supply chain in food industry – especially valuable at a time when traceability and security are becoming more and more important issues in the food industry.

125. **Vopak**, a shareholder in tank container operator VOTG, has introduced ChemPoint.com, an "e-distributor" of chemical products and logistics services. Initially addressing the markets for specialist, fine and semi-bulk commodity chemicals, the web site also accepts customer orders.

4. Key factors in choosing outsourced logistics

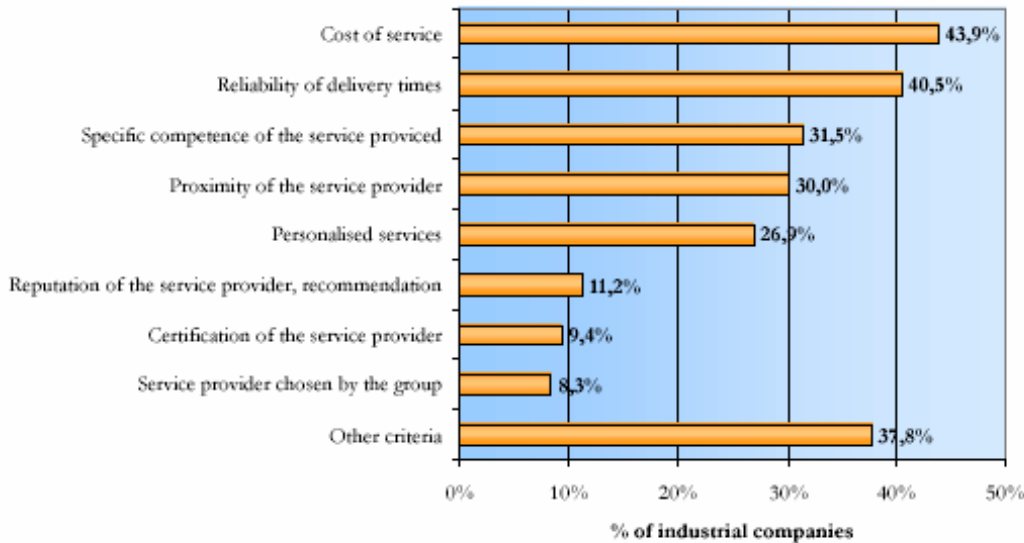
126. The case studies outlined in the previous section represent a cross-section “sample” or e-commerce implementation in the multimodal transport industry. Clearly almost any process in logistics management, and freight forwarding, can be streamlined through the use of e-commerce systems. It then becomes useful to examine which areas can benefit the most from e-commerce. To do this, the key obstacles to outsourced logistics must first be examined.

127. Research projects conducted in this context were carried out by Arthur Andersen in studying outsourcing of services in large French companies in 2000. The major results of the study were:

- Logistics was outsourced by 9% of large companies in 1999 and 27 % in 2000;
- 17 % of large companies planning to outsource new functions during 2001-2002 would outsource the function “distribution, logistics and transport” (26 % in 1999);
- 26 % of companies which outsourced the function “distribution, logistics and transport” in the past have stopped outsourcing it (5 % in 1999);
- 39 % of managers of large firms think that the function “distribution, logistics and transport” will be the most outsourced function during 2001-2002;
- The most important criteria in the choice of a logistic service provider are the cost of the service and the reliability of delivery times. The competences of the service provider, its proximity and personalized services also are important in the choice of a service provider.

128. The following criteria were identified most often in the study:

Chart 3. Criteria in the choice of a logistics service provider



Most important criteria in the choice of a logistic service provider¹⁴

Source: Arthur Anderson

129. Clearly, the cost of the service is the main feature influencing choice of outsourcing (66 % of companies and 27 % of companies already outsourcing logistics). Another important feature in choosing to outsource logistics is the company's difficulties in perceiving the quality of the supply. Other major factors are difficulties in defining own needs and the fear of losing control of the function or competence in logistics.

130. As Erkki Liikanen, European Commissioner for Enterprise and Information Society, pointed out when speaking at the Maritime Industries Forum in Helsinki in June, 2000, "The changes which are going to take place will be the most dramatic change in our lifetime because, even in the procurement side, we will see enormous savings. Business models will change and we will see new dynamic business models; the value chains will be different. The challenge that this will all put on the logistics - where you [maritime industries] are all part, in one way or another - will be tremendous." Mr Liikanen stated that it was already being found that B2B E-commerce in procurement alone would bring about 10 % savings, on average, while there are sectors where it can reach around 25-30 %. But this can only happen, he said, "when the logistics run fast and the obstacles are minimized - and when services are always available. It is clear that the companies who are not going online will carry upon their shoulders a major extra burden."

131. It is clear from Lee and Whang's analysis summarized in Chart 3 above why the cost savings are so great - in every area in which waste is eliminated from the value chain by e-commerce, the processes in that segment of the value chain are accelerated, or at least made more efficient. Greater efficiency, combined with reduced wastage, naturally results in lower cost. In other words, the cost savings brought about by e-commerce in the supply chain are the end result of numerous other improvements in the supply chain.

132. Within logistics and multimodal transport, then, the following are the most clearly distinguished benefits of synchronizing existing processes with electronic supply chains:

- **Information integration:** Information sharing across the supply chain;
- **Planning synchronisation:** Collaborative planning and coordination, demand and supply management;
- **Workflow coordination:** Workflow automation with contract manufacturers or logistics providers, replenishment services;
- **New business models:** Supply chain restructuring, market intelligence and demand management;
- **Monitoring and measurement:** Logistics tracking, order monitoring, visibility of the supply chain to the customer.

133. It should also be noted that reducing transport and logistics costs for e-commerce shipments may be constrained by a number of factors. Many individual business-to-consumer e-commerce orders tend to be small and thus the cost of shipment may be quite large relative to the unit value of the goods being shipped, making transactions unprofitable. Also, the rapid increase in the number of online customers means that the transport and logistics requirements cannot be predicted and planned with ease. As a result there may be a tendency to either under-invest or over-invest in facilities.

134. Another factor that may pose problems is the density of e-commerce traffic, especially for business-to-consumer home delivery services. As residences tend to cover large city areas, an increase in home deliveries may mean greater driving distances covered by delivery vehicles per package delivered. This reduces productivity and hence lowers profits.

135. In researching the role of order fulfillment in e-commerce, Forrester Research surveyed 40 United States companies using online sales in retail, Internet and manufacturing businesses. The companies indicated that on average they were handling 400 orders per day online. While their online sales accounted for a small share of their total business, the companies reported that handling merchandise (a function that includes transportation and delivery) was a major problem. Less than half of the respondents made money on each shipped package and most of them failed to measure the total cost of fulfilling an order.

136. A large number of the companies losing money on shipping attributed the losses to their company's pricing system, for example charging the same fees for all packages regardless of size or imposing no shipping charges at all. Eighty five per cent of the companies noted that they could not fill overseas orders because of the complexity of shipping across borders. Of those who had problems shipping overseas, 75 per cent cited their system's inability to register international addresses accurately or to price total delivery cost.

137. The Forrester study notes that order fulfillment has so far not been a serious impediment to e-commerce because most online sellers have limited the number of products offered on their sites and have used in-house capacity to fulfill orders. However, as online sales are expected to reach US\$ 3.2 trillion by 2003, with the range of products sold expanding and the need to move large volumes of parcels increasing, there will be increased pressure on the order-fulfillment system. Forrester says sellers will face logistics chaos, as they strive to adjust their infrastructure in order to handle the new demands. As a remedy, the study advocates the implementation of end-to-end logistics in which distribution operations focus on the movement of parcels rather than pallets.

138. The significance of transport and distribution costs is also illustrated, for example, by the existence of enterprises which have established online shopping malls dedicated to connecting consumers with e-merchants that offer products free of shipping and handling charges. Some surveys have indicated that consumers rank free shipping and handling offers as a much greater incentive when purchasing, compared to other price discounts.

139. In assessing the impact of e-commerce on transport services, it should be borne in mind that the transport industry has, over decades, been undergoing organizational and technological changes

independent of any influence from electronic commerce, especially from the use of the Internet, which is quite a recent phenomenon. Particularly, developments in industrial production systems and globalization of economic activities have had profound effects on transport. Thus e-commerce tends to reinforce developments that have already started in the transport industry.

5. Recommendations

140. It is clear from the discussions in this report that electronic commerce is no longer an emerging technology option in supply chain management, but that it has in fact already revolutionized logistics globally. While many African countries not yet fully making use of e-commerce enabled systems, many are now being serviced by organizations that use e-commerce-oriented systems.

141. For this reason, the first recommendation of this report is that **the “go-it-alone” approach should be actively avoided**. In other words, outsourcing is the order of the day and any logistics provider or customer, and any organization using freight forwarding as a customer, supplier or fulfillment agency, should not be tempted to build a system from scratch to bring their supply chain into the e-commerce environment. This is likely to prove costly, time consuming, will unlikely to be capable of with competing with specialized MTO/FF outsource providers, or be compatible with systems already in use.

142. It is suggested that the first step in the e-commerce enablement of freight forwarding be for the “candidate” company or organization to **research the e-commerce status of suppliers and customers, and identify those players in the supply chain who are already at an advanced stage in such enablement**. This will usually also imply experience in the arena of e-commerce fulfillment systems, as well as an understanding of the needs of both customers and suppliers.

143. Where this is the case, the next step would be to **examine the feasibility of extending those players’ electronic supply chain management systems into the candidate’s own processes**. In this way, the cost of implementation becomes one of extending existing systems rather than of setting up and implanting systems from scratch. The further benefit is that the system will be based around one that is known to be a workable mature system, as opposed to an immature system built from the ground up.

144. Where suppliers and customers are in a similar state of e-commerce readiness, as is often the case in Africa, the next step would be to **examine the status of the industry at large** within which the candidate operates. If industry portals exist, then it may be advisable to examine the feasibility of integrating into these portals. Where they do not exist, it would be advisable to examine a range of implementations of equivalent players in other countries, and identify those which best match the needs of the candidate, both in terms of national-, regional- and industry-related factors.

145. It should be borne in mind that **there is no “one-size-fits-all” solution**, of the kind referred to in the IT industry as a “silver bullet” solution. Every organization has different needs for its supply chain processes, even where the industry at large appears to have adopted standard solutions. The reality is that individual organizations can fit in with portal-type solutions that impose standard processes, but these solutions may not appropriately fit into the individual organizations. In other words, **portal and standard solutions can meet some of the needs of individual organizations, but not all of their needs**, so they tend to become part of an overall solution for each organization. This is the awareness that needs to underpin the final step; i.e. in implementing a solution, candidates for e-commerce enablement should understand that any solution will not meet all their needs. This indicates that:

- a careful needs analysis must be undertaken on a per-case basis and incorporated into any scoping or specification of an e-commerce-enablement project;
- any gaps between the needs analysis and the solution set that is available or implemented to fulfill those needs must be addressed through alternative processes or solutions.

146. In conclusion, e-commerce is not a solution to shortfalls in multimodal transport, but an essential approach to:

- achieving greater efficiency;

- taking advantage of the global communications environment;
- integrating systems with those of customers, suppliers and partners;
- reducing cost of fulfillment;
- increasing the efficiency of fulfillment; and
- promoting competitiveness in an environment that is traditionally regarded as unable to compete in the global economy.

Annex 1

References

- Anderson, D. (1), and Lee, H.L. (2), Andersen Consulting Supply Chain Practice (1) and Stanford University Graduate School of Business (2), *The Internet-Enabled Supply Chain: From the "first Click" to the "Last Mile"*, *ASCET Project* (2000).
Available at <http://www.transora.com/en/pdf/andersonlee.pdf>
- Ashcroft, J., *Fourth Party Logistics - Position At the Top of the Supply Chain*, About Logistics/Supply Chain, About.com (<http://logistics.about.com/cs/fourthpartylogistics/index.htm>)
- Bowersox, D.J., Daugherty, P.J., DroÈ ge, C.L., Germain, R.N. and Rogers, D.S. (1992), *Logistical Excellence, It's Not Business as Usual*, Digital Press, Burlington, VT
- Bumstead, J., and Cannons, K., *From 4PL to Managed Supply Chain Operations*, Logistics & Transport Focus, May 2002
- Closs, D.J., *Views of the Logistics Integrator*, Logistics Quarterly, Volume 8, Issue 4, Winter 2002
- Christopher, M., *Logistics and Supply Chain Management: Strategies for Reducing Cost and Improving Service*, Financial Times Prentice Hall; 2nd edition, 1998
- Economic Commission for Africa (ECA) - Electronic Commerce in Africa. 2000 <http://www.uneca.org>
- European Conference of Ministers of Transport, *The Impact of E-commerce on Transport*, in proceedings of Joint OECD/ECMT Seminar on the Impact of E-commerce on Transport, Paris, 2001
- Goldstuck, A., *Value Stream Management and Information Systems: Do opportunities for e-commerce extend to m-commerce?*, School of Economic and Business Sciences, University of the Witwatersrand, April 2002
- Hines, P., Lamming, R., Jones, D., Cousins, P., and Rich, N., *Value Stream Management - Strategy and Excellence in the Supply Chain*, Pearson Education (Harlow, Uk, 2000).
- ITU World Telecommunication Development Report 2002 <http://www.itu.int>
- Industrial Data & Information, *The New Logistics Management Paradigm: The Impact of Today's Trends*, Sparksources, 2001
- Langley, J., et al. , *Seventh Annual Third-Party Logistics Study*, A joint research project of CGE&Y, Georgia Institute of Technology and Ryder System Inc., 2002
- Lee, H.L., and Whang, S., Stanford University, *E-Business and Supply Chain Integration*, *Stanford Global Supply Chain Management Forum* (November 2001)
- O'Keeffe, M., *Building intellectual capital in the supply chain - the role of e-commerce*, *Supply Chain Management: An International Journal* (Volume 6 Number 4 2001), 148 – 151
- Maritime Industries Forum, *Proceedings of the Annual Plenary Session*, Helsinki, June 2000
- Porter, M.E., and Millar, V.E., *How information gives you competitive advantage*, *Harvard Business Review* (July-August 1985), 149-160

Tarasewich, P. (1), Nickerson, R.C. (2), and Warkentin. M. (3), Northeastern University (1), San Francisco State University (2), Mississippi State University (3), *Communications of the Association for Information Systems* (Volume 8, 2002) 41-64

United Nations, *United Nations Convention on International Multimodal Transport of Goods*, Geneva, 1980

United Nations Commission on International Trade Law (UNCITRAL) Model Law on Electronic Commerce <http://www.uncitral.org>

United Nations Conference on Trade and Development, *Background paper on developments and main issues in electronic commerce and information and communication technologies*, in proceedings of the 7th Session of the Commission on Enterprise, Business Facilitation and Development, Geneva, 24–28 February 2003

United Nations Conference on Trade and Development, *E-Commerce and Development Report*, 2002

UNDP World Development Report 2001 <http://www.undp.org>

United Nations Economic and Social Commission for Asia and the Pacific, *Report of the Committee on Transport, Communications, Tourism and Infrastructure Development (CTCTID) on its Fourth Session*, in proceedings of the CTCTID, Fourth Session, Bangkok, 2002

Van Hoek, R., E-supply chains - virtually non-existing, *Supply Chain Management: An International Journal* (Volume 6 Number 1 2001) 21-28

Williams, T., Realizing the potential benefits of real-time, online data exchange, *Supply Chain Management: An International Journal* (Volume 2 Number 4, 1997) 134 - 136

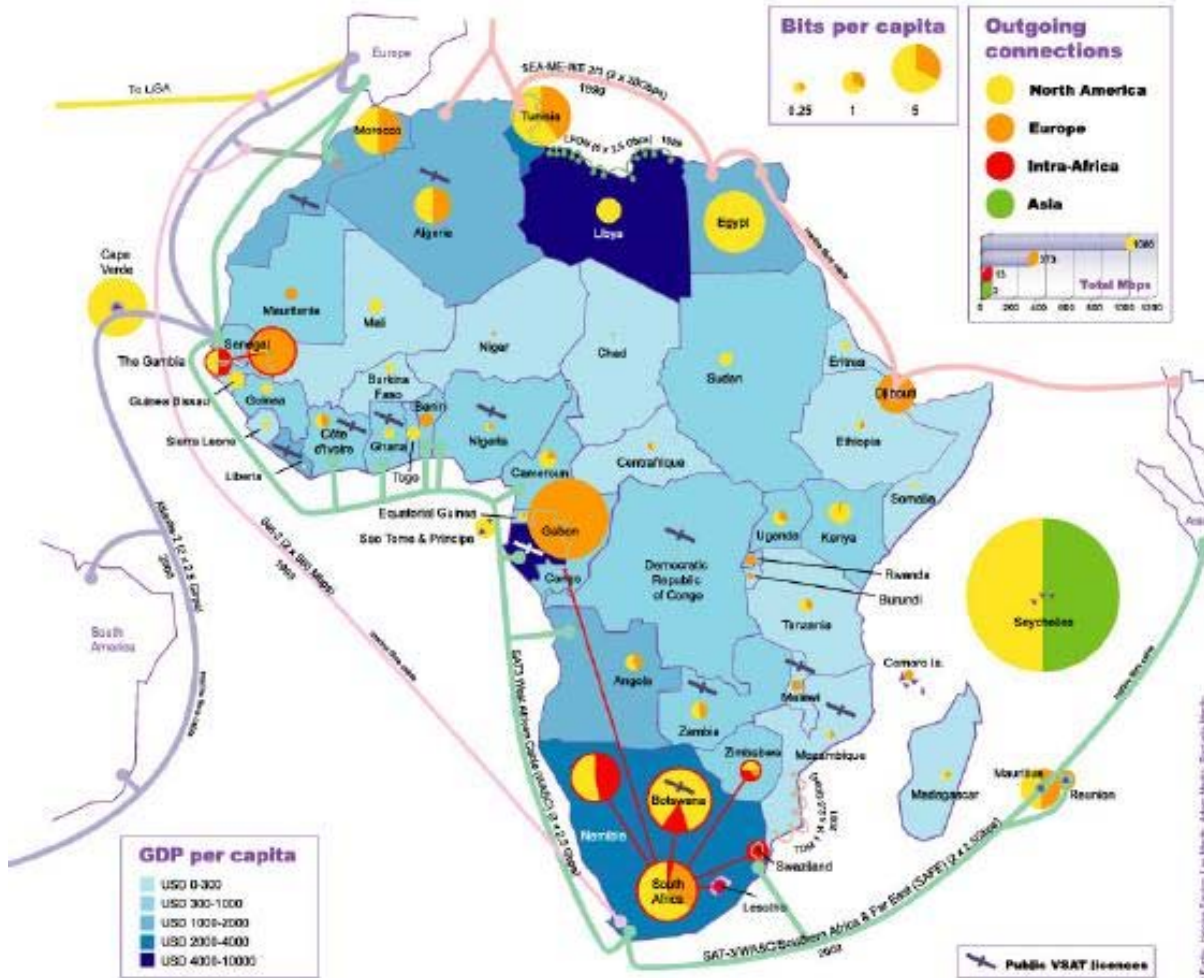
Annex 2

African Internet Statistics 2002

Country	Dialup	International	Population	GDP/Capita	Cities with
	Internet	Outgoing Bandwidth	Millions	USD	POPs
	Subscribers	Kbps	2000	1999	
Africa	1492535	1409100	769,66	1207,5	283
ALGERIA	45000	12000	30,08	1442	1
ANGOLA	16000	5126	12,09	1684	3
BENIN	4500	2100	5,78	374	1
BOTSWANA	20000	14000	1,57	3252	11
BURKINA FASO	4700	256	11,31	199	1
BURUNDI	300	512	6,46	159	4
CAMEROON	7000	9000	14,31	617	2
CAPE VERDE	2456	1024	0,41	876	1
CENTRAL AFRICAN REPUBLIC	700	64	3,48	276	1
CHAD	900	64	7,27	149	2
COMOROS	491	64	0,66	382	7
CONGO	200	128	2,79	833	5
COTE D'IVOIRE	13000	6000	16,2	767	13
D.R CONGO	4500	1024	49,3	400	1
DJIBOUTI	850	2048	0,62	846	6
EGYPT	100000	535000	65,98	1195	1
EQUATORIAL GUINEA	200	64	0,43	668	1
ERITREA	2500	512	3,58	161	1
ETHIOPIA	6500	8200	59,65	103	5
GABON	5000	16384	1,17	5121	7
GAMBIA	3000	1024	1,23	284	14
GHANA	15000	4096	19,16	372	3
GUINEA	4000	128	7,71	677	10
GUINEA-BISSAU	250	640	1,13	245	4
KENYA	35000	28000	29,01	347	2
LESOTHO	750	784	2,06	547	2
LIBERIA	250	128	2,67	1000	1
LIBYAN ARAB JAMAHIRIYA	4000	2048	5,98	6579	1
MADAGASCAR	10000	2750	16,36	224	1
MALAWI	3500	2300	10,75	242	2

MALI	6000	4096	10,69	230	1
MAURITANIA	960	384	2,53	455	1
MAURITIUS	35000	4096	1,15	3661	1
MOROCCO	80000	200000	27,87	1218	1
MOZAMBIQUE	6000	2048	18,88	86	11
NAMIBIA	15000	6144	1,66	2051	100
NIGER	2000	384	10,08	161	1
NIGERIA	60000	15000	113,5	551	2
REUNION	47000	576	0,68	9270	4
RWANDA	2700	1300	6,6	317	1
SAO TOME & PRINCIPE	378	64	0,14	358	1
SENEGAL	15000	48000	10	518	4
SEYCHELLES	3000	4098	0,08	6995	3
SIERRA LEONE	1000	512	4,57	209	1
SOMALIA	250	768	10,63	169	2
SOUTH AFRICA	750000	342000	44,31	2979	2
SUDAN	9000	10000	28,29	364	7
SWAZILAND	5000	256	0,95	1388	1
TANZANIA	30000	12000	32,1	244	4
TOGO	1700	1536	4,4	324	9
TUNISIA	70000	75000	9,34	2144	1
UGANDA	10000	9250	20,55	317	5
ZAMBIA	7000	5120	8,78	463	1
ZIMBABWE	25000	11000	12,68	712	4

Annex 3. African Internet Bandwidth Per Capita and Marine Fibre Cables



Source: IDRC <http://www.idrc.ca/acacia/divide>