Using Information Technology to Coordinate Transnational Service Operations: A Case Study in the European Union

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When multinational organizations operate across borders they must solve a host of problems relating to culture, currencies, language, customs and laws. In addition to these local variables, organizations are under increasing pressure to integrate or coordinate operations. This study explores the information strategy adopted by a new organization located in Holland and serving the European (EU) market. It identifies the way in which local variables affected its strategy and examines the way in which the organization used information technology to coordinate an operation that served over a dozen countries in the EU. Implications are drawn for organizations that find it increasingly necessary to coordinate transaction and planning activities across national borders.

Trade agreements, such as the Treaty of Maastricht and NAFTA, have created unprecedented business opportunities. Indeed, most organizations, in response to these agreements, have already crossed national borders to expand and protect their market share in an increasingly competitive world-wide environment. But as they expand beyond their borders, these organizations often find it necessary to coordinate geographically and culturally dispersed operations. Unless coordination succeeds, they risk the ability to maintain high levels of customer service, control costs, or achieve economies-of-scale (Ives and Jarvenpaa, 1991; Chidambaram and Chismar, 1994).

Coordinating activities across national borders requires that a wide range of management and operational problems, unique to transnational commerce, be addressed. Many of these problems can be attributed to differences in: culture, laws, customs procedures, languages, currencies, markets, and work practices. How the organization addresses these differences, through organizational strategies and structure, can vary greatly. But regardless of how they are addressed, information and telecommunications technologies are frequently at the core of these strategies (Roche, 1992). In fact, information technologies are so important in achieving a competitive plan that Harold Chong, Chief Information Officer of Asia Pacific Division of Compaq Computers, in an interview in the Spring 1993 issue of Global Information Management, contends that the third or fourth person hired when establishing overseas operations should be an information technology (IT) person.

This study focuses on a single international company, and explores the way in which IT was used to support a competitive business strategy for expanding service operations into the European Union (EU). It addresses the way in which local variables affected the development of its information system, and how this system was used to coordinate operations spanning many countries and cultures. The paper begins with a literature review, examines the competitive environment of the firm, and looks in detail at the strategic, infrastructure, operational, and cultural issues which the firm needed to resolve in order to coordinate its information system (IS) activities. Finally, some conclusions are drawn about service organizations engaged in transnational business.

Literature Review

Several studies have explored the way in which global organizations respond to competitive pressures and use information technology to support organizational strategy (Schwarzer, 1995; Simon and Grover, 1993). But their response depends not only upon the IS environment and capabilities of the headquarters operation, but also upon the IS environment, local pressures, and capabilities of the subsid-
iary or host organizations (Karimi and Konsynski, 1991; Simon and Grover, 1993; Cheung and Burn, 1994). Accordingly, several issues relating to the headquarters and subsidiary organizations must be addressed when organizations expand their operations across national borders.

Palvia (1993) suggests that the nature of these issues can be classified as infrastructure, operational, and strategic. Ein-Dor, Segev and Orgad (1993) contend that variables which affect information systems can be broadly classified as national culture, environmental, structural, behavioral, and procedural. For purposes of this study, the issues affecting transnational information systems will be classified as, strategic, infrastructure, operational/management, and culture. The influence of these factors on the firm’s information system is shown in Figure 1.

Bartlett and Ghoshal (1989) tied business strategy to the organizational forces faced by the firm. They identified four broad strategies including multinational, global, international, and transnational. Cheung and Burn (1994) developed a model for distributing global information system resources in organizations. At one extreme is the global multinational corporation (Global MNC), which minimizes differences among headquarters and subsidiary organizations in the interest of maintaining uniform methods and strong centralized control. At the other extreme is the multidomestic MNC, in which methods and procedures are adapted to meet the needs

Figure 1: Categorization of Issues Influencing Transnational Information Systems
of the subsidiary’s business environment. Depending upon the structure of the organization, its information systems will tend to be on a continuum between centralized and distributed, with centralized architectures associated with Global MNCs and distributed architectures associated with multidomestic MNCs. Other studies focusing on issues of strategy and structure include Schwarzer (1995), who used three case studies to examine the way an organization’s IT strategy responds to a changing competitive environment, and Ives and Jarvenpaa (1991), who studied the problems and opportunities facing managers responsible for developing global applications of information technology.

Infrastructure issues include software and hardware availability, telecommunications capabilities, and human resource constraints (Palvia, 1993). Studies which have focused on these issues include: Oz (1994), who studied the barriers to international data transfer; Chidambaram and Chismar (1994), who studied the telecommunications investment patterns in U.S. Multinationals; and Janczewski and Targowski (1994), who studied the regulatory and competitive environment for telecommunication services.

Operational issues, addressed in many studies, often focus on practices within a particular country. Hassan (1994) studied a variety of constraints affecting the use of IT in Pakistan, many of which can be classified as operational/management issues. Odedra-Straub (1993) studied several organizations in Africa and uncovered many operational as well as management factors that influenced the success of applications. Burn, et al. (1993) identified ten issues among Hong Kong IS managers and compared them with issues reported in other countries. Many of these issues were operational/management in nature. Harrison and Farn (1990) compared information management issues in the US and Taiwan. Others who have studied operational/management issues include Khan (1991), Couger (1992), Nelson, Weiss and Yamazaki, (1992), Ives and Jarvenpaa (1992), and Azuma and Mole (1994). Several studies have addressed national culture’s role in information systems. Kedia and Bhagat (1988) explored the role of national culture in IT diffusion. Barrett and Walsham (1995) contend that culture can affect cross-cultural efforts to develop and use innovative IT applications. Nelson Weiss and Yamazaki (1992) concluded that culture affects the way companies approach information and the systems that produce this information. Shore and Venkatashalam studied the role of culture in systems analysis and design (1995) and the role of culture in developing IT implementation strategies (1994). Burn (1995) suggests that culture plays a role in the absorption of EDI technology.

Methodology

According to Ein-Dor, Segev, and Orgad (1993), global IS studies can be categorized by research location and variables studied. This study will focus on one company serving many locations in multiple countries. It will also address local variables within these locations. The case study method is used, which, according to Gable (1994), provides the opportunity to ask penetrating questions, explore issues in depth, and capture the richness of organizational behavior. But, Gable contends that a disadvantage of this approach is that conclusions may not be generalizeable to other organizations.

Ein-dor, Segev and Orgad (1993) suggest that the most valuable contributions to the IS literature will be made by multicultural explorations between cultural and local variables. Furthermore, they contend that the unification of Western Europe has provided rich opportunities for this type of research. The research location and variables studied in this paper are an attempt to take full advantage of this rich environment.

Roberts Express Europe

Roberts Transportation Services, Inc. was acquired by Roadway Services, Inc. in 1984 and includes Roberts Express, Inc. and Roberts Express Europe. Total revenue for Roadway Services in 1994 was $4.5 billion. The company is publicly owned and traded on the New York Stock Exchange. Roberts Transportation Services, with headquarters in Akron Ohio (USA), is the world’s largest surface expedited carrier specializing in the transportation of critical and emergency shipments of items which are fragile, valuable, require security provisions, special handling, customized equipment, or require full-range temperature control. In 1992 a decision was made to be the first to enter the critical shipment market in the EU. This decision was made after a careful analysis of the changing business environment in Western Europe. It was concluded that the liberalized trading environment of the EU presented a window-of-opportunity which should not be ignored.

Liberalized Trade

In the first half of the 1980’s the European Union was characterized by economic stagnation, increasing unemployment, and a loss of competitiveness (Directorate-General, 1993). In 1985 an ambitious initiative was launched, the objective of which was to achieve a single large market by 1992. With one large market, the European Union would join North America and the Pacific Rim as one of three major trading blocks in the world. To meet its objectives, barriers to the free flow of goods, services, persons, and capital had to be eliminated.

The goal set in the 1980’s led to an ongoing process of negotiations and agreements. On 7 February 1992 the Treaty on European Union, known as the Treaty Of Maastricht, was signed in Maastricht, The Netherlands. Perhaps the most ambitious agreement, it addressed the economic, political and legal issues of a unified European Union.

While the ability to meet many of its political and legal goals are still uncertain, significant economic progress towards a unified Europe has been made. The liberalized trade environment, for example, has provided organizations with the opportunity to internationalize their operations on a scale...
previously not possible. Indeed, this was the window-of-opportunity which Roberts Express Europe (REE) recognized in 1992.

**Industry Structure**

Traditionally, the physical distribution of goods in Europe had been supply driven (Stern, Sturdivant and Getz, 1993). Manufacturing plants as well as main vendors produced goods that were stored in large distribution centers. When business was conducted in several countries, distribution centers would be maintained in each one. For example, a British computer manufacturer may have stored its computers at distribution centers in Belgium, France, Netherlands and Germany. In addition to computers at these sites, the distribution centers may have also stored terminals and keyboards purchased from sub-contractors whose manufacturing plants may have been located in the host country as well as other countries. Sales in Belgium were then filled from the Belgium distribution center, and sales in France were filled from the French center. If the manufacturer expanded its sales into other countries, distribution centers would have typically been opened at these locations.

According to REE, there are several advantages attributed to this system. Per unit shipping costs are low since shipments take place in large batches, and large regional inventories decouple manufacturing from customers as well as absorb fluctuations in demand. Indeed for many products this approach proves to be cost effective.

There are, however, disadvantages associated with this approach. They include: high inventory levels; fragmented distribution; high multiple handling costs; and unresponsiveness to customers. First, aggregate inventory levels are high since inventory must be stored in each country. Second, because many warehouses must be maintained, and because these warehouses are staffed with people from different cultural backgrounds, central control and coordination of distribution centers can be difficult. Third, additional distribution centers necessitate multiple handling that can lead to higher handling cost, increased risk of obsolescence, and product damage. Fourth, it is difficult to be responsive to customer needs. For example, if the British manufacturer received an order for computers from France, but the printers were stored in a distribution center in Germany, not only would it take time to move the goods between these two locations, but barriers to

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Table 1 Issues which REE management expressed as important to achieving business objectives.

the free flow of goods, especially before 1993, would make fast customer response difficult. Furthermore, these supply driven systems do not respond well to customers who: demand just-in-time shipments; ship items that have a high per unit value; or need to send emergency shipments. Perhaps the biggest disadvantage is that it takes, according to REE, between 3 to 14 days to move goods through these supply driven distribution systems.

**New Distribution Structure**

The Treaty of Maastricht, and the changes it has produced, has made a demand or customer driven physical distribution system possible within the EU. Today, a manufacturer can ship directly from a centralized warehouse or distribution center in any EU country to customers in any other EU country, without many of the burdens of transnational shipping. Several advantages are achieved: faster customer service; lower warehousing costs; better control over operations and expenses; less handling.

It is no longer necessary to maintain distribution centers in several countries. As a result shipping time from the manufacturing distribution center to the customer can be reduced from days or weeks to overnight. Fewer warehouses mean lower warehousing and inventory carrying costs. Fewer steps in the distribution process mean less handling, smaller handling losses, and fewer damaged goods. But, offsetting these advantages, shipping costs may increase as the quantity per shipment decreases and the number of shipments increase.

Now, manufacturers and distributors can choose from two models. The new centralized distribution model would appeal to those organizations that need to: send emergency shipments, keep just-in-time schedules, ship items with high per unit values, transport hazardous materials, minimize handling of fragile or perishable goods, or accommodate the customer’s need for first class service. It was this emerging market that REE targeted in 1992.

**REE Identifies Issues**

While the emerging market for emergency shipments provided the opportunity for REE to expand into the EU, many issues needed to be resolved if they were to compete efficiently in this market. An analysis of the concerns which management expressed, suggested fourteen issues. Using the
framework uncovered earlier, these issues were classified as either strategic, infrastructure, operational, or cultural. They are summarized in Table 1.

Note that infrastructure problems may also have operational implications, and operational issues may have infrastructure implications. While the divisions of issues between these two categories may have overlap and be sometimes arbitrary, it nevertheless provides a convenient way of sorting and discussing the issues. In the following section, the issues associated with these categories will be explored in greater detail.

**Strategic Issues**

It was management’s view that the European transportation industry in the early and middle 1990’s was suffering from vast overcapacity. There were simply too many freight companies chasing too few goods. Economic recession and competitive pressures had forced prices down and kept profits low. Not only would REE face a very competitive market, but management had little experience to guide this new venture. Deans and Ricks (1993) suggest that a firm’s previous international business experience may influence its approach and reaction to various issues. But REE had no experience in Europe. Moreover, they pointed to the experience of a French trucking company that attempted to sell its services as a European shipping company. Because they had little experience in the complexities of transitional business, they failed. REE management was quite aware of the need to enter this market with a carefully developed competitive plan.

**Customer First**

Caution suggested that they begin by placing the customer first. In the words of the managing director, “Winners in the new Europe would be those organizations that could meet their service commitments every time and regardless of customer location.”

Central to its strategic plan would be the guarantees that REE would make to its customers. It would guarantee pickup within 90 minutes in Germany, France, and the Benelux countries (Holland, Belgium, and Luxembourg). In addition, delivery would be guaranteed over any distance. If REE failed to meet a promised delivery target, it would deduct 1/4 of the bill for shipments 2 hours late and 1/2 of the bill for shipments more than 4 hours late.

**Global MNC**

While a centralized business and information strategy for an overnight shipping company, such as Federal Express, has been considered an industry standard, the fact that REE would operate in more than a dozen countries raised questions about the wisdom of a strict centralized strategy. After considerable debate, REE chose to centralize planning and control activities, but decentralize physical distribution and some accounting functions. Using the framework established by Cheung and Burn (1994), this suggested a strategy closer to the model of a global MNC than a multidomestic MNC.

**Independent Subcontractors**

REE built its physical distribution network, country by country. At the center of this network were independent subcontractors, who would pick up and deliver customer shipments. Consider a request from a company in Brussels, for example, to deliver a package to one of its customers in Paris. The shipment would be picked up by a subcontractor in Belgium and delivered by this subcontractor to its destination in Paris. This distribution network differs from the one used by overnight express carriers, such as Federal Express. Those networks typically involve a hub and spoke configuration in which all shipments are first sent to a central hub and then distributed to their final destination. Roberts would use a different strategy in which dedicated vans, trucks, or even aircraft would pick up a job and deliver it using the same vehicle. No intermediary transshipment facilities would be involved.

**Information**

Schwarzer (1995) contends that IT strategy and structure needs to be addressed simultaneously with decisions focusing on business strategy and structure. This was precisely the approach taken by REE’s management. During the development of the strategic business plan it became apparent that the only way in which to accommodate the differences among countries and maintain a competitive advantage would be to develop a carefully conceived and innovative information system capable of addressing local issues but at the same time providing centralized control of operations. The managing director expressed the role of IT in this way, “Those organizations that will win in the EU need to use computers and telecommunications as a strategic tool, and set quality of service as number one.” Accordingly, the systems analysis and design process emphasized the centralization of REE’s operations and the need for effective and timely control of shipments. But to accomplish these goals, several issues relating to the infrastructure, operational environment, and culture of its sub-contractors and customers needed to be addressed.

**Infrastructure Issues**

**Data Flow**

The free flow of information, according to Oz (1994), is fundamental to free trade. This point is particularly underscored by companies like REE whose strategic plan would be unworkable without the ability to move data through different countries. In Europe, however, privacy is a highly sensitive issue, and restrictions to the free flow of data are common (Mische, 1992). The French Data Processing, Data Files,
Individual Liberties Act is an example of how governments can place restrictions on data flow. Organizations operating in France must pledge that their data processing systems meet the legal standards of the act. Providing inadequate controls is considered a criminal offense. Sweden, too, has similar laws. Germany, England, and the Netherlands, however, depend much more on private self-regulation. For example, in Germany, organizations must appoint data controllers to establish data security. Attempts to harmonize these laws, thereby facilitating business transactions within the EU, are currently under way, but progress has been slow (Oz, 1994).

Since it was essential for REE to transfer customer and shipment location data across borders, an important step in the IT development process involved the careful review of these restrictions and the development of applications that ensure compliance with all regulations and laws. Although the problems of data flow for the EU have received considerable attention, this issue was not a difficult one for REE to resolve. It was management’s contention that data flow restrictions were not a problem.

**Telecommunications**

In addition to the limitations imposed on data flow, the telecommunications infrastructure may also impose a constraint on the electronic transfer of data (Janczewski, Targowski, 1994), especially when that infrastructure varies considerably among countries. Modern information technology relies upon telecommunications to link geographically distributed nodes in a network. For many organizations, the establishment of this link begins with a close look at the public telephone network. Reliability, however, can be a problem. McCready, Boulton, and Sankar (1993) contend that outmoded and overworked phone systems in many countries make international telecommunications services unreliable.

In addition to reliability, cost is a factor. Ives and Jarvenpaa (1991) suggest that communication costs affect the choice between centralized and distributed hardware. A centralized solution, they maintain, may be the most economical choice when telecommunications costs are low. But, they suggest that a decentralized system may be appropriate when these costs are high.

Availability is also an issue. Janczewski and Targowski (1994) contend that the backbone of modern transmission networks is high capacity 2Mbps circuits, and that the availability of such lines in Western Europe is extremely uneven.

REE had to contend with all of these problems. First, they considered the possibility of using the European public telecommunications systems, called PTT’s. While the climate is changing, in most countries the PTTs are national monopolies. In the UK, however, the telecommunications market is considered by many to be the most deregulated in the world (McCready, Boulton and Sankar, 1993). Most PTTs, however, are saddled with a reputation for poor quality service.

If REE was to succeed in placing the customer as number one, it would need access to reliable and efficient telecommunications systems. While Ives and Jarvenpaa (1991) suggest that a distributed or decentralized telecommunications system is appropriate when these costs are high, REE found it necessary to emphasize customer service rather than telecommunications costs. But emphasizing customer service would mean that using the PTT system, although the most economical, would be out-of-the-question. Other alternatives, considered more expensive but more reliable, included microwave and satellite technologies.

The solution finally chosen relied upon a proprietary state-of-the-art system, called “Customer Link” which utilizes two-way satellite communications. According to the company’s annual report, “Roberts has the distinction of being the first carrier to use satellite communications in both North America and Europe.” The system collects location data, stores the data in the central database, and displays real-time graphic images of shipment locations on a map of Western Europe. This display allows dispatchers to see the whereabouts of drivers and to assign the closest available truck to new orders. Using satellite technology, Roberts can complete its dispatch process within a 10-minute window during which time a shipment is matched to a truck size, an available driver is selected, and an immediate pickup is scheduled. In addition, the state-of-the-art system supports direct communications between drivers and dispatchers at the central facility.

**Customs Procedures**

Essential to the free flow of goods is the elimination of internal customs procedures. This means that goods manufactured in England must not be subject to customs procedures as they move through France on their way to a customer in Belgium. In addition, it is essential that non-EU imports be subjected to only one customs procedure as they enter the EU and thereafter move freely within the EU. Unfortunately not all interference has been eliminated when goods are shipped between EU member nations. Customs procedures are still required when movement occurs through non-EU nations. For example, goods moving from Belgium to Italy must be shipped through Switzerland or Austria and are subject to customs procedures and delays in those countries. Sometimes these delays can be extensive as drivers wait for cargoes to be inspected and paperwork to be processed. The ability of REE’s information system to return reliable location and message information when custom procedures are required, helps dispatchers keep track of delays and communicate these problems to its customers.

**Legal Restrictions**

The free flow of goods within the EU is sometimes hindered by legal restrictions. They include cabotage regulations, night and weekend road restrictions, and protectionism. While a truck registered in the Netherlands can deliver a shipment to Germany, it is restricted in its ability to pick up another load in Germany and deliver it to a German company. Germans issue only 60,000 permits a year to authorize national activity by foreign national trucking companies. The French however, still do not allow this.

Night and road restrictions also present legal barriers. It is unlawful to drive during some weekend hours in Germany,
for example. And in France, there is no truck traffic allowed on weekends in August. Furthermore, customs processing may close during holidays making it more complex to schedule transshipments through non-EU member nations. At present there is no movement in the EU to liberalize these restrictions.

These restrictions clearly affect the dispatching process, and unless dispatchers have access to them, their ability to make accurate pick-up and delivery promises would be limited. Accordingly, data on permits, night and road restrictions, and customs processing, all became part of the information system.

Operational Issues

Currency Problems

While one goal of the Treaty of Maastricht is the achievement of a single currency, called the ECU, the realization of that goal continues to be elusive. Unfortunately, separate currencies are firmly entrenched, and movement from this position appears to be difficult. Meanwhile multiple currencies impose inefficiencies on the trade process. An individual starting with $100 US and journeying across all EU borders would have less than $50 remaining if the original sum were exchanged at each border. So costly is this problem that 1/2 to 1 percent of Europe’s Gross Domestic Product is absorbed in this way.

To accommodate the problem of different currencies, REE developed application packages capable of quoting prices in local currencies. For example, when a customer in France requests a quote to pick up a package in Paris and deliver it to Milan, the system quotes the job in French francs.

EDI to Link Customers with Headquarters

Electronic Data Interchange (EDI), the use of telecommunications to send documents between computers, should be particularly effective in international trade because it reduces the time to carry out important interorganizational transactions (Holland, Lockett, Blackman, 1992). One would therefore expect to find this technology as part of REE’s competitive plan. Indeed the systems which they developed are EDI compatible, but in the words of the managing director, “No customer yet has shown interest in using EDI.” It is not used for accounting, operations, or customs procedures. The managing director went on to explain, “Our customers need fast response. They prefer to pick up the telephone, call our toll free number, and hear someone on our end say, yes, we’ll take care of it right away.” He also suggested that EDI may not be used because the EU tends to be behind the U.K. and U.S. in the diffusion of this technology. “Perhaps sometime in the future,” he continued, “we might adopt EDI technology.” This is confirmed by Mische (1992) who contends that: EDI network capabilities and standards in the EU are behind those in North America; fewer value added networks are available (VANs); and the service infrastructure is weaker than in the United States.

Accounting Differences

There is a considerable difference among the accounting practices found in the EU member nations. These differences can be attributed to the influence of legal systems, taxation systems, forms of organizations, the role of capital markets, and the influence of the accounting profession in each country (Lawrence, 1992, p.38.) (Maijoor, 1994). A brief summary of these systems and practices suggests the magnitude of the accounting problem when an organization engages in transnational business.

In the UK, accounting systems are rooted in common law, while in France and Germany the systems are rooted in Roman codified systems. These systems are indeed very different, and rather than move toward a common accounting systems for the EU, the effort has been towards the ‘harmonization’ of these systems. But harmonization has proved difficult to achieve because national systems are influenced by very different constituencies. The accounting system in the Netherlands, for example, is driven by business economics, not unlike the driving force behind accounting practices in the US. These systems meet the needs of businesses rather than governments or tax authorities.

The accounting systems found in France, Belgium, and Germany find their roots in government and tax authorities. In France, for example, the major influence is the government and especially the large public sector. The Uniform Plan, or “Plan Comptable General,” specifies a coding system for accounts, defines standard formats, includes cost and management accounting procedures, and varies by organization, size and industry.

The major influences on the German accounting system include the government and banking industry. The banks are influential because they represent the major source of capital to industry. The government also imposes its influence through formal tax procedures. In this system, no judgment is permitted, just the careful attention to detailed rules. The German accounting system reflects conservatism and adherence to legal form rather than economic substance (Lawrence, 1992).

Clearly the differences among these accounting systems are great. In a study of French, German, and Dutch accounting practices, Lawrence (1992) states that these countries may be in close geographic proximity, but their accounting systems hardly reflect this fact. Differences in social structures, legal systems, and sources of capital all speak to cultural issues that are difficult to change. Accordingly, the achievement of a unified EU accounting system, a goal of the International Accounting Standards Committee (IASC), has proven a difficult target.

In the face of these differences, it was clear to REE that they would have to address strategies for dealing with these requirements from the very beginning of their operation; they would have to ensure that profits made in one country would be reported to the taxing authorities in that country. Furthermore, the assignment of expenses to revenues would had to be done carefully since taxing authorities were sensitive to the over-allocation of expenses within a country where tax rates
are high and the under allocation of expenses to countries where tax rates are low.

They considered two alternatives. The first would involve the development of more than a dozen accounting systems, each of which would be tailored to a specific country. The second would include a single, and comprehensive, accounting system administered from headquarters in Maastricht. This central system would collect all of the relevant revenue and cost data, carefully matching revenues and expenses for each country. Public accounting firms would then be used as sub-contractors in each of these countries, and access the central data base in the preparation of accounting statements, tax forms, and payrolls. REE chose the latter alternative.

**Testing and Certification**

How can an organization rely on a vendor, located in the same or different country, to provide a quality product or service? In 1987 the 92 nation International Organization for Standardization (ISO) issued a set of standards for assessing the quality control systems used by suppliers. Today, ISO 9000 certification, as it is called, has become a requirement for doing business with many companies in the EU. Indeed the EU has adopted this certification program as part of its trade laws governing specific imports (Brewer and Mills, 1994) (Lee, Schniederjans, 1994). While it may not be necessary to have ISO 9000 certification to do business with all organizations in the EU, restrictions do apply on the use of non certified vendors operating within those countries. Some companies such as British Telecom and French PTT will not purchase parts unless a vendor is certified.

Compliance with ISO 9000, requires that the work performed in an organization be documented, and procedures, usually supported by information systems, developed to ensure that workers adhere to these practices. To achieve certification, a qualified external auditor inspects the company to ensure that it is in compliance with its procedures. Upon successful inspection, a compliance certificate is issued.

It was clear to management at REE, that ISO 9000 certification would be an essential element of their competitive plan. Indeed, ISO 9000 was a requirement of many organizations whom they targeted as potential customers. Accordingly they developed their procedures with certification in mind, and used IT as a major ingredient in this plan. In 1993 they were awarded ISO 9002 certification.

**National Cultural Issues**

National culture has been defined in many ways (Lachman 1983; Hofstede, 1981; Erez and Early, 1993). Stated simply, culture is the shared values and beliefs, formed early in childhood, that distinguishes one group from another. Hofstede (1981, 1993) contends that culture not only shapes an individual’s beliefs, but also the type of organizations, practices within organizations, and organizational behavior. Central to culture is language. Indeed one of the first issues with which REE had to contend was the way in which language would be accommodated in a strategy which would emphasize effective and reliable communication.

**Language Differences**

The EU members served by REE speak more than a dozen languages. While the international language is moving toward English, many individuals speak only their native language. According to a study reported in the Eurobarometer, a European business publication, only 20 percent of the people in the UK can follow a conversation in another language while this number increases to 22 percent in Belgium, 26 percent in France, 29 percent in the Netherlands, and 33 percent in Germany.

To accommodate the movement of voice and text across borders, REE felt it was necessary to develop applications that would accommodate different languages and prevent the confusion that could take place as two or more people, speaking different languages, exchange data.

Toll-free systems now recognize the caller’s country of origin and route the call to a person at headquarters speaking the caller’s native language. In this way Germans speak to Germans and French speak to French. While the use of a central facility appears to bother smaller customers, who prefer to talk with local representatives, the experience at REE suggests that large customers such as Volkswagen and BMW don’t care where they are calling as long as the job gets done.

Roberts needed to address two groups, drivers and customers. With drivers speaking different languages, the problem of message reliability could not be overlooked. To solve the problem, a set of 25 frequently used messages was made available to each driver by the information system. The driver identifies his or her native language and selects, by number, the appropriate message. For example, message 12 reads, “1 am delayed in traffic and will be 15 to 30 minutes late.” At the receiving end the message appears in the dispatcher’s native language.

**Methods and Procedures**

Since the research literature has established the role of national culture in the transfer and use of IT, it seems reasonable to raise questions about the way in which culture may have influenced REE’s effort to use an information system that spanned more than a dozen cultures. Would culture affect the way methods and procedures were followed by drivers and customers? Would cultural attitudes affect the timeliness and reliability of data used to maintain central control of operations, as suggested by Verstaete (1992)?

But no evidence was found to suggest that culture …defined as values and beliefs… played a role in the development or use of the applications. Indeed, after one year of operation, the “values and beliefs” of users in one culture did not appear to have any different impact on IS performance than the “values and beliefs” of users in another culture. One explanation for this observation is that only peripheral values of end-users were involved. Peripheral values, are those cultural values which can change through life. Core values, on the
other hand, are acquired in youth and difficult to change (Erez and Earley, 1993). It does not seem unreasonable to conclude that the way in which drivers and customers were required to interact with REE’s information system involved only, or substantially, peripheral values. Since an individual’s peripheral values can adapt to changing environments, users were probably able to adjust to the procedures demanded by REE’s applications. Using this argument, it can be concluded that end-user core values were left intact, and national culture did not emerge, either directly or indirectly, as an issue.

A second explanation for the apparent absence of a cultural dimension may be explained by the structured nature of the IS applications in this case study. Applications vary according to the level in the organization they are designed to support. Anthony (1965) contended that the management process can be divided into operational planning and control, management planning and control and strategic planning. Using this framework, information systems can be classified as supporting transaction processing systems, operational planning and control systems, management planning and control systems, and strategic planning systems (Gorry and Scott-Morton, 1989). The REE applications covered in this study primarily support transaction processing activities. Transaction processing systems require users to follow highly structured procedures, with few decisions of any consequence required by its users. By contrast, as information systems support higher levels in the information hierarchy, the ambiguity of the decision making process increases and the decision maker has greater degrees of freedom within which to express personal preferences that might be expected to embody the values and beliefs associated with national culture. This argument suggests that the involvement of end-users in the REE system was of such a structured and routine nature that cultural differences had little room to emerge.

Conclusions and Implications

Roberts Express is a particularly interesting study because it focuses on a start-up operation in a region with recently liberalized trade laws, and because it suggests how information technology can be used to accommodate a multinational environment encompassing a wide range of local variables. Furthermore it suggests that IT can play a major role in coordinating transaction activities across national boundaries, even when very different cultures are involved.

But REE’s success in using IT was not easy to achieve. In the introduction, Harold Chong, Chief Information Officer of Asia Pacific Division of Compaq Computers, was quoted as suggesting that the third or fourth person hired when establishing overseas operations should be an IT person. The outcome of this study suggests that in those circumstances where coordination is a strategic factor, an IT person should be hired even earlier; perhaps among the first two hired. At the very least, the first person assigned to the project needs to have a strong foundation in the use of IT. The hard work of integrating business and IT strategy needs to begin during the early stages of business planning, before constraints are imposed which limit the strategic contribution that IT can make to the organization.

While the focus of this study has been on a transnational transportation company, the results can be cautiously extended to a broader spectrum of service organizations that need to quote prices across borders, take orders in different languages, follow customs procedures, compute currency exchanges, accommodate accounting differences, comply with legal issues, and contend with vendor certification. This case study suggests that information technology can indeed play an integral role in coordinating these differences and at the same time provide the mechanism for integrating operations across borders.

The study also suggests that national culture within the EU may not be an issue at the transaction processing level. Indeed many local variables such as languages, currencies and accounting practices must be addressed, but national culture...defined by values and beliefs...may not be an issue, especially if the methods and procedures which IS users must follow do not conflict with the core values of their culture.

While it is tempting to extend the insights gained from this study to regions beyond the EU, evidence suggests that caution must be exercised. A study undertaken in the former Soviet Union by Verstraete (1992) reported that data reliability in that region is a significant issue. If this is true, the transfer of information technology, even at the transaction level, may not produce the successful results reported by REE. Even state-of-the-art systems cannot overcome the problems associated with unreliable or erroneous data. Therefore, the extension of the conclusions of this study to other trading blocks such as the Pacific Rim and NAFTA must be made with extreme care. Further studies are needed before the conclusions of this study can be considered culturally independent.

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