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Americas Conference on Information Systems (AMCIS)

8-16-1996

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Selected Topic Area:

Management/International Business

Important issues in Implementing Global networks

Abstract

Global communication networks are used by multinational companies for instant access to information and communications. Many advantages can be obtained from implementing a global network; however, many challenges exist in designing and implementing a network that encompasses different countries. This article presents some key issues for the design and implementation of a global network.

**Introduction**

With the advance of computer and telecommunication technologies, global networks become reality. A global network is particularly important to a multinational company. As business grows, an organization will gradually spread out geographically. Communications among geographically diverse decision makers will become more difficult than ever, particularly in a multinational company. The need of global networks to facilitate organizational communications is recognized. This study will stress the significance of global networks to multinational companies, and to discuss some critical issues in global network implementation.

It is undeniable that a business can not survive without a communication system. An effective means of communication is needed for executing the command and control over business operations. Internally, resources could be identified, located, and shared by using the communication system (Roche, 1991). For external competition concern, this system has to be able to provide timely information regarding the industry, the environment, and competitors. Advantages to be gained from an effective and efficient information flow have triggered the explosive need of networking in the past few years.

It is estimated that multinational companies spend almost 20% of their communications budget on global networking. Many companies, such as American Express, Bank America, General Electric, HongkongBank, through their global network, can now have immediate access to their branches for transaction information in a matter of seconds (Rowe, 1992; Cureton, 1992). To compete internationally, a move toward globalization of networks is inevitable.

## Proliferation of Global Networks

Information processing has experienced some changes since the birth of networking, such as LAN, MAN, WAN. Budwey and Salameh (1992) indicated that organizational management has been affected by this evolution. Data networks have been created to connect computers of all sizes to one another, allowing computers to share expensive resources for costsaving concern. As this technology advances, networking has become more mature and has extended its features to facilitate communication in a very fast manner between hosts and with remote facilities.

Today, many companies are international in scope. The requirements for global communications have proliferated. By linking local networks together through public service or private installation, global networks can help multinational companies managing their data, providing communication among employees, and accessing timely information. In addition to the advantage of high speed file transmission and interactive graphics in some cases are also possible.

The global network concept is gaining acceptability by the industry. According to the interview conducted by Budwey and Salameh (1992), executives of many companies see LANs evolving into global networks through a series of steps or by leaps. Operational needs, market demand, competitiveness, and global economy are forcing companies to expand their LANoriented systems to global networks. Obviously, in the near future, global networks will be an indispensable communication system for every multinational company.

## Advantage of Global Networking

In their studies, Johnson (1992) and Lin and Kuo (1992) consider networking as a strategic weapon for gaining competitive advantage. They indicate that the economic survival of a firm in the future will depend heavily on networking and communications (Trebing, 1995). In a competitive global market, the economic boundaries of a multinational company may cover several countries and thousands of miles of distance. Instant access to data and information is vital for the survival of such a company. There are a few successful companies that utilize global networks for competitive advantages, such as HongkongBank in Hong Kong and Toys R Us in USA.

Hongkong and Shanghai Banking Corp. Ltd. (HongkongBank), one of the world's ten largest financial organizations with $265 billion in capital, has gained a substantial advantage from implementing a global

network (Cureton, 1992). HongkongBank has been able to automate more core operations than many competing banks and has developed an infrastructure that has given the bank a lead in the race to leverage global resources and introduce global banking service. Bank was the first foreign bank to open an office in New York in 1880. After that, It has successfully operated many branches in Germany, Russia, and U.K. Today, Bank has 45 subsidiaries with 3,300 offices in 50 countries. Their operations are mainly relying on the corporation's global private networks. The network carries data, compressed voice, fax and video traffic. It supports all the bank's core retail applications, such as branch teller terminals, and ATMs worldwide.

With the support of its global network, Bank is able to keep tight control on quality, performance, and costs. Bank spend about $430 million a year on information technology with one quarter of which goes to global networks. The overall figure is kept within 14 percent of the bank's total operating overhead. This percentage is significantly less than the industry average of 20 percent while the bank's operations generally are more automated than those of many of its competitors.

In retailing industries, the diffusion of information technology is now gathering pace. Electronic point of sale systems are widely in use. By scanning the merchandise, bar codes are read and data are captured in the terminals, which are than sent to the data center through networks, to update the inventory database as well as cash flow for accounting purpose. Toys R Us is one of many successful companies gaining advantages from such a network.

Toys R Us, the $6.1 billion, New Jersey based toy company, is joining other retailers such as Kmart and Walmart in coordinating its vast operations by using satellite networking. Through this network, each retail store transmits daily transactions back to the data center. The headquarters is able to access updated information on stores' operations as well as identifying hot items. With these information, the headquarter can maintain an adequate supply of hot items, or place orders for those popular items to avoid inventory shortage.

Toys R Us management believes that the satellite network clearly help them to be a global company. Their stores in the US are already tied to the network using a Very SmallAperture Terminal (VSAT) system. Eventually, their South America, Europe, and Japan branches will all be hooked up. The VSAT system is implemented to distribute information among its data center in New Jersey and its outlets. It uses Unisys A19 mainframe as the hub to manage network traffic and process information. The VSAT network became costeffective after the number of stores worldwide reached 300 units. Presently the company's challenge is to connect all 497 stores and 18 distribution centers with corporate headquarter (Hoffman, 1992). The efficient and effective flow of data and information has played a very important role in Toys R Us' successful story.

Interconnection of LANs to form global networks emphasizes the fact that companies are operating in a global economy. A global network provides means for communications. With a global network, multinational companies will experience geographic transparency. Teleconferencing is a good example. Participants from different geographic areas are able to discuss online through telecommunication system or meet each other via video equipments. The geographic distance is no longer a barrier for communications; global networks have provided farreaching capability to management. It allows businesses to be more distributed while still maintaining management control. Networking is a powerful business tool. Global networks are crucial to business growth and economic survival in a global competition environment.

## Barriers in International Networking

Global networks require the crossing of public rightofways and using the circuits provided by common carriers. A global network may be made up of a combination of switched and leased, terrestrial and satellite, and private microwave circuits (Rowe, 1991). Many multinational companies prefer building their own private global network for strategic control purpose. With the arrival of digital leased lines, private

networks received a big boost in many areas, for the cost of digital leased lines runs 60% lower than those of analog lines. General Electric is one of the companies that implement a private global network to transmit voice, data, and video signals. Bank also installed a private packetswitching network to integrate its IBM 3090 mainframes, AS/400 midrange computers, and 49,000 terminals across the world (Cureton, 1992).

Technically, there is no substantial barrier in implementing a global network; however, many companies have invested heavily in the technology and hoped to gain competitive advantages; instead, they have failed to secure the full benefits available (Senker and Senker, 1992; Hancock, 1990). The Yankee Group (Horwitt, 1992) has suggested that inconsistent standards in use in different geographic zones is the top problem facing multinational companies in implementing global networks. Tariff is also a critical issue. Other problems identified by their survey are: backup circuits, no endtoend management, delivery lead times, inconsistent service, no diverse routing, fault reporting, cost monitoring, circuit quality, lack of qualified staff, equipment approval, and resale restrictions.

Although global networks are similar to the traditional long distance data networks, designing and implementing a global network is more difficult than building a wide network within a national boundary. In addition to the issues cited by Yankee Group, transborder data flow, national politics, regulations, hardware and protocol, and cost could be problematic in a multinational environment.

**Transborder Data Flow**

Transborder data flow is probably the first concern that organizations involved in international operations needs to be addressed. The laws each country enforces affect the transmission of data and information across international boundaries. In a multinational operation, data is transmitted across borders for customers transactions processing, inventory control, or any financial purposes. For example, in a credit card company, customers information, such as monthly charges, credit limits, and credit records are transferred around when necessary. The restrictions imposed by the countries involved will certainly create problems for the credit card company's worldwide activities. Currently, many countries in Europe as well as Canada have enacted legislation to prohibit or restrict the transmission of their citizens' information across borders. Members of European Community Market, on the other hand, can freely import and export this type of information within the Market itself. U.S. is excluded from the privilege of transmitting personal information to/from the Community Market countries.

**Politics**

Politics is another concern in running international networks. Jenkins (1987) mentioned that a US company installed a microwave link in a country in central America. It was suggested to the company that it double the capacity of its network by the government. When the network was ready, half of the carrying capacity was taken over by that government. This type of case is usually not new to companies conducting businesses in the developing or underdeveloped countries. Moreover, many organizations experienced staffing difficulty from bizarre politics. For example, one country in Asia prohibits any foreign organizations operating within its border to hire and fire its citizens without government's approval; the government acts like a mandatory employment agency controlling personnel management for the foreign organizations.

**Regulations**

In many countries, telecommunicationrelated operations are controlled by the government that has the exclusive privilege to provide communication facilities. The design and use of certain communication media often do not take business and economic aspects into consideration. Moreover, their regulations are established for the purpose of protecting their national interest which might possibly impede the establishment of international data communication. It is not unusual to find certain governments pricing

their telecommunication facilities and services in order to subsidize their domestic providers (Stamper, 1992).

**Hardware and Protocols**

Hardware is another potential problem for implementing a global network. Some countries either require that equipment used within the country be locally manufactured or manufactured by some particular vendors. Further, most countries have their own minimal technical specifications (Lin and Kuo, 1992; Thomas, 1991); these specifications may differ among countries. For example, Japan and America use different voltages in power supply. Australia has much tighter specifications in the use of communication controllers (Stamper, 1992). In addition, many countries require facilities be certified before they can be hooked up. It is not unusual to take months to get a certification; therefore, the schedule of operation is difficult to predict.

Since many countries are covered in a multinational global network, several communications providers and protocols involved. Using a public switching network may result in less interface problem; however, by using public packet switching, subscribers have virtually no strategic control over service levels, reliability, or maintenance since the network is intended to be a public utility for general customers (Stallings, 1990; Cureton, 1992). For strategic and cost concerns, many companies would prefer their own leased lines or private networks if high volume of stream traffic is expected. When a leased line or private network is used, communication interface and troubleshorting will be another burden. The link between source and sink could be consisted of many endtoend connections with a variety of protocols where different countries are involved. The resolution of the differences between existing computing systems and intended telecommunication systems, or hardware and software requirements from different countries certainly discourage companies in investing in a global network.

**Cost**

The average telecommunication cost of a company is around 20% of the operating overhead (Crueton, 1992; Horwitt, 1992). J.P. Morgan & Co. was spending $100 million annually in 1991 (Davis, 1995). These huge costs are mainly for high quality and reliable circuits, hardware, software, and management expenses. By using a public network, cost would be more affordable since it spreads over many users and users are relieved from maintaining a large data communication network (Stallings, 1992). Disregard the strategic control over the network, public service is, thus, a costsaving alternative. Measuring the cost of global networking is much more complex than that of local networking since in addition to the above mentioned costs, taxes are usually attached to the transmission of data over national borders as well as on imported software and other facilities. However, according to a recent survey conducted by Yankee Group on 68 U.S.based multinational companies, cost was the least important criterion for evaluating a global network (Horwitt, 1992). The overall effectiveness of the network has been the most critical consideration of the top level management.

Among the above mentioned problems, several are very difficult to resolve. Transborder data flow is expected to be a less concern in the future especially for those countries that have mutual agreements since the need for worldwide information flow for mutual benefit is universally realized. Through diplomatic negotiation, this problem can be overcome. However, politics, regulations, and standards for hardware and protocols will always be the barriers in implementing a global network, particularly the host country's politics, the most unpredictable problem of all. Management should have a thorough investigation before embarking on a major global network project.

## Important Issues in Implementing a Global Networks

As mentioned previously, the design and implementation of a global network is complicated. A thorough investigation on the organizational needs and the current system is indispensable. In addition, there are some critical issues that must be dealt with in implementing a global network.

As with building any type of computerbased systems, the first concern is to realize whether competent personnel is available to conduct the project, and later to manage the network. Managers involved in the implementation of a global network must have a good business vision in addition to a broad technical background. Users must not be ignored in the designing process; a join development will always produce a more acceptable system.

Since a global network involves more than one country, it is necessary to study the standards and protocols used in different countries to ensure compatibility of the network. Further, to support a global system, a single telecommunication company might not be able to offer all services needed. When many vendors are involved, compatibility becomes a major concern.

The range of hours during which the network will be operational and available to users is vital. If a global network serves users in America as well as in Europe and Asia, twentyfour hours operation is necessary to cover the normal business hours. To certain areas, the network can not be linked up quickly for economical reasons, some arrangements with public data network must be made.

A strong user support will make a network different. Users need training on how to access network and how to use it. They also need advice on the use of hardware and software. In a global network environment, users may speak different languages. The language barrier must be overcome to reduce miscommunications. Global networks are used for a variety of applications. Data transmitted may contain information of great commercial value. A secure authorization and authentication system must be implemented; encryption could be very helpful.

Any network is prone to crashes (Wiggen, 1987). An appropriate level of fault tolerance must be designed. Redundant backup systems will reduce disaster; however, redundancy will increase the cost of the network. Network management should study carefully and make a judgement on the necessary redundancy. Bank, as Cureton (1992) indicates, tends to adapt a risktaking approach. They reduced cost of facility by minimizing the redundancy after a thorough study.

## Conclusion

Global networks have become a very important communication tool for multinational companies. They serve as media for communication, data transmission, information access, and decision making for people in different geographic areas. Many companies consider global networking as the competitive weapon for business survival in the future.

To design and implement global network is much more complicated than that of local networks since many countries may be covered by the network. In a multinational operations, each country's unique environment may have an impact on the implementation of such a network. This study briefly discusses some implementation problems, such as transborder data flow, politics, regulations, hardware and protocols, and cost. Politics is one of the most difficult problems to deal with, and is always difficult to predict in certain countries. Building a good people network with local government should help.

Telecommunication has become a major investment for a business, particularly for multinational companies. The least cost principle is not always applicable to the implementation of such a network. The overall effectiveness should be the major concern. Personnel resource, compatibility, availability, user support, data security, and backup systems are important factors in operating an effective global network.

## References

1. Budwey, James N., and Salameh, Asad. "From LANs to GANs," Telecommunications, July 1992, pp. 237.

2. Cureton, Tim. "An Eastern Approach to Global Networking," Data Communication, Sep 1992, pp. 119-24.

3. Davis, Stephen. "How Morgan makes do with $645 million a year," Institutional Investor, March 1995, pp. 35-37.

4. Hancock, Bill. "Issues and Problems in Computer Networking,"AMACOM, 1990.

5. Hoffman, Thomas. "Toys R Us Shifts to Satellite Network," Computerworld, May 4, 1992, p.46.

6. Horwitt, Elizabeth. "Seeking Help in Overseas Networking, "Computerworld, October 12, 1992, pp.657.

7. Jenkins, Avery. "Networks in a Strange Land," Computerworld,Focus, September 9, 1987, p.21.

8. Johnson, William R. Jr. "Networking: A Strategic Advantage in Today's Global Marketplace," Telecommunications, February 1992, pp.278.

9. Lin, Jimming, and FengYang Kuo. "Potential Applications and Existing Barriers of ISDN: A Global Perspective," ACME Transactions, 1992, pp.16874.

10. Roche, Edward M. Telecommunications and Business Strategy, Orlando: The Dryden Press, 1991, p.7.

11. Rowe, Stanford H. II. Business Telecommunications, New York:Macmillan Publishing Company, 1991.

12. Stamper, David A. "Business Data Communications," California: The Benjamin/Cummings Publishing Company, 1992.

13. Senker, Jacqueline and Peter Senker, "Gain Competitive Advantage from Information Technology," Journal of General Management, v.17, no.3, spring 1992, pp.3143.

14. Trebing, H. M., "The Globalization of Telecommunications," Journal of Economic Issues, June 1995, pp. 535-544.

15. Thomas, M. W. "ISDN: Some Current Standards Difficulties," Telecommunications, June, 1991, pp.408.

16. Wiggin, Geoff. "The Golden Rules of Global Networking," Datamation, October 1, 1987, pp. 6873.