Chapter 6
Toward an Integrated Digital Company

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Introduction

In the 'digital age' that we live in, information has evolved as the primary element of markets and as a source of wealth and power. Increasingly, market economies rely on services for GDP growth and for the creation of employment opportunities. Unlike physical products, the key characteristic of services, including 'product-oriented services', is that they are knowledge-intensive and information-intensive. Hence, we now speak of knowledge-based economies. Some economists argue that in some respect we are already in the era of a new e-conomy, with substantial structural acceleration in total factor productivity – TPF, [Bailey and Lawrence, 2001].

Since the turn of the 21st Century, a number of change drivers have been challenging accepted business models. Among these change drivers: competition is intensifying and is facilitated by globalization and the liberalization of markets, product differentiation is diminishing, product life-cycles are getting shorter, consumer behaviour and patterns are changing, consumer loyalty can no longer be taken for granted, and consumer expectations concerning quality, delivery times and after-sales service, are increasing.

E-commerce, facilitated by the revolutionary changes in the Internet and related technologies, is a powerful force with profound implications on the functioning of markets and on the behaviour of consumers and businesses. The Internet exploited, or rather capitalized on its immense information management capability in order to dramatically reduce the cost of creating, sending, and storing information, and facilitate the development of a more direct, instant and almost free exchange of information between market players. This capability provided unique opportunities for companies to improve operational efficiency and managerial effectiveness by re-configuring discrete activities throughout the value chain. In other words, to reengineer business processes within and between businesses. This entailed integrating and coordinating activities within the firm, as well as with suppliers (B2B), channels, and customers (B2C). The increasing interdependence of firms with business partners, has given rise to the need for enterprises to have integrated information systems that can facilitate seamless supply chain management (SCM), effective customer relationship management (CRM), and efficient financial management. Today, information-driven, integrated systems are enabling organizations to reduce inventory and

costs, add product value, extend resources, accelerate time to market, and retain existing customers as well as attract new ones. Online data exchange using the Internet and related technologies is transforming business practices, allowing managers to capture and track complex data more effectively, or to exchange information among entities across the value chain, thus greatly improving reciprocal customer-firm relationships.

These managerial benefits of integrated systems are very evident in the case of JDECO in the second stage of their ERP implementation stage, where they 'informationally' linked key business stakeholders with their central systems.

Modern enterprises in industrial-manufacturing, retail distribution, or service sectors, engaged in the digital domain; whether online or not, should realize that systems should be designed to enhance open and rapid communication and sharing of information within the enterprise and across the entire supply chain. The application of integrated information systems can eliminate errors and duplications in data entry, as was the problem at JDECO prior to 2000 and at GAMMA before 2002. Like at JDECO in 2002, they provide a real-time view of business activity, customer profiles, financial standing, and other relevant information and help organizations, such as AEOLOS prior to 1999, to overcome viewing departments and strategic business units (SBU) as independent functions (silo view) and discrete processes. Integrated systems enable enterprises to view business operations as a continuum of integrated business processes purporting to increase the economic value added at each stage of the value chain, within the context of mission-critical decisions and goals. GAMMA seems still to be struggling to integrate its two ERP systems that it decided to install, a decision that, in retrospect, was a grave mistake resulting in time and budget overruns, without management ever seeing any added-value from this investment!

Overview of e-commerce

Online retail sales, especially in the U.S., are recording phenomenal rates of growth, but they still comprise less than 2% of U. S. retail sales.[1] According to the U.S. Department of Commerce, online retail sales in 2003 rose by 26% to 55 billion USD. It is estimated that potentially, direct and indirect e-commerce sales may account for close to 20% of retail sales.[2] For some information-intensive sectors, such as travel and finance, and some standardized or homogeneous products, e.g. books, electronics, software and digital content, etc., the magnitude of potential e-commerce sales may be larger.

Admittedly, these figures only tell part of the story. For instance, they exclude online travel services which is perhaps the most successful e-commerce

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[1] US Census Bureau, 2002.
[2] Bakos, 2001

sector, ticket sales for various events, and financial services, but also much less socially desirable services such as pornography and online gambling, with a combined 'business value' estimated close to 10 billion USD worldwide.[3] Furthermore, these figures include only the fees earned by online auction houses such as e-Bay and others, but exclude the value of traded goods (a few tens of billions)! Moreover, the figures exclude the billions of dollars-worth of business conducted over the Internet in the Business-to-Business (B2B) domain, connected either through public, private or proprietary exchanges and networks, such as the one used by Wal-Mart which connects all its suppliers to its own system.

The Internet has established a new distribution mode for the 'traditional' firms with multi-channel system capabilities, to deploy their existing strategic weapons and competitive advantages. These assets include, but are not limited to, financial and human resources, brand name and reputation, support infrastructures, locational, distributional and logistical advantages to secure a stake in the digital domain and provide existing and potential customers with an additional convenient way to shop. Many enterprises are rushing to gain first-mover advantage in cybermarkets, acquiring the necessary digital infrastructure and securing cyber 'real estate'.

The B2C digital markets, especially for information-intensive goods and standardized products such as books, CDs, airline tickets, software, etc., are characterized by high transparency and lower entry and exit costs. Yet, there are endogenous sunk costs in setting up and operating B2C eCommerce companies. Initial technology costs, data build-up, advertising and promotion expenditures, etc., render the exit a costly affair.

A website is increasingly becoming the 'storefront' of a digital company, its gateway for customers to access its products and services, even if it is does not sell online. Modern enterprises are investing in web functionality, interactivity, and aesthetic presentation in order to attract customers' attention and gain their loyalty. In addition, traditional manufacturing firms are increasingly using the Web to provide information to consumers about their products such as prices, features, loyalty benefits, financing facilities, etc., but are then directing them to visit their traditional sales outlets for the actual purchase. For instance, online sales data do not reveal the fact that a growing percentage of consumers use the Internet to research and comparison shop for many products, especially durable goods such as cars, computers, household appliances, furniture, etc), but the final purchase of the 'goods' is done at a traditional 'brick-and-mortar' store.

Indeed, it is becoming evident that offline merchants, including the traditional cataloguers who moved online, are becoming stronger and are the dominant form of general merchandizing. The choices that mega-players such as Wal-Mart, Sears, JCPenney's, Kmart, L. L. Bean, Dell and others will make in harnessing e-commerce potential will deeply fashion the ultimate size and shape of the overall digital market.

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[3] The Economist, 15 May 2004.

Case relevance:

AEOLOS seems to have been successful in Phase II of their ERP implementation by developing an Internet-based e-commerce module using an interactive Web site to cater for both retail clients, as well as business partners. The latter access the website using passwords, which take them to a customized page with a pre-determined selection of hotels and other facilities according to their preferences and attributes, indicated in the contract they sign with AEOLOS. GAMMA, on the other hand, got 'trapped' in the integration of two ERP systems and has been unable to develop e-commerce functionality as yet. As the US and European leading general merchandising firms show, having such E-commerce modules integrated in the overall ICT systems is a critical success factor for integrated digital companies.

E-Business Models

The Internet has severed the link between the product and product-related information. With instant and direct access to information, customers can transact electronically directly from suppliers. This unbundling of information from the traditional value chain creates new business potential and new business models.

E-Business strengthens the linkages in the value chain between enterprises (B2B) and between enterprises and customers (B2C), thereby significantly contributing to improvements in operational efficiency and corporate profitability. In addition to operational efficiency in selling, marketing, procurement and so on, e-business contributes to managerial effectiveness — improved customer service, reduced costs, streamlined business processes. Using the Internet and related technologies, businesses are able to implement CRM and SCM functionalities, thus facilitating the integration of their operations and the linkage with all business partners and customers.

Case relevance:

Annex 1 provides an overview of Michael Porter's Core Principles of business strategy as it relates to the Internet and digital markets [Porter, 2001]. 'Value Chain Analysis' examines the entire enterprise in the context of the overall chain of value-creating activities to find strengths and weakness of all these activities, the 'linkages' within each product line's value chain and the potential synergies among the value chains of different product lines or strategic business units.

To capitalize on the imperative for strategic alliances and networking in a highly globalized tourism sector, as well as to maximize the value added at each stage of the value chain, in 2000, AEOLOS forged a significant strategic alliance with a global tour operator. Additionally, the invested heavily in integrating its ICT systems and is committed to using the Internet to enhance collaboration across the supply chain as well as to offer more products and

services to more customers, more directly without destroying long-established value-creating business partnerships.

Towards an Integrated Digital Enterprise

Business Process Reengineering

Business Process Reengineering (BPR) seeks to achieve significant improvements in cost, quality, service or speed. The objective is to create entirely new and more effective business processes, usually by exploiting ICTs. As with any business process, supply chain management can benefit from the principles of reengineering. It is necessary for organizations to have a thorough understanding of how their existing supply chain works, as well as the processes of their suppliers and the needs of their customers, and to establish a performance measurement system after reengineering has taken place.

Case relevance:

For instance, AEOLOS uses a system of standards or 'best practice indicators' that were developed after extensive benchmarking of airline requirements and Service Level Agreements, whereby they constantly measure 72 activities against benchmarks at each of the stages in the value chain, particularly targeted at customer contact points. A report is prepared on a regular basis with a summary of the performance against these standards.

Information-Sharing by Functional Areas of Business Administration

Functional areas of business administration such as Sales & Marketing, Production & Materials Management, Accounting & Finance or Human Resource Management, are served by information systems. Employees in one functional area need information from another to do their job. Yet, for many enterprises information is locked into 'functional silos', whereby one department or business unit cannot seamlessly use information collected or maintained in another department or functional area. Traditionally, marketing, distribution, planning, manufacturing, and purchasing functions have operated discretely and independently. For instance, managers who designed manufacturing operations to lower costs and maximize output rarely considered the impact on inventory and distribution capabilities. Increasingly, however, business managers today think in terms of business processes rather than functional areas.

Enterprise Resource Planning (ERP)
As already discussed in Chapter 4, Enterprise Resource Planning (ERP) solutions facilitate this new thinking and business process re-engineering. An ERP system is a set of integrated software modules for supporting all of an enterprise's processes in real-time allowing it to share information throughout the entire enterprise and in all functional areas of business administration.

ERP systems enable functional, horizontal i.e. integration to production systems often via a manufacturing execution system (MES) and external integration e.g. relationships to customers and suppliers.

Table 1 below summarizes the information needs of functional areas of business administration, as well as the key benefits that integration across systems and information sharing across business functions may have for enterprise operations.

Table 1. Informational Integration of Functional Areas and Processes of a Firm

Functional Area	Needs / Activities	Information Sharing	Benefits
Marketing and Sales (M/S)	- Determine pricing - Take customer orders - Create sales forecast - Segmentation strategies - Customer Profiling - Product Customization	Marketing and Sales exchanges and shares data and information with customers, but also with the other functional areas of business administration (HR, A/F, and with Production, Materials (P/MM) and SCM)	- Profitability analysis using real-time data (costs, revenues, sales volumes). - Permits creation of more sophisticated pricing (price discrimination, discounting, rebate marketing plans, etc) - Focus on profitable customers (80:20 rule) - Tie pricing to customer, product, sales channel - Use more accurate delivery dates (by tying sales orders back to inventory, and knowing materials availability for unprocessed products)
Production and Materials Management (P/MM)	- Planning - Need accurate forecasts from Marketing and Sales - Compare costs with Accounting	The P/ MM and Supply Chain Management area exchanges and shares data and information with suppliers, but also with the other functional areas of business administration (HR, A/F, and with Sales and Marketing)	• Integration of sales and production information (for Current/anticipated orders) • Visibility of Product availability (for sales, distribution and materials management) • Better order-to-production planning • Integrate distribution with other organizational functions (Manufacturing, Sales and Financial reporting) • Allows reporting on past performance and forecasting indicators • Strategic purchasing, "materials only" costing • Alignment of performance indicators: cross-functional, process-driven, customer-driven
Accounting and Finance (A/F)	- Record transactions - Summarize data	The Accounting and Finance Area exchanges and shares data and information	• Consolidated, consistent financial picture (reduced errors and recordkeeping costs) • Better financial analysis (linking

		with customers, but also with the other functional areas of business administration (HR, P/MM, and with Sales and Marketing)	operational results to financial effects, as well as easier cause and effect view for operational managers) • Ready access to financial data for decision support • Allows creation of strategic performance measures
Human Resources Management (HR)	- Hire staff - Train and Develop staff - Evaluate / Reward Performance - Retire, lay-off or fire	The HRM area exchanges and shares data and information with all other functional areas of business administration (Accounting and Finance, P/MM, and with Sales and Marketing)	• Integrated personnel database (salaries, benefits, planning and recruiting, travel and living expenses) • Payroll accounting tax pensions requirements • Employee as customer (career, succession planning, training program coordination) • Time recording (hours, vacation, shift plans) which is important information for cost allocation

ERP Implementation

Frequently, when embarking on the implementation of an ERP system, given the sophistication of these systems and the substantial amount of resources needed, enterprises outsource this function and usually proceed in phases. The first phase usually focuses on 'tying up loose ends' in the financial operations, in other words, with integrating systems for the collection of accounting-related data.

Case relevance:

This is exactly what happened in the case of AEOLOS Travel and JDECO. For instance, in Phase I of the Oracle Financials system that AEOLOS selected, the preoccupation of the managers was to consolidate and streamline the financial and accounting side of the operations, by integrating the information flow and sharing across functional departments. In other words, they wanted to make internal processes more efficient and lower costs of operations; overall to achieve better performance. The goal of Phase I for AEOLOS seems to have been met, since management claims it is now more able to integrate the database, and access that data in a timely manner for making mission-critical business decisions. The goals for Phase II were to improve sales and operations planning, install an e-commerce module to enhance the online sales potential and improve customer service. Finally, in Phase III, the company hoped to provide end-to-end supply chain integration, so that it could dynamically alter operational processes to enable it to take advantage of new value-added processes and to respond faster to fluctuating demands from customers and business partners.

One of the major pitfalls of ERP implementations is that enterprises frequently do not correctly estimate the work involved and do not draw up a schedule of activities and plan to assign the necessary human and financial resources It seems that both JDECO and AEOLOS were successful in their implementation of their ERP systems because both had set up dedicated project teams and had drawn up a binding time schedule. For instance, the AEOLOS team identified and diligently followed six stages—from the design of the entire solution, to process mapping, compatibility of legacy systems with Oracle Financials, integration and customization of data, and finally to testing and final installation and running of the system.

For Gamma Inc, on the other hand, it seems that the design of the basic ERP system was not adequate to address the specific strategic needs of the Company and additional customizations had to be done. Overall, the company underestimated the cost of integration and customization, which eventually resulted in time and cost overruns.

One of the most frequent problems encountered in the installation of any new ICT systems is staff resistance to change. Therefore, change management is fundamental in obtaining a commitment from all employees and thereby avoiding failures. Staff resistance was a major issue in the JDECO case. The company had to make redundant a number of employees that management felt were beyond training. It seems that in the case of AEOLOS, the problem of staff resistance was not acute. The key success factors seem to be that the company devoted a lot of time and effort in personnel training, in numerous test runs of the systems, and effective communication of the features and benefits to all users.

Extended ERP (ERP II)

Even though the ERP market is evolving rapidly, and the core ERP functions are still in very high demand, these core ERP systems need to be re-defined and extended to:

- Facilitate the Internet and E-Commerce trends. ERP systems must include an E-Business module.
- To accommodate integrated ('seamless') Supply Chain Management (SCM) systems. This is the ability to integrate customers and suppliers across the entire value chain.
- Customer Relationship Management (CRM) systems. This is the ability to keep and track the sales and marketing process (sales call, emails, sales proposals, sales hits, etc) with all customers.
- Facilitate Manufacturing Execution System (MES) - the ability to track and manage productive processes.
- Facilitate new business models such as
  - Business-to-Business (B2B) models

- Business-to-Consumer (B2C) models
- C-Commerce (Collaborative Commerce) models

Some of the above needs may be satisfied, or at least facilitated, with the use of the Internet through Application Service Providers (ASPs). This is the next generation of ERP systems: ERP II. The basic philosophy of ERP II is that organizations open up their systems to external users. The proprietary, inward-looking basic ERP systems (the 'one vendor owns everything' philosophy) are breaking down.

Strategic Use of the Internet

The Internet has emerged as a major worldwide distribution channel for goods, services, and managerial and professional jobs. This is profoundly changing markets and industry structure, products and services and their flow, consumer segmentation, consumer values, consumer behaviour, jobs, and labour markets [Latzer and Schmitz, 2001; Litan and Rivlin, 2001; Bakos, 2001].

At the enterprise level, the Internet and its use in e-commerce is increasingly affecting all functional areas of business administration, including but not limited to marketing, production, materials management, distribution, finance and accounting. Information collected through interactive websites or externally from specialized infomediaries, is used for customer profiling and market segmentation, for customizing products, for forecasting future demand and for formulating business strategies.

A promising application of electronic commerce for a digital firm is to use Web technology for intra-business, business-to-consumer (B2C), and business-to-business (B2B) interactions. Business logistics including supplier management, inventory, warehousing and invoicing can be integrated into a corporation-wide Intranet. Suppliers and customers are given appropriate levels of access to Intranets so that employees, suppliers and customers can be integrated in the firm's production and sales functions in a network rather than a physical locale.

Web Functionality

The primary mode used by digital firms to collect and transmit information about prices, product features, etc., to potential buyers is through their website. Although the majority of websites are still passive, offering static descriptions about the company, product range, and personnel, increasingly Web storefronts are becoming dynamic points-of-sale (POS) enabling firms to combine more effective and efficient advertising, marketing, and sales functions than in the conventional channels. Web storefronts offer 24/7 continuous customer service using computerized processes, global customer reach as well as customer interactivity.

The Web as a new channel can potentially not only complement but also substantially enhance existing channels such as direct sales forces, traditional

'brick and mortar' outlets, mail order systems (MOTO), home-shopping on television, phone-in order system, and e-commerce enabled websites, where increasingly consumers will be 'instructed' to place their orders. It seems that to some extent, the offline and online worlds will merge. It seems that we are heading towards 'end-to-end' digital connectivity. Information collected internally through interactive websites, using *cookie* technology, transaction logs, shopping carts, registration forms, clickstream data, and other data collection and personalization programs, can be analyzed and managed using sophisticated computer programs to provide very detailed customer profiles and enable businesses to achieve a one-to-one relationships with their customers.

The challenge that remains for many online companies is how to convert the millions of online customer visits into profitable sales. Likewise, the challenge for successful offline retail companies is how to leverage the Internet to enhance their business, as well as how to turn their newly acquired e-commerce capabilities and operations into profitable business. To succeed online, these companies need to diligently guard their brand name and service reputations established over many years in the offline world, avoid the cannibalization of sales through the different channels, and provide incentives for customers to use the lower-cost online channel.

Case relevance:

JDECO seems to have done an excellent job in integrating their business processes and capitalizing on the capabilities of the Internet and mobile technologies to interact with customers and employees for a more efficient and seamless end-to-end digital connectivity.

In the first phase of their e-business project to install the Oracle Financials ERP module, AEOLOS Travel managed to gain operational efficiency by improving the financial management of their horizontally- and vertically integrated operations. In the second phase of their e-business project AEOLOS provided e-commerce functionality in the B2B and B2C areas, thus reducing operational costs and informationally integrating the majority of their stakeholders.

The Business-to-Customer (B2C) Digital Marketplace

Even though experience in e-commerce is still limited, it shows that consumers engaging in the digital domain, whether they actually buy online or simply use the Internet for searching, are really motivated by roughly the same set of factors as in conventional markets: product quality and other features, convenience, speed of delivery, acquisition costs, seller's reputation, reliability, after-sales service, privacy of information and payments security issues, etc.

Yet, the mode of transacting is changing. Consumers can now carry out a number of digital activities, such as ordering and paying for products online, but also searching for information, interacting and negotiating with sellers,

exchanging information with other consumers, as well as using products online by filtering, processing, and linking them with other computer programs.

Changing Role of Intermediaries

Intermediaries have long established their critical role in the functioning of markets, especially in physical markets, though the popular impression is that they add an unnecessary layer of costs to the final product. Retailers are a classic example of intermediaries. They make available goods produced by sellers who may not be accessible by consumers. Intermediaries also warrant product quality and diversity, and provide product information.

In a digital domain where physical products and product-oriented services have a high informational content, low value added tasks are done directly through ICTs. With the help of instant and direct access to information, customers can transact electronically directly from suppliers. In addition, since digital markets have global reach, potentially more information and lower search costs, one can reasonably conclude that the Internet will lead to the elimination of the intermediaries, in other words, to **disintermediation** [Evans and Wurster, 2000; Bakos, 2001].

Evidence, however, shows that the middlemen are 'mutating' and evolving into different forms in the emerging digital domain. In other words, the Internet is not leading to disintermediation but rather to **re-intermediation**. A new breed of intermediaries is emerging. Infomediaries, online clearing houses, online auction houses and so on, play a critical role in bringing buyers and sellers together, in facilitating the clearing of markets, and in the efficient transmission of information to market players, buyers and sellers alike. 'Specialized mediators' are 'invading' the commercial space. Some seek to facilitate the efficient transmission of information, others to provide for the flow and distribution of goods and/or services. The virtual economy will be populated by cyber-mediaries who provide essential services such as certification, payment services, quality assurance, copyright clearing and royalty allocation as well as distribution.

Customer Relationship Management (CRM)

As highlighted in Chapter 3, CRM is a set of business methodologies, technologies and e-commerce capabilities used by firms to manage and improve the quality of customer relationships from the very first contact at the retail outlet to after-sale services. Software systems facilitate the efficient interaction of the company with the customer and vice-a-versa. In other words, CRM connects the different systems, thus providing key employees at any level of the company with a single-view of each customer's total relationship with the company. Communication with the customer therefore presents a unified message and image. Integrating CRM with ERP yields additional benefits, such as providing real-time information on order.

Internet and the Efficiency of B2B Markets

A firm is an organization that brings together the necessary factors of production and combines them in a production process in order to produce goods and services that it can market. For economists, a firm is an organization that internalizes transaction costs associated with each stage in this production process. When total transaction costs are high, a firm may find it efficient to handle all activities internally. When transaction costs are low, on the other hand, many functions, processes or activities may be outsourced, i.e. contracted out to third parties. It is frequently argued that if electronic commerce reduces transaction costs, firms will contract out or delegate many of its functions to other agents in the market.

Market Transparency and Search Costs

Search engines and electronic price comparisons render information more abundant and significantly reduce the costs of obtaining it, thus leading to lower transaction costs. Buyers can easily locate and identify potential sellers or suppliers. With regard to coordination costs, online logistics companies are now able to monitor easily and accurately the location of shipments and take action if needed in real-time.

With regard to electronic B2B relationships, there are barriers to switching to new suppliers [Shapiro and Varian, 1998; Smith et al. 2000; Brynjolfson and Smith, 2000]. Companies tend to make additional investments in equipment and software to support their e-commerce operations, or specifically to facilitate transactions with business partners upstream and downstream on their supply chain, thus increasing sunk cost investments and exit barriers [Steinfield et al., 2000].

Supply Chain Management (SCM)

Chapter 5 discusses sophisticated SCM systems, which have been developed to help enterprises improve overall operational efficiency through a firm's supply chain, primarily by fostering better communication and cooperation within each link. SCM can enhance the profit potential of enterprises primarily through reductions in costs by making the firm more efficient and cost-effective across the entire system and by minimizing total system-wide costs, from transportation and distribution, to inventories of raw materials, work in process, and finished goods. Firms can thus respond more effectively to changes in the demand of their products. The use of ICT could also render improvements in competitive conditions possible, thus increasing efficiency and reducing prices. Finally, the emergence of new industries and sectors has only been possible thanks to the intensive use of ICT.

Indeed, the Internet enables enterprises to manage their supply chain more effectively, to informationally connect key business partners across the entire value chain, to reduce inventory levels, and to cut customer service costs [Litan

and Rivlin, 2001]. All these lead to improvements in overall management efficiency and enhance total factor productivity at all stages of the supply chain. The benefits from the Internet and from ICT in general, materialize through various uses and through changes in a variety of business practices. According to the transaction cost theory, the role of ICT in enterprises is one of processing information and, thus, reducing search, negotiation, monitoring, settlement and co-ordination costs[4] .

Case relevance:

The success story of Wal-Mart outlined in the excerpt below is very instructive for enterprises engaged in retail merchandising, such as Gamma Inc. in Lebanon.

Wal-Mart --An ICT Application Success Story
In 1980, Wal-Mart was a small niche retailer. It is currently largest most profitable retailer in the world. What is Wal-Mart's Critical Success Factor? Most would agree that it is the exploitation of ICT to develop its "cross-docking" technique of inventory management—a computerized just-in-time (JIT) system.

Wal-Mart considers that its continuous substantial investments in the latest technology are paying off handsomely in increased sales and profitability. It developed a satellite-based EDI system using a private satellite communication system that sends daily real time point-of-sale (POS) data to some 4,000 suppliers. In association with Procter & Gamble, the Company developed its "Efficient Customer Response", an integrated, computer-based SCM system. Key store personnel are continuously provided with on-line real time critical information on customer buying patterns as well as a video link permitting stores to share success stories.

Wal-Mart's application of state-of-the-art ICT was rewarded by competitive efficiency in the B2B and B2C markets. It currently ranks in the top 5 in terms of website visitors. It seems that Gamma Inc. has not yet harnessed the capabilities of the Internet by developing e-commerce modules and website functionalities for online sales, or at least online searching for customer who can then visit the stores to do their shopping (especially for durable household items).

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[4] The 1991 Nobel laureate in Economics Professor Ronald Coase postulated that a company compares the costs of organizing an activity internally with the cost of using the market system for its transactions. The cost incurred by using external resources was what he called 'transaction costs'. In addition to transaction costs, there are two other categories of costs: 'coordination costs' 'and information costs'. 'Coordination costs' arise because of the uncertainty and complexity of such tasks as timing the deliveries, meeting customer specifications, making alternative payments arrangements, and forecasting needs. On the other hand, 'information costs' arise because information is essential for the proper coordination activities between the firm and its business partners.

Security Dimensions for Digital Enterprises

One of the most sensitive issues in e-commerce, and perhaps the primary reason preventing digital transactions from growing at an even faster rate, is the issue of unsecured transmission of information, primarily financial information, on the Internet due to its inherent 'openness'. Security of transactions, of course, goes beyond just securing the payment, to include the privacy of sensitive information from being 'stolen' or intercepted by third parties, requiring among others such elements as non-repudiation, authentication, *integrity*, and confidentiality.

To address non-repudiation and authentication, new forms of intermediaries have developed and are known as 'trusted third parties' (or 'trusted certification authorities', or Public Key Infrastructures, PKI). Data integrity and confidentiality issues have been largely addressed by advanced encryption and digital signature technologies. Encryption and certification services play an important role in establishing digital identity, preventing money laundering and anonymous crimes, digital currency and consumer privacy. Especially for content providers and digital product sellers, encryption technologies are critical in protecting their *intellectual property rights* and other contents.

Case relevance:

To address the issue of security in their E-Commerce module, which became operational in the beginning of 2005, AEOLOS Travel has subscribed to VeriSign to ensure the security of payments.[5] The company realized that since financial transactions are involved, customers needed to be assured that their financial data would not be made available to others. In addition, since personal data are involved, AEOLOS took all the necessary precautions to ensure that private information would not be intercepted or made available to third parties without the owners' consent.

Integrated Digital Enterprises in the Mediterranean Context

In many eastern Mediterranean countries (Cyprus, Turkey, Lebanon, and certain Middle East countries) it seems that enterprises are keen on integrating ICT systems to cope with the increasing demands of the market. Many mid-size and large companies have or are embarking on installing ERP and other integrated systems, capitalizing on the capabilities of the Internet and related technologies by incorporating functionalities for e-commerce, and supply chain management. Increasing attention is being paid to designing interactive websites to increase customer communication and facilitate more effective market segmentation, pricing and customization strategies.

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[5] VeriSign is a certificate authority providing public-key infrastructure (PKI) security solutions. It issues digital IDs to enable authenticated encryption that secure e-commerce and online payments across the Internet.

Looking at the question from the industries' point of view, the early adopters of ICT and e-commerce technologies are the banking and finance companies, for the obvious reason that enterprise-wide integration and real-time online access of information is so critical for their daily operations. Other information-intensive services sectors such as hotels, travel agents, and tour operators have likewise been actively engaged in installing ERP and other integrated information systems. Merchandise companies and traditional physical product sellers are slower to adopt e-commerce, beyond setting up static websites.

Summary and Concluding Comments

Increasingly, modern enterprises already engaged in the digital domain, are becoming interdependent with key stakeholders. As a result, enterprises need to integrate their information systems in order to enable them to have seamless supply chain management (SCM), effective customer relationship management (CRM), and efficient financial management. Such integrated systems are enabling organizations to reduce inventory and costs, add product value, extend resources, accelerate time to market, and retain existing customers as well as scout for new ones.

The Internet is transforming business practices, allowing managers to manage massive amounts of complex data more effectively, to share information with functions or entities across the value chain, to improve and facilitate online communication and interaction with customers. The bottom line is that by using integrated systems in an environment where competition is intensifying and consumers are becoming more sophisticated and demanding, managers are able to gain operational efficiency and managerial effectiveness, and are thus able to enhance their profit margins.

The critical point is that systems should be designed to enhance open and rapid communication and information-sharing within the enterprise and across the entire supply chain. Integrated systems can facilitate the reduction or elimination of errors and duplications in data entry, as well as provide a real-time, comprehensive view of business activities, customer profiles, financial status, and other relevant information. This would help managers view business operations as a continuum of integrated business processes purporting to increase the economic added value of the organization at each stage of the value chain, within the context of mission-critical decisions and goals, rather than as independent functions and discrete processes.

The Internet and related technologies and their use in digital markets are in an early stage of development and far from their equilibrium point. As e-commerce becomes more widespread, economists, ICT experts, business consultants and other researchers clearly need to move beyond the popular hype and empirically scrutinize and investigate its many facets in order to understand how markets, enterprise practices and consumer behaviour interact to shape the new economy and market landscape. Undoubtedly, digital markets are more efficient in terms of communication and collecting information. Yet, on a

number of other dimensions, there is no consensus that the Internet has enhanced the overall efficiency of markets. Concerns by consumers and policy-makers troubled by the infringement of privacy and other legal aspects could prompt legislation into limiting the Internet's capabilities to collect, manipulate, customize and commercially manage and deploy information.

Therefore, the digital domain still poses significant managerial challenges as well as opportunities:

- Unproven Business Models: There is no consensus that E-business is necessarily more efficient or cost effective. Not all digital firms make money. 'Getting onto the Web' is not enough!

- Business Process Re-engineering: Digital operations require careful re-examination and coordination of all functional areas of business administration, plus close relationships with customers and suppliers and other business partners in order to create value!

- Legal and Ethical Issues: Relevant e-commerce laws are still being drafted. Corporate Social Responsibility is just as applicable in the digital domain as in the traditional marketplace.

- Security and Privacy: 'Open' Internet-based systems are very vulnerable to 'outside' intervention, notwithstanding significant improvements in the area of encryption and certifications.

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Annex 1: Core Principles of Business Strategy and the Internet (Michael Porter, 2001)

These principles are summarized below:

1. Operational effectiveness /efficiency advantages due to the Internet will not be sustainable.
2. Over the long term, the Internet will be neutralized as a source of competitive advantage.
3. Internet applications, though important, are not the only cost and quality drivers. Economies of scale/scope, employee skills, continuous investments in technology and other assets are additional critical success factors.
4. Yet, if Internet applications are tailored to a company's unique strategy, it can contribute to competitive advantage.
5. Integrated strategies, in which Internet applications become integral to the entire activity system, reinforce a company's distinctiveness and are far more difficult to imitate than stand alone applications.
6. Internet technology will allow new ways of combining virtual and physical activities and creating new dimensions of value.
7. The Internet is a potential strategy enabler, not a new industry.
8. The Internet can open up new positioning strategies.
9. The Internet is often complementary to existing ways of competing.
10. Strategies that integrate the Internet and traditional advantages / ways of competing should prevail in many industries.
11. Given the importance of integration with traditional ways of competing, separating Internet-based operations from the rest of the company often undermines the potential for competitive advantage.
12. "Traditional" sources of competitive advantage will re-emerge as more and more companies use the Internet, as buyers get more sophisticated, and as e-commerce becomes more established.

Case: AEOLOS, Cyprus

Author: Savvas Savvides, Katerina Papanikolaou, Chryso Mavrommati, George Papadopoulos

Sotos Stephanou, Managing Director of AEOLOS looks towards the future and comments on the ambitions harboured by him and his company in the island of Cyprus: *"These are times of rapid changes and the future demands new ideas. Here at AEOLOS we have always selected our business partners very carefully, ensuring that we can expect from them the same high standards of quality as we strive to offer. By working today on the tourism and travel trends of tomorrow, anticipating and adapting to new customer trends such as special interest groups, sports groups, eco-tourism, international meetings and conferences, we are continually promoting the island as a major Mediterranean destination. At the same time, we play a role in preserving its unique culture and character, conscious always of the need to protect the environment."*

Company Background

AEOLOS was founded in 1933, and was one of the pioneers in the Travel and Tourism sectors, a tradition the company still maintains today. Early on, the visionary founders of the company had seen the excellent potential of the travel and tourism sectors, even before Cyprus had its own national carrier, and long before the Island had a government administrative body or ministry to address the needs of the Tourism sector. Through a series of strategic moves the company linked up with major European airline carriers to serve as their general sales representative in Cyprus.

In order to cater for the multitude of travel and tourist requirements, the AEOLOS Group runs 10 offices strategically located in all parts of Cyprus and manned by over 200 experienced and skilled permanent staff. In addition, the company employs a large number of temporary staff to cater for significant seasonal needs. Several core activities come under the umbrella of AEOLOS, each specializing in specific areas of the business, namely, incoming and outgoing air and sea travel, airport ground handling, cargo clearing and forwarding, hotel accommodation, hotel investment and management, inland transport, sightseeing excursions & tours, and conference organising and incentive tourism. A broad schematic view of the organizational structure is shown below:

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                    │    AEOLOS GROUP     │
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│Admin-   ││Tourism  ││Ground   ││Tourism &││         │
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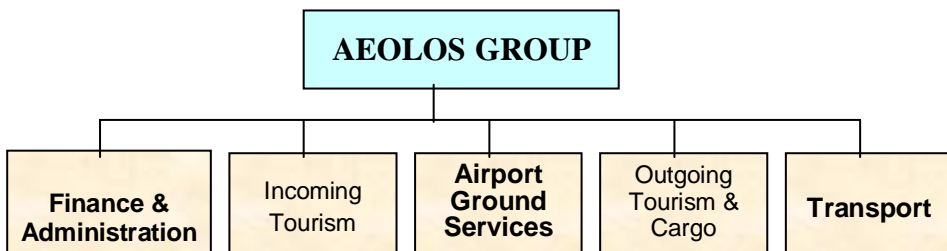
Fig. 1: AEOLOS Organizational Structure

The key to AEOLOS's success is the company's overriding emphasis on customer satisfaction. The corporate culture has trickled down to all levels within the company, whereby each and every employee is responsible and empowered for the maintenance of quality standards, creating first-class client relations and cooperative business partnerships with the company's key stakeholders and business partners. The company uses standards to measure 72 activities at each of the stages in the value chain, particularly targeted at customer contact points (the 'Moments of Truth' of Jan Carlzon, former President of SAS Airlines).[6] These standards were determined and are employed by the company following extensive benchmarking of airline requirements and Service Level Agreements. During each operation, the company records its performance against agreed standards in areas such as: passenger check-in, passenger arrival / departures, ramp arrivals / departures, and cargo import / export. A report is then prepared with a summary of the performance against standards and is sent to the customers on a regular basis. (See Annex 3 for a complete list of these benchmark standards).

In order to respond to environmental change drivers,[7] the company continually measures quality, invests in superior vehicles, and constantly invests in staff training. AEOLOS also introduced Management Systems to monitor business efficiency and to ensure immediate identification and reaction to deviations in performance standards. The company's Management Systems are certified compliant with ISO 9001:2000 standards (for Quality Management), ISO 14001:1996 (for Environmental Management), and OHSAS 18001 (for Occupational Health and Safety Management).

AEOLOS' operations in detail
Incoming Tourism

The incoming division of AEOLOS is responsible for the overall handling of some 400,000 incoming tourists, providing a full range of incoming services such as: tour operating, inland production, incoming services, transport, conferences & incentives. The transport department operates a fleet of 23 luxury coaches, 10 medium coaches, 5 mini busses, as well as a number of taxis. The services offered include transfers from and to airports, harbours and hotels, excursion touring, VIP transfers, private transfers, etc. (See Annex 1 for figures on tourism in Cyprus).

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[6] Jan Carlzon, Moments of Truth, (Harper, 1987). *"Scandinavian Air Service (SAS) is not a collection of material assets, but the quality of the contact between an individual customer and the SAS employees who serve the customer directly"* (p. 2*). "Anytime a customer comes into contact with any aspect of a business, however remote, is an opportunity to form an impression.*" (p.4) *"Last year each of our ten million customers came in contact with approximately five SAS employees, and this contact lasted an average of 15 seconds each time. The SAS is 'created' 50 million times a year, 15 seconds at a time. These 50 million 'moments of truth' are the moments that ultimately determine whether SAS will succeed or fail as a company. They are the moments when we must prove to our customers that SAS is their best alternative".* (p. 3).
[7] Two of the key change drivers are: (1) market conditions, such as the increasingly more educated, informed and demanding customers, and (2) regulatory conditions, such as the ever more stringent European Union regulations associated with the transportation of passengers.

AEOLOS holds allotments in most hotels and hotel apartments, ranging from 1 to 5 star category. From these allotments, the company is able to satisfy all requirements at any time and provide highly competitive rates. Besides accommodation the company provides various tours and thematic excursions such as: history & culture, active and hobby, sea activities, special interest, mini cruises, group air trips, international cruises, etc. In addition, AEOLOS successfully caters for the varied parameters of any conference ranging from 20 to 2000 participants. Incentive activities include: culture & scenery, fun & sports, competitions, sightseeing, galas & theme nights. The company offers a full range of Destination Management Services that range from receiving travellers upon arrival, transferring them to their hotel, organizing and providing them with varied activities, and finally arranging for their transfer back to the airport for their departure.

Airport ground handling services

AEOLOS' airport ground handling division runs their own check-in counters at both Larnaca and Paphos international airports, offering services to over 50 international scheduled and charter airlines. The broad domains of airport services include: passenger handling, ramp supervision, load control, operations and station co-ordination, general representation, private and corporate handling, cargo services.

Beyond the general IATA ground handling procedures, the company ensures compliance with specific standards and directives as outlined by the airlines they represent. This applies to every area of activity from passenger services to ramp supervision and from corporate aircraft handling to account management. An ISO9002 accredited quality management system operating alongside AHS1000 (an IATA AHM 804 compliant service delivery measurement system) further reinforces the efficiency and feasibility of AEOLOS' operations.

Outgoing tourism

In addition to the incoming tourism business, which comprises the largest part of AEOLOS' revenue, it is also actively engaged in outbound travel from its travel offices in towns all over Cyprus. It caters for the needs of individuals, businesses, and special groups for ticketing, cruise, tours, and excursions as well as special interests trips to any place in the world. It currently handles some 50,000 outgoing travellers. For the reservation of airline tickets and hotel accommodation, AEOLOS uses Global Distributions Systems (GDS).[8]

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[8] Global Distribution Systems are computer distribution systems for displaying available services (bookings and ticketing by airlines and hotels). There are four major GDSs: Amadeus, Galileo, Sabre and Worldspan.

Cargo and logistics

The cargo and logistics department is staffed with 10 people and specialises in air and sea freight, customs clearing and express courier services. The cargo and logistics department acts as the general sales agent in Cyprus for a number of major European, Asian and African scheduled air carriers as well as some 40 chartered airlines.

Situation analysis

The market

The broader tourism and leisure industry in Cyprus is fragmented and highly competitive. The industry is far from homogeneous. Rather, it is composed of a cluster of forward- and backward-linked sectors of tourism and leisure related activities, loosely categorized according to the type of product or service offered (see Appendix 1 for selected statistics for tourism in Cyprus):

- incoming tourism and travel services
    - hotel accommodation (hotels, hotel apartments, villas, agro-tourism),
    - tours, excursions, conference and incentive tourism, etc.
    - restaurants, clubs, entertainment
    - passenger transport (busses, taxis, rental cars)

- outgoing travel (ticketing, reservations, groups),
- airport ground handling services (on-board food catering, aircraft cleaning services, baggage handling, ramp control services, etc)
- commercial transport (cargo and logistics)
- cruise line operations

Usually a fairly large number of small firms compete in only one of the above activities. In some activities such as cruise lines, tours, transport, and outgoing travel, certain detain a large share of the market. Competition within each segment of the industry is quite keen. On a global scale, the tourist product is becoming increasingly standardized, and competition in local and regional markets is intensifying, therefore margins are getting thinner. Integration and alliance building, particularly establishing larger business chains and networks, characterize the development of the various sub sectors of the tourism industry.

AEOLOS' Market positioning strategy

AEOLOS is uniquely positioned in that it has a direct and indirect presence in all of the above sectors. In other words, its operations are integrated across the entire value chain. In addition, in each of the sectors in which it is engaged, AEOLOS is a key player. Managing Director Sotos Stephanou considers that AEOLOS is 'playing the field'. *"We are quite conscious of the fragmented nature of the industry, so in any sector of activity we get in we make sure we*

can secure a strategic stake. We don't want to be a fringe player. In addition, we get involved in activities that can operationally be integrated so as to capitalize on synergistic effects and exploit the opportunities across the entire value chain."

The objective of AEOLOS is to streamline operations and capitalize on their core competencies, consolidating or expanding in areas where they have a competitive advantage. This selective diversification has served the company well so far (through good and bad business cycles), providing AEOLOS with relative revenue stability, compared with other 'single-activity' competitors. The breadth of vertically and horizontally integrated activities is difficult to match. Additionally, it warrants the company a competitive edge in maximizing the added-value from each customer. AEOLOS provides comprehensive tourism and leisure services.

To capitalize on the strategic imperative of integrating the front and back end of the supply chain and establish networks in a highly globalized sector, in 2000, AEOLOS forged a significant strategic alliance with the most prominent global powerhouse in the tourism industry. This proved to be the most significant milestone in AEOLOS' history. According to the Managing Director, *"the company will continue to expand horizontally and vertically, through strategic acquisitions in Cyprus and the neighbouring markets."* (see Annex 2 for selected financial figures).

AEOLOS' segmentation strategy

In terms of market segmentation, AEOLOS is targeting the middle-to-upper segment of the incoming tourists to Cyprus. Proof of the matter is that most of the company's hotel accommodation allotments are with 3 to 5 star hotels and luxury villas. The company focuses on attracting selected motivational and demographic segments from priority geographic markets, such as the U.K., Germany and Russia, whose interests go beyond sea and sun, but extend to culture, conference and incentives, nature, agro tourism, cruise tourism, etc. From the demographic perspective, the company's marketing strategy focuses on young and middle aged couples, families and retired tourists of middle to high economic backgrounds, and middle to high educational levels. The entire spectrum of the above marketing strategy is consistent with the pricing and quality strategy of the company.

AEOLOS' efforts to gain competitive advantage and differentiation are spearheaded by its 'Quality and Value-Added' strategy, whereby the company strives to optimize the relation between price and quality and maximize the 'value for money' perceived by the customer. It is a strategy that the company worked very hard to implement, establishing standards, total quality systems, quality mind-sets and a strategy that is not easy to copy.

In the words of Sotos Stephanou, *"we are in the business of 'selling dreams', 'selling experiences', not simply accommodation and food, and increasingly the customers are expecting and demanding to realize those dreams, live those experiences. To offer this 'value for money' product, we strive to maximize the*

visitor's satisfaction, offer a rich and diverse tourist experience, present the distinctive character and identity of Cyprus and maintain attractive and high quality facilities."

AEOLOS differentiates its 'product' by offering ancillary services and experience-rich add-ons to the basic accommodation or travel products and by positioning itself more on the upper end of the market.

The ICT strategy and e-business dimensions of AEOLOS operations

Until 1999, AEOLOS' computer information system consisted of a number of individual and independent software systems (written in COBOL and BASIC). The primary system was built to facilitate the financial and accounting side of operations. Each of the other functional areas was interfaced with the finance and accounting system using customizations from Cypriot software companies. Data transfers from these different business units were performed in batches using lease-line telephone connectivity.

These systems were not inter-operable. Data was locked within 'functional silos' and were unable to support processes that cut across strategic business units (SBUs) and the common functional areas of business administration. Data that was shared across systems had to be double-booked and re-keyed manually. This led to a higher incidence of data entry errors, higher costs of error processing, and greater data inconsistency.

It became apparent to the management of AEOLOS that a common, integrated company-wide solution would not only improve data consistency and accuracy, but also reduce system maintenance costs (e.g., data re-entry and error correction) and enable the implementation of new value-added processes across business units. In view of these limitations, in 1999, the company initiated a search for technology solutions that could streamline its internal processes, lower the costs of operations, and strategically position the company to benefit from new value-added processes. Given the sophistication of the required systems, the company knew fine and well that is should not attempt to develop anything in-house, but rather outsource, and purchase a solution from a reputable global vendor. The company was looking for an Enterprise Resource Planning (ERP) solution to be implemented in phases. Yet, the solution had to be flexible and expandable.

According to Mr. George Ioannou, Director of Finance at AEOLOS, during Phase I the company focused on consolidating, integrating and streamlining the financial and accounting management operations. In other words, they wanted to achieve better performance and reduce the cost of operations. The goals for Phase II were to improve sales and operations planning, and consequently improve customer service. Finally, in Phase III, the company hoped to provide end-to-end supply chain integration, so that it could dynamically adjust operational processes to fluctuating demands from customers and business partners.

Implementing an ERP solution at AEOLOS

After evaluating the pros and cons of the ERP solutions available on the market, the company decided to go with Oracle Financials which most closely matched its needs. The IT manager argued that Oracle Financials is database oriented and therefore it fitted better with the existing architecture and data base of the company warranting an easier interface and navigation of data from the old system to the new.[9]

Oracle Financials at AEOLOS

Since AEOLOS derives some 80% of revenues from incoming tourism and related services rather as opposed to outbound traffic, it was obvious that the company was fundamentally concerned by integrating the financial management of that side of business (See Annex 2 for an overview of the relative position of revenues and cost structures). This was facilitated through the INSO module (INcoming SOlution), which interfaces with all aspects of Oracle Financials: Accounts Receivable (AR), General Ledger (GL), Accounts Payable (AP), and Fixed Assets (FA) modules. The entire solution is shown schematically in Figure 2.

Interfaced Third-Party Systems

In order to integrate the other key areas of the company's business, namely Airport Services, Outgoing Travel & Cargo, and Transport, the company installed two other modules / programs which were interfaced with relevant modules of Oracle Financials (Accounts Receivable and Account Payable, and by extension to the General Ledger). These are:

- NORCOM, which caters for airport handling operations (services at the check-in counters, the weighing stations, the departures and passenger boarding).
- PANASOFT, which handles all the issuing and invoicing of all outbound travel services (passenger ticketing, and cargo-related financial matters). Under the PANASOFT modules there is also another sub-program, BSB, which handles the receipt of moneys related to ticketing operations and serves as an Audit track in the PANASOFT system to check for discrepancies.

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[9] In the Oracle 'Client/Server' architecture, the database application and the database itself are separated into two parts: *a front end* and a 'back end' or server position. 'The Client' executes the database application that accesses database information and interacts with the user through the keyboard, screen, a pointing device such as a mouse. 'The Server' executes the Oracle software and handles the functions required for concurrent, shared data access to an Oracle database.
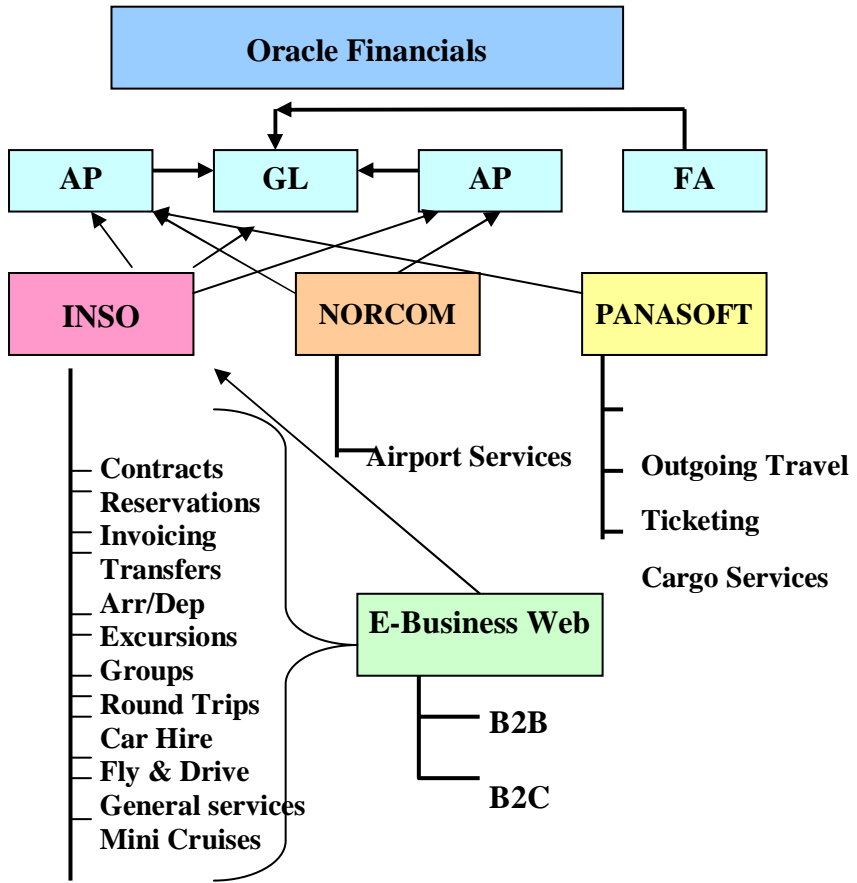
Fig. 2: Oracle Financials Module

All the services above are web-based. With the exception of mini cruises, all other services have on-line functionality.

Implementation issues

The Project Team identified two critical success factors: one at strategic level and one at operational level. At strategic level, the team needed to visualize the entire solution. At administrative level, the team had to be disciplined; so, right from the outset, they charted out a binding time schedule of activities. Otherwise, the team risked running into 'classic' implementation pitfalls. The team identified the following six stages:

1. Design a Solution Strategy
2. Prepare a process mapping and gap analysis

3. Decide on the customizations necessary to fit the nature of the business and the specific strategic and operational needs of the company

4. Investigate and analyze the data infrastructure of the existing legacy systems used by the company in order to chart out a methodology and a time-plan for the integration, conversion and migration of data to the new system

5. Plan user-training (at managerial and transactional level), and finally

6. Install and set up the system

The specific tasks to be undertaken in Stages 3 and 4 are further analyzed below since they entail a lot of painstaking, technical work.

Integration stage:

- Analyze in great length and detail the features of the new (Oracle Financials) and old (legacy) systems—Legacy Analysis and Mapping to Oracle Apps.

- Examine the business processes and business aspects of the company and see whether all areas are indeed served by the standard Oracle Financials module or whether supplementary systems or sub-systems are necessary to meet all strategic and operational. needs. See how they 'talk' to each other —Interface Development.

- Set up the common 'language'—Configure and Implement Messaging Products.

- Examine system set-up—Test System Functionality

- Prepare the methodology for the integration—Oracle Methodology.

- Prepare the integration tables—Oracle Interface Tables.

- Implement the Interface —Integration.

Migration and upgrading stage:

- Design the functionality.
- Carry out an analysis of the required customization.
- Develop a detailed technical design and update of existing documentation.
- Develop / Re-engineer the necessary customization.
- Test that the data transfer or updates are functioning well.
- Implement the data migration.

The implementation of the Oracle Financial solution at AEOLOS went broadly through the following four stages: Demo, Development, Test and Production. All in all, from 'kick-off' to 'go live', the INSO module took AEOLOS about one year to implement.

The project team & steering committee

A Project Team was set up to implement the entire solution, comprised of the Director of Finance, consultants from Oracle, a dedicated full time Oracle project manager appointed by AEOLOS, and the Group IT manager. The managers of the three key business operations (incoming tourism & transport services, airport ground handling services, and outgoing travel & cargo services) also belonged to the team in an ad hoc advisory capacity. Their inputs on the nature and interrelationships within the Group of each Strategic Business Unit (SBU) were instrumental in formulating an integrated solution for the entire company.

The Steering Committee was composed of the Managing Director, the Director of Finance (as Project Team Leader), and the Oracle project manager. The Steering Committee held monthly meetings to review the progress of the project. The head of the Oracle consultants attended meetings in an advisory capacity.

Implementation Constraints / Problems

During the various stages of the implementation of Oracle Financials, certain 'classic' or anticipated problems surfaced, but were efficiently and promptly dealt with by AEOLOS management. Again, good preparation, numerous system test runs, a clear vision of the whole solution, and effective communication of the features and benefits to all the users seem to have been the key success factors. The company devoted a lot of time and effort to personnel training. Yet, some resistance to change was natural and indeed, anticipated.

After five years in operation, the company is quite pleased with progress, though on the technical front, some delays in system reporting have occurred, presumably due to the nature of Oracle's database system, which requires massive memory capacity. On the operational level, the various suppliers and business partners are not electronically linked with the company's systems as yet. For instance, invoices by third-party bus and taxi operators are hand written. This creates delays in producing the monthly reports required to meet the reporting commitments of the company with respect to its global tour operator partner.

Managerial and Organizational Benefits

The entire Oracle Financial System with the interfaced third-party sub-systems has been in operational since 2000. The system undergoes periodic reviews and updates. Due to the significant costs involved, the company wanted to move cautiously, commencing with the financial operations. The functionality of the system over the last 5 years, and the resultant operational efficiency have encouraged the company to look further into the implementation of the other

phases as imagined back in 1999. As of the beginning of 2005, AEOLOS has launched an e-commerce enhanced module.

As shown in Figure 2, the system is mainly focused on the incoming tourism. In the INSO module, all the information necessary for the accommodation of incoming tourists is kept and processed, such as contracts negotiated with their partners and service providers, reservations, invoices transfers, etc. Thus, the organizational integration of all these operations is the main benefit of the system.

All these operations create value for the company. The ease of reserving hotel accommodation, airline tickets and other tourist activities makes the company highly efficient and provides the client with prompt service. The system provides a centralized view of ongoing operations and gives managers the ability to take the right decisions. The second significant advantage of the system is the promptness and efficiency in generating invoices to the company's suppliers, contractors, and other business partners.

In the words of the Director of Finance, George Ioannou, *"We have become much more efficient. We deliver all the same services as before, plus a number of new ones, to our clients faster, and we use fewer resources. Operationally, we are able to better integrate our database, and are able to access that data in a timely manner for making mission-critical business decisions. In addition, going through the Oracle Financials implementation, we have become a knowledge-based organization, and we are now in a position to leverage future technological improvements and process innovations. We expect to grow with the system over time, more able and better placed to offer new, more technology-based services."*

Translating the above quote from the Director of Finance, the benefits yielded by the implementation of the Oracle Financials solution are the following:

- Cost Savings
- Business Expandability
- Flexibility in business process re-engineering
- Readiness to cope with fact-changing trends in the tourism sector

Cost Considerations

The entire solution (Oracle Financials, NORCOM, PANASOFT, and the E-Business/E-Commerce module) cost AEOLOS upwards of 1 million CYP (about 1.7 million Euros). This is out-of-pocket expenditure, without counting the time opportunity costs of management and project or steering teams and the many hours devoted to user training. This is a considerable investment given the size of operations at AEOLOS. Yet, the Managing Director deems the investment in both time and money well worth it, *"We are a forward looking company, with a long-range horizon. We have been in this business for a long time and we intend to be pioneers for many decades to come. We view spending*

on technology as an investment, in much the same way we view investments in new product / services, new distribution systems and branch networks.”

E-Commerce Dimensions of AEOLOS Operations

The Past E-Commerce Situation (1999 – 2004)

Until the end of 2004, the company's e-commerce applications were limited to a website, which was still just a brochure site with limited user functionality. The site offered a wealth of information to the visitor on the company's business profile and operations. All products were listed and adequately described so that the website visitor could acquire information on the products and services on offer. Unfortunately, the information was static, without any interactive capabilities. No business transactions could be performed online. Users were able to submit their requirements for hotel reservations and expected the company to contact them with the relevant information. This asynchronous communication mode, although useful, needed to become synchronous through online reservations. Experience around the world and especially in the USA had shown that online reservation systems were very popular and used extensively by customers. Even in Cyprus, a latecomer to online reservations, Cyprus Airways, launched a very successful e-commerce web site in 2003.

Aware of the importance of e-commerce and the current trends in B2C e-business, the management of AEOLOS knew that in order to compete successfully in this new market environment, the company needed to launch a functional website. The customer needed to have access to updated product and service information as well as the possibility of transacting and interacting with the company in real-time. Online customers deserved the same prompt service as 'regular' customers. Realizing the importance of all these changes, in 2003, the company contracted a Greek company based in Athens to design and produce their new e-commerce interactive website. The firm undertook the task of integrating the e-commerce transaction functions with Oracle Financials.

The Present B2C E-Commerce Applications

As of the beginning of 2005, the company launched its E-commerce module. AEOLOS set up a separate pure online travel company under the trade name Bookcyprus.com (https://www.bookcyprus.com), and it is through this subsidiary that it offers online capabilities for hotel reservations, excursions, car rentals, transfer management, reservation retrieval, etc. The e-commerce module caters for the business traveller (small, independent tour operators and travel agents), as well as the individual online customer. Through this e-commerce module, the online travel agent may plan and build the entire travel itinerary of its customers in Cyprus, while the individual customer can make direct reservations for hotels, etc.

When the customer logs onto the website, he can select a hotel by location or by name, or by scrolling down the various special offers. After selecting a hotel,

he is presented with various accommodation options e.g. single or double room, sea view, land view, pool view, suite, pavilion, etc., each with its own 'price tag'. The e-commerce module brings the customer to the payment page where they fill in their personal details and credit card payment data. The same functionalities apply to the other services (e. g., excursions, car hire, etc).

The business customers of AEOLOS have been attributed passwords to access professional pages, offering the same functionalities. Each of these business customers is profiled according to their customers needs. Depending on this profile, they sign a 'financial agreement with AEOLOS. There are basically three alternative financial arrangements all purporting to make the reservation process efficient, while minimizing the financial risk:

1. For the more credit-worthy agents, AEOLOS extends a credit facility of an agreed amount. The concept resembles the functioning of a bank account overdraft facility. Within a certain limit, agents can book reservations without paying on the spot. Accounts are settled on a revolving basis as per agreed terms. This makes the reservation process very efficient.

2. For other agents, AEOLOS requests that they have an appropriate 'rolling deposit' to facilitate an average volume of business. This concept resembles the functioning of a debit card. Agents can book reservations up to the amount they have on 'deposit' with AEOLOS.

3. Thirdly, AEOLOS may accept the bookings on 'temporary' credit, but demands payment before arrival.

When a business customer accesses the AEOLOS' online reservations website at www.bookcyprus.com they are brought to a personalized webpage where the selection of hotels and other services is customized according to the segmentation profile of their clientele. In other words, only the selection of specific hotels or hotel category is listed.

Security Issues

Of course, management knew that the new e-commerce module would have to address the issue of security, a key concern for prospective online customers. AEOLOS subscribes to VeriSign to ensure payment security.[10] Security is very important for two reasons: the first reason is that financial transactions are involved and customers need to be reassured that their financial data will not be made available to others; the second reason is that personal data should not be made available to third parties either without prior consent.

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[10] VeriSign is a certificate authority providing public-key infrastructure (PKI) security solutions. It issues digital IDs to enable authenticated encryption that secure e-commerce and online payments across the Internet.

The B2B Applications of E-Commerce

A number of business functions are facilitated through the new e-commerce module (see next section for Supply Chain Management).

System Support Requirements

The company recognized that once the e-commerce module was developed, its maintenance and support would be equally important for effectiveness and proper usage. Many websites fail to attract customer interest due to outdated information and technical problems (ease of access and navigation, complexity in finalizing a transaction, too many clicks, etc. This dis-functionality results in unavailability and poor customer service.

Integrating applications over the Supply Chain

Toward the Management of the Supply Chain at AEOLOS

So, having gone through their ERP implementation of Oracle Financials and the development of their first e-commerce application, how did the company feel about the future, and how did they manage change and harness the ICT revolution? The following statement from the Managing Director sums up the company's strategic direction, *"Our long experience in the industry has taught us to be watchful of, and adapt to, industry trends. Globalization and the information technology revolution are two change drivers no one can ignore. Change cannot be stopped, but I believe change can be harnessed.*

There are two major change drivers in the Travel industry: 'Integration' and 'Alliance Building'. In the process of integrating the upstream and downstream ends of their supply chain, AEOLOS signed a significant strategic alliance with one of the pre-eminent tour operators in the world. The company will continue to expand horizontally and vertically, through strategic acquisitions in Cyprus and in neighbouring markets.

AEOLOS' Supply chain

The supply chain of AEOLOS is linked backwards and forwards to the point of contact with the customer. The customers can purchase tourist products and services individually and directly from each individual supplier, i.e. the airline companies, hotels, transport services, excursion and special interest events, restaurants, and others. Alternatively, they may secure all these through a tour operator, or a travel agent, or directly from AEOLOS.

With regard to incoming tourism, AEOLOS views the tour operators, the travel agents, the airline and ship companies as well as the Internet, as intermediaries that make the company known to customers, but also as backward-linked business partners. At the forward end of the supply chain, the business partners of AEOLOS are the hotels, the transportation agencies (taxis, busses, etc), the theme parks and restaurants where AEOLOS takes its

customers. At each and every stage of the supply chain, AEOLOS strives to derive added value for clients and by the same token, added value for the company. With regard to outgoing travel, the roles of the tour operators are reversed: the backward-linked supply chains now become forward linkages.

Components of the Supply Chain

In order to assist people with their travel arrangements, the company cooperates with specialist travel service providers. In general, these include travel agencies who retail travel products direct to individuals or groups, business travel agencies who specialize in providing travel for the business customer or promoting conference trade, tour operators that provide packages for individuals and principals that provide the basic services required by the travel and tourism industry, like transportation, accommodation, etc.

Travel Agents

AEOLOS cooperates with a number of other travel agents in Cyprus and abroad. They are responsible for providing the customer with advice and professional guidance when choosing a holiday or purchasing travel products. For example, they give advice to clients on destinations and make arrangements for transportation, hotel accommodation, car rentals, tours and recreation. They may also advise on weather conditions, restaurants, and tourist attractions. Travel agents act as 'retailers' for AEOLOS.

THE END USER

**DELIVERY MODE /
INTERMEDIARIES
(Using GDS)**

**RECEPIENT
AGENCY**

**VENDORS /
CONTENT
SUPPLIERS /
BUSINESS
PARTNERS**

**PRODUCTS /
SERVICES**

Tourist

Tour Operator

Travel Agent

Internet

AEOLOS GROUP

Airlines
& Cruise
Lines

Owners of
Hotels,
Villas,
Apartments,
Agro-tourism

Owners of
busses,
taxis, rent-
a-cars

Restaurants,
theme parks,
safari
services,

Hotel Accom-
modation

Transport
Services (A
Sea, inland

Inland
Tours /
Excursions

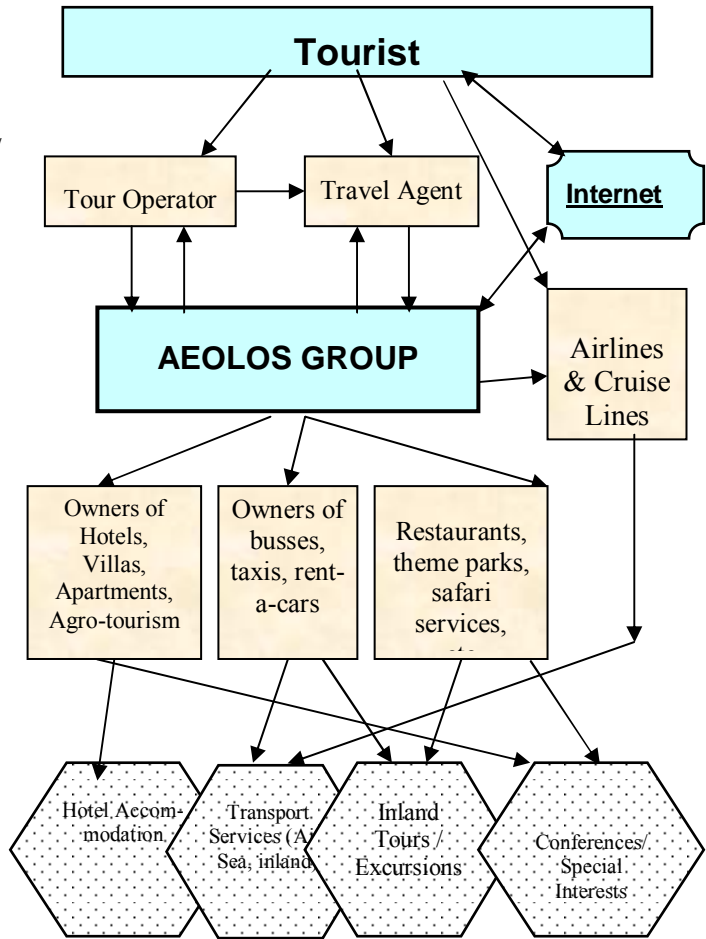Conferences/
Special
Interests

Fig. 3 : AEOLOS' Supply Chain

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Tour Operators

AEOLOS also cooperates with a number of tour operators in Cyprus and abroad. They are in charge of promoting special packages, travel programmes and brochures provided by company Most of this marketing work is performed directly with the customer but they also make use of websites, TV advertisements, call centres or travel agencies. The package holidays offered can cover a wide range of both local and international destinations and a variety of holidays, such as cruises, adventures, touring, winter and summer destinations. Tour operators act as 'wholesalers' for AEOLOS.

Transport Providers

AEOLOS cooperates with a number of airline and ship companies as well as bus, taxi and rent-a-car companies in Cyprus and abroad. AEOLOS also owns a number of coaches, mini-busses and taxis in order to satisfy the transportation needs of inbound tourism.

Accommodation Principals

Accommodation principals are the owners or operators of hotels, villas, apartment resorts or holiday cottages, which are available for rent to any traveller. AEOLOS cooperates with many owners of all kinds of accommodation all over Cyprus, ranging from 1 to 5 star categories.

Catering Facilities

Besides accommodation, travellers require catering facilities and principals provide a variety of food and refreshment outlets. These include cafeterias, self-service food selection areas or restaurants with waitress service. AEOLOS is under contract with many restaurants in Cyprus.

The B2B and SCM Applications of E-Commerce

Besides the B2C dimensions of e-commerce, the company also recognized the importance of on-line B2B applications. As presented in the company profile, AEOLOS is already collaborating with one of the largest global tour operators as well as with a number of varied local providers of leisure services. A B2B site would facilitate its business transactions. A number of business functions are facilitated through the new e-Commerce module, such as payments and reservations connecting their Oracle Financials ERP system to an Extranet with their suppliers and business partners. Contract negotiations, product and service acquisition or reservations, product and service payments can now be performed online.

The future e-business challenges of AEOLOS

E-Business is becoming indispensable for t any modern enterprise, especially for enterprises in the tourism sector. Companies that adopt technological

advances early will benefit most. AEOLOS still holds a competitive advantage in Cyprus, but the local market as a whole is lagging behind compared to the international development of ICT adoption.

Harnessing the Internet

To harness the capabilities of ITC, the company is investing heavily in integrating their systems across the supply chain. Although they have not quite finished, they have a clear vision of where they are going. As Sotos Stephanou commented, *"We will continue to capitalize on IT, especially on the Internet, to offer more products and services to more customers, more directly! Yet, we are very careful not to upset or destroy long-established value-creating business partnerships at both the forward and backward ends of the supply chain. Rather, where possible, we want to use the Internet to enhance collaboration across the supply chain."*

It is clear that the top management of AEOLOS has fully assessed the value and the role of the Internet as a powerful new tool that companies the need to strategically deploy and complement, rather than replace or upset, established and accepted competitive business practices.

Future B2B and SCM challenges

The challenge that remains for AEOLOS in the next phases of their ICT implementation is to strengthen relationships, on the one hand, with key suppliers and business partners, and on the other hand, with customers by integrating the entire supply chain. The company has an excellent opportunity to extend the use of ICT to all areas of their operations. The use of mobile network technology for communication with their suppliers by the exchange of SMS messages, reallocation of resources if an unexpected need arises, promptness in dealing with delays, cancellations or unexpected demand, will minimize cost and increase profit.

From the business partners' point of view, the company is considering the idea of providing hand-held devices to key employees and vendors such as airport ground control personnel, bus or taxi operators, cooperating hotels and restaurants. These handheld devices will be connected to Oracle via GSM and the data will be transferred directly into the system.

Moreover, the company's cargo operations are not integrated into the system and are handled separately. But after entering the European Union, this sector has been simplified immensely in terms of customs clearances, especially since the majority of products are transported to and from EU countries. The company can therefore facilitate the provision of this service to their business customers via their B2B site, or to their individual customers via the B2C functionality of their new e-commerce module.

Future CRM challenges

Ideally, the e-commerce module should provide and facilitate Customer Relationship Management, with help and responses to online user requests. Customized care through loyalty schemes should not be ignored. The company is not currently thinking of implementing a customer loyalty system. The local market although small, is generating a respectable volume of business and is likely to increase. The implementation of such schemes by other companies in the sector seems to have been quite successful and profitable, since it provides companies with tangible data about user behaviour and expectations and can enable them to provide better service and forecast user demands more accurately.

Other dimensions of e-business for the future

On the customer side, the company intends to further expand its e-commerce module to accommodate flight reservations and other marketing actions to increase direct sales. Additionally, the company plans to introduce the Human Resource Management module and perhaps a Quality Control module in the next implementation phases.

Questions

1. What motivated AEOLOS to implement Oracle Financials? Are these reasons consistent with those generally accepted as the norm in the ERP industry?

2. Was AEOLOS successful in their venture? In your opinion, what did they do right and what did they do wrong?

3. With the implementation of the E-Commerce module in the second phase of their ICT project, has AEOLOS succeeded in re-engineering business processes and in integrating informationally their stakeholders (suppliers, products/services, and customers)?

4. In a services sector such as travel and leisure, is an integrated supply-chain for AEOLOS as significant as for a manufacturing company? What are the underlying requirements for integration and what could the limitations be?

5. Are there any remaining risks in the implementation of the remaining phases of the ERP solution towards becoming an "integrated digital company," and are these risks manageable?

Annex 1 : Selected Cyprus Tourism Statistics
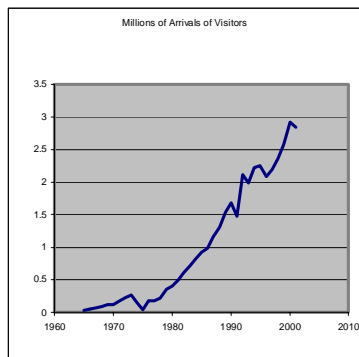
Arrivals of Long-Stay Tourists by Country of Residence				
	2001		**2003**	
Country	**Number**	**% of Total**	**Number**	**% of Total**
United Kingdom	1,486,703	58.19%	1,347,037	58.48%
Germany	214,153	8.38%	129,028	5.60%
Russia + CIS	128,532	5.03%	114,792	4.98%
Scandinavian Countries (Finland, Norway, Denmark)	143,393	5.61%	113,465	4.93%
Greece	89,763	3.51%	110,220	4.79%
Sweden	127,419	4.98%	86,819	3.77%
Switzerland	76,614	3.00%	37,500	1.63%
France	32,829	1.28%	31,413	1.36%
Austria	31,035	1.21%	25,889	1.12%
All Other countries	315,541	12.35%	307,083	13.33%
TOTAL	**2,554,887**	**100.0%**	**2,303,246**	**100.0%**

Millions of Arrivals of Visitors

Source: Statistical Abstract 2001, Statistical Service. Republic of Cyprus; and Cyprus Tourism Organization.

BED CAPACITY BY TYPE OF ACCOMMODATION	
Category	**2001**
HOTELS AND SIMILAR ESTABLISHMENTS	**87,366**
HOTELS	**78,488**
Hotels with Stars	50,820
5 stars	9,050
4 stars	18,983
3 stars	17,526
2 stars	3,998
1 star	1,313
Hotel Apartments	23,457
Tourist Villages	4,211
TOURIST APARTMENTS & SIMILAR ESTABLISHMENTS	**9,252**
OTHER COLLECTIVE ACCOMMODATION ESTABLISHMENTS	**4,056**
GRAND TOTAL	**91,422**

Source: Statistical Abstract 2001, Statistical Service. Republic of Cyprus; and Cyprus Tourism Organization.

Annex 2

Selected Financial Information

(NB: The revenue figures below have been sufficiently altered to protect the confidentiality of information of the underlying company)

Estimated Revenue (2003):	**CYP 5 million (about 8.5 million EURO)** **Expected growth rate for the next 3 years: 5 %**
Estimated number of handled incoming tourists:	**400,000**
Estimated number of handled outgoing tourists:	**50,000**

Relative Contribution of Activities / SBUs to Total Revenue	
Incoming Travel	**50%**
Airport Ground Handling	**15%**
Transport Services	**15%**
Outgoing Travel	**20%**
TOTAL	**100%**

Relative Contribution of Cost Elements to Total Expenditures	
Personnel	**60%**
Selling Expenses	**11%**
Rent	**4%**
External Services	**5%**
Depreciation	**12%**
TOTAL	**100%**

Annex 3 : Airport Services Benchmark Standards

Passenger Check-In

Baggage Sort ready for baggage (STD 2:30 hrs)
Counter preparation and serviceability complete (STD - 2:15 hrs)
Sufficient counters open (STD 2:00 hrs)
Queue lengths (< 3 pax - C Class) (7 pax - Y Class, with even passenger distribution)
Was check-in interrupted by baggage belt performance?(Info only)
Flight closed-out (STD 30 mins)
Final Load Figures passed to Load Control (STD 25 mins)

Passenger Arrivals

PSM available before STA (Info only)
Sufficient staff to meet aircraft (100%)
Passenger escorted to busses (100%)
Staff available at Arrivals area (100%)
First bag into Reclaim Area (ATA + 12 mins)
Priority Baggage into Reclaim Area first (95%)
Last bag into Reclaim Area (NBA: ATA + 20 mins, WBA: ATA + 30 mins)
Sufficient Mishandled Baggage staff in Reclaim Hall (100%)

Passenger Departures

Departure gate open, equipment and signage checked (ETD – 45 mins)
First boarding call or delay announcement made (STD – 40 mins)
Boarding commenced:
(Pre-boards: Prior to general boarding
Narrow bodied aircraft: ETD – 25 mins
Wide bodied aircraft: ETD – 30 mins
Executive Lounge: ETD – 20 mins)
Sufficient busses available for boarding (95%)
Last bus away from terminal (ETD – 12 mins)

Ramp Dispatch – Arrivals

Have Civil Aviation provided requested manpower and equipment (Yes/No)
Steps available on stand (ATA +/- 0 mins)
Sufficient busses available on stand (ATA +/- 0 mins)
Priority bags dispatched from aircraft (ATA + 6 mins)
Last bags from aircraft
(Narrow bodied aircraft: ATA + 14 mins
Wide bodied aircraft: ATA + 24 mins)

Ramp Dispatch – Departures

All docs [MET, AIS, FPL, OFP, CTOT etc.] available for ETD (100%)
ED message sent if ETD is more than +/- 15 mins from STD (100%)

All baggage at aircraft side for an on time departure (95%)
ULD Labels & Trolley Cards used and correctly completed(100%)
Transfer / Priority baggage correctly loaded (100%)
Catering change/on-load complete for ETD (100%)
Cleaning satisfactorily completed for ETD (90%)
Passenger & Hold doors closed (ETD – 5 mins)
Signed Loading Instruction received [where applicable] (100%)

Cargo – Import

All documents available at aircraft (ATA + 3 mins)
AWBs in office (ATA + 15 mins)
Processing of AWBs started by (ATA + 60 mins)
Warehouse distribution advice to Customs (ATA + 60 mins)
Offloaded inbound Consignments/ULDs advised (Before STA)
PO Mail ready for delivery (ATA + 60 mins)
Discrepancies advised to Carrier (ATA + 3 hours)
All ULDS checked for damage (at ATA)

Cargo – Export

Customer waiting time (Less than 10 mins)
Closeout for general cargo
(Wide bodied aircraft: STD – 5 hrs
Narrow bodied aircraft: STD – 3 hrs)
Closeout for Courier / Special cargo (STD – 1 hr)
Estimated load to Load Control (STD – 4 hrs)
Final Load to Load Control (STD – 60 mins)
Documents to Customs (STA – 30 mins)
Carrier advised of offloaded cargo (ATD + 15 mins)
Shippers advised of offloaded cargo (ATD + 60 mins)
All ULDs checked for damage (Prior to build-up)

Case: Gamma Inc., Lebanon

Authors: Chantal Chelala, Ayman Hodroj

Gamma Inc.[11] is one of the oldest retailers in the Middle East. Its principal holdings include the region's largest department store. With over 70,000 square meter of retail space, Gamma is the leading department store in Lebanon. In December 2003, Gamma opened a new outlet of 40,000 square meters in Achrafieh, Beirut's sophisticated and cultural neighbourhood, which became its new flagship department. The new outlet is expected to realize annual sales of USD 255 million, a 16% share of the USD 1.5 billion Beirut retail market. Taking into consideration the increase in demand that this new expansion is likely to generate, Gamma Inc. decided to implement an Enterprise Resource Planning (ERP).

Company Background

What began as Lebanon's first department store on Martyr's square in 1936, is now the local market leader. Gamma Inc. currently has 7 branches throughout Lebanon, employs more than 750 people and attracts over 3 million shoppers per year out of an estimated total Lebanese population of 3.5 million. The company is as an up-market department store chain aiming to satisfy a variety of customers by offering a wide selection of goods and convenient shopping in 12 departments, including family clothing, cosmetics and perfumery, footwear, house equipment and decoration, electronics and computers, toys, fabrics and crafts, jewellery. Gamma Inc. is committed to providing excellent customer service and maintaining standards of efficiency and professionalism in all domains.

Supply Operations at GAMMA Inc.

Overall Supply Process

Over the years Gamma Inc. has established processes that more or less fulfil its needs. The first phase is the procurement of local and imported merchandise. The next step concerns imported goods that have to be stored at the warehouse and later distributed to the stores. As for local goods, they are automatically shipped directly to the selling points.

Procurement

Gamma Inc. has approximately 500 different local and international suppliers. It imports 80% of its merchandise mainly from France, Italy, Germany and Spain, while 20% is acquired from local manufacturers. The local merchandise is sent

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[11] The name of the company has been changed for security and confidentiality reasons.

to stores on consignment[12]. The supplier is responsible for shipping merchandise to the warehouse, where it is tagged and then distributed directly to the stores without being stocked. As for imported goods, they are shipped from the port of Beirut to the warehouse and then distributed or stocked depending on their nature.

Gamma Inc.'s buyers, located at the central headquarters in Antelias, issue approximately 450 orders a year. Most of the orders are issued several months in advance. Actually, there are two seasons at Gamma Inc. For each season, the merchandise is bought at different trade-fairs in Europe. Buyers attend 10 trade-fairs in total per year and each of the twelve departments attends its own trade-fair. The number of orders varies depending on annual budgets. Forecasted purchases are estimated on the basis of historical sales data. Some adjustments for seasonality and trend are sometimes needed.

Warehouse

Gamma Inc.'s stores are supplied from wholly owned central warehouses situated in Antelias, northern Beirut. The warehouses cover a floor surface of 6000 m². Only the 'permanent merchandise' (ex: household merchandise) is stocked at the warehouse.

For 'seasonal merchandise' (e.g. ladies clothing), the warehouse operates as a flow-through warehouse, where incoming goods are immediately processed and shipped to the stores. If the merchandise is not sold, even after the sales, it is returned to the warehouse. This merchandise will then be reshipped the next season to the stores and will be re-offered either:

- as 'sale' merchandise,
- or with the 'new season', depending on its quality.

Operations in the warehouse include lot picking, ticketing, tagging and distributing merchandise.

The warehouse is staffed by:

- One full-time manager and his assistant
- 8 full-time 'stock keepers', in charge of stock entries and exits
- 15 full-time 'store keepers', in charge of delivery
- 10 full-time casual workers. During peak seasons, management use temporary staff to supplement the existing workforce (the number of workers can reach 16).

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[12] *Consignment inventory*: Inventory that is in the possession of the customer, but is still owned by the supplier. Consignment inventory is used as a marketing tool to make it easier for a customer to stock a specific supplier's inventory. The customer pays for the inventory only after it is resold or consumed.

On average, the warehouse receives 1.5 million USD of inventory per year. The inventory can differ a lot from one month to another. For example, for the period June – August, total inventory does not even reach 100,000 USD.

Distribution

After being centralized at the warehouse in Antelias, the merchandise is then distributed to the stores following recommendations from the buyers. The warehouse operates as a distribution centre. There are two distributions cycles of imported merchandise:

1. The first distribution cycle occurs when the merchandise is bought from the supplier. After confirmation of the purchase order, some of the merchandise is shipped to the stores, while the rest is stocked at the warehouse.

2. The second distribution cycle is intended to fill store shelves on a daily basis. This is the replenishment process. Once 50% of the merchandise in each store has been sold, the shelves are replenished. During the sale period, this replenishment rate is even lower. In some cases, transfers from one store to another are necessary when the warehouse is out of stock.

Local suppliers, on the other hand, distribute the merchandise directly to the different stores once it has been tagged at the warehouse. In order to transport the merchandise to the stores, Gamma Inc. uses 3 of its own trucks. The transport is done twice a day to the flagships stores: Dbayeh and Ashrafieh, and twice a week to the others. Transport costs are equivalent to 50 USD for each dispatch and could reach 60 USD for the stores farthest away (Zahle and Tripoli). The distances between the warehouse situated at the headquarters in Antelias and the different stores are presented in the table below:

Table 1 : Distances between warehouses and Gamma Inc. Headquarters

Warehouse – Dbayeh	5 km
Warehouse – Kaslik	8 km
Warehouse – Ashrafieh	12 km
Warehouse – Furn el Chebbak	15 km
Warehouse – Hamra	15 km
Warehouse – Tripoli	80 km
Warehouse – Zahle	80 km

In order to send the merchandise, a shipping order must be completed which generally takes from 30 to 45 minutes and costs about 500 USD. As for the transport of imported merchandise from the Port of Beirut to the warehouses, it is taken care of by the shipping agent. The merchandise is transported in containers and the transportation of each container costs 200 USD.

ICT and E-Business at Gamma Inc.

Description of the existing situation

Up until 2002, the company had a legacy system, comprising a number of separate applications and processes, designed specifically for the retail business. It necessitated manual operations at various different levels. For example:

- Storage: once the merchandise arrived at the warehouse from the suppliers, it had to be given a number, a description with all the references, the cost in currencies and in Lebanese pounds, the retail price, the reception date and the supplier number. All of these operations were performed manually.

- Transport: twice a day orders had to be delivered to the Dbayeh branch (the main branch before the opening of Ashrafieh) from the warehouse in Antelias, situated 8km away and twice a week for the other branches. The manifest had to be done manually.

- Distribution: there are two types of distribution. The first concerns the merchandise to be delivered directly to the stores and the second, the remainder stocked to replenish shelves in each store. The entire process once again was done manually.

Once the paper documents had been completed, they were sent by mail to Headquarters, where data was entered into the sales system. Then, the information was exported, using floppies, to the accounting application. This lack of inter-operability led to erroneous results at corporate level.

The ICT problem

In 2002 before opening the Beirut Mall, Gamma Inc. reviewed its entire operations and especially its supply chain management. It discovered several sources of inefficiency illustrating how existing processes and information systems wasted both time and money. In actual fact, the opening of the new outlet would require higher efficiency levels and standards had been set so high, that the retailer could not afford any errors.

However as already mentioned, the legacy system involved a number of separate applications and necessitated manual operations at several different stages (warehouse and price referencing, distribution manifest etc.). The new outlet would demand even more work and would therefore accentuate these inefficiencies. Moreover, two shipments of merchandise per day to Ashrafieh would mean higher transport and labour costs. An increase in demand and potential shortages in merchandise, especially during sales periods would require more reliable forecasts and efficient inventory management for accurate replenishments. So a solution had to be found.

Gamma Inc. realized that the existing situation was unsustainable - it had outgrown its system and needed to integrate operations in order to remain competitive and continue its growth. An Enterprise Resource Planning (ERP)

solution and platform had to be developed, one that would cover the complexity of the retail textile business and that could go live before the opening of Gamma's Beirut Mall, in December 2003. Time was a huge constraint for Gamma Inc.

Why implement an ERP at Gamma Inc.?

ERP provides the flexibility a company needs to improve customer responsiveness, on the demand side, and to better manage production needs and inventory, on the supply side. With an ERP system, Gamma Inc. would be able to replace its legacy system and build a new database. The ERP system would provide data consistency throughout the company and would integrate the following features:

- 'Resource planning' involves forecasting and planning, purchasing and material management, warehouse and distribution management, product distribution, and accounting and finance.
- 'Supply-chain management' implies understanding demand and capacity, and scheduling capacity to meet demand. By linking disparate parts of the enterprise with ERP, more efficient schedules can be established to optimally satisfy the company's needs. This reduces cycle time and inventory levels, and improves the company's cash position.
- 'Demand chain management' includes handling products configuration; quotes, pricing, and contracts; promotions and commissions. By consolidating information with ERP, contracts can be better negotiated; pricing can be established taking into account the whole company's position; and sales offices can be better assessed, rewarded, and managed.
- 'Knowledge management' requires a data warehouse, a central repository for the company's data. It then enables companies to performing business analyses on this data; thus providing decisional support for corporate management when creating future customer-based strategies.

The ERP implementation project

Gamma Inc. started planning in 2002 to implement a single Enterprise Resource Planning (ERP) information system throughout the company. The firm had chosen V5, release 3, from JDA Software Group, Inc for its retail activities and J.D. Edwards, which has now merged now with PeopleSoft, for its financial modules.

Project Team Structure

In order to implement the ERP system, a team was assigned to manage the project. The core team needed to have the appropriate skills and experience to manage implementation. A new MIS manager was hired in order to lead the implementation process and was thus appointed as the 'project manager'.

A 'steering committee' was formed with managers representing all major functional areas impacted by the new system. The steering committee's responsibilities included monitoring the status of the project, ensuring that key business issues were being addressed, reviewing and approving the major decisions and actions of the project team.

A 'technical support team' was composed from several IT professionals with the full time role of supporting each implementation process.

Evaluation of the ERP System and Vendors

Selection Criteria

Selecting the right package to perform business process improvements is an important decision for an organization. During the selection process, some general characteristics had to be taken into consideration:

- The package must fit the organization: organizations should look for packages that match their ways of doing business.The package must have features that are appropriate for the industry: in other words, the team will use the parameter tables in the package to tailor the system to meet the needs of the organization.

- Flexibility is needed to support a changing business environment.

- Interoperability with other systems is becoming increasingly important.

- Third-party hosting must be available for the package.

- Implementation support must be available.

- The package must be complete and stable.

In order to decide which package to choose, a team composed of various department members was formed. The selection team short-listed seven ERP vendors using:

- Results of selection projects from other organizations.
- Package selection databases.
- Literature on different packages.
- Vendor web sites.
- Other information.

The Management Decision

The ERP vendors were: Software Design, HP, Quantec, Olivetti, Oracle, JDA and J.D.Edwards. After several meetings, and presentations from the finalists, the team submitted its report and recommendations to the management board. Gamma Inc. felt that it had to choose two ERP solutions because of its complex financial system. Due to the Lebanese economy's 'dollarization', companies

were used to having two pricing systems: the first in Lebanese pounds and the second in US dollars. The ERP solution for the financial module had to take this into account.

Gamma Inc. management start planning for ERP implementation in 2002, and bought the system in 2003, just a few months prior to the opening of the Gamma Beirut Mall. The purchase decision was late in coming; timelines and budgets were tight! The Board of Management took the final very late with respect to the 'go live' date, and ignored the recommendations in the report. JDA was chosen by Gamma Inc. because it offered product features and functionalities that best fit the business requirements, and because of a price situated at around 800,000 USD. J.D. Edwards was chosen for the financial module because of its flexibility.

Key Features of the Selected Systems

(1) The JDA Portfolio® contains many solutions and aids in different areas:

- *Allocation and replenishment*: it decreases safety stock, improves service levels and increases sales. Using detailed demand and lead-time forecasts, this solution can help drive in stock positions while reducing excess inventory.

- *Merchandise management*: the merchandising system is at the heart of the organization. By automating the information management and operational requirements, this solution optimizes inventory levels, maintains a profitable product mix and responds rapidly to market changes.

- *Planning and forecasting*: the applications in this portfolio accumulate and assimilate information throughout the operations in order to present a single version of the truth. It creates strategic plans that gain the highest returns on the inventory investment and ensure the right assortments at the stores. It boosts the category sales, improves shelf conditions and lowers stock shortages at the stores.

- *Store systems*: it captures, manages, synchronizes and accesses key information at the point of sale and back office. From optimizing local inventory to building customer relationships, this portfolio empowers the sales associates with real-time information and executable options.

The applications covered by the ERP were Sales and Marketing, Logistics, Retail and Human Resources.

(2) The financial module from J.D. Edwards was chosen for certain advantages:

- *Flexible*: Changes, including reorganizations, new distribution centres, and new product lines, could be folded into the existing financial operations, without compromising the integrity of historical data.
- *Pre-integrated*: All of the financial and accounting solutions linked seamlessly with all other PeopleSoft EnterpriseOne solutions.
- *Collaborative capabilities and built-in interoperability:* The business processes could be easily extended to interact with the business partners.

The consultants

Gamma Inc. managers realized that putting two ERP's in place would be an enormous job, and would require a great deal of customization and integration. To assist them in all aspects of the project, Gamma Inc. contracted the services of an independent British consultant to implement JDA and a Lebanese company to implement J.D. Edwards. The consultants were hired in order to:

- Be their strategic partner from the planning phase right through to implementation
- Manage implementation
- Conduct knowledge transfers
- Provide training
- Be responsible for customization

The independent British consultant used to work for the vendor, and was supposed to help during the implementation process. He was hired for his expertise, which turned out to be inadequate, and because his rates were lower than the vendor's consultant.

He did however indicate the best business practices for Gamma Inc., but the costs ended up higher than originally estimated, the knowledge was not transferred to internal resources and he failed to understand corporate culture.

As for the Lebanese consultant implementing J.D. Edwards, Gamma Inc., hoped that working with him would be easier and cheaper owing to the fact that he was from a Lebanese company.

ERP Implementation at GAMMA Inc.

Project evolution

The project schedule and budget were extremely tight. The budgets overran even though the company still had to implement the J.D. Edwards system. The "go live" date was initially set before the opening of the Gamma Beirut Mall, but the company was compelled to sacrifice certain modules where bugs had appeared during implementation.

The JDA system went live on the 17th October 2003, a month and a half

before the opening of Gamma's Beirut Mall. The time constraint obliged GAMMA Inc. to go fast and that explains why the ERP system went live with only certain modules (sales and retail), and especially owing to the fact that some problems had arisen during implementation.

JDA's modules **scheduled** to be implemented	JDA's modules effectively **implemented**
Sales and marketing	Sales
Logistics	Retail
Retail	
Human Resources	

The J.D. Edwards is still in the implementation process. It still hasn't gone live yet. This means that the financial and accounting departments are still operating with the legacy system. The implementation process was not easy and several problems occurred which can be defined as either technical or organisational:

Technical Problems	**Comments**
Bugs	The ERP software was not sufficiently tested and some modules hadn't been used before
Integration	Lack of interoperability between the 2 systems
Customization	Standard system not adequate with the needs of the company
Organizational Problems	
Choice of consultant	Lack of expertise and high cost
Time constraint	Purchase decision taken too late
Training and resistance to change	Not enough time to prepare employees for change

Integration and customization

Gamma Inc. had to use an integrator because of the lack of interoperability between the two ERP systems. An integrator was chosen to develop an interface between JDA and J.D. Edwards. Gamma Inc. also had to customize part of the ERP systems. It turned out that the standard system did not address the specific needs of the company. So, the costs of integration and customization were underestimated and naturally, the cost of implementation was over budget.

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Current state of the SCM module

The SCM module is not totally implemented but Gamma Inc. has begun to use some features of the ERP system and tasks are no longer performed manually. The merchandise picking, PO confirmation, shipping are all generated by the new system. The company hopes to implement all the modules soon in order to take full advantage of the investment and be able to ensure customer satisfaction. After this first implementation, and in terms of project targets, we can hardly say it was a complete success.

Training and resistance to change

The implementation encountered a problem of resistance to change. People at Gamma Inc. did not fully understand the extent to which the systems would impact on their environment. They were doubtful of their capacity to acquire new skills in order to perform daily tasks. About 100 Gamma Inc. employees had to be trained on the new system.

The training sessions were given to a total of 15 managers and stock keepers, once a week over a period of two months. The rest of the employees were trained for 5 consecutive days prior to implementation. The consultants were in charge of the training.

Both managers and staff considered the final outcome of the ERP project to be 'good', but unfortunately, senior management had not yet seen the added value.

The future

Management now has real-time access to centralized, up-to-date information about the organization's overall performance levels. The next step will be to implement J.D. Edwards and exploit the advantages of the implemented ERP system. Managers sincerely hope they will reap the benefits of their investment.

Questions

1. Do you think that the management of Gamma Inc. had an overall view of the solution they were seeking to achieve?
2. Identify weaknesses in the various dimensions and channels of the operations of Gamma Inc. that you believe motivated the management of Gamma Inc. to implement an ERP system? Was the company able to avoid some of the common pitfalls in ERP implementation?
3. How do you evaluate the contribution of the consultants in Gamma's ERP implementation? Was the proposed solution appropriate?
4. One of the most successful integrated digital companies in the general merchandise sector is Wal-Mart. What best practices (benchmarks) can Gamma Inc. adopt from Wal-Mart's operations? In other words, identify the ways by which Wal-Mart successfully integrated its information systems to be customer-responsive (CRM) and gain efficiencies across the entire supply chain (SCM).

Case: Jerusalem District Electricity Company (JDECO), Palestine

Authors: Caroline Hajal, Saeed Zeidan, Wesam Salhi

Jerusalem District Electricity Company (JDECO) is an electricity distribution company in Palestine that started implementing electronic business to run all its operations. The company was able to overcome curfews, closures, and all other obstacles to maintain efficient business operations. While JDECO was on the edge of bankruptcy in the late 1990s, its annual profits now reach 4 million US Dollars thanks to the successful implementation of an e-business strategy.

Company Background

In 1914, Euripides Mavrommatis was awarded the concession to generate and distribute electricity to 1256 km² of the Jerusalem area by Ottoman authorities, and thus Jerusalem Electric Company (JEC) was born. Five years later, the Pinhas Rutenberg concessions to generate electricity were awarded by British mandate authorities for Jordan and Yarmuk rivers. During the year 1923, the Palestine Electric Company (PEC) was given the concession to generate and supply power to Jordan and Palestine. Meanwhile in 1926 and 1928 the Mavrommatis concession was reconfirmed by the British mandate authorities under the 1923 treaty of Lausanne.

In 1948, JEC concession area was split and PEC became Israel Electric Corporation (IEC) Ltd. Three years later, JEC registered as a Jordanian[13] company and became JDECO on 1956 – a Jordanian company with municipal owners. Throughout 1957, JDECO was owned by the Jordanian government. Two years after the June 1967 war, JDECO was registered as an Israeli private limited company and in 1970 the registration of JDECO was changed to a non private company. During the Israeli occupation, mainly in 1979 and 1987, JDECO's concession area in Jerusalem was reduced. In 1988 JDECO concession terms were prolonged for 60 Years by the government of the Hashemite Kingdom of Jordan, and since 1994 JDECO has been operating under two license/concession regimes – in East Jerusalem and in the West Bank.

JDECO before year 2000

Before the year 2000, no electricity was generated by JDECO, so it had to purchase electricity from the Israeli Electricity Company (IEC). IEC is the sole electricity provider in Israel and it provided electricity to JDECO through 15 bulk supply points. At that time, JDECO had 25 main substations with a peak load of 190 Mega Watt and 130, 000 customers all around its concession areas.

Most of JDECO's business processes and functionalities, especially the financial and administrative parts, were centralized at the Head Office in East Jerusalem. Decision making was entrusted to one person, far away from any

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[13] Palestine was at that time under full control of the Hashemite Kingdom of Jordan

decentralized duties and authorities. Operations during the 1990's were based on austerity and emergency measures. There were inadequate procedures and internal control and there was no control on the company's inventory. The company's information system was developed in-house and wasn't integrated. This was a heavy burden on personnel and, in addition to duplicating tasks, led to customer dissatisfaction owing to long and time-consuming procedures.

New management and a new vision

In year 2000 and as a result of new challenges at JDECO, there was a definite need to re-launch electricity generation in JDECO. Bringing in some 'new blood', the board of directors (BoD) hired a new visionary, creative managing director (Eng. Hisham Omari). He was selected by the BoD to spearhead the company through a new era. His vision was '*to make the company one of the three pioneer utility companies in the region by 2005*'. To accomplish this objective he - in cooperation with JDECO's experienced and energetic employees - put forward a plan. JDECO established a strategy cycle that consisted in the following four main phases:

- Vision: One of the three pioneer utility companies in the region by year 2005.
- Strategy: to make the company customer-oriented.
- Tactic: Decentralize the organization processes and implement modern tools.
- Operation: Establish new branches and warehouses in all concession areas and consider them as profit centres.

ESIMP Project

JDECO's financial position before year 2000 was weak owing to the large amount of customer debts, the hard economic situation, the difficulties in collecting dues, and the high operational costs. To overcome these problems, JDECO approached the World Bank[14] to obtain a long term loan, which enabled them to initiate their action plan. Fortunately, the World Bank accepted JDECO's proposal, and offered them a long term loan of 54 Million USD. This loan was part of a larger project named 'The Electric Sector Investment and Management Project – ESIMP'. The development objective of the ESIMP for the West Bank and Gaza[15] was 'to benefit electricity consumers, predominantly households, through sustainable improvements to the quality of electricity supply', with three main components.

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[14] The World Bank Group's mission is to fight poverty and improve the living standards of people in the developing world. It is a development Bank which provides loans, policy advice, technical assistance and knowledge sharing services to low and middle income countries to reduce poverty. The Bank promotes growth to create jobs and to empower poor people to take advantage of these opportunities.
[15] West Bank and Gaza are Palestinian Territories Occupied by Israel.

- The first dealt with the rehabilitation and upgrading of electric utility distribution facilities in the central West Bank and the Hebron governorate[16], and to implement a distribution dispatching centre for JDECO.
- The second component was to finance a management contract and technical assistance to strengthen sector institutions. This component comprised of four sub-components: 1) the three-year cost (fixed fees and performance incentive) of a performance-based management contract for the Southern Electric Company; 2) technical assistance to JDECO in areas where its own capacity had potential for improvement; 3) technical assistance to help the municipality of Hebron corporatize and commercialize its electric utility operations (business plan implementation); and 4) technical assistance to the Palestinian Energy Authority to implement the actions specified in the Letter of Sector Development Policy.
- The third component was to fund initial start-up and operating expenses and help strengthen both the Hebron and Southern electric companies' capacities to operate as financially sound and technically capable power distribution companies.

A "three-phase" strategy, a "five-year" plan

After obtaining the funds from the World Bank, JDECO put forward a 5-year action plan to fulfil its mission. The plan went as follows:

- Phase I: Restructure the company.
- Phase II: Build Solid Information and Communication Technology (ICT) infrastructures.
- Phase III: Automate all other services (implement added-value services).

Phase I: Restructuring the company

This phase can be described as re-building the company from the inside and from the outside. As a prerequisite of the future stages, this phase began towards the middle of the year 2000 and was completed by mid-2002.

Overview

In order to prepare itself for the 21st century, JDECO took the decision to review the current setup, processes, procedures and hierarchy in addition to making any necessary amendments and changes in order to build an appropriate and functional organizational structure. The new structure would provide JDECO with the ability to serve its customers quickly and efficiently in a professional way. JDECO's top management, along with the help of its

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[16] Hebron is a city in the south of Palestine

consultants invested a great deal of effort in order to complete this phase successfully and all employees, managers and engineers adopted the new structure. In addition, it provided employees with required training, since top management believed that this phase was one of the most important milestones in implementing JDECO's new strategy.

Goals and Benefits

The main goals of this phase were to create a new image for the company, enhance and refine business processes, improve customer service, improve relations with business partners, and prepare the infrastructure for implementing a fully integrated E-Business solution.

The motivations behind these goals were the negative perception of customers, the delay in delivering services and overall customer dissatisfaction.

Steps taken to achieve these goals

An international leading consulting firm called Norconsult AS – a Norwegian company - was appointed to conduct this phase. With its wide experience in this field and more especially in the electricity sector, Norconsult helped JDECO's management successfully complete this part of the project. A new organizational structure was designed (see Figure 1, below) in which new departments were opened such as the SCADA[17] centre, other departments were closed, such as stock accounting, and new jobs and job descriptions were created.

In addition, the company opened new offices and built new branch buildings, as in Ramallah and Bethlehem. It also restructured others such as the Jerusalem branch and Shu'fat main warehouse. In parallel to this, the company opened new warehouses in each branch to facilitate its operations in each area. This gave rise to decentralized business operations where each branch considered itself as a stand alone operating unit with full authority and control over its sub-branches.

From the technical point of view, JDECO began this phase by maintaining the electricity network in all its concession areas. New high voltage lines and new street lights were installed. New main stations were also constructed, new transformers added to the network and meanwhile the company replaced old and defected customer meters free of charge.

A major problem

The main problem facing JDECO during this phase was the fact that the company counted several

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[17] SCADA: stands for "Supervisory Control and Data Acquisition", which is a process control application that collects data from sensors and machines on the shop floor or in remote locations and sends them to a central computer for management and control.

ageing employees whom they were afraid would be unable to adapt to the new technologies and changes about to take place. However, JDECO's management proposed a compensation package equivalent to double their pension in order to encourage them to take early retirement. Some accepted the offer, but others didn't. And in the end, JDECO's transferred the employees to more suitable positions such as customer services and indoor office work.
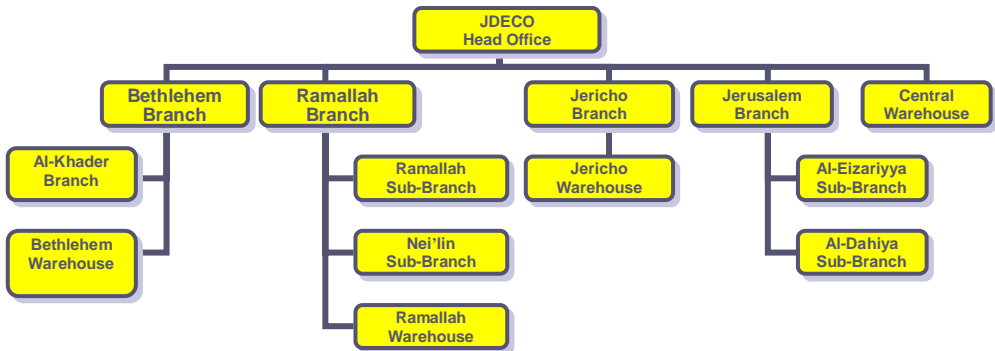

Fig. 1 : JDECO's New office and branches hierarchy

Phase II: Building the ICT infrastructure

The objective of this phase was to build a solid IT infrastructure and core applications i.e. ERP system that would covers all company operations, departments and branches. This phase started from towards the middle of 2002 and was completed by the end of 2004.

After completing the restructuring plan, JDECO had to implement some core applications with an ERP system in order to manage workload, facilitate processes and operations, and reduce future expenses. The responsibility for this phase was given to a local company called Arab Technology Systems (ATS) that won an international tender to implement and commission this phase. This phase was completed successfully.

Overview

In completing phase one, JDECO decided to implement a fully integrated Enterprise Resource Planning (ERP) system to cover the entire functionalities of the company and integrate all departments together, in addition to providing tools to monitor, control and analyze all business functions using the latest cutting edge technologies. This phase covered all procedures relating to business, customers, employees and shareholders and daily duties.

Goals and Benefits

The main goals and benefits of this phase were to create an ICT infrastructure that would enable the company to perform all kinds of business functions automatically and efficiently and increase business performance by means of cross-departmental integration. Moreover, the intention was to help employees perform daily tasks by eliminating duplicate transactions and entries through systems integration. Moreover, other goals were set to assist customers and answer their inquiries, reduce the time and effort required to perform certain business functions by means of automated services such as Hand Held Units (HHUs) and Electronic Data Interchange (EDI) solutions. Furthermore, JDECO aimed to increase the collection percentage by minimizing the number of employees needed to perform routine jobs and re-orientate them towards collecting receivables and debts, bearing in mind that most of the data entry employees were moved to the collection, connection, and disconnection department. JDECO's management was very concerned about its employees' welfare and managed not to make any redundancies during this period.

Steps taken to achieve these goals

JDECO strategy was to buy, and not build, all the equipments, tools, software and hardware from one vendor. The company decided to contract all of these services from one vendor in order to have one single communication channel and one focal point of contact. To implement this strategy, a two-tiered international call-for-tender was carefully prepared and announced by JDECO's international consultants. A total of 15 local and international companies responded and submitted their proposals. Roughly 6 of them were short-listed for phase II and the local company, Arab Technology System (ATS), won the bid. An 18 month plan was established for the completion of the project tasks.

Scope of Work

Within this phase, the Wide Area Network (WAN) (see Annex 1) was established to link all branches together with a high speed connection (Leased Lines) and a backup option in case of disconnection (using ISDN lines), in addition to a firewall for internet security reasons. Moreover, a Local Area Network (LAN) was established in each office and branch.

An integrated ERP Solution was implemented (see Annex 2) that covered the following four major areas:

1. A Business Management System (BMS) that included:
   - A Financial Management Information System (FMIS), which is designed to provide more than merely financial data to facilitate the work of decision makers by providing managerial reports and analysis.

- A Logistics Management Information System (LMIS), which includes purchasing, inventory and order management systems.

- A Human Resources Management Information System (HRMIS), which is a comprehensive package for effective management of human resource records that has the ability to collect, calculate, manage and report all employee information.

- A Filing and Archiving Management Information System (FAMIS), which captures and shares corporate knowledge in a controlled environment with the use of state-of-the-art technology.

- A Shareholders Management Information System (SMIS), which aims to serve the company's objectives by keeping a shares registry for all shares owned by the shareholders in an accurate manner and by handling all the administration associated with owners' shares, dividends distribution, and financial transactions.

- A Fleet Management Information System (FMIS), which is quite new in the Palestinian market, where the transportation management system handles fleet transactions including vehicle's information, licenses, insurance, maintenance, drivers' information, etc. All the systems are integrated together to form the Business Management System.

2. A Customer Management System (CMS), which contained two main modules:
   - A Billing Management Information System (BMIS) that is designed to handle billing and customer service activities through one integrated package;
   - Mobile Billing and Hand Held Units (HHUs), which is designed for meter reading and Billing activities. Speed, accuracy, and cost effectiveness are the strongest features of this System.

3. Electronic Data Interchange (EDI), which covers the relation between JDECO and certain business partners such as Banks, Tax Authorities, and Collection Centres.

4. An Electricity Network Management System (ENMS), which can be described as the remote control and monitoring of the electricity network. However, a data conversion process was performed to convert old customers' data into the new system.

The problems encountered

One of the main concerns pertained to the connection lines between JDECO's different branches and offices, especially the connection across the Israeli and

Palestinian zones. In order to resolve this problem, JDECO installed a backup ISDN line for each Leased Line in the event of cut-offs.

Another problem that JDECO had to overcome during phase was data conversion. Historical data was not complete and didn't match all the functionalities of the new system. A process of data verification and correction was performed to ensure data consistency and integrity.

Employees' lack of computer literacy was yet another problem. Therefore, basic and advanced computer training courses were conducted for all those employees at each branch. The training covered Windows Basics, Advanced Windows, Internet, and Microsoft Office.

Phase III: Implementing value added services

Overview

The successful completion of Phases I and II resulted in a highly functional and fully operational management, financial, and ICT infrastructure. JDECO management then planned to implement value added services to enable them to provide all stakeholders and customers with the very best in quality services through automating most of the company's operations and providing an online access through the intranet and internet. This phase was planned to be completed by the end of the year 2005.

Goals and Benefits

The main goals and benefits of this phase, as explained by JDECO top management, consisted in automating the rest of its business functions. This includes providing stakeholders with Self-Service tools to enable them to perform tasks remotely through the intranet and internet. Another goal was to increase the electricity network's efficiency by troubleshooting problems quickly through the information network and SCADA systems. Furthermore, they aimed to improve CRM by implementing a customer information system with physical locations, or in other words, a Geographical Information System (GIS). Finally, they intended to manage the company's fleet remotely by installing Global Positioning Systems (GPS)[18].

Scope of Work

In this phase, JDECO management planned to implement a Geographic Information System (GIS) and integrate it with the Customer Management System (CMS). By doing so, JDECO would be able to identify the customer's

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[18] (Global Positioning System) A satellite-based radio navigation system run by the U.S. Department of Defence. Using 24 MEO satellites for identifying earth locations, the first GPS satellite was launched in early 1978. By triangulation of signals from three of the satellites, a receiving unit can pinpoint its current location anywhere on earth to within 20 meters horizontally.

physical location just by querying customer information. This would accelerate the response time to customer complaints and inquires and hence increase customer satisfaction of JDECO's support and maintenance services.

They also planned to implement a Network Information System (NIS) and integrate it with the GIS and SCADA systems to enable JDECO to control the electricity network remotely and manage it efficiently and accurately. Moreover, they planned to install Automatic Meter Reading System (AMR), which is a system that enables JDECO to read meters and change its status remotely and online using the electricity network. A pilot AMR site is currently under testing in one of the areas near Jerusalem. After completing this project successfully, JDECO will start installing the AMR at all its concession areas step by step and phase by phase.

In addition to the AMR, JDECO started to install Pre-Paid Meters, which is a new type of meter that enables the customer to purchase electricity power in advance, exactly as they would pre-paid cellular phone cards. This method will increase JDECO's profit and cash income, in addition to giving customers autonomous control of their electricity expenses.

In parallel with the aforementioned plans, JDECO started to implement a customers' web portal to enable customers to perform certain tasks over the internet (Customer Self-Services). This service will enable JDECO's customers to inquire about their invoices, payments, applications and other online services using the internet. Meanwhile an employees' self-service system was implemented to enable employees to perform certain tasks independently and at a remote distance. At the same time, a Business Intelligence System was being installed to provide management with decision-making tools, what-if-analysis, and other supports to help them in their decision-making processes.

The impact on JDECO

The e-business implementation had a profound impact on the company. The implications were twofold: financial and administrative on the one hand and technical on the other. From a financial and administrative point of view, JDECO became more customer-centric with moderately satisfied customers. Employees' efficiency had also improved thanks to the integration of different applications and the eradication of duplicates. Moreover, throughout the new system, JDECO's top management could generate and produce financial and managerial reports, which enabled them to forecast and plan better. JDECO also diminished its rather bureaucratic and lengthy decision procedures and managed to lower average age of the workforce, with more motivated employees, capable of understanding change and willing to adapt.

Table 1: JDECO net profit

Year	Net Profit Before Tax
2001	-2,058,554
2002	-11,981,613
2003	18,395,049
2004	19,314,801
2005 (expected)	19,701,098
2006 (expected)	20,095,119
All figures are in New Israeli Shekel (NIS) (1 NIS is about 0.23 USD)	

The above figures show that net profit will increase considerably, which means that JDECO strategy is successful not only in improving management procedures, but also in increasing profit margins.

From a technical point of view, JDECO reduced technical and non-technical electricity losses through the implementation of the SCADA and network information systems, in addition to having more operational control over the network, clear command lines, and delegated authority with safety rules and regulations that resulted from implementing the NIS/GIS systems. Moreover, these systems allowed JDECO to improve its technical planning and competences.
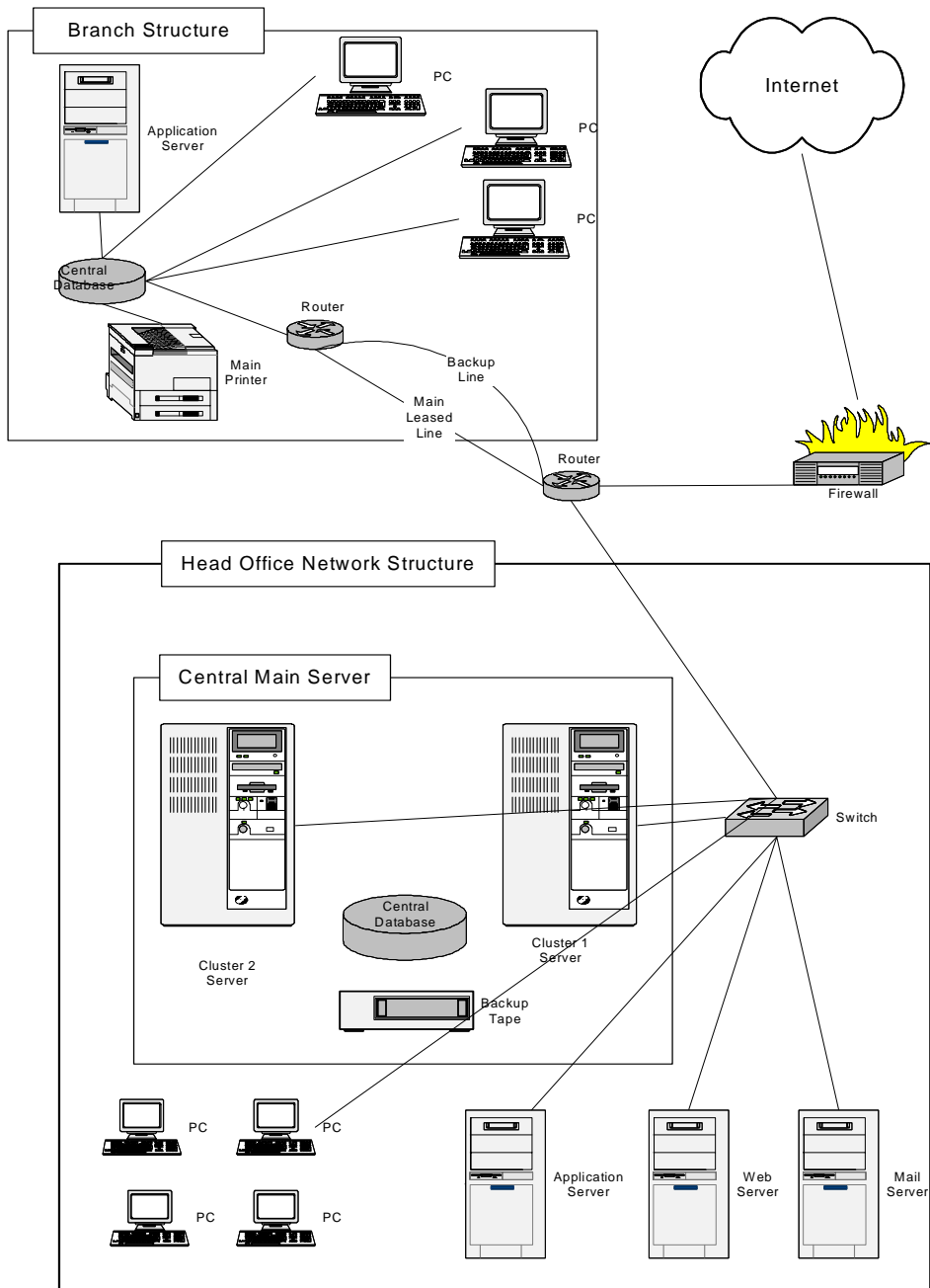
Future Plans

- JDECO's management plans to follow the evolution of the e-business to ultimately become an integrated digital company, in which all its stakeholders – Customers, Suppliers, Employees and Stockholders – have access to 24x7 online services.

- JDECO plans to reduce the operating costs by generating electricity instead of acquiring it from IEC, or at least find other sources for acquiring electricity from neighbouring countries such as Egypt, Jordan and Syria. This will also lead to reduced electricity costs for consumers.

- There is an opportunity for JDECO to merge with other utility companies in the future and broaden its concession areas.

- JDECO is willing to establish a new business line, where it would open up a new consulting department to proffer advice to other utility companies based on the skills and experience they have gained.

Case Questions

1. In your opinion, do you think that JDECO's experience represents a successful story in implementing e-Business strategy? Explain.

2. Do you think that the company's restructuring phase was essential for implementing e-Business in the company? Explain why/why not?

3. Can other utility companies replicate the same procedure that JDECO pursued in order to achieve the same results?

4. How can JDECO use the Internet to improve its core business functionalities?

5. Suggest and recommend other strategies, which can be adopted by companies' top management that lead to a successful e-Business implementation?

Annex 1: JDECO hardware and software infrastructure:

Annex 2: JDECO's IT building blocks

Added Value Services
(Hand Held Devices and Pocket PCs, Self-Services, SCADA)

Fully Integrated Enterprise Resource Planning Package
(Financial, Logistics, Projects, Order Management, Billing, Customer Care, Human Resources, Shareholders, Fleet, Archiving)

Wide Area Network with Reliable Options and Backup Solutions
(Connected all JDECO Offices, Warehouses and Branches)

Reliable Wide Area Network

Financial

Mobile Billing

Billing

IT Infrastructure

Customers, Suppliers, Employees

Archiving
Archiving

Portal
Portal

Shareholders

HR

Fleet

Fully Integrated ERP System