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TEPM 6301
Project Management for Technical Professionals

Partial Completion of the
Lucent Case Study Project

Monday, 7:00pm – 10:00pm

12/02/2004

Project Charter

Name of Project
TEPM 6301 Case Study of Lucent Technologies: Global Supply Chain Management

Team Name:
Lucent Team

Core Team Members
Lai Zhang
Wladimir Juna
Chad Van Zandt

Customers/Stakeholders:
Members of the Lucent Team
Dr. Gibson
Students of TEPM 6301

Objectives:
The primary objective of this project is to evaluate the case study and create a report detailing the pros and cons of Lucent's Supply Chain Management Strategy. In order to achieve this, we will:

a) Discuss and develop a project plan suitable for the cusses of the group.
b) Research this case study using sources other than the case to find additional information about Lucent.
c) Meet often to evaluate our progress and make any changes necessary to the project plan.
d) Complete a case study report to be turned in to Dr. Gibson for evaluation.
e) Each member of the team will develop written portions of the case study report.
f) Give a formal presentation of the project summary to the TEPM 6301 class upon completion of the case study.

Scope Statement:
The general scope of the project is to develop a team to evaluate the Lucent Technologies case study and to employ project management tools and techniques in doing so.

Project Duration:
The project will begin on the assignment date of August 30, 2004 and conclude at the end of the formal presentation on November 15, 2004

Roles and Responsibilities:

Name	Role	Responsibility
Dr. Gibson	Project Sponsor	Monitor project, sponsor, customer
Chad Van Zandt	Team Leader	Guide and manage team activity, assignments and communications. Team Assignments
Wladimir Juna	Team Scribe	Ensure that the team records are accurate and correct. Team Assignments
Lei Zhang	Team Gatekeeper	Meeting timekeeper and mediator. Team Assignments
Chad Van Zandt	Team Editor	Combine the individual work done by each team member into a coherent report to be submitted to instructor. Team Assignments

Approach:

As a project team we are tasked with a case study that details the various aspects of major change in the Global Supply Chain Management strategies of Lucent Technologies. We will use this case study to establish a formulated project management approach that we as a team can use to deliver a final written and oral presentation.

Ground Rules:

A) Conflict Management

If a conflict should arise, we will discuss the problem among the members until all parties involved are heard. At this point, we will take all views into consideration and try to arrive at a resolution. We want to make sure that all team members work together and that the working environment is as harmonious as possible. In the event of unresolved conflicts, the group will seek outside mediation to quickly resolve issues.

B) Decision-Making

The project should include the best work that each team member can achieve. All decisions within the group should be decided by team consensus. In cases of dispute, the elected team gatekeeper should mediate. Final decisions must be made in the interest of the project and with a majority approval by team members. The purpose of decision-making is to select the best options, and to use those options achieve the finest work possible.

C) Attendance / Tardiness

All team members will agree on reasonable time/date to turn in individual work to team leader. If work is not received by this time it will be considered late/tardy. All team members must realize that emergency circumstances do arise that will lead a fellow member to be late. If a member knows that he/she will be late on a specific assignment they must notify each of the fellow members. If a team member is consistently late (more than two assignments), the other team members will meet to determine a course of action and/or resolution.

D) Participation

Participation is mandatory from all members on all assignments, hence the name "team". All team members must be actively involved in all decisions, work, and meetings. We will make sure that each person's opinions are heard during each discussion. If we feel that a team member is not performing to their full potential, we will approach them and discuss the problem immediately.

Final Deliverables:

- Selection of team member roles and work breakdown
- Creation of charter and scope and other necessary project management tools
- Draft of written project report to be created to the entire team's satisfaction
- Final draft presented to sponsor
- Formal presentation
- Individual group evaluations

Key Assumptions:

- Team members will complete enrollment through the end of the semester (academic withdrawals & drops)
- Team members will be available for meetings and discussions taking into account work and personal schedules
- Cost has been considered and is not an issue

LUCENT TECHNOLOGIES

CASE STUDY

BACKGROUND

From 1984 to 1996, AT&T was an integrated telecommunications services and equipment company, having divested its Bell System operating companies. On September 20, 1995, AT&T announced its intention to restructure into three separate public companies. One of these companies was to focus on communications equipment, and would include AT&T's renowned research organization, Bell Labs, which was later named Lucent Technologies.

When it became independent in 1996, Lucent, which operated in more than ninety countries, was organized into four units, the largest of which was Network Systems. This unit generated 57 percent of the total Lucent revenues for the first year of operation. The Switching Solutions Group (SSG), which made the 5ESS@ Switch, was part of the Network Systems organization.

The 5ESS@ Switch

Lucent's flagship product was the 5ESS@ Switch. This was a large-scale, software based digital switching platform, which provided communications service for any type of signal over any medium. It connected end-users to central phone offices, and phone offices to each other. A full- sized 5ESS@ Switch was capable of serving up to 250,000 subscriber lines (connecting a phone office to an end user), and over 100,000 trunk lines (connecting phone offices to each other). The 5ESS@ Switch was based on a modular design, making it relatively simple to expand capacity. Customers included major telephone companies, which in some countries were state-owned. The 5ESS Switch was the world's most reliable and widely used switching system.

The 5ESS@ Switch Supply Chain Before The 1996 Redesign

In 1995, most production for Asian customers was done in Oklahoma City. The parts and subassemblies were then shipped to a staging center in Rocklin, California before being sent on to Asia. As the Asian electronics industry grew in the early 1980s, AT&T began to use parts produced in the region, which were shipped to Oklahoma City for assembly. This resulted in long lead times, as well as high costs associated with maintaining a parts pipeline extending from Asia to the United States and back again. By the late 1990s, more than 90 percent of all integrated circuits consumed in the world were packaged in Asia.

The long transportation routes lead to long transport time and cost. Basically, transportation cost is the product of volume and distance. The entire Asian product is transported by air, the most expensive, relative fast and vitally unique approach. Air carriage is about 20 times more expensive than ocean carriage and 10 times more expensive than land carriage. Also, long transportation times mean a longer customer service cycle. Many customers tend to order as late and expect delivery to be on time.

Long distance shipment extends the delivery time and some service demands go beyond Lucent's service capability causing break-down of its regular service system.

Because labor in Asia is cheaper, Lucent deciding to put its assembling center in the U.S. meant higher labor cost also.
In 1996, Lucent Technologies decided to address these problems by redesigning their supply chain for the 5ESS@ switch.

Lucent's Solution

Their solution was to change from the U .S.-centric supply model to a "hub-and-spoke" approach. In this model, Taiwan would be the hub of the Asian supply chain. Orders were placed with Taiwan, rather than New Jersey. Custom engineering and manufacturing of Asian orders would be done in Taiwan. The supply of parts to Asian joint ventures would come from Taiwan, as would technical support.

Parts procurement was also changed. Components that originated in Asia were identified and shipped directly to Taiwan rather than the United States ("direct procurement"). The joint ventures also sought out additional local suppliers to build assemblies from Lucent drawings ("local procurement").

Cost justification resulted in medium and high volume assemblies being built in Taiwan. Low volume assemblies remained in Oklahoma City, where costs could be spread over world-wide production. Assemblies that required expensive, specialized tooling or test fixtures also remained in the United States.

In the new system, most shipping is happening within Asia. Big volume intercontinental transportation is no longer needed. This decreases the overall cost (transportation, inventory, labor, and handling) and improves the customer service level. Some economic, door-to-door transport approaches could be easily applied. By 1999, 90% components are sourced from Asia.

Problems After Implementation

As Lucent reviewed the Asian situation in 2000, they realized that rapid changes were taking place, and that the situation had dramatically changed in the past few years. The year 2000 was an extremely challenging year for all manufacturers in the electronics industry. Due to unprecedented growth in the cellular and Internet sectors, component demand far outstripped supply, and unprecedented material shortages developed. Leading edge procurement arrangements were sorely tested, and in some cases broke down.

The supply chain redesign had focused on cost and speed. Parts availability had not been a problem in the past, and therefore not been a consideration. With the focus on costs in China and Taiwan, several Asian vendors did not make needed investments in new capacity. Lucent, like many electronics manufacturers, was vulnerable to this imbalance in supply. The problems could be broken down into five areas:

1. Sole-sourced component lead times more than doubled.
2. Inventories increased by about 25 percent, as assemblies could not be completed.
3. The Taiwan factory had to commit to early parts delivery to ensure availability.
4. Product shipments to customers were jeopardized, and orders were at risk due to an inability to ship on time.
5. Premium prices were required in order to obtain expedited shipments of missing parts.

Scope and Objectives of Our Analysis

For the purposes of this analysis we are looked at Lucent Technology's supply chain redesign done in 1996. We looked at their situation before and after the redesign analyzing their financial situation, market share, competition in the region, effect of the supply chain redesign, and threats to the continued use of the new design. We also looked at the opportunities that could be presented to Lucent in the near future based on the development of new technologies. Considering the manufacturing infrastructures in Asian countries had matured substantially since the 1996 redesign, we looked to see if the continued evolution of the supply chain was necessary. Based on our analysis of where and what Lucent is today, we have made some recommendations as to the direction the company should be heading in order to maintain their competitive edge in the

LUCENT TECHNOLOGIES FINANCIAL SITUATION

After a year that the Taiwan case note was discussed, Lucent Technology has decreased its profits significantly. The company's revenues in 1998 - 1999 were exceptional as reported in the fourth fiscal quarter paper of the company. Lucent's solid operational growth and successful cost management led to a 46.4% increase in earnings per share and the total revenues for this fiscal quarter of 1998 increased 51.8% over the comparable quarter of 1997. This was the result of the strong growth in Systems for Network Operators, Microelectronic Products, Business Communication Systems, and other system and products. [1]

Also, sales generated outside the United States increased approximately 49% over the year-ago quarter, with revenue expansion in all major regions, led by the Europe/Middle-East/Africa region. Revenues generated outside the United States represented approximately 29% of revenues for the quarter. Furthermore, revenues from sales of microelectronic products increased $29 million or 3.7% over the comparable quarter of 1997. Product sales were driven by increased sales of chips for communications and computing, including data networking, mass storage, network communications, and optoelectronic components. Increased revenues from power systems also contributed to this increase. From outside the United States, revenues increased approximately 12% in comparison to the year-ago quarter, led by gains in the Asia/Pacific and Caribbean/Latin America regions. In short, in 1998, the total revenues from outside the United States represented approximately 53% for the quarter. [2]

This shows us that the strategy implemented in their logistic operations played an important role in keeping the company in a high level of profits in the European and Asian Region.

In 1999, the situation also improved greatly and the stock price of the company increased to $64, 87.[3] With all these results, the company felt that its strategies produced its expected outcomes and therefore, the strategy of the new hub in the Asian region was on of these strategies that contributed in the success of the company. Financial data summary is presented in the following table to see the great performance of the company in those years.

	Year ended September 30	Year ended September 30	
OPERATIONS	1999	1998	CHANGE
Revenues	$38,303	$31,806	20.4%
Gross margin	$18,687	$15,091	23.8%
Selling, general and administrative	$8,166	$6,867	18.9%
Research and development	$4,496	$3,903	15.2%
Operating income	$6,025	$4,321	39.4%
Net income (excluding certain one-time events)	$3,833	$2,619	46.4%
Earnings per share-diluted[(d)] (excluding one-time events)	$1.22)	$0.86	41.9%
FINANCIAL POSITION			
Total assets	$38,775	$29,363	32.1%
Working capital	$10,153	$4,899	107.2%
Shareowners' equity	$13,584	$7,709	76.2%
OTHER INFORMATION			
Capital expenditures	$2,215	$1,791	23.7%
Return on assets	11.4%	10.0%	1.4 points
Debt to total capital	34.1%	37.6%	(3.5)points
Stock price	$64 $^{7}/_{8}$	$34 $^{5}/_{8}$	87.4%

Source: http://www.lucent.com/
Lucent Web Site: Financial History

However, in the years 2000 and 2001, the company had a considerable loss in its operational fields. According the financial data presented in Lucent Web Site, the operating income in 2001 resulted in a negative amount of 19,029 millions of USD against an expected amount presented in the pro-form of that year, which was 6,692 millions of USD. This big shortfall was due to an increased amount expended under business restructuring charges and asset impairments concepts which reached the amount of $10157 millions of USD. (see appendix A)

Due to the operational income shortfalls that came up in 2001, the company stock prices decreased in a great amount, from $30.50 in 2000 to $5.73 in 2001.[4] In the following years, stock prices have decreased as shown in the following figure.

Source: http://www.lucent.com/
Lucent Web Site: Financial History

With all these bad results, in 2003, one of the company's strategies to compete in the Asian region was the establishment of a new hub for telecom network products testing for the Asian Pacific in Singapore. However, even though the company made many efforts and applied several strategic plans, like the hub in Singapore, to compete in the difficult market of Asia, Lucent Technologies was not able to boost and equal their profits as much as those in the 1998 and 1999 years.

Nevertheless, by that time, many Chinese companies had started developing and providing IT infrastructure solutions at a much lower cost compared to Lucent's products. This has become now in one of the most important problems that Lucent is still fighting with.

One might think that the fact of taking the required technology to Taiwan to star manufacturing its communications equipment was assertive, however, it could be considered a wrong strategy either. When a company takes its know-how information into another country or region, it might be creating a great risk in terms of confidentially of the information –procedures and technology- . The information provided to the local employees about the technology used in the manufacturing process of its products could be taken illegally and applied into other products manufactured by the competitors companies.

POTENTIAL THREATS TO LUCENT

Quality of the Lucent's products – Product Quality

When Lucent applied its new supply chain structure, they knew that Quality of its products would be a critical threat. Therefore, Lucent implemented a strict quality control process of the new parts selected from Asian suppliers. A Lucent support group, independent of the local manufacturing organization, was in charge of these quality control activities and once they approved the candidate components, these were shipped to Bell Labs for certification. Also, new assemblies made in Asia were built using the same technology, manufacturing, and quality standards used in Oklahoma City. Lucent must maintain these quality control procedures in the whole processes of the company if it wants to be competing in this hard Asian market. Maintaining tight control over quality is critical, dealing with the local customs, legal, and financial issues become much more difficult in a global environment.

Technology short life cycle

An observation made in 1965 by Gordon Moore, co-founder of Intel, was that the number of transistors per square inch on integrated circuits had doubled every year since the integrated circuit was invented. Moore predicted that this trend would continue for the foreseeable future. In subsequent years, the pace slowed down a bit, but data density has doubled approximately every 18 months, and this is the current definition of Moore's Law, which Moore himself has blessed. Most experts, including Moore himself, expect Moore's Law to hold for at least another two decades. What this means for us is simple. Computers and technology in general will continue to get faster, smaller, and cheaper opening up the world market to competition from every corner of the globe.

Due to Moore's Law, Lucent has had to work very hard to retain a share of the world market. In the years since the case study was done, Lucent lost a lot market share because of this competition and has had to work constantly to improve their technologies as well as come up with newer, more efficient, cheaper solutions for their customers.

After Lucent spun off from AT&T, they became an assembly company, not a Research and Development company. Without the deep pockets of AT&T, Lucent had to take advantage of the technologies they currently had and cut back on Research and Development. Because of the short life cycle of electronics, the entrance of competition into the market, and the reduction of Research and Development, customization became very difficult.

Since the Technology life cycle is critically short, products can not become stagnant. Lucent must assign enough resources to the Research and Development to prevent them from losing the competitive edge. According to data provided in Lucent's web site, the company has the largest amount of Research and Development resources focused on the service provider market, which means they have more networking "know-how" than any of its competitors. Moreover, Lucent's philosophy states that in today's market

environment, an in-house Research and Development capability is an important differentiation as well as a strategic advantage. That's why the company continues to improve the alignment between its technology vision and business strategy, and approximately 60% of Lucent's Research and Development budget is invested in newer products, technologies and breakthroughs focused on this philosophy. The remaining 40% will support the more mature products that make up the foundation of Lucent's portfolio.

Lack of resources in Research and Development is a critical threat for any company where the innovation of its products is essential for its development and stability. It is imperative that Lucent keep investing in Research and Development, otherwise, it does not make any sense its presence in this technology market.

Technology and Information Security

One of the threats multinational companies like Lucent Technologies face is "Technology Information Theft". Information is the most valuable asset of a company and it must be strongly protected by all means. Since Lucent transferred its technology and manufacturer standards to Taiwan's Hub, the possibility of facing this information theft threat increased considerably.

Along the time, there have been several cases where internal employees sold technology information to competitors or, simply, they quit the company and joined its competitor entity in order to apply what they learned in the former company. Although the latter is not totally considered an information theft, it is still a leak of information that could harm any company where the technical data of a product or service is extremely sensitive since it might be a new technology or new critical strategy.

Lucent had this type of problems in 2001, where two foreign Research and Development scientists and another employee from Lucent were arrested and charged with stealing company trade secrets and giving them to a Chinese technology company in Beijing. Cases like this are potential threats that Lucent must know how to deal with; otherwise, competitors always will have one step further.5

A good example of the problems companies face in dealing with Information Security is a legal problem involving the biggest competitor of Lucent in Asia, Huawei Technologies. This company was sued by Cisco in January 2003, accusing China's largest maker of telecommunications gear of copying its intellectual property, documents and other material and infringing on several patents. The case had been pending in U.S. District Court in Marshall, Texas. However, Cisco decided to drop this suit since Huawei changed its command line interface, user manuals, help screens and parts of its source code, discontinued the sale of product at issue in the case and agreed to sell only new, modified products globally.

Culture

In the times of globalization, most multinational cooperation applies employee localization to avoid the culture gap. But even when they do this; there are still some problems. For example, in May 2004, the top management of Lucent china branch was fired because they bribe their customers, even though they did a really good job for Lucent. According the United States law, a United States company oversea branch is prohibited form using bribery in their business practices. However, in most development countries, bribery is a common competitive method.

China is considered one of the most unsecured countries in terms of copyrights issues. If we take into account that after establishing the lucent manufacturing process in Taiwan, Chinese companies start competing strongly in this field with products as well-done as Lucent's products. Now, these companies not only have equaled the quality but also pass the levels of this quality without increasing in a big amount its prices.

Certainly, this statement could be only a simple speculation, but copyright issues in these regions might be a key factor that should be considered in this analysis.

New Technologies

Lucent is taking advantage of its core technology strengths in optical, data and third generation (3G) wireless to offer segment-specific solutions for integrated wireline networks and mobility networks focused on the individual needs of the largest leading service providers around the world. However, Lucent's competitors such as Huawei, is to open a new research and development centre in Pakistan to further expand its business aboard. The centre will complement the company's existing Research and Development network outside China, including facilities in the United States, Russia, Sweden and India.

Switching Technologies

Lucent's multiservice switching solutions can expand ATM and Frame Relay (FR) services to reach more subscribers, transport existing services more efficiently, and offer customers more flexible bandwidth options. IP routing solutions enable service providers to integrate new value-added services to create new revenue streams. And service providers can optimize their networks using IP and Multiprotocol Label Switching (MPLS) with fully integrated network provisioning and management systems.

The market-leading *CBX 500*® Multiservice WAN Switch lays the foundation for next-generation networks. Deployed at the network edge, this 5 Gbps switch delivers Frame Relay (FR), Circuit Emulation (CE), IP carrier-class networking, and ATM (Asynchronous Transfer Mode), which is the international standard for cell relay in which multiple service types such as voice, video, or data. Together the quad-plane

redundant switch fabric, output-buffering scheme, and hardware implementation of ATM service classes ensure end-to-end Quality of Service (QoS).

A wide range of I/O modules lets you deploy unmatched port densities over fiber and copper at speeds up to 622 Mbps. Module-based processing of routing and signaling allows for network scalability.

Some of the key selling points of this switching technology:

- Scale, simplify, and consolidate converged public networks
- Extend ATM and FR services and add IP services through cost-effective multiservice capabilities
- Increase revenue potential with flexible bandwidth service offerings supported by Inverse Multiplexing over ATM, Multilink Frame Relay and subrate capabilities
- Deliver high speed ATM trunking and high-density ATM, FR and IP/MPLS services from one switch
- Differentiate services with QoS and preserve SLAs
- Proven carrier-class reliability, availability and fault tolerance
- Help ensure network reliability and reduce operating costs with *MXOS*™ Multiservice Switch Operating Software
- High port-densities, high VC support and distributed routing

The *CBX 500* switch is part of the Lucent multiservice switching portfolio, which includes the *CBX 3500*™ *and GX 550*® switches and the *PacketStar*® PSAX multiservice media gateways. Together, Lucent multiservice switches create a highly scalable and reliable network that you can customize to support existing and new services with a unified network management system.

COMPETITION ANALYSIS

Competition definitely constitutes a major threat that all companies face. When Lucent went into the Asian Market, they knew this threat was going to be really hard to deal with. Taking into account this fact, they successfully implemented the new supply chain for the Asian Market. This strategy certainly helped the company knock down its products prices; however, this plan is not the only one they may apply. In 2003, Lucent tried again its supply chain strategy and implemented a new hub for the Asian Region located in Singapore. This one, however, was oriented to telecom network products testing for Asia. In spite of its efforts to decrease its products prices, Lucent's products are still one of the most expensive ones in Asia.

Lucent needs to find another way to decrease its prices; otherwise, it will continue its profit problems and its competitors will continue taking a big part of the market.

Lucent in the Asian Market

The Asian market situation is totally different from when the case happened in 1998. Now the Chinese fixed-line teledensity (telephone per capita) and Wireless penetration (mobile phone per capita) both exceed 20%. If we consider the population of 1.3 billion Chinese, increasing volume of high speed telephone communications make it the far leading the market in the world. In dropping world market, Chinese became the only increasing market for Lucent. Lucent was awarded $ 0.18 billion PHS contract in the China Shandong province (Qingdao located) as well as several other provinces. According the Lucent senior management, China is the essential market in which Lucent could make up its deficits and get surpluses.

The main market of Lucent's switching technology –Taiwan, was already saturated. India plans to improve telephone per capita from 5.3% now, increase to 7% by 2005 and 15% by 2010. India along with China will be the main telephone market for Lucent.

Lucent's Chinese competitors (DaTang, ZTE, Huawei, and Siemens local joint venture) have already grown to be the world-class rivals and their business scope exceeded Lucent already. The communications industry is the only IT industry that has the Chinese corporations grasping at the core technologies. Once China grasps the core technology, combining their labor advantage and huge market, they can obtain an incredible advantage. Chinese competitors drove the switch price from $500 per line in 1992 to no more than $20 now. And they occupied a big part of fix-line phone market in developing countries; we know the main fixed-phone market is in developing country. For example, Huawei sold over 0.2 billion lines switch over 70 countries, almost equal the US total market. In 1999, Huawei international income was almost zero, but in 2003 it exceeded $1.1 billion and will be over $2 billion in 2004. This year, Huawei revenue has already exceeded Lucent and Nortel in the fiber business, their strong suit. In the same situation, China supplier quote price is at least 25% lower than the others.

After "dot com" bust of 2000, Lucent began hurting financially and its share price fell to

below $2.00 per share. The global market shows stagnancy. Several years must be taken to absorb the deposited investment on the telephone communication industry that is over invested during the period of the net bubble. The next generation communication technology is under developing and the old generation began to saturate in this period. The Chinese fixed telephone market started to slow down the growing speed after 2002. Accord the estimation, after 2005, another upsurge of the Communication investment in Asia will come. The represents product of this wave will be 3G, and NGN (next generation network). Now, as I know the GMS (European Mobil standard), CDMA (US standard) and Chinese own next generation standard are struggling in the Asia. The winner will be rewarded tens of billion dollars in contracts. Lucent should take advantage of its leading technology, grasping this precious opportunity to halt its downward spiral.

Chinese Competition

Today, the biggest competitor that Lucent Technology has is a local Asian Company, Huawei Technologies. Even though there are some other multinational companies fighting in this tough market, such as Siemens, this paper would like to focus on the local company since it is implementing different operational strategies which have made this company one of the leaders in the Asian Market.

Huawei Technologies was incorporated in 1988 and headquartered in Shenzhen, China. It specializes in the Research and Development, production and marketing of telecoms equipment, providing customized network solutions in fixed, mobile, optical and data communications networks. Huawei constitutes the key player in China's telecom market and is quickly becoming an active participant in the global telecom market. Huawei focuses on such areas as WCDMA, CDMA2000, NGN, xDSL and data communications and, through its continuous investment and efforts, aims to become a global leading player in those areas. Currently Huawei has 22,000 employees and sales in 2003 reached $3.83 billion[6].

In data communications field, Huawei Datacomm is capable of providing a full range of data communications products including total series router products and LAN switch products for low, mid, and high-end markets, as well as BRAS products, Security Firewall products, WLAN products, Internet Access Server products and VoIP GW/GK. The products offer high-performance and are customizable and cost-effective, addressing the diverse global market needs for today and tomorrow. With a self-developed software platform VRP and core ASIC chips, Huawei's data communications products have gained a strong competitive position in the market, providing customized end to end solutions with high quality customer service.

As of June 30th, 2004, more than 5,500 high-end routers, 268,000 routers and more than 494,000 sets of LAN switches have been installed in global networks. According to reports issued by IDC[7], Huawei ranked second as the most competitive routers and LAN switches provider in China for the years 2002 to 2003. In Chinese new backbone market,

Huawei high-end routers occupy the market share as high as 40% in 2003. The Siemens partnership is complementary to Huawei's existing Joint Venture partnership with 3Com in the Enterprise market and will expand Huawei's addressable market by leveraging Siemens installed base and market leadership in Voice technology.

LUCENT OPPORTUNITIES

Reputation

Bell Labs, the most famous engineering laboratory in the world, has 11 Nobel Prize recipients and is responsible for many milestone innovations for humanity. Those entire make Lucent a fame of the world science and technology leader in most of the people mind. This notoriety can be a major asset in a competitive market. Emerging competitors have products, sometimes at lower cost because they do not have the name recognition or the association with quality that Lucent has.

New Technology on the Horizon

In 2005, the next communication infrastructure investment wave will arrive. Chinese 3G equipment market is valued at about $30 billion. And according the situation now, three 3G standards (WCDMA, CDMA2000, and TD-SCDMA) are fighting for the Chinese market. According the situational now, Lucent could support two of the possible mainstream standards. If Lucent successfully selects the correct standard and occupies a considerable market share, the coming years will be Lucent another golden period.

RECOMMENDED SOLUTION

Move Hub to china

Move the Asia and Pacific hub and mass production center from Taiwan to main land China. Compared with the Taiwan, Chinese salary is about 85% -90% lower. Mainland land china has already matured in the circuit package production. Lucent Qingdao now could account for most of the advantages that Lucent Taiwan hub could have. Because of the Chinese surging market, Lucent Qingdao has grown up to $900 million in revenue, $250 million in exporting, $120 million in assets facilities, and holds one of Lucent’s four global integration centers. China posses the transportation infrastructure to support it’s becoming a supply hub.

In order to successfully move their hub of operations to China, Lucent should start by looking to see if their current facilities in China will do as a supply hub or should they work to find or build new facilities. In most cases it would be faster to retool an existing factory to make it work for their business needs than to build new facilities entirely. If it is found that their current location in China will not handle the heavy traffic required of a supply hub, Lucent must make a decision whether to build or buy new facilities, and then

begin the construction process. It is recommended that Lucent look first at its joint venture located in Qingdao. This is Lucent's largest joint venture and will be the most likely option in finding an existing location that, with a relatively small amount if renovations, will be able to support being a major supply hub for Lucent in Asia.

Lucent should begin planning their shipping plans, both local and international, at the earliest possible time in the project. This step is actually part of the process involved in making the decision to move the hub to china, but once the decision has been made, a more detailed shipping plan should be created. The company has to look into the available shipping resources and decide if they are adequate or will Lucent have to set up its own methods of shipping. Lucent has to deal with the problems of getting parts and products to the entire world, not just the local area, so working with the local companies and consultants will be a vital part of the move.

Human Resources should begin working on plans to hire and train the employees that will be working in the new factory. There are things to consider with this. The Taiwanese employees that wish to move to the new hub in China should be allowed to do so. This will reduce the cost of training new employees and, because of the lower cost of living in China, the Taiwanese transfers will be able to take a lower salary and still maintain or even upgrade their lifestyle. For the Taiwan employees that do not wish to relocate to China, Lucent must decide how to staff the new factory with personnel that possess the proper technical skills to maintain the company's level of standards. To do this, Lucent Taiwan should analyze the key personnel to see which positions will be difficult to hire locally in china. For those positions, workers should be brought in from China early in the transition process so that they can have plenty of time for training and education with the intention of sending the Chinese workers back to china to run the new facilities once it is fully operational. This will give Lucent the ability to not only train the new employees in their procedures, but they will also have the chance to watch on-the-job performance before sending them to take over a new facility. Once the new factory is up and running, the new workers should not be left completely on their own to run the operation. Lucent should consider sending an "opening team" in to help get the new facilities running smoothly. This opening team will be temporary, not a permanent position, so it will not be necessary for the team to completely relocate to China. The employees that will be hired and trained locally should be hired early enough to complete all necessary training before the new facility is ready to go live with production.

Develop Taiwan as a customized product-manufacturing center. Taiwan still leads mainland China in engineering capability. This tiny island is the densest IT product manufacturing industry in the world. The Lucent Taiwan joint venture is the best choice for the more customized products.

Research and Development and low cost production stays in Oklahoma

As lead time is not a major problem for low volume assemblies, they should remain in Oklahoma City, where costs could be spread over world-wide production. Lucent should analyze their product line to see which products are the lowest demand and would allow for the longest lead time. A cost/benefit analysis should be performed to decide which products would be the most cost effective when produced in the United States and not China or Taiwan. Once the decision has been made as to which products should be produced in the U.S., Oklahoma Lucent would be able to reduce their inventory because they would only need to carry enough stock to handle a very small amount of production. The rest of the resources could be shipped in as they are needed without a great expense on shipping because of the allowable lead time.

The United States is the most technologically advanced country in the world. This being the case, Research and Development should stay in the United States because of the access to the necessary skilled labor and expertise needed for product development. China, as well as many other countries have by far, a much lower labor cost than the United States, but you are limited in the number of highly skilled, experienced professionals that are needed for Research and Development purposes. Lucent would be wise in keeping the Research and Development in the United States. This helps to keep the company on the cutting edge. As more and more companies catch up with the technology, it will be easier for new companies to produce competitive products. The extensive R&D of Lucent gives them the advantage of being the industry leader. All other companies will have to follow the trends set by Lucent or they risk falling behind and eventually being overlooked completely by the consumer. When new products are developed and production begins on a large scale, it would be cheaper to send a small team or technical specialists to the Hub in China rather than moving the Research and Development department to China. Once the new product is deployed and production is going well, the team of specialists should be brought back to the U.S. to continue working on new technologies.

Joint Ventures with leading competitors in Asia

Globalization is an economic factor that is forcing companies to take some strategies to keep battling in the market. One of these strategies is Joint Ventures with leading companies from the competition or complementary industries. In March 2003, Huawei Technologies Ltd. and 3Com Corporation announced the establishment of a data communications equipment joint venture in China to carry out research and development, manufacturing, and sales and marketing. The Shenzhen-based Huawei company will own 51 percent and 3Com 49 percent of the Hong Kong-based joint venture -- "3Com-Huawei". Huawei will bring enterprise networking business assets, including LAN switches, routers, engineering, sales and marketing resources and personnel, and relevant intellectual property licenses to the joint venture. Meanwhile, a press release by 3Com-California (United States) said the company will invest 160 million Yuan in capital assets related to its China operations in the new joint venture.[8]

Also Huawei Technologies and the Siemens Communications Group have signed a cooperation contract. The agreement comprises integration of Huawei's network infrastructure products in Siemens communication solutions for enterprise customers, and will primarily cover the Huawei portfolio for Quidway routers and switches. Users of the Siemens HiPath enterprise solutions will be able to choose from an even broader range of products from leading manufacturers including Huawei when designing their network to take advantage of second generation IP applications.

Lucent should work to further develop its joint ventures across Asia to help maintain a dominant role in the telecommunications market in that region. To do this Lucent must look closely at the Asian market analyzing its own strategies and policies. It must continue looking at other, local, companies that have the ability to augment Lucent by providing something, such as parts, labor, clients, or services that Lucent is lacking in the area. In most cases, Lucent will be looking for a manufacturing company that will be able to produce the components needed to assemble the telecommunications technologies that Lucent is marketing to Asia. Lucent should approach these companies with a win-win situation explaining what both companies will get out of forming a joint venture. By entering into agreements with China based companies, Lucent will continue to make itself a dominating force in the telecommunications industry in Asia. Developing good, strong relational ties to the local market will be a great asset to Lucent as it makes its move into the Asian market. Lucent has been using joint ventures to assist in working in the global market for over 15 years, so this is something that Lucent is very experienced with and should continue to improve its joint ventures in Asia to capitalize on its position. Other companies have successfully implemented these strategies and are gaining ground on Lucent in the never ending race for market share. The further development of their joint venture relationships will help to prevent other, smaller companies, from taking valuable market share from Lucent in an ever changing global environment.

Joint ventures are not the only way Lucent can work its way into the Asian market. It should also be looking at consultants. Consultants usually have worked for several companies and have many contacts in the local market. Their clients could very likely be possible clients for Lucent. Although Lucent has over 20 years experience in the Chinese market, Lucent should look to consultants to assist with marketing and sales in the Asian market. Because of cultural differences, Lucent should look to these consultants to assist in these areas because they will understand the advertising and sales techniques that work the best in that area.

Lucent should enter into contractual agreements with consultants that have a broad client base as well as an expertise in telecommunications technologies, specifically switching technologies. By looking for consultants that have a great deal of experience in working with switching technologies and also a good reputation with their clients, Lucent will be greatly increasing the possibility that their products will be used as the solutions the companies are looking for. These consultants will have a client base that will supplement Lucent’s client base. In order for these consultants to enter into an agreement with Lucent, they must agree to promote Lucent’s technologies as solution to their clients’ needs. By enlisting these consultants, Lucent would be gaining a valuable asset that will

open the doors to many more opportunities. It is important for Lucent to maintain a positive image in the new market since their reputation, as good as it may be, may not be as well known in all instances as the reputations of the companies and consultants in the local area.

Conclusion

Lucent made a sound business decision when it redesigned its Global Supply Chain in 1996, but the world market is not stationary. As time moves on and technology advances, it will be to their advantage to continue to change as well. The design that worked so well in 1996 is not really the best design in today's market. Technology has gotten to the stage that many small companies are able to provide competitive solutions to those offered by Lucent. Therefore, Lucent must consider adjusting its supply chain to take advantage of opportunities in the Asian market. As China advances in its need for communications and technology, Lucent is in a position of move into that market and establish a strong foot hold before many other companies can follow. This will give Lucent the ability to setup strong ties with the local industry leaders, which will help them to maintain their leadership role in the global market.

By moving its hub to China, Lucent is able to reduce it operating costs as well as put itself in a better location with respect to its client base in the Asian market. By continuing to prioritize funding for Research and Development as well as maintaining centralized U.S. based Research and Development efforts, Lucent is able to sustain its competitive edge.

By seeking out more and more joint ventures it is establishing strong ties to the local industry leaders by offering them access to a larger and more powerful product line. Lastly, by establishing good relationships with a consultant base in China they are opening up doors to possible clients that, without help, they would not have had access to.

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