

**A STRATEGIC ANALYSIS OF AN INDUSTRIAL
WIRELESS COMPANY**

by

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ABSTRACT

OMNEX Control Systems Inc., has been the prime innovator in the field of wireless I/O links for system-critical industrial applications. As a small, self-financed high-technology company, OMNEX faces many new challenges. This paper describes and analyzes the company and its products, markets, competitors, and industry with a focus on the company's strategic efforts.

The industry within which OMNEX operates can be described as wireless devices for industrial, commercial, and mobile machine applications. This is an emerging industry and growth potential looks promising. Currently, most competitors are small and rivalry is low. The threat of entry for this industry is high. The bargaining power of customers and suppliers are both very high, and the threat of substitute products (primarily wires) is high.

OMNEX is pursuing a differentiation strategy. The company differentiates itself through superior product quality, reliability, and functionality. OMNEX supports this generic strategy through high innovation and R&D activities. The company's marketing activities and capital structure do not support its differentiation strategy well.

Analysis suggests that OMNEX should undertake a technology leadership strategy along with its existing differentiation strategy. The accompanying marketing strategy would include rapid skimming, which uses increased promotion to create awareness in the marketplace and enables retention of higher pricing than competitors. Alliance partners should be used as a mode to gain access to complementary core competencies and to provide valuable learning opportunities.

In order to achieve technology leadership and increase marketing activities, equity financing is recommended. Equity investment will help resolve infrastructure and execution issues by enabling the hiring of qualified staff in a number of key areas. These areas include R&D, manufacturing management, manufacturing engineering, IT, and service leadership. This investment would also provide the cash needed for globalization and IP protection activities.

DEDICATION

This project is dedicated with love to my amazing daughter, Sarah. Your intelligence, talent, and perseverance inspire me daily. I am so proud of you. To my parents whose support and unfailing love were instrumental in helping me pursue my dreams. Thank you and I love you.

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LIST OF ACRONYMS

CAD	Computer Automated Design
DCS	Distributed Control System
DIN	Deutsches Institut Fur Normung (German equivalent to American National Standards Institute)
DSSS	Direct Sequence Spread Spectrum
EMI	Electro-Magnetic Interference
ERP	Enterprise Resource Planning Software
FHSS	Frequency Hopping Spread Spectrum
GHz	Gigahertz
I/O	Input/Output
IEEE	Institute of Electronic & Electrical Engineers
IP	Intellectual Property
IPO	Initial Public Offering
ISO	International Organization for Standardization
JIT	Just in Time
LAN	Local Area Network
MHz	Megahertz
MOU	Memorandum of Understanding
NPI	New Product Introduction
OEM	Original Equipment Manufacturer
PCB	Printed Circuit Board
PLC	Programmable Logic Controller
R&D	Research and Development
RF	Radio Frequency
RTU	Remote Terminal Unit
SBU	Strategic Business Unit
SCADA	Supervisory Control and Data Acquisition
SR&ED	Scientific Research and Experimental Development
SMT	Surface Mount Technology
TPC	Technology Partnerships Canada
VDC	Venture Development Corporation
VMI	Vendor Managed Inventory
WIO	Wireless Input Output

1 COMPANY OVERVIEW

OMNEX Control Systems Inc. is a Canadian-controlled private corporation operating in Port Coquitlam, British Columbia. The company was founded by three friends in September, 1986 and was originally incorporated under the laws of British Columbia as OMNEX Engineering Limited. The company started active business in 1989 providing industrial users with state-of-the-art radio remote control systems. In 1996, the company's name was changed to OMNEX Control Systems Inc. to better reflect its shift in focus from engineering to developing products. In August, 2001, one of the three founding shareholders was bought out by the remaining two shareholders. These two original founders continue to own and operate the business.

In the early years, OMNEX developed radio control products for logging carriages. In the early 1990s, OMNEX developed radio remote control products that were used to control valves and actuators on heavy equipment requiring mobility, safety, and reliability. In 1996, the company signed a supply agreement with Schwing America, the largest concrete pump manufacturer in North America. During this time, sales grew rapidly, and, since the mid-1990s, OMNEX has been the principal supplier of wireless controls to the mobile boom industry. During 1998 and 1999, approximately 85% of the company's revenues were generated through Schwing America sales. Recognizing its economic dependency on this one customer, the company increased its research and development (R&D) spending to develop new products that it could sell to other customers and markets.

As a result of these R&D efforts, a family of wireless input/output (I/O) products providing one-way and two-way wireless monitoring and control solutions was developed. The introduction of this product line led to OMNEX becoming a leading manufacturer of "trusted" wireless products; reliable proprietary wireless link systems used as replacements or substitutes for cable to provide "last mile" connectivity in mission-critical industrial, government, and municipal applications. Trusted refers to the fact that customers depend on the devices to not fail, or to fail safely if they do fail. Approximately 50 distributors sold the I/O products to the North American market.

In the spring of 2003, OMNEX signed a Memorandum of Understanding (MOU) with Phoenix Contact, a C\$1 billion global company headquartered in Blomberg, Germany, granting Phoenix Contact exclusive distributor rights of OMNEX's I/O products

worldwide. Phoenix Contact is a worldwide leader in the manufacturing of industrial automation, interconnection, and interface solutions.

The signing of this agreement was attractive to OMNEX for several reasons. First, this channel consolidation alleviated channel conflicts OMNEX was experiencing at the time between Phoenix Contact and other OMNEX distributors. Second, the agreement provided OMNEX with the resources and marketing knowledge it needed to penetrate the market more rapidly. At the time the agreement was signed, most of OMNEX's competitors were small; however, it is expected that larger players will enter the market in the near future. As an attempt to gain significant market share early, OMNEX partnered with Phoenix Contact to take advantage of its marketing expertise and the 1,000-person strong sales force which will enable OMNEX to achieve faster global penetration. Third, OMNEX's original distributors had already expressed that if the products were sold under a well-known brand name such as Phoenix Contact, the products would be easier to sell. Furthermore, allowing the existing OMNEX distributors to sell radios under the Phoenix Contact name would allow them to sell more products. It would also give these distributors the opportunity to sell the complementary Phoenix Contact product line, which they did not have access to previously. Finally, this channel partnership provides both companies a strong competitive advantage. OMNEX would supply Phoenix Contact with a radio that no company has been able to match in quality and reliability, while OMNEX would have a channel to the global marketplace.

To enable OMNEX to continue to build brand awareness and leverage the partnership with a well-respected large organization such as Phoenix Contact, the products are co-branded, and bear the labelling: "Powered by OMNEX Trusted Wireless" for radio products developed and/or manufactured by OMNEX and sold through the Phoenix Contact channel. Phoenix Contact is planning an extensive publicity campaign around the agreement that will establish instant credibility and brand awareness for OMNEX in the untapped global markets. Phoenix Contact will commit to specific sales volumes which effectively guarantee OMNEX's projected sales growth for the next two years on products sold through the Phoenix Contact channel. OMNEX will also benefit from Phoenix Contact's purchasing power with component suppliers and from access to Phoenix Contact's in-house product certification test laboratories. Phoenix Contact benefits from the relationship with OMNEX by obtaining a wireless product it does not have the in-house R&D capability to develop. These wireless products also complete its

line of industrial products thereby providing its customers with a more complete, one stop product offering.

To date, OMNEX's founders have successfully created a profitable and growing company, based on proprietary secure wireless communications technologies developed in-house by the company's R&D group, which now consists of 24 people. The OMNEX engineering team draws from years of combined experience in satellite and microwave communications, modem design, coding techniques, data processing interfaces, analog and digital modulation systems, microprocessor hardware and software development, and radio remote control packaging techniques.

All products are produced in OMNEX's factory in Port Coquitlam, British Columbia. The company currently occupies two buildings. Corporate Headquarters is in a 10,000 square foot office space that the company owns and houses the company's finance, administration, human resources, Information Technology (IT), R&D, and sales and marketing functions, employing a total of 45 people. The company leases an additional 2,000 square foot space next to its headquarters that is currently occupied by a five-person service/repair department. OMNEX's manufacturing is located in a leased 12,000 square foot building within walking distance of its corporate offices. The company employs 54 people in its manufacturing facilities. In total, OMNEX currently employs 104 people.

OMNEX achieved ISO 9001:2000 quality assurance registration in 2002. The company has been profitable for the past 13 consecutive years and its most recent financial results saw OMNEX achieve \$C11.8 million in revenue. It is expected that the current fiscal year will see the company achieve approximately \$14.5 million in revenue, a 23% increase over the previous year.

The company is led by a five-person Executive Committee consisting of the two owners (the President and Vice President of R&D), the Sales and Marketing Manager, the Production Manager, and the Manager of Finance, Administration, and Human Resources. Until recently the company had a traditional functional organization structure.

OMNEX has two distinct product groups known as Portable Wireless (Remote Controls) and Industrial Products. These two product groups are sold in different markets and through very different channels; however, the company's core proprietary

technology, frequency hopping spread spectrum (FHSS) radio, is shared across these product groups. In recognition of the two distinct product groups, the company was reorganized into two market-focused Strategic Business Units (SBU) and five corporate resource groups to service the SBUs. The new chart is organized in a matrix with most managers reporting to an SBU manager and a corporate resource manager.

This new structure was initiated to give the SBUs the freedom to organize around activities that would add the most value to their customers. The corporate resources groups were created to ensure that initiatives remain consistent with the corporate strategies within each function of the business, such as shared technology, factory automation and methodologies, ISO compliance, and centralized information technology. Over time, it is expected that the two SBUs will become profit and loss groups with corporate financial reporting reflecting these SBUs. As this change took place mid financial year, 2004, the SBU financial reporting will likely not occur until at least the year, 2005.

As a small, self-financed high-technology company, OMNEX faces many new challenges. This paper will describe and analyze the company and its products, markets, competitors, and industry with a focus on the company's strategic efforts. The validity of the company's activities with respect to its growth targets will be analyzed and assessed; appropriate recommendations will be made based on this analysis and assessment.

2 PRODUCTS

OMNEX's radios are based on frequency hopping spread spectrum technology, a proprietary technology that "hops" to 50 different frequencies every second within the 900 MHz band. A key advantage of the FHSS technology is that the restriction to low data rates means it achieves maximum interference suppression and guaranteed transmission reliability. Therefore, multiple radios can be used in the same area with no frequency coordination or licensing.

The 900 MHz band is license free in the Americas and Australia; however, most other countries in the world operate in the 2.4 GHz band. OMNEX is developing an innovative hybrid of direct sequence spread spectrum (DSSS) and FHSS techniques, which will be able to satisfy both the regulatory requirements of minimum bit rates and the target industrial applications.

OMNEX has nearly completed the design of a 2.4 GHz wireless engine. This platform will continue to be developed to achieve the performance and reliability criteria demanded by OMNEX's "trusted wireless" internal standards, along with the cost, power consumption, and physical size constraints demanded by industrial applications. Technology advances resulting from the 2.4 GHz work will be applied to the 900 MHz band, where appropriate, and potentially to additional unlicensed frequency bands, as required by the market. Originally designed for the Industrial Products line, 2.4 GHz technology will be migrated into the Portable Wireless product line so these products can be marketed globally, as well as to North American companies with global sales.

Future development will include a range of network and remote interface technologies, required to integrate the 2.4 GHz trusted wireless technology into real-world industrial monitor and control systems. Future development will also include miniaturization technologies to reduce the size and cost of trusted wireless products to meet the requirement of new applications and maintain OMNEX's competitive position in the market. This technology development will include a wide range of enabling technologies, including Radio Frequency (RF) hardware, digital signal processing, control algorithms ensuring reliable and fail-safe operation, packaging (ergonomics, shock-proofing, weather-proofing, miniaturization), power consumption/conditioning (extended battery life, solar power), multiple access protocols and design for

manufacturability, all of which are necessary to meet the rigorous requirements of the industrial work site.

Successful development of the technologies described in the preceding paragraphs will greatly expand the markets accessible to OMNEX. Specifically, these technologies will enable OMNEX to develop products that: (a.) can be sold wherever the 2.4 GHz band is available for unlicensed operation, (b.) can be adapted for new and more demanding applications (such as battery-powered remote sensors), and, (c.) can compete on price as well as performance with competitors' offerings.

Within both the Industrial Products and Portable Wireless product groups, OMNEX could be considered an innovator. Although there are competitors building similar products, OMNEX's products are generally technically superior; most competitors have to play "catch up" to achieve OMNEX's radio performance, packaging, and product functionality. As such, OMNEX is committed to satisfying customer expectations and needs, and striving for excellence through continual improvement and by providing quality products and services conforming to customer, regulatory, and internal requirements.

2.1 The Portable Wireless Group

Trusted wireless products offer mobility, flexibility, quick installations, and a way to get around physical obstacles (such as paved ground, rivers, and buildings) that can make cable installations difficult. In the case of remote controls, wireless operation enables operators to move around equipment unencumbered, which generally improves productivity, safety, convenience, and lowers maintenance costs.

Within the Portable Wireless business there are two product lines: the Classic line and the Origa line. The Classic line of remote control systems for industrial users has become the "radio of choice" in the heavy construction industry since the early 1990s. These Classic radios are used to operate a multitude of industrial equipment, often characterized by the use of joysticks as the primary user interface.

Within the concrete pump industry, the OMNEX brand name is well known and its remote control products are generally viewed as being of higher quality compared to its competitors. Schwing America has an exclusive agreement with OMNEX to purchase

its 900 MHz spread spectrum radios for Schwing America's concrete pump trucks. Schwing America's share of this market is just over 50%.

To supply end users other than Schwing America customers, OMNEX uses an older model, 450 MHz remote control which provides dependable service a decade after its initial introduction. This product uses a unique identification code for each transmitter/receiver pair to ensure that no two systems will conflict on a job site. Other products in this family are used for boom control, cranes, lifts, locomotives, mining and drilling equipment, digger derricks, fire apparatus, and marine equipment.

The OMNEX Origa line was launched in 1999 to provide end-users and the original equipment manufacturer (OEM) radio remote control systems that give machine engineers maximum versatility. It integrates easily to machines that require on/off, voltage, Pulse Width Modulation, current and a CANbus (Controller Area Network bus) protocol to activate the hydraulic control components on the machine. The Origa line is a lighter-weight, less expensive solution used for a variety of mobile equipment including truck mounted cranes, trench compactors, line pumps, and man lifts to name a few. Although the full suite of products is relatively new, the Origa line has achieved recent success by securing a number of OEM contracts. Several of these OEMs have received beta products, first production runs, or evaluation units for testing on their equipment; these OEMs are preparing to order products in larger quantities starting in the next year or two. Growth potential for this product line is promising.

2.2 The Industrial Products Group

A family of wireless I/O products providing one-way and two-way wireless monitoring and control solutions was developed and is now referred to internally as the Industrial Products line. These products are used for system-critical industrial applications. System-critical means that the products must work. In other words, the signals must get through, not just with other radiating equipment already installed in the plant, but also with any licensed or unlicensed equipment that might be installed in the future. Also, the products must not fail, or if they do fail, they must fail safely. The ability to satisfy all these criteria is what OMNEX refers to as "trusted" industrial wireless, and is what primarily differentiates OMNEX's products from most wireless equipment available today.

OMNEX has been the prime innovator in the field of trusted wireless I/O links for system-critical industrial applications. In effect, its proprietary FHSS technology defines the current state of the art in secure, robust, and totally reliable wireless transmission in high-interference industrial environments. Only hard-wired connections can currently match the transmission reliability of OMNEX's trusted wireless technology. Other wireless solutions, such as IEEE 802.11 and Bluetooth, have their place in the commercial and industrial world, but, their protocols were designed for high data throughput in relatively benign electro-magnetic interference (EMI) environments and they do not perform well in high-interference situations.

Applications for wireless I/O products are wide and varied. Close to 99% of the market uses wires; however, there are many circumstances where wire is the inferior choice. Currently, wireless products are used in hardship applications. For example, cable systems used to monitor the flow of chemicals from storage tanks to railcars in chemical plants can be corroded by the acid being loaded and can be damaged by the constant coming and going of the railcars. The OMNEX wireless solution can be fully installed and monitoring the chemical flow within a few days of placing an order for product. Another example is in plant applications where manufacturers need to bring back monitoring signals from various locations throughout their plants. Often, the cost of installing cable and conduit and the inability to get right-of-way access to water and gas meters across railway tracks, roads, or other obstacles, can present significant roadblocks. In cases such as these, OMNEX's wireless products can provide the solution. The sensors and meters can be wired directly to OMNEX's inputs and the matching receivers can replicate the signals as wired outputs flowing directly to the monitoring programmable logic controller (PLC). This provides a lower cost solution compared with wires and the more traditional Supervisory Control and Data Acquisition (SCADA) solution.

OMNEX's wireless solutions will not always be the best approach, but there are myriad applications whereby wireless is the most effective. OMNEX's solution has advantages over other wireless providers because of its simplicity, or ease of use, and reliability. The future use of wireless will be very cost savings driven. For example, installing cables and conduit in industrial plants can cost between US\$20 and US\$2,000 per foot, the latter cost applying primarily to nuclear facilities. The economic benefit for the use of wireless already exists; however, trust, confidence and awareness are the

current limiting factors for market penetration. While it is difficult to predict potential wireless penetration, some comparison can be made to penetration rates in the cell phone industry (the last link in the human communications infrastructure) over the past 20 years. The Vancouver Sun reported on May 27, 2004, that Bell has 13 million phone line users and 4.4 million cellular users, or 25% wireless users. Telus reported that the numbers are 4.8 million line users and 3.4 million wireless users, which translates into 41% wireless users (Wilson, 2004, p. F1).

3 MARKETS AND OPPORTUNITIES

The best available market study to date for the emerging industrial market for wireless remote monitoring and control products is a report published in March, 2002 by Venture Development Corporation (VDC), a technology market research firm based in Natick, Massachusetts. VDC predicted North American market for wireless products for on-site industrial monitoring and control will grow from US\$96.9 million in 2001 to US\$627.7 million in 2006 (Shea & Taylor, 2002). The estimated total global market is expected to be about three times the North American forecast by 2006. Therefore, the total industrial wireless market projection for 2006 is close to US\$1.9 billion. Each wireless product within the industrial market is expected to have an increase in sales (see Table 1).

Table 1: *Industrial Wireless Market*

Total Industrial Market Product Category	Projected Industrial Wireless Market (US\$ million)				CAGR
	2001 (Base Year)		2006 (VDC Forecast)		
	N. America	Global	N. America	Global	
Actuators	0.3	0.9	14.8	44.4	118.1%
Data Acquisition Systems	20.0	60.0	156.0	468.0	50.8%
Networking Products	38.0	114.0	387.9	1163.7	59.1%
Remote Controls	37.5	112.5	46.3	138.9	4.3%
Sensor/Transducers	1.1	3.3	22.7	68.1	83.2%
Total:	96.9	290.7	627.7	1883.1	45.3%

OMNEX's medium- to long-range trusted wireless products market, excluding (non-trusted) IEEE 802.11 and (short-range) Bluetooth technologies, is projected to exceed US\$800 million or C\$1.1 billion by 2006. Two market products Wireless to Devices and Wireless to Nodes are expected to have the greatest increases in the market. The global amounts include North American projections (see Table 2).

Table 2: Industrial Wireless Market by Internal Segments

OMNEX-addressable Industrial Market	Projected Industrial Wireless Market (US\$ million)				
	2001 (Base Year)		2006 (VDC Forecast)		CAGR
	N. America	Global	N. America	Global	
Wireless to Operators	36.00	108.00	39.40	118.20	1.8%
Wireless to Devices	6.64	19.92	99.10	297.30	71.7%
Wireless to Nodes	38.20	114.60	130.70	392.10	27.9%
Total (All):	80.84	242.52	269.20	807.60	27.2%
Total (Devices & Nodes)	44.84	134.52	229.80	689.40	38.7%

In general, OMNEX finds the market sizes and growth rates projected by VDC to be reasonably realistic. One exception is the low projected growth for wireless remote control, including the trusted segment. Specifically, OMNEX believes that VDC has missed the disruptive emergence of non-traditional applications of wireless remote controls, namely, that the availability of, and growing confidence in, trusted wireless technology is changing the way machines are designed and operated. Examples of new machine concepts include rider-less machines, where elimination of the operator's cab or seat facilitates optimizing the configuration of the machine for maximum functionality at minimum cost. Additionally, the rider-less machines allow a single operator to control multiple machines. Essentially, removing the operator from the machine can greatly enhance operator efficiency, safety, and comfort, and reduce construction, operation, and maintenance costs.

OMNEX's own estimates of current market size in North America are roughly US\$28.5 million and US\$500 million worldwide for identified vertical markets for remote controls. OMNEX anticipates it can feasibly capture 10% of this global market within the next five years, meaning that its remote control business could potentially represent US\$50 million in revenue annually by 2009.

OEM sales were sluggish during the 2000 to 2003 year timeframe because of a slowed economy causing a "wait and see" attitude toward capital equipment investment. General business conditions are still fluctuating; however, consumer confidence is returning, which should increase buying in many sectors. The VDC sensor market projections are also low, as they do not take into account the potential for significant

cost, size and power consumption reductions in sensor radio modules, allowing the battery-powered radio to be installed inside the sensor.

Although VDC’s projections for the industrial Bluetooth market have been excluded from the figures in the above table, it is expected that OMNEX will capture a share of this segment. This capture will be achieved through OMNEX’s existing technology and through the development of its own Bluetooth solutions.

3.1 Wireless to Operators Market Segments

Radio remote controls for stationary cranes and locomotives have been around since the late 1960s. Although the crane industry would now be considered mature, it has only been over the last decade that radio controls have found an increasingly wider variety of applications largely due to the decreased size of the transmitters (the unit carried by the user). So far, OMNEX has identified 22 broad vertical markets for remote control products (see Table 3).

Table 3: Remote Controls Vertical Markets

Agriculture	Industrial, In Plant
Aviation	Manufacturing, Mobile Process
Automotive, Truck Chassis	Marine
Consumer, Retail Goods	Material Handling, Cranes, Conveyors
Construction (Heavy)	Medical
Construction (Light)	Military Applications
Construction Road	Mining
Distributor, Reseller	Municipal/Regional/Federal Works
Entertainment, Sports	Transportation, Railroad, Logistics
Fire Fighting, Safety Equipment, OSHA	Utilities
Forestry	Waste Management

The company has also identified specific vertical markets that could utilize remote controls solutions (see Table 4).

Table 4: Remote Controls Detailed Vertical Markets

Augers	Hot Tubs, Outdoor Accessories
Backhoes, Excavation Equipment	Industrial E-STOP
Boat Hoists, (see cranes)	Insulation Blowers
Bob Tails (Petroleum/Gas Delivery)	Irrigation Systems
Cable Tensioners	Lift Gates
Cable Winders / Reels	Light Standards
Car Movers (Truck mobile)	Locomotives (Switching Yard)
Cherry Pickers	Locomotives (Track Switching)
Chippers	Man Lifts
CNC Equipment (Tethered)	Mine Clearing, Explosives
Concrete Cutting, Coring	Mobile Lube Equipment
Concrete Mixer Trucks	Mowers, Grass, Vegetation
Concrete Line Pumps	Paving, Asphalt and Concrete
Concrete Pumps, Boom	Petroleum / Liquid Fuel Delivery
Control Panel Operator I/O	Pile, Caisson Drivers, Sign Erection
Conveyor, Truck Mounted	Power Units, Hydraulic, Electric, Pneumatic
Conveyors Mining	Pressure / Power Washing
Cranes, Gantry	Reel Trailers
Cranes, Lattice	Rock Slingers
Cranes, Mobile	Scale, Wireless
Cranes, OHT	Scoop Trams, Loaders
Cranes, Tower	Skid Steers, Loaders, Accessories
Drilling (Vertical Rock)	Slip Rings
Digger Derricks	Stringing and Pulling Equipment
Dredging	Stump Grinders
E-STOP (Wireless Mobile)	Tow Trucks
Excavator	Tree Trimmers
Fibre Optic Replacement	Trench Compactors
Fire Fighting Equipment	Trenchers (Grinding)
Fuel Delivery Vehicles, Loading, Unloading	Tub Grinders, Hay, Trees
Garbage Trucks	Vacuum Trucks
Grouting	Vehicle Frame Straightening
Hook Loaders / Shuttle Loaders	Walking Floor Trailers
House Boats, Winches, Masts, etc.	Well Head, Gas Fire Suppression
House Movers	Well Head, Post Drilling Production Ready
Horizontal and Vertical Drilling	Winches Unloading, Loading

At the moment, the company's market research has been limited to anything with wheels and hydraulics; however, new applications for remote controls are emerging

every day. Upon first entering various vertical markets, OMNEX observed initial reluctance to adopt wireless. More recently there has been a dramatic shift with regard to acceptance of wireless products. Most users know they need to start using wireless soon but are unfamiliar with the technology, its potential, and its uses. Most of the engineers that would design-in the product have some electrical experience and degrees in mechanical engineering or have fluid power experience. Few have education in complex electrical, software, and RF, which makes the selling process that much more difficult for OMNEX's sales staff and distributors.

OMNEX intends to focus on the disruptive component of this market segment. The company intends to become the wireless engineering partner of major machine builders, working closely with them to design revolutionary machine design concepts. By providing its partners with bundled solutions custom-engineered to their unique requirements, OMNEX intends to remain the dominant player in the "trusted" portion of this segment.

3.2 Wireless to Devices Market Segments

Those who specify industrial wireless products include: (a.) system integrators of instrumentation and controls systems; (b.) design consultants, used extensively in water and wastewater systems; and, (c.) instrumentation and controls technicians or engineers at end-user sites. Buyers of OMNEX's products are generally: instrumentation and controls technicians or engineers at end-user sites; and, municipal water works operators or chief engineers.

The price each sector, or, each customer, is willing to pay depends on the value of the solution. Value-propositions differ for each customer type (buyer, specifier, channel). Water & wastewater operators want a lower cost option than Remote Terminal Unit (RTUs), and affordability of monitoring remote locations. Continuous process end-users expect lower wiring costs and reduced maintenance (as there are no problems with deteriorating wiring in wireless products). System integrators want solutions for their customers, easy installation and setup, and trouble-free operation. Control/sensor/instrumentation suppliers expect the pre-qualification of equipment, a wireless option for their product line, and product differentiators.

OMNEX has identified 18 vertical markets within which its products can be sold (see Table 5).

Table 5: Industrial Products Vertical Markets

Agriculture	Material Handling (Bulk Solids and Liquids)
Building Automation	Metal Processing
Chemical Processing	Mining
Communications	Petroleum
Construction	Power Generation
Food and Beverage	Power Transmission and Distribution
Forestry and Wood Products	Pulp and Paper
Hazardous Gas Monitoring and Processing	Warehousing
Irrigation	Water and Wastewater

The company has also identified seven horizontal technologies, which are applied in the above-mentioned vertical markets (see Table 6.)

Table 6: Industrial Products Horizontal Technologies

Data Acquisition	Sensors
Identification Technology	Switches, Relays and Controllers
Instrumentation	Tanks
Remote I/O	

Phoenix Contact will be selling I/O products to the global marketplace in the automation, industrial controls, material handling, and process markets.

The sensor market provides significant growth potential. In order to meet this demand, OMNEX must be able to achieve a dramatic reduction in the size of its radio equipment so that it can be mounted in the cramped space available in the sensor housings. OMNEX also needs to address its power consumption, to permit extended operational life with only battery or solar power. By exploiting this technological advantage through key partnerships and custom-designed partner-specific bundled solutions, OMNEX intends to remain the dominant player in the “trusted” portion of this segment.

3.3 Wireless to Nodes Market Segment

The sales forecasts for the wireless to nodes segment is more conservative, but will still contribute a substantial portion of forecasted sales. OMNEX is likely to be only one player among many in this market; however, the company expects to capture a profitable share of this rapidly-growing established market by virtue of:

1. the ability of its trusted wireless technology to achieve greater link ranges than competing products, and to work on the factory or plant floor where IEEE 802.11 fails;
2. its support of key industrial network protocol standards;
3. the breadth of OMNEX's product offering, including embedded board-level products custom-designed to the specific needs of OEMs; and,
4. the strength of OMNEX's partnerships and channels.

The size of the future market for wireless links between nodes implies that the wireless products serving it will become "industrial commodity" items, with extensive use of IEEE 802.11 or Bluetooth technologies. Essentially, IEEE 802.11 does not qualify as "trusted," while Bluetooth, and the higher bit-rate products produced by OMNEX's competitors meet the "trusted" criteria only for very short-range links. It is predicted OMNEX products will be very competitive for the medium- to long-range trusted wireless segment of this market.

4 INDUSTRY ANALYSIS

4.1 Industry Definition

The industry within which OMNEX operates can be broadly described as wireless devices for industrial, commercial, and mobile machine applications. These wireless devices are predominantly used to bring input and output signals to and from machines or process controllers. The input and output signals typically come from either a machine operator or from sensors (typically measuring temperature, pressure, flow, pH, etc.) providing measurement values to the controller.

Common characteristics that differentiate industrial wireless devices from consumer wireless devices are:

1. customers rely on the wireless product for revenue generation;
2. customers depend on the devices to not fail, or, to fail safely if the devices fail; and,
3. operating environments for industrial wireless devices are harsh, dirty, hot, and cold.

Wireless technologies for the industrial applications market are still in the early stages of their development. Customer acceptance of wireless technology is starting to widen across the industry due, in part, by the more widespread use of home and office wireless devices.

There are a number of wireless devices that are now being deployed in the industrial marketplace. These wireless devices include: (a.) mobile-enabling devices, wireless industrial notebook computers, hand-held computers and tablet computers, and wireless adapters; (b.) network infrastructure, wireless modems, and access points; and, (c.) automation devices, such as radio modules, antennas, wireless I/Os, wireless data acquisitions, and serial port adapters (RS232/422/485).

The market drivers for this industry include:

1. applications where wireless products are essential;
2. flexible, portable, and temporary installations;
3. cost reduction;

4. the increasing use of wireless consumer products; and,
5. a competitive industrial market.

The market restraints to industrial wireless include:

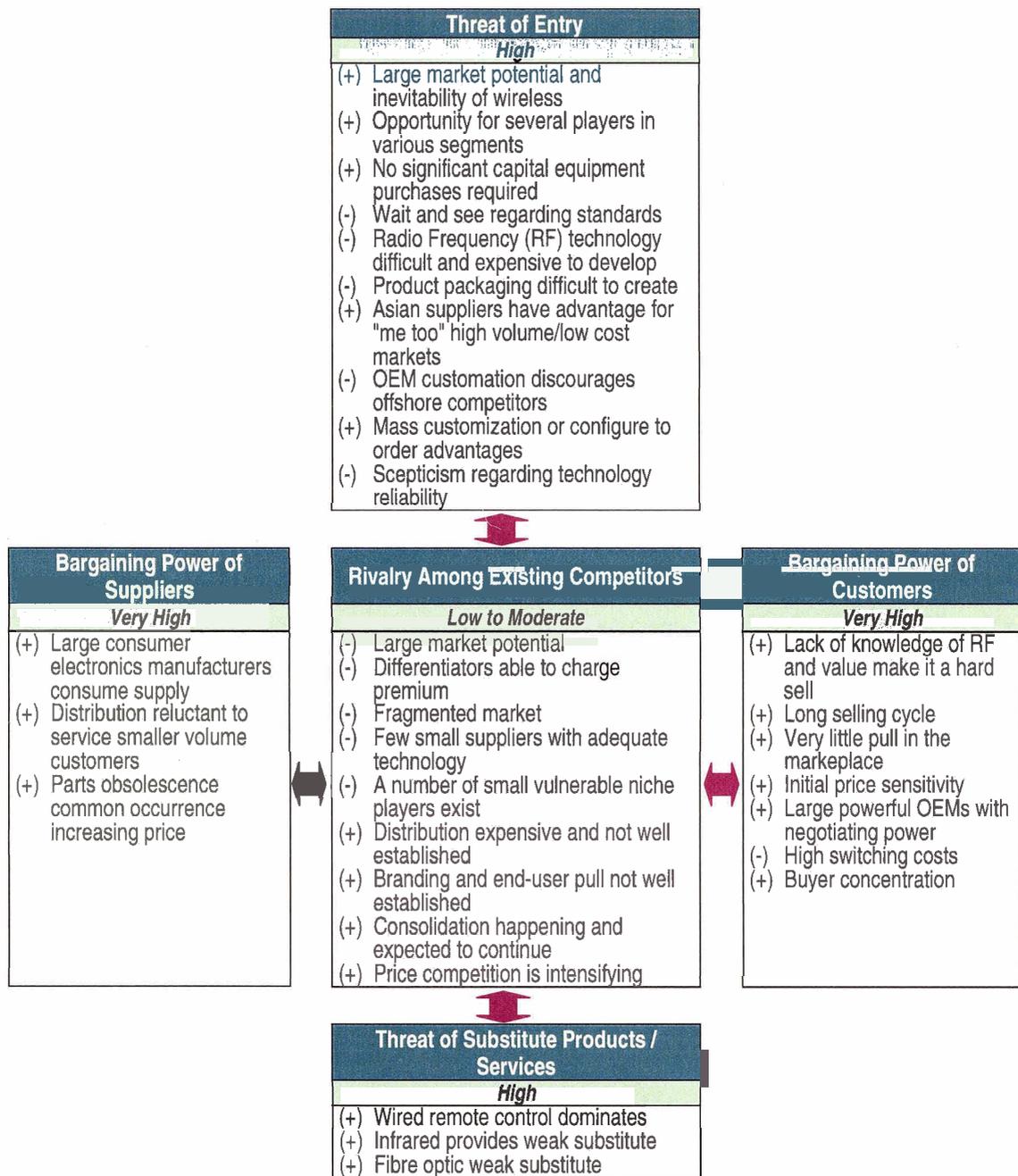
1. security concerns;
2. power supply;
3. lower prices in the consumer market where reliability is less of an issue; and,
4. a qualified work-force to work with wireless products.

OMNEX's trusted wireless products, or wireless I/O (WIO), connect remote devices, such as sensors (e.g. temperature gauges, flow-meters or fluid level detectors), switches, and actuators, to controllers, such as PLCs and Distributed Control Systems (DCSs). These products differ from wireless LAN (WLAN) systems in that they generally use proprietary rather than standards-based RF communications protocols. A plant electrician can deploy the products with little or no device configuration. Furthermore, the products operate as a dedicated wire-replacement, as opposed to becoming part of a shared (LAN) resource, which must be administered by the plant's IT organization. WIO products can frequently be installed at a small fraction of the cost of an equivalent wiring run and are very cost-competitive in plant upgrades, expansions, or modernization.

The wireless technology for industrial applications is in the introduction stage of its life cycle; however, the interest in industrial wireless products is increasing as evidenced by the recent formation of an organization called WINA (Wireless Industrial Networking Alliance). The founding members of this organization include OMNEX, Honeywell, Eaton Corp., Invensys (Foxboro), General Electric, and Ember. It is expected that there will be high growth rates in demand for all applications of industrial wireless products as the market expands. As this expansion takes place, competitors will need to change strategies for market penetration. Rather than the current method of trying to reach the highest possible range of customers, competitors will need to become more focused on targeting specific vertical markets.

The following section will use Porter's Five Factor Analysis (Porter, 1979) to examine the industrial wireless industry. The attached diagram provides a synopsis of this analysis (see Figure 1).

Figure 1: Five-Factor Analysis Synopsis



4.2 Threat of Entry

The wireless devices for industrial, commercial, and mobile machine applications industry is in the very initial stages of its development and has large growth potential. The threat of entry for this industry would be considered high. Companies with the

resources to develop reliable wireless products will recognize the opportunities that this industry presents and choose to enter. The expected large size of this market will invariably attract several players each likely targeting different segments depending on their established distribution channels and complementary products.

The attention of the major players in the wireless technologies arena is currently focused on the enormous global market for consumer and business wireless products like cellular phones and Wi-Fi. Eventually, the industrial wireless market will grow to the point where it becomes attractive to large companies like Motorola and Philips, but the mass-market technologies they deploy (e.g. IEEE 802.11) will limit their penetration to office and warehouse applications and exclude them from competing in high interference in-plant environments.

There are standards for distances and data rates in the marketplace for wireless devices. For the 802.11b standard, the data rates are higher than the other technologies, but the distance the signal can travel is very short. This technology is plagued with interference and security issues, thereby limiting its uses to the office and warehouse applications markets. Bluetooth is considered a more reliable technology and is an accepted standard in the industrial marketplace, but the distances the signals travel are still short.

In the future, proprietary wireless solutions will continue to have a place, but they may be limited to specialist applications as acceptance of open wireless technologies increases. OMNEX is working with Honeywell to develop a standard for farther distance/lower data rate products that are more secure than existing technologies. The Zigbee standard has the low cost, low power consumption, and low data rates targeted at home automation, toys, and PC peripherals, and is not appropriate for the industrial marketplace.

Different technologies are used in different applications depending on the requirements. Although adequate for the entertainment and convenience sectors, safety and reliability concerns in the industrial environment are often not met by currently available industry standards, which were primarily developed for the consumer markets. In the absence of suitable industrial radio standards, OMNEX developed proprietary technology that would make wireless systems acceptable in applications that affect efficiency improvements, revenue generation, and public and personal safety. Through combined efforts with Honeywell (annual sales US\$23 billion), OMNEX is working on

developing a draft specification for a potential US Government established public standard stretching the area currently only covered by proprietary trusted wireless. The existence of a public standard for secure operation in industrial applications is seen as a key factor enabling wireless implementations to move from hardship cases to be the unconscious choice.

It is expected that the largest threat of entry will come from large industrial control systems suppliers, such as ABB Automation, Emerson Process Management, GE Fanuc, Honeywell, Invensys Process Systems, Rockwell Automation – Allen Bradley, Siemens Energy and Automation, Schneider Automation/Square D, Drexelbrook, and Eaton Corporation, who will all become active in the markets for wireless monitoring and control products (Shea & Taylor, 2002). Without the entrance of these larger players, it is likely the market will remain small. Although they represent a threat to OMNEX, these large players are key to increasing the total market size. It is unlikely that these large firms will develop their own solutions and would probably either buy smaller vendors to obtain wireless technology, or, they would buy and resell wireless products of other vendors through formalized partnership arrangements. OMNEX has already arranged to sell to Drexelbrook through Phoenix Contact and is in discussion with Honeywell and Eaton Corporation. Through these partnership arrangements, OMNEX could gain significant market share.

For the above-mentioned firms, internal development of wireless products would be costly and time consuming and could potentially put them behind competitors who have already bought the technology. Furthermore, as most of these firms are unfamiliar with RF, it is likely they would prefer to seek out the existing experts to gain the technology rather than attempt to develop their own internal RF competency. Small players who have already developed the technology will have difficulty setting up distribution (particularly on a global scale) and developing product/brand awareness to penetrate the market quickly. Eventually, they will have little choice but to partner with larger players with substantial brand awareness and the resources to take the products to market.

RF suppliers that remain in the proprietary arena will remain smaller niche players. Large customers interested in wireless for factory automation and control will likely restrict themselves to Bluetooth or a newly developed standard such as the one OMNEX and Honeywell are currently developing. Standards development is also

holding companies back from developing RF technology as they wait to see which standard emerges victorious. It is expensive and risky to develop products only to have them usurped by another technology. A prime and familiar example is the battle between VHS and Beta in the video recording market.

The market size potential suggests that there will be ample opportunity for several differentiators. In the future, it will be the lower cost providers that will compete on price in the higher volume, less mission critical applications. Once standards have been achieved, differentiation will come in the form of product packaging, features, applications fit, service level, and reliability. Open standards allow devices to communicate with each other leaving them vulnerable to interception. Differentiators can command premiums based on the levels of security and encryption they incorporate into their product offerings.

Certain barriers need to be overcome before this market takes off. The scepticism in the marketplace regarding radio performance and reliability is slowing growth. There is also a lack of awareness in the marketplace that reliable wireless solutions such as OMNEX's products exist.

Globalization will be challenging and expensive for smaller players who will likely be limited to countries or regions. The 2.4 GHz band is acceptable globally; however, North American competitors have developed primarily 900 MHz products. Those companies who have not yet developed 2.4 GHz products will be scrambling to catch up. Certification and approvals are required for each country.

The remote controls market is more mature therefore the threat of entry is lower. Although initial capital equipment investment is minimal, RF technology development is difficult and expensive – enough so to deter most new entrants. Furthermore, new entrants often fail because of their inability to master the RF technology required to achieve the performance results demanded by the variety of harsh environments within which the equipment operates. As well, product packaging (the unit's plastic casing) is expensive to create further deterring new entrants.

Asian remote control competitors are a potential threat, particularly in the overhead crane industry. Asian competitors would most likely be "me too" manufacturers choosing to take advantage of economies of scale by producing higher volume, lower margin products and competing on cost. However, as the market is

fragmented, with OEMs each requiring some customization, proximity to the OEM is an advantage. Differentiators that go after smaller vertical markets with higher value-added propositions will not necessarily feel the threat of Asian competitors. Selling to OEMs often requires significant customization to secure the sale, enough so to deter many offshore competitors who generally look for volume/price opportunities. It often takes up to two years to get OEMs to design-in remote controls on their equipment. To potentially dominate this market, a company would need to develop a mass customization strategy similar to the Dell model, in other words a “configured to order” model, with most of the customization taking place in the software rather than hardware.

4.3 Rivalry among Existing Competitors

Rivalry among existing competitors in the general wireless devices for industrial, commercial and mobile machine applications industry would be considered low although rivalry within the remote controls market is intensifying. As the wireless to devices and nodes segment is still in the early stages of development, lack of standards, apprehension regarding reliability of wireless, and limited knowledge of the technology exists. Thus the market is fragmented in terms of suppliers, customers and products. Although there is promising market potential, product adoption is slow so competitors are aiming at all possible markets in the hope of targeting more specific markets at a later date.

Some large automation firms have recently entered the market with a limited number of products, but most are still working on product development based on emerging technology standards. These manufacturers want to be prepared when the market truly takes off, but seem to be waiting for much more stable market conditions in terms of technology research and standards development.

The wireless to devices segment is relatively small compared to the overall industrial wireless market. At this time, small companies with proprietary solutions are serving the industrial wireless world. Most of these companies market their products as off-the-shelf units, and do not offer bundled solutions. Traditionally, systems integrators who assemble components into bulky panels (RTUs) have served this market. OMNEX has been a prime innovator in developing a family of compact, integrated products for these applications, designed to mount directly on the industry-standard DIN rail.

OMNEX's main competitors today are ELPRO Technologies in Stafford, Australia and Adcon Telemetry in Klosterneuburg, Austria. ELPRO, which is principally pursuing the SCADA market, uses FHSS technology and has the potential to build trusted wireless systems, but ELPRO is currently lagging in RF technology design and performance. Adcon does not qualify as a trusted wireless vendor as it uses DSSS technology. Adcon seems to be targeting the sensor market as it is focusing on developing custom silicon for low power consumption and short range operation. Other companies like Microwave Data Systems in Rochester, New York, and FreeWave Technologies in Boulder, Colorado, are not direct competitors, but they have the technical capability to enter the trusted industrial I/O arena. All of the above-mentioned competitors are small players and are ideal targets to be purchased by larger organizations interested in entering the wireless market.

The traditional application of wireless to nodes, widely deployed in North America in situations where running wires is not feasible, is wireless SCADA. Wireless to nodes is the transmission of data between nodes (network to network connections, or links between remote and centrally-located network nodes). This segment will continue to grow from its established base. Non-traditional applications, such as wireless networking on the factory floor or in the processing plant, are emerging and are expected to grow very rapidly as network operators gain confidence in the reliability of wireless transmission in the industrial environment.

The main competitors in the wireless to nodes market are Microwave Data Systems (MDS), and Freewave Technologies. MDS has the technical capability to compete in the trusted wireless arena, but remains focused on the higher bit-rate segment of the wireless SCADA market. Freewave's products also emphasize high throughput at the expense of interference tolerance. As such, the maximum link ranges over which these companies' products qualify as "trusted" are much shorter than those achieved consistently by OMNEX products. Again, these are all small players unlikely to have the capability to enter the global marketplace without a partnering relationship.

The remote controls market is more mature, thus, rivalry among existing competitors is higher. Currently there are 46 companies providing some form of wireless remote control (see Table 7). Of these 46 companies, five are significant competitors with a global presence. Two of these five global companies are German based and three are US based.

Table 7: Remote Control Competitors

Applied Electronics	IRAB - Int'l Radiostyrming AB
Atlas Polar	ITOWA
Autec	JAY Electronique
Blackbox	Lore
BWI Eagle, Inc.	MCS - Mobile Ctr. Systems SA
Canac	Micromotive
Cattron	Microtronics
Commander	Moog
Control Chief	Nautilus
Datek	NBB
Electromotive	Nichols RF Systems
Femco	Olsberg
Flo-Draulic	OMNEX
Froitzheim	PMH Radiostyrming
Futaba	Power Up Products
Grossfunk	PQ Controls
HBC Radiomatic	Remtron
HED	ROWE
Hetronic	Scanreco
Hubbell Industrial Controls	Telemotive
ICOM Systems (Walvoil)	Teletec
IKUSI	TeleRadio
Imet	Theimag

Wireless remote control of cranes is virtually universal in Germany. Not coincidentally, the major competitors in the remote machine control field are HBC in Crailsheim, Germany, and Hetronic in Langquaid, Germany. Both competitors are active in the large European and smaller North American markets. These companies are exhibiting little interest in innovating beyond their current product offerings and do not appear to be interested in providing custom solutions to OEM manufacturers.

Competition among the above-mentioned competitors is intensifying in North America. Price competition is increasing. The remaining competitors are small and vulnerable and will have difficulty capturing major market share. Nonetheless, each of the remaining competitors could be a significant niche player within a specific vertical

market. For example, OMNEX has achieved over 52% market share in the concrete pump market and could easily obtain close to 100% market share if it were not for an exclusivity agreement it has with its largest OEM, Schwing America.

Hetronics, one of the better established North American competitors in material handling and mobile truck cranes, has lost market share over the past few years. It was successful in the past because of its aggressive marketing, but its product innovation has slowed and its customer service is considered poor. This has opened the door for competitors to steal this business. Poor distribution channels and the high costs of marketing remote controls make growing outside of an established market segment problematic; these factors explain why the industry has such a high number of small niche players.

As most competitors for remote controls have relatively homogeneous products, they are often forced to compete on price. European competitors have appealing packaging but the RF does not perform well in the North American radio environment. Although they have achieved market dominance by undercutting their competitors, their products are not reliable or robust enough yet to keep North American customers happy for long. Currently, Japanese and Asian competitors do not have the technology to create any product differentiation. Instead, they offer more competitive prices and pursue higher volume markets that do not require custom engineering.

The remote control business is largely focused on OEMs. The remote control vendor often has to be viewed by the OEM as a partner in the machine design team. Remote control vendors located in close proximity to the OEMs and who are willing and able to stay close with regard to language and time zones, have a real advantage over other competitors.

Differentiators in this market can command a premium. Currently developed technology has put OMNEX three to five years ahead of the competition. Nevertheless, OMNEX needs to develop brand awareness to achieve significant market share in several of these vertical markets.

Superior reliability, maintenance, and service would be considered competitive advantages in this segment; however, the sustainability of these advantages is unclear. A company with superior technology should be able to effectively establish the value proposition that justifies the price premium to the buyer and end user; but this has not

always been easy. This is primarily because the margins are thin on the sale of most construction equipment. The competitor who can quantify the cost of lost productivity and down time on equipment that generates several thousand in revenue per day is certainly at an advantage; however, switching costs are high, so displacing an incumbent OEM can be very difficult.

As products and opportunities expand and trust in RF increases, remote control companies will begin to consolidate, thus, eliminating some of the existing providers. Some mergers and acquisitions have already begun. Recently Cattron merged with Thiemeg and Canac acquired Vectran. Cattron has also merged resources with Futaba (Penner, 2004).

4.4 Threat of Substitute Products/Services

The only significant substitute to OMNEX's trusted wireless products are cable and conduit. Threat of substitute products would be characterized as high although, in reality, it is the wireless products that are substitute products to wires. All markets are still competing against the wire, which means the price to install wireless cannot be excessively higher than the wired solution. For example, with remote controls, the first option is to put on a cable at a cost of approximately US\$300 and up. In contrast, OMNEX's controls run from US\$700 to US\$12,000. Other substitute products would include infrared and fibre optics. Infrared is popular in Europe and is used on trench compactors exclusively because it has been mandated. However, infrared does not pose a big threat in other markets because it is not very practical. For instance, infrared requires line of sight, needs lots of power, and is sensitive to sunlight, which limits its outdoor use.

4.5 Bargaining Power of Customers

Initially, the bargaining power of customers would be considered high. They often do not recognize that they need the improved technology and they often need to be educated on the advantages of using wireless over the cable option. Customers need to believe that the wireless option is as reliable as the wired option.

For remote controls, the selling cycle is long, often taking two to three years to win an OEM contract. Customers using remote controls for the first time would be considered price sensitive. Once they recognize the benefits of using remote control on their equipment, they begin to move up the chain to higher priced, more reliable equipment. At that point, bargaining power shifts more to the vendor with the differentiated product.

The most attractive OEMs are large powerful organizations, but it is difficult to get a foot in the door or to discover the identity of the decision-maker in the organization. Some OEMs have several SBUs purchasing and designing their own components. Selling to one of these SBUs does not guarantee a sale to the other SBUs; thereby increasing the complexity of the selling proposition. These large OEMs can have considerable bargaining power leaving the unsophisticated remote control manufacturer unable to negotiate premium pricing. The company that is best able to differentiate by providing technologically superior products with exceptional customer service will obtain a competitive advantage.

Another obstacle in the selling process is that once an incumbent has its product engineered on an OEM's equipment, the OEM is very reluctant to switch. The cost of switching can be high because of the above-mentioned engineering requirements and because of the need for significant training of end-users. These factors make the bargaining power of the OEM high and make it difficult for competitors to displace an incumbent.

The equipment rental business is forcing costs down, making OEMs much more sensitive to price increases. The rental business can make up to 50% of OEM sales, especially in the material handling equipment. It is expected that consolidation in this vertical market will continue. Certain organizations that are heavily financed and unfocused may slip into bankruptcy. Careful selection of OEMs is imperative.

4.6 Bargaining Power of Suppliers

Bargaining power of suppliers is very high. Many of the components used to build wireless products are being manufactured for commercial wireless applications such as cellular phones. These high volume manufacturers consume the majority of the supply; smaller electronics industries are left to wrestle over the leftovers. This difficulty

obtaining components is considered OMNEX's biggest threat going forward. Most components are sourced through distributors purchasing from Asian suppliers. Distributors will service large customers first; smaller quantity purchasers are unable to negotiate either better pricing or progressive vendor agreements, such as just in time component delivery or vendor managed inventory.

Parts obsolescence is also a common occurrence forcing companies to redesign their products on a regular basis. Component parts prices can increase dramatically during wind down. In an effort to keep enough parts supplied in house to last until new designs are released, last time buys before parts become obsolete are common. This dilemma consumes both R&D resources and cash that could be deployed more strategically elsewhere.

4.7 Attractiveness of Industry

Growth potential for the industrial wireless industry is promising and the gross margins available would suggest a degree of attractiveness.

The remote control market is difficult on many levels. For instance, developing the right technology requires expertise and high levels of R&D spending, deterring many new entrants. Rivalry among existing competitors is intensifying, and the product selling cycle can be long and difficult. In addition, training a sales force is problematic. Despite these difficulties, the innovative company that is able to differentiate itself in the marketplace and establish a recognizable brand name known for quality, reliable products will recognize that there are still ample opportunities. For instance, new applications for wireless devices are emerging every day, acceptance of wireless is increasing daily, and companies that have developed the technological expertise and have the business acumen to capitalize on these opportunities will find this market rewarding and profitable.

The wireless industry, particularly the cell phone market, has grown quickly. The IT world has embraced WLAN (802.11) devices to achieve limited mobility computing. For both of these applications, reliability is less of an issue. If the connection is lost, it is usually a minor inconvenience and is not critical. The sales channels are consumer, mass market-oriented. Companies such as Nokia, Ericsson, and Cisco, dominate these markets.

The major competitors for industrial applications are companies like Honeywell, Rockwell, Schneider, Parker, and Foxboro. They understand industrial customers and have the appropriate sales channels to service them; however, they have limited experience with wireless technology. It will take a major diversion for a consumer-oriented wireless provider such as Nokia to embrace the industrial requirements and the smaller market size of the industrial wireless market. According to The Wall Street Journal, world-wide mobile-phone sales were 153 million units for the first quarter of 2004 (Fildes, 2004) with Nokia's market share at 29%. Extrapolating these numbers to all of 2004 puts Nokia's annual mobile-phone unit sales at approximately 177 million. Since the industrial wireless products market potential is likely to be more in the 100,000s of units annually, spread over many different applications and product types, this industry is less attractive to large consumer-market focussed players such as Nokia. Industrial wireless remains much more attractive to those companies that already have established market channels and an understanding of the industrial customers.

4.8 Key Success Factors

There are many varied key success factors for companies in this industry. Sales and marketing requirements will be high as companies attempt to develop the market, attempt market penetration and build early brand awareness. Successful companies will need to build marketing and sales channel strength. Since this is an emerging industry with ever changing technology, it is imperative that companies understand RF technology and have the capability to contribute to the success of the organization through innovations. To support the marketing activities and high R&D spending, companies will need to have significant amounts of capital.

Companies that are able to offer stable, reliable, and quality products, with improved features for specific application markets, will improve their competitive positioning and standing in the market. Successful companies will need to understand the needs of their customers and offer outstanding service, particularly to those companies that rely on the product for revenue generation. Organizations looking to build a key position in this developing market need to understand the key dynamics, challenges, drivers, and restraints so as to enhance their overall product offering and take advantage of the shift to wireless solutions that is occurring throughout the industry.

The development of public standards suited to industrial needs will be essential to develop and grow the market as a whole. There will be an increasing awareness of wireless solutions for the industrial world, which, in turn, will help increase sales for all players with appropriate products.

5 INTERNAL ANALYSIS

5.1 Company Generic Strategy

OMNEX is pursuing a differentiation strategy. The company differentiates itself through superior product quality, reliability, and functionality. In addition, the company has developed a reputation for providing excellent technical support and service to its customers.

The company's ability to develop and manufacture radio technology is becoming well known in the RF community in North America. Large companies are seeking out OMNEX's assistance as the "experts" in this field. For example, OMNEX is currently assisting Honeywell, a US-based company that has US\$23 billion in annual sales. Honeywell has been selected to advise the US Government on standards setting for RF in the industrial environment. Through this consulting arrangement OMNEX could be instrumental in industrial RF standards setting activities in the US. Involvement on this project will help OMNEX achieve critical mass in the marketplace and respectability with US Government officials.

OMNEX's reputation is not limited to North America. After recently attending a large European tradeshow, it was evident that OMNEX's major competitors in Europe were well aware of OMNEX's North American successes and had been anticipating the company's entrance into Europe.

In the North American concrete pump industry, OMNEX is well-known for providing the most dependable and highest quality radio. As the general industrial wireless market is young, the attention that OMNEX has been receiving regarding its RF expertise is relatively new. The company's relationship with Phoenix Contact has certainly accelerated this attention.

Throughout its history, the company has been able to charge a premium on its products. The company's cost structure is adequate for its differentiation strategy. For many years, the company has used the profits it has received through a favourable US/Canadian currency exchange rate to develop in-house manufacturing expertise. In the fall of 2002, the US dollar started losing value relative to the Canadian dollar. Since that time, the company has had to focus more on efficiency as margins have eroded. Despite the 20% drop in the value of its US sales, which makes up approximately 85%

of the company's sales, OMNEX has fared relatively well; many other Canadian manufacturers and exporters have not been so fortunate.

The following discussion will examine the appropriateness of the company's organizational capacities and competencies in relationship to its differentiation strategy. A synopsis of this discussion is provided in the Strategic Fit Diagram (Bukzar, 2004) (see Figure 2). The numbers on the diagram signify where OMNEX fits on a sliding scale from 1 to 5. The arrows point in the direction OMNEX is attempting to move. The absence of an arrow indicates that the company is not making any attempts to change the way it operates.

Figure 2: Strategic Fit Diagram

	Generic Business Strategy				
	Cost Based		Differentiation		
	1	2	3	4	5
	Adequate Quality/ Low Cost			High Quality/ Adequate Cost	
Product Strategy	Rapid Follower			← Innovative 5	
R&D Expenses	Low R+D		3 →	High R+D	
Structure	Centralized		3 →	Decentralized	
Manufacturing	Economies of Scale			Economies of Scope/Flexible 4 →	
Labour	Mass Production		3 →	Highly Skilled / Flexible	
Marketing	Comparative / Push 2			High Cost / Pioneering / Pull	
Risk Profile	Low Risk			4 High Risk	
Capital Structure	Leveraged 2			Conservative	

5.2 Product Strategy and R&D Expenditures

OMNEX's product success is based on proprietary secure wireless communications technologies developed in-house under a multi-year R&D program. The company's ability to develop highly innovative products would be considered a core competency. OMNEX's R&D expenditures for the past four completed fiscal years are calculated as a percentage of the company's expense budget and as a percentage of revenues (see Table 8).

Table 8: *R&D Spending as a Percentage of Revenue*

R&D spending	2000	2001	2002	2003
Total Revenues	\$7,674,204	\$8,369,474	\$9,588,106	\$11,834,488
Total R&D Spending	\$1,414,921	\$1,611,360	\$1,857,878	\$2,152,970
Expenses:				
COGS	\$4,421,820	\$4,901,335	\$6,102,737	\$7,664,303
Selling & Admin. (Before Tax)	\$3,670,595	\$4,221,586	\$4,232,061	\$5,042,977
Taxes	\$92,700	\$58,774	\$75,721	\$47,517
Tax Credits and Refunds	\$772,471	\$1,003,393	\$1,058,414	\$1,093,073
Total Exp. Incl. Tax & Credits	\$7,412,644	\$8,178,302	\$9,352,105	\$11,661,724
R&D as a % of Expenses	19.09%	19.70%	19.87%	18.46%
R&D as a % of Revenue	18.44%	19.25%	19.38%	18.19%

At 18% to 19% of revenues spent on R&D, OMNEX has high R&D spending consistent with its differentiation strategy. The primary reason for this high R&D spending is to satisfy a number of diverse and challenging requirements imposed by the "mission-critical" nature of industrial applications. For example, in the industrial environment wireless links must be trusted. In other words, they must perform as intended, and be as safe and dependable as hard-wired connections. Unlike such consumer wireless products as cell phones, which promise "best efforts" in performance, trusted industrial wireless products must guarantee operational dependability and safety and must also tolerate high levels of interference. They must operate in unlicensed spectrum bands, and be quickly and reliably installed by users who need not have a specific background in radio systems.

OMNEX's current sales revenues are all based on products operating in the 900 MHz band. In order to grow its revenues, and to become a viable supplier to global

companies such as Phoenix Contact, OMNEX urgently needs equivalent products designed to operate in the 2.4 GHz band. Therefore, the principal short-term objectives of OMNEX's R&D program are: (1.) to complete the development of the 2.4 GHz technology and use it to migrate the company's current products into the 2.4 GHz band; and, (2.) to develop and commercialize additional technologies to expand the company's product lines and revenues. OMNEX's long-term R&D objectives are to establish and confirm the company's position as the primary product innovator in trusted wireless products and solutions.

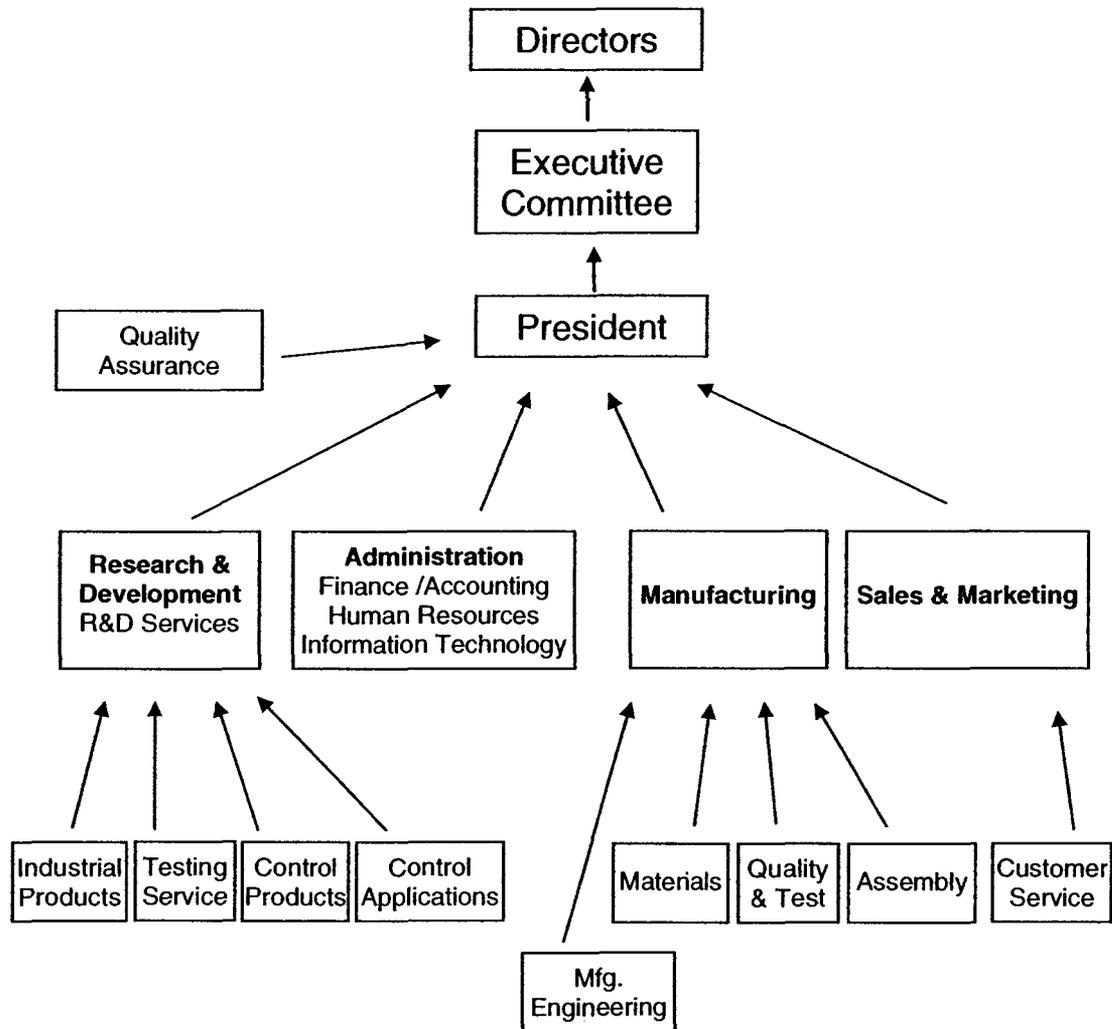
OMNEX pioneered many of the trusted wireless concepts. Although slower than expected, competitors' technologies are starting to catch up. As the market for trusted industrial wireless products develops, it is predicted that wireless products will become commodities like cell phones. OMNEX plans to counter the potential erosion of its prices and its market share by developing more and more cost-effective product designs on the industrial products line. With regard to remote controls, OMNEX believes its sustainable competitive advantage is its ability to understand the customer's needs and translate that understanding to products. The line of competitive defence will be adding value at the systems level to provide customers with fully engineered solutions. Meeting these objectives will require OMNEX to maintain an intensive program of R&D and technology development for the next few years. Its target is to reduce R&D spending as a percentage of sales to approximately 10% by 2007, through increasing sales rather than decreasing R&D spending.

5.3 Structure and Culture

OMNEX is managed and directed by a five-person Executive Committee made up of the President (who is also a founder and director), the Vice-President of R&D (who is also a founder, director and the Portable Wireless SBU leader), the Sales and Marketing Manager (who is also the Industrial Products SBU leader), the Operations Manager, and the Manager of Finance, Administration and Human Resources.

Until March of 2004, OMNEX had a functional, hierarchical organization structure that would have been viewed as highly centralized (see Figure 3).

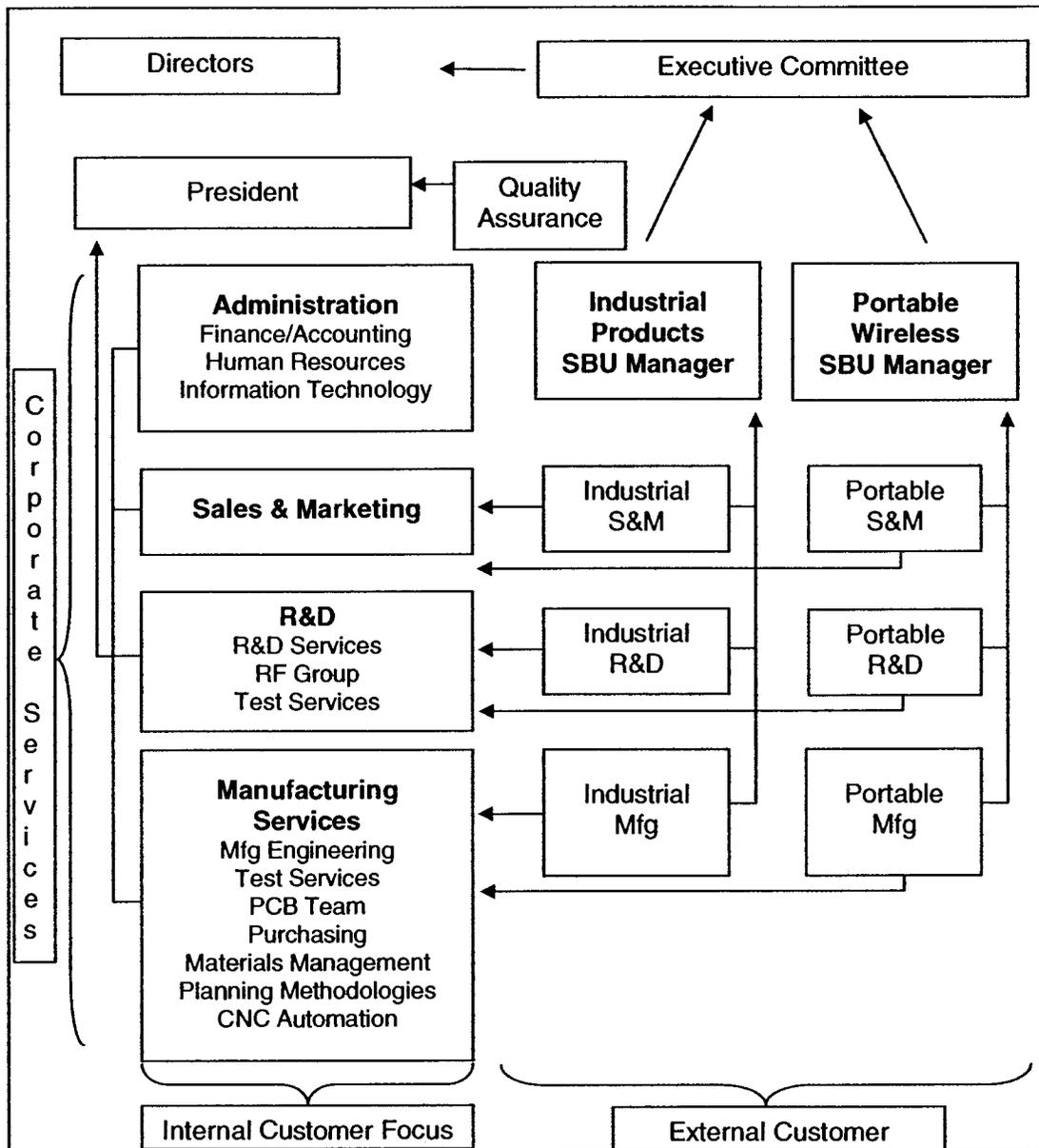
Figure 3: Old Organization Chart



Although some R&D, sales and manufacturing staff were dedicated to working on either the portable wireless or industrial products lines, all reported to a functional department manager. As a relatively small company, this structure had not posed significant problems until the fall of the year 2003. Conflicts had emerged between the requirements of the product group (and its corresponding customers) and the requirements of the functional departments. As a result, customer responsiveness had slowed down. In an attempt to standardize, the company introduced common practices

and procedures. Although this standardization enhanced the productivity of one product group, it simultaneously hindered the productivity of the other product group. As a company that requires flexibility and customer responsiveness, this centralization was becoming a serious impediment to quick responsiveness to customer demands. In response to these issues, the company reorganized by creating a matrix structure (see Figure 4).

Figure 4: New Organization Chart



Two SBUs were created to ensure there were dedicated employees from sales and marketing, R&D, and manufacturing supporting each product line. SBU managers were appointed and two "Go Teams" consisting of the SBU manager and a management representative from each of the functional areas within the SBUs were formed to better serve customers.

The staff responded positively to the organizational change. It is too early to assess the success of this change; however, there has been a noticeable reduction in conflicts as some staff had their multiple priorities reduced. This SBU and team-based structure should allow for more flexibility and responsiveness to customer needs. This structure is also more in line with the company's differentiation strategy, which relies on flexibility and autonomy. Nonetheless, the new structure implementation is far from complete since there are still a number of employees that are being asked to perform more than one key position.

5.4 Decision Making

Most significant decisions are made at the Executive Committee level. Specifically, the Executive Committee makes decisions on capital spending, human resources requirements, and salaries. Any major initiatives such as strategic issues and sales targets are decided at this level as well. Despite this, managers have a large degree of autonomy within their teams and they can provide input through participation on cross-functional projects. There is a great deal of freedom for both managers and employees to contribute and make decisions, even though there is some reluctance to exercise this freedom. Many managers are unclear of OMNEX's strategic direction and are unsure of whether their activities are appropriately aligned with the company's overall strategy.

For the most part, there is no clearly-defined decision-making process and inaction has resulted due to the aforementioned problem of poorly communicated strategic direction. OMNEX espouses teamwork and employee empowerment, but often does not give people the authority to make decisions or implement changes. The company falls midway between autonomy and less autonomous on the Strategic Fit Diagram.

5.5 Manufacturing

OMNEX's manufacturing strategy favours economies of scope and flexibility rather than economies of scale, and would rate about "4" on the Strategic Fit Diagram. Currently, OMNEX assembles all of its products in its Port Coquitlam factory; a small amount is contracted out. The diversity of needs in the industrial wireless market and the strategy of providing customers and partners with bundled custom-engineered solutions imply that the majority of OMNEX's production will be "high-mix/low-volume" products. Manufacturing high-mix/low-volume products demands a high degree of control and flexibility in the production process to respond to customers' unique requirements and (usually short) delivery lead times.

Although manufacturing has not always been considered a core competency and it has taken the company many years to develop its manufacturing capabilities, OMNEX has progressed to the point where its radio frequency manufacturing abilities have developed a good reputation in the marketplace. This reputation prompted Honeywell to approach OMNEX to write the software for a wireless product Honeywell has designed and to manufacture the product. If OMNEX chooses to pursue this proposal, it would be a major shift in the philosophy of developing all technology in house, but it would enable OMNEX to develop better scale in manufacturing through higher volumes.

OMNEX anticipates that, eventually, some production will have to move off-shore to lower-cost production facilities. This decision will be influenced by a number of factors. An in-house facility, optimized to manufacture high-mix/low-volume products efficiently, is not designed to produce high-volume/low-mix products cost-effectively. When the size of the market grows to the point that the major companies compete heavily in the industrial wireless arena, or, when competitors introduce very aggressive pricing, it is possible that the only way for OMNEX to remain price-competitive will be by moving high-volume production off-shore. OMNEX may choose to sub-contract production to an off-shore manufacturer with no licensing or transfer of IP rights. On the other hand, OMNEX may charge a licensing fee to permit key strategic alliance partners to manufacture products destined for their distribution channels in their lower-cost production facilities.

The industrial wireless market that is emerging is characterized by widely diverse applications and short lead times to respond to new demands. By developing a

“portfolio of modular technologies,” OMNEX has been able to employ a flexible “building-block” approach to product design, allowing for the speedy development of new or modified models for new applications and allowing for the customizing of existing products for new customers. This strategy has been applied at the sub-system level where “standard” components can be used in a multiplicity of products and at the basic technology level where “standard” design modules can be re-used in a multiplicity of components, thereby reducing the number of components to be stocked and yielding economies of scale in component procurement. However, there are risks associated with this approach when common components become obsolete in the marketplace, or, when larger firms consume most of the supply.

5.6 Labour

OMNEX could be seen as having two distinct groups within the organization, putting it midway between Mass Production and Highly Skilled/Flexible on the Strategic Fit Diagram. One group consists of highly skilled knowledge workers employed primarily in R&D, service, manufacturing engineering, manufacturing management, and sales. The majority of these employees are required to have at the very least a two year post-secondary education in electronics, computer science or mechanical engineering. Several employees have significantly more education, including one employee who has a Ph.D. Specifying and designing products for industrial applications requires in-depth knowledge and understanding of both the environmental conditions in which the products will have to function and the installation and operation of such products in industrial plants. OMNEX has recruited an excellent engineering team whose members possess an ideal balance of academic and technical qualifications and practical experience in industrial products design and applications. Despite the fact that OMNEX has developed superior technology, its RF development group is understaffed. Indeed, most of its RF technology was developed and is supported by one person.

The OMNEX sales force is required to become familiar with the technology behind the product. The sales employees usually either have a technical background or need to acquire a year of product training before they are able to sell effectively.

The second employee group performs more repetitive assembly work requiring minimal education or previous work experience. An experienced assembler usually

provides on the job training; many duties can be learned relatively quickly. Although not highly educated, several manufacturing employees are highly skilled workers with years of experience testing RF products, operating equipment such as the surface mount technology (SMT) machine, and soldering components. Most positions in manufacturing require that employees be able to read and understand schematics and other assembly documentation. Many are asked to participate in continuous improvement activities.

OMNEX has developed a skills matrix for shop floor staff to assist with its cross-training efforts and to help production managers identify appropriate work for qualified staff. Most staff members have been cross-trained and can perform several functions within the manufacturing plant. Most cells have an identified senior person who performs most of the on-the-job training of less experienced staff. Newly trained staff must meet set standards before qualifying to be included on the skills matrix. There are no financial incentives attached to achieving more skills or levels of proficiency on the matrix.

It is expected that as the company moves to larger volumes, and as more demanding customers require high quality and more favourable warranty offerings, there will be a need to hire more technically knowledgeable manufacturing personnel. Currently, the company struggles to implement advanced manufacturing techniques. Process, mechanical, and chemical engineering skills in both R&D and manufacturing are lacking which has resulted in a higher warranty return rate than the company can sustain in the long term.

5.7 Sales and Marketing

OMNEX's distribution strategy is to actively seek alliances that provide channels to specific, identified vertical markets such as the sensor market. The ideal alliance partner will be a major player in one or more vertical markets. The alliance would provide OMNEX with credibility in, and a "large-bore pipeline" to, that market. OMNEX's objective is to be the creative partner in each alliance, developing new technologies and generating new product ideas to keep the pipelines full and retaining control of the resulting IP.

OMNEX's alliances can be divided into two distinctly different models. The relationship with Schwing America covering wireless remote controls for concrete

pumps, etc., exemplifies the OEM model used mostly for portable wireless products. In this case, OEM partners are the primary users of the OMNEX product, building it into their own products and sometimes seeing it as a means to obtain a competitive advantage over other players in their own vertical markets. The OEM model affords OMNEX excellent opportunities to participate in the conception and engineering of new products for the partner, adding value to the partner's business through innovative applications of trusted wireless technology. These relationships are developed through introductions at tradeshow and through customer visits. Although contact is initially made by the business development salesperson, R&D representatives (primarily the VP of R&D) assist the salesperson in fully understanding the customer's needs so an appropriate solution can be developed. Rarely are "off-the-shelf" products fully satisfactory; therefore, there is a requirement for some product customization. It is expected that as OMNEX has a more diverse product offering, a more configured to order approach can be taken for the portable wireless products line.

The agreement with Phoenix Contact for wireless I/O devices represents the other main distribution alliance model. In this model, the partner acts primarily as a reseller, marketing OMNEX products through their existing distribution channel. To the reseller partner, offering OMNEX products increases revenues from its distribution channel in two ways: through the sales of the trusted wireless products and through the increased pull-through sales of their existing product lines. A similar partnership is currently being discussed with a major manufacturer of sensor devices, and many other partnership arrangements are anticipated over the next few years. A key part of OMNEX's reseller model strategy is to maintain a flow of OMNEX-initiated innovative products into this channel, recognizing that requests for new products originating from the reseller are most likely to be for lower-cost copies of competing products.

OMNEX anticipates maintaining a direct sales component in its distribution strategy. Direct sales are most likely to focus on the initial offerings of emerging disruptive applications of trusted wireless technology. As these new applications gain recognition in the market, they will find their way into the reseller and/or OEM partner channels. The relationship with Schwing America and Phoenix Contact were established by selling to end users in their respective vertical markets. The end-user sales then demonstrated the benefits and performance of trusted wireless products and, eventually, convinced these channel partners to purchase from OMNEX.

Relying on major partners to distribute the bulk of OMNEX's products eliminates a considerable portion of the marketing expenses but results in lower margins. It is recognized that there is a strong need to bolster margins.

By contracting out much of the marketing effort, OMNEX achieves a multiplier effect. With a number of significant channels the company requires limited resources. With the growth in number of OEMs and distribution partners, there will be a need for additional account managers. Business development and new customer marketing must go hand in hand with R&D as most significant deals will result in some customization efforts.

It is the intent of OMNEX to sign agreements with multiple partners. This strategy promises several advantages for the company. First, it will lead to diversification in potential product offerings, vertical markets, and channels to market and reduce vulnerability to downturns in any one partner's business. Second, it will strengthen the company's hand when negotiating partnering agreements with other large companies. Third, it will ensure that the underlying IP will be retained by OMNEX and that any technology licensing agreements will be non-exclusive. Although key personnel have a strong understanding of how to sell wireless products, sales and marketing is not considered OMNEX's core competency. Indeed, the sales and marketing budget has been small relative to other organizations and most direct sales and marketing activities are contracted out to the channel partners.

OMNEX's marketing expenditures have been low relative to its sales. Its marketing activities have focused on pushing product into the market. Scoring a "2" on the Strategic Fit Diagram indicates that OMNEX's marketing strategy is not well aligned with its differentiation strategy.

5.8 Risk Profile

OMNEX scores a "4" on the Strategic Fit Diagram. OMNEX has a high risk profile for a number of reasons. The overall risk of the company hinges primarily on the market's acceptance of trusted wireless technology. Wireless use for the applications that OMNEX is targeting is in its infancy. Many of OMNEX's best customers have been early adopters of its technology. With the increased recognition of productivity and

safety gains of wireless compared to the wired solution, the North American market has become more accepting of wireless for operation of mobile equipment.

The greatest risk to the company foreseen at present is rapid market growth. If OMNEX is unable to respond to new demand quickly enough, new competitors may fill the resulting vacuum. The principal mitigation efforts will be to develop flexible new technologies and a varied product line as quickly as possible to obtain dominant market share in the expanded market.

Success may result in dramatic growth of sales, increasing the cash needed to finance the associated growth in inventory and accounts receivable. By careful management of costs and cash flow, it may be possible to mitigate this risk. OMNEX has demonstrated its ability to manage cash flow demands by consistent revenue generation, controlled growth, profit reinvestment, and an operating line of credit; however, it is certain that the company would be unable to generate sufficient cash to finance growth above 30% to 40%.

In such a rapidly-growing market, it is not unreasonable to imagine that a new competitor with ample cash reserves and financial backing may seek to eliminate its competition by very aggressive pricing strategies aimed at driving competitors out of business. It is believed this risk will be mitigated by OMNEX's strategy of partnering with major players in specific vertical markets and providing them with custom-designed integrated solutions to their specific needs.

The cost of components will also become a critical issue. Even without considering the cost of labour, high-volume off-shore manufacturers have a significant price advantage in parts procurement. When OMNEX's competitors tap into this advantage, OMNEX will be obliged to move its high-volume manufacturing off-shore too, or risk losing the business to the competitors. The potential licensing arrangement contained in the MOU with Phoenix Contact provides an attractive model for implementing off-shore manufacturing when the need arises, in that it protects OMNEX's IP rights and strengthens a key distribution channel relationship. Using other off-shore contract manufacturing, particularly in Asian countries, significantly increases the risk of loss of IP as these manufacturers have been known to copy IP regardless of patent protection.

5.9 Capital Structure

OMNEX has chosen a conservative growth pattern, primarily financed by profits. More recently, the company has relied on debt to finance growth. Working capital (inventory and accounts receivable) is financed by an asset-secured line of credit. Fixed assets are generally purchased through the use of long-term bank loans. The company has taken advantage of federal and provincial tax credits along with government grants to help finance its R&D initiatives.

Recently, the company secured additional financing in the form of a loan through a government organization called Technology Partnerships Canada (TPC). The full loan amount is C\$7.5 million but is given to OMNEX as a reimbursement of 30% of OMNEX's R&D spending spread over five years. The repayment of the loan is in the form of royalties as a percentage of sales for a predetermined length of time, to a cap. This means that OMNEX must spend money first before it can receive funds from TPC.

The company had little choice but to look for alternative sources of financing as its Debt-to-Tangible Net Worth ratio, which must remain below two to satisfy bank requirements, was reaching its limit. Currently, 72% of the company's assets are financed through debt. In North America this would be considered risky and relatively highly leveraged. For a company with a differentiation strategy, OMNEX is highly leveraged. Traditionally, differentiators have extremely conservative capital structures to fund innovation and insulate them from risks. Growth will be challenging without additional equity financing.

5.10 Overall Assessment of Fit

The most glaring strategic fit incongruence is the company's capital structure. As a differentiator with high R&D spending requirements in a potentially high-growth market, the company is far too highly leveraged. As a result, OMNEX is forced to proceed with controlled, conservative growth oftentimes missing out on opportunities. If the company wants to be dominant in its industry, it will need to grow faster than it can support on its own.

Another area that appears to have lack of fit is its marketing. Differentiators are often associated with higher cost, pioneering marketing campaigns intended to create

pull in the marketplace. The company is relying heavily on its channel partners to market its products with very little consideration regarding how it wants to position its brand. At the moment, there appears to be no desire to push in either direction on the cost based/differentiation continuum indicating a lack of strategic marketing planning within the company.

Historically, the structure has been too centralized and decision-making has been lacking in autonomy. Although significant gains have been made in each of these areas with the introduction of the matrix organization structure, further work will be needed to continue to decentralize and increase autonomy to better align with OMNEX's differentiation strategy.

Although OMNEX has some highly-skilled labour, some areas of the company need improvement. For instance, as an RF company, its RF design team is sparse. Manufacturing engineers have no prior experience with modern manufacturing techniques and shop floor personnel are often inexperienced and error prone. As volumes increase, scale effects can be achieved. In the meantime, flexibility is key and requires a highly-skilled workforce both in manufacturing and in R&D areas of the company.

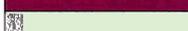
OMNEX's innovative product strategy, its economies of scope and flexibility, and risk profile are all appropriately matched to OMNEX's differentiation strategy.

5.11 Company Value Chain

The company's primary activities are manufacturing and selling product to its customers. OMNEX's core competency is its ability to understand its customers' needs and, in response, to design superior products and solutions and to provide superior customer service (even though its service department itself is not a core competency). Within the industrial wireless and portable wireless product groups, OMNEX is considered to be an innovator. A pictorial representation of the company's value chain indicates which activities are performed internally and which are outsourced (see Figure 5). The following discussion will examine each of the functions indicated on the attached chart to identify the extent of OMNEX's vertical integration and to identify whether or not there are opportunities for improvement.

Figure 5: OMNEX Value Chain

Firm Infrastructure	- Finance - Accounting - Quality Systems (ISO)	- Budgeting - Productivity Improvement	- Management Consulting - Legal Services		
Human Resources	- Payroll - Education & Training	- Recruiting - Occupational Safety	- Benefits Administration - Employee Relations		
Information Systems	- Local Area Network - Company Email	- Internet - Telephone - Security	- Software Licence Management - Database Management - Enterprise Resource Planning		
Research & Development	- Product Development - Product Maintenance - Custom Applications - New Business Development	- Research - Printed Circuit Board Design - Computer Automated Design - Standards and Country Approvals	- Product Testing - Custom Labels		
Supply Chain Management	- Parts Procurement - Services Procurement	- Vendor Management - Materials Management			
Manufacturing Management	- Facilities Management - Manufacturing Engineering	- Manufacturing Equipment Selection - Manufacturing Practices Management	- Manufacturing Documentation - New Product Introduction		
Primary Activities	In Bound Logistics - Receiving - Inventory - Incoming Inspection - Picking - Kitting	Production - Fabrication - Manufacturing - Product Assembly - Product Testing - SMT - Conformal Coating - Quality / Inspection - CNC Machining - Label Production	Outbound Logistics - Shipping - Transport - Brokerage	Sales & Marketing - Advertising - Sales - Pricing - Channel Selection - OEM Account Mgmt - Technical Support - New Business Develop. - Market Research - Branding - Forecasting	Service - Warranty - Repair - Technical Support

	Core Competencies
	In House
	Outsourced
	Combined Internal / Outsourced
	Non-Core Competencies

Note. Based on Porter, 1985.

5.11.1 Firm Infrastructure

With 104 employees and only \$12 to \$15 million in annual revenues, the company's infrastructure support is minimal. Six out of the 104 company employees work in finance, administration, human resources, and IT. OMNEX is primarily internally financed and has demonstrated its ability to manage cash flow demands over the past 12 consecutive years by consistent revenue generation, controlled profitable growth, reinvesting profits, using an operating line of credit for working capital, and long-term

bank financing for capital purchases. Financial reporting requirements have been minimal and relatively unsophisticated to date. Monthly interim financial statements are produced to satisfy the bank's financing requirement. An external accountant is used to perform a year-end review engagement, to calculate corporate income taxes, and to calculate Scientific Research and Experimental Development (SR&ED) income tax credits/refunds. The company has an internal accountant for financing, financial accounting and reporting, financial analysis, and budgeting and costing activities. An accounting assistant and a junior accounts payable person complete the accounting team. Budgets are prepared yearly and reviewed monthly at the Executive Committee level to ensure fiscal accountability.

Productivity improvement is an ongoing activity at OMNEX, aiming to achieve "continuous improvement" in all aspects of the company's operations. The continuous improvement program is run by a committee of 10 members, comprised of five Executive Committee members and five staff members drawn from all areas of the company.

OMNEX is committed to satisfying customer expectations and needs, and striving for excellence through continual improvement, and by providing quality products and services conforming to customer, regulatory, and internal requirements. To demonstrate this commitment, in September, 2002, the company received ISO 9001:2000 quality assurance certification; its quality practices comply fully with the requirements of that program. The company employs a full-time Quality Assurance Specialist to ensure continued ISO compliance and to manage its continuous improvement efforts.

From time to time, the company uses consultants to help with projects the company's management feels it lacks in-house expertise to perform. Any legal services needed by OMNEX have been obtained through external legal counsel.

5.11.2 Leadership and Culture

Over the years, OMNEX has made significant internal changes and improvements in order to provide better service for its customers and to adequately respond to its competitive environment. The new matrix structure is a prime example of an internal change made by OMNEX; however, the implementation is not complete. One purpose of this change was to reduce conflict by eliminating the multiple priorities experienced by some employees. Not all conflicting priorities have been removed. Most

notably, the leader of the Industrial Products SBU is also the Sales and Marketing Resources Manager. The leader of the Portable Wireless SBU is also the leader of the R&D Services group. There are noticeable conflicts between the two as they battle for scarce resources.

The company has an inexperienced managerial team both at the executive level and the management level. The management team is familiar with running a small company but lacks experience in larger company issues such as globalization, rapid growth, sourcing financing, and managing a large company. Although some isolated discussions happen regarding strategic direction, no formalized, company-wide strategic analysis occurs on a regular basis. This has created confusion with the management team members who are left to figure out which activities best support the company's needs. Corporate activity alignment has proved to be challenging particularly in manufacturing where managers are physically removed from four out of five of the Executive Committee members who are located in a separate building.

Over the past year, the Executive Committee has noticed an increase in conflict among its members. In particular, the two owners are often at odds due to conflicting visions. Tempers flare as committee members struggle to separate issues from personal criticisms. This conflict has filtered through the organization and has created further tension among the management team.

Generally, the management at OMNEX has adopted a laissez-faire style that has created resentment and conflict among employees and managers. The lack of experience and lack of discipline of the management team at times makes it difficult for the company to resolve issues and remove obstacles to move forward. OMNEX is witnessing the kind of organizational strain often observed during periods of growth. The concern is that OMNEX may not have the ability to develop the systems, structures, and personnel needed to cope with a much larger scale operation.

Historically, OMNEX has had very low turnover, which has been both positive and negative. On one hand, it shows that the company has created a pleasant, friendly work environment that treats the employees in a fair manner. On the other hand, a laid back culture has emerged through lack of pressure from the relaxed management style. Some employees, especially new hires, have commented that management and staff have become too complacent. For a company operating in a competitive, high-tech environment depending on constant innovation and continuous improvement for its

future success, there is very little pressure to meet deadlines or hold people accountable.

Assigning responsibility, authority and accountability issues are also concerns. The new organization structure is helping to alleviate some of these difficulties; however, some ambiguities remain. Accountability problems will continue if these ambiguities are not addressed. The creation of a team-based structure requiring teams to accept responsibility and be accountable for results is a better cultural fit for OMNEX going forward.

Having experienced a lot of changes in the last few years, OMNEX's employees are well equipped to deal with current changes. Indeed, most employees are starting to take control of their environments and are striving to make daily improvements. This adaptability has allowed the company to experiment with new methodologies; prospects for continuous improvement look promising as employees become more and more engaged in improvement activities.

OMNEX's culture is deeply rooted in its R&D origins. Two out of the three company founders have come from R&D departments of larger firms. Although profitability has always been a concern, the company was founded on the philosophy that growth would happen at a steady, manageable rate. The owners have not been interested in seeking external financing commonly required for rapid growth. Instead, the owners have preferred to take moderate (below market) salaries and reinvest the company's small profits to finance the growth. Focusing on R&D, high amounts of OMNEX's revenues have been used to fund R&D activities. Past performance shows that OMNEX does not lack product development ideas; however, it may lack the discipline to execute many of its ideas.

The manufacturing group espouses lean manufacturing concepts but is making little headway moving in this direction. Inventory turns are low as the company continues to carry large buffers and safety stocks to deal with volatility in demand. Eighty-five percent of the company's bank debt is needed to support trade capital primarily in the form of inventory. On time delivery is well below target. Since profits are low and inventory high, cash flow is continually a problem. Despite all the above-mentioned issues there is no sense of urgency to make changes.

5.11.3 Human Resources

Currently all HR initiatives fall under the responsibility of the Finance and Administration Manager. A full-time HR Generalist assists with this work. The HR generalist also performs payroll and benefits administration. Payroll is only partially performed in house with a payroll service providing deduction calculations, automatic deposits and remittances, and personal income tax documentation.

Most of the education and training for OMNEX employees is achieved either through external educational institutions on an individual basis or on the job training provided by job incumbents or supervisors. At times, when it is more economically feasible, seminars and training courses are brought in house.

Recruiting is mostly performed in house. The BC Technology web site is used to advertise technical staff positions. The Human Resources Development Canada web site is used for production employees and non professional staff. At times, placement agencies have been used for key positions; however, this approach has not been the most successful recruiting method. The most successful approach has been through the company's internal referral program, whereby employees receive between \$500 and \$2,500 in bonuses for referring successful placements.

The safety committee, composed of two management representatives and a number of staff representatives, performs occupational safety. The company has four employees who have obtained their Level 2 Industrial First Aid. These employees also participate in the safety committee activities. The committee meets monthly to address any safety concerns, ensure that procedures are being followed and to ensure that the company is WCB compliant.

Employee relations are handled in house mostly through the Executive Committee with the assistance of the Finance and Administration Manager and the HR Generalist. Disciplinary action is discussed at the Executive Committee level and if an employee needs to be specifically addressed, this is performed by the employee's manager and the Manager of Finance, Administration and Human Resources. The company is not unionized.

The company's two HR representatives belong to an organization called the High Tech Exchange Group for Human Resources Professionals (HTEG). This group consists of HR professionals in high tech and biomedical companies in the BC Lower

Mainland that get together to discuss area specific HR issues and to provide training and information to its members. The organization also publishes a yearly salary survey, in which all members of the group are required to participate. OMNEX uses this survey as a guide with respect to compensation ensuring that the company remains competitive in the local labour market.

5.11.4 Information Systems

OMNEX employs only one IT person to manage its Local Area Network and all other information systems related activities and services. The company occupies two buildings in the Port Coquitlam area that are within walking distance of each other. To connect the two buildings electronically, the company installed fibre optic cable that runs under concrete parking lots and walkways of two separate strata complexes. This IT person also manages the company email and internet, ensuring that a proper firewall is in place for security purposes.

The company implemented a company-wide Enterprise Resource Planning (ERP) software package in 1999. This software is a powerful tool used to manage product documentation, manufacturing, manufacturing planning, inventory, accounting, finance, sales, and service. OMNEX recently upgraded this software to the latest version. The software upgrade has required the purchase and upgrade of a number of computers and Microsoft software. It is hoped that the improved functionality and capacity of the upgraded ERP system will allow OMNEX to manage its anticipated growth for many years. The Finance and Administration Manager chairs the ERP committee, but the committee members represent all areas of the company. This committee is responsible for upgrades and testing, customization control, training, and other issues associated with the ERP. Occasionally, the company uses consultants to assist with ERP related work.

One person handles all the company's information systems needs, so most of the focus is on ensuring that people have working computers when they need them, and that the network stays operational. There is no strategic direction for IT. Minimal effort is being spent on automating processes and reporting. There are a number of standalone databases and spreadsheets that people have created because they either do not like the functionality of the company's ERP system or they cannot get the help they need to create reports. The standard in industry for IT spending is between 3% and

5% of sales. OMNEX spends well below this level. As a result, excess overhead costs have occurred as people struggle to manually create reports and other tools to help them get their jobs done.

5.11.5 Research and Development

OMNEX's ability to design quality products has provided the company with a competitive advantage to date; however, technology, alone, is not expected to provide sustainable competitive advantage. The majority of R&D, including the RF portion of its products, is performed by OMNEX. Similarly, OMNEX's I/O technology, considered a core competency, is also developed in house. Competitors have had trouble producing I/O comparable to OMNEX's functionality. Indeed, one of the company's major competitors has asked to purchase this I/O on more than one occasion, but to date, OMNEX has refused to sell this technology. Unlike its competitors, the packaging of OMNEX's industrial wireless products has been purchased through a company called Phoenix Contact. OMNEX's major competitors design their own packaging. All of the packaging for OMNEX's portable wireless products have been designed in house, which is similar to OMNEX's competitors.

OMNEX has recruited an excellent engineering team with an ideal balance of academic and technical qualifications and practical experience in industrial products design and applications. On occasion, OMNEX has employed various independent consultants to get valued expertise and for additional capacity. Expertise has been provided in Signal Processing Theory; Spread Spectrum Analysis; Air Protocol modelling; and Tool and Die making. Globalization of OMNEX's products places additional importance on the acceptance of the products by various approval bodies around the world. Identification of requirements tests and testing bodies is done through the use of an external consultant. Where possible, OMNEX works with channel partners to share the cost and effort of getting the necessary approvals including UL, CSA, CE, FCC, ITC, FM, etc). In particular, Phoenix Contact, Germany has offered its compliance test facilities and staff to OMNEX at no charge.

OMNEX plans to introduce computer-aided testing on all its RF modules as a company standard in R&D and manufacturing. Extensive use is made of Computer Aided Design (CAD) software tools for mechanical design (SolidWorks, AutoCAD), PCB

design (P-CAD), graphic design (CorelDRAW, Adobe Photoshop) and digital signal processing simulations (Visual DSP++). All of these activities are performed in house.

OMNEX has not patented any of its technology or products; instead, it keeps technology as a trade secret. The company views this as a major deficiency going forward and will be working on better means of Intellectual Property (IP) protection in the future.

New business development is a shared activity between the sales and marketing staff and R&D. OEM visits are often performed with representation from both of these departments. This approach allows the R&D staff to better understand the needs of customers and ensures that the salespeople do not promise what the company cannot deliver. This customer feedback has been instrumental in the design of packaging and functionality of the company's products, particularly for portable wireless product development.

New product concepts can originate anywhere. Typically, either sales or R&D, often in consultation with an existing or potential customer, initiate new product concepts. The typical process requires that a requirements specification be created for review and approval by marketing. The requirements specification should include: what the product is, who needs the product, what it does, how much the product will cost to manufacture, and who will buy it. No information is included on design costs or estimated numbers of potential unit sales making it difficult to assess the business case for proceeding with the project.

Once the design specification is approved, the project is assigned a project leader and the requisite engineering resources. A project plan is developed and is supposed to include a project schedule, responsibility assignments, milestones and targets, estimated development costs, and other project planning information as needed. If the plan is fully approved by R&D and sales, a prototype is developed and tested. Revisions are made and once certifications are achieved, Beta units are sent to select customers for field testing, if appropriate. When a product is deemed acceptable, pre-production runs in medium quantities (50 – 100) are produced and shipped to interested customers. In the meantime, manufacturing processes and procedures are verified. Once manufacturing can produce the product without R&D intervention, it is deemed fully "released" and product improvements and modifications are initiated through more

formalized Engineering Change Order (ECO) and Engineering Change Request (ECR) processes.

Although the procedure is clearly defined, product development delays are commonplace. The company has difficulty going from the design phase to full production. Its new product introduction (NPI) processes are at times cumbersome, undocumented, and difficult to repeat. This is particularly true on the Portable Wireless SBU. At present, the company does not have the resources to make significant improvements in this area as its manufacturing engineering staff struggle just to keep up with current NPI volumes, and product design changes, manufacturing, and systems maintenance.

Over the years, a lack of respect has developed between R&D staff and the manufacturing staff that has led to conflict. The company has developed an "us and them" attitude particularly between these two areas further exacerbated by the separation into two buildings. There is a definite lack of communication and cooperation between these departments, although improvements are being witnessed with the new matrix organization structure. This lack of communication, respect and trust has slowed down the introduction of new products into manufacturing. Often, manufacturing is unaware of new product development and is presented with the challenge of manufacturing new products without proper documentation, test instructions, and procedures. When conflicts arise, most employees are unable to resolve the conflict in a healthy way. Blaming, finger pointing and hurt feelings are relatively common.

Over the years, OMNEX has been fortunate that it has had the time to develop products slowly with very little accountability for cost and time over runs. Currently, the company is two years behind on the release of its 2.4 GHz industrial wireless products. It has been fortunate to date that Schwing America has been very undemanding with new product development and that Phoenix Contact recognized OMNEX would have difficulty with on-time delivery for new products. Once the company starts working with more large players who may be less patient, OMNEX will need to improve its internal control and accountability. The company does not have the discipline required to meet hard and fast milestones and deliverables. If improvements are not made, the company could damage its relationships and its reputation in the marketplace.

In the past, opportunities were scarce, so the VP of R&D grew accustomed to a chaotic approach with respect to product development and responded to every

opportunity that presented itself. R&D was not required to commit to strict timelines, focus could be shifted at a whim, projects could be postponed, and there was no accountability for missed deadlines. Now the company is having difficulty as it struggles to make choices, complete the R&D efforts required to secure OEMs interested in OMNEX's products, and get the product into production.

When the company was small, with only a few opportunities presenting themselves, responsiveness was quick. One R&D member could design the product, order the parts to build the prototype and beta units, build the units, and simultaneously work with the customer to receive feedback and make modifications to the product. This was often done without full bills of materials, proper procedures, or complete documentation. Repeatability was an issue. Oftentimes, more than one prototype would be built at a time so that if more were needed later, they could use the second prototype (to copy to build the first production runs). Once the majority of the kinks were ironed out, the product documentation was finalized, and processes were fully defined, the product was released to a small group of manufacturers to produce in larger volumes. Currently, customer responsiveness has been slowed because of the need for more people to be involved at several stages of the process. Despite the introduction of ISO, numerous procedures, and additional documentation, quality and responsiveness are primarily suffering because this rigor has not been fully institutionalized.

5.11.6 Manufacturing Management

Manufacturing management provides a number of services to ensure the smooth operation of OMNEX's manufacturing. These services include the management of the manufacturing facilities, equipment selection and maintenance, and project and manufacturing practices management. NPI also falls under this group. Each SBU manages NPI activities differently. The manufacturing engineering team falls under manufacturing management and works on product maintenance, manufacturing documentation, procedures maintenance, and any other related activities.

Planning falls under manufacturing management as well. Planning receives input from sales and marketing and the Sales & Operations (S&OP) Committee regarding forecasted production demand and potential master production requirements. Production demands can come from a variety of places including customer orders, sales plans, safety stock requirements, demo or prototype requests. Customer orders can be

shipped from stock, shipped from a Kanban (visual replenishment bins) system or scheduled through material resource planning (MRP) generation.

5.11.7 Supply Chain Management

OMNEX performs all of its own supply chain management with the exception of a small number of consumables that are managed by its vendors. The company anticipates working on Vendor Management Inventory (VMI) contracts in the future along with Just In Time (JIT) and other lean manufacturing concepts to increase inventory turns and reduce working capital requirements. The company is unaware of how these functions are being managed by its competitors.

OMNEX's wireless products are designed around high-volume, low-cost RF components developed by major semiconductor manufacturers such as Philips for the cellular radio handsets market. While this strategy is crucial to keep OMNEX's unit production costs low, it is rarely possible to find "form, fit and function"-equivalent second sources for these components. In house purchasers procure parts through North American distributors. Most components parts are manufactured in Asia.

Most plastic injection manufacturing, metal fabrication, and subcomponent assembly services (when needed) are outsourced to local manufacturers and are sourced through the company's purchasers with the assistance of the R&D staff. Most competitors in this market are still relatively small; therefore, it is unlikely that any of them perform this kind of heavier manufacturing in house.

Members of the materials management team negotiate long-term supply agreements. Pricing is often negotiated based on forecasted demand as provided by OMNEX's S&OP Committee. Although previously centrally located and controlled by materials handling staff, more and more inventory is now being moved to point of use.

Sourcing and implementing major manufacturing equipment is generally achieved through project teams with an assigned team leader who has appropriate technical expertise, rather than through the purchasing staff. This ensures employees who are qualified to make these kinds of buying decisions perform due diligence and decision-making.

5.11.8 Inbound Logistics

Inbound logistics involves all activities associated with bringing in product used for production. The activities undertaken by this group include receiving, incoming inspection, inventory tracking including daily cycle counting, and inventory flow to the work cells. The plant receives materials via courier. If the materials are OMNEX designed parts, they immediately move to Quality Control for inspection. Non-conforming parts are returned to the manufacturer for rework or replacement. Commodity parts are given a brief inspection by receiving staff and then either moved to stock or given to the purchaser if the parts are non-conforming. Components are either moved to the work cell where they will be used, or moved to the stockroom. Where Kanban is used, reorder cards are used to request replenishment or reorders.

For SMT equipment, kits of reeled components are picked from stock to prepare for circuit board population for components unique to the product being manufactured. Common parts are often left on the equipment for ease of set up. A similar kit picking methodology is used for external contractors populating printed circuit boards, but kits will include all components for one job including commodity parts.

5.11.9 Production

Current production capacity, operating a single shift, is 160-180 printed circuit boards (PCBs) per day. Depending on the product, the number of PCBs used to build a system varies, ranging from a single board to as many as 10, so the daily "system production capacity" depends on the product mix. Over the past couple of years, OMNEX has made significant additional investments in manufacturing equipment, in order to expand in-house capacity, to reduce production lead times and costs, and to increase the flexibility required for small batch sizes. The additional equipment includes a CNC router to automate drilling plastic housings, a label printer and plotter to produce weather-proof, wear-resistant, polycarbonate product labels in-house, and SMT equipment worth approximately C\$500,000 to populate printed circuit boards. Currently, the company continues to outsource about 25% of its PCB requirements as a strategy to avoid a single source for this work. R&D prototype boards are also being produced on this equipment. The company expects to continue to invest in equipment to achieve improved productivity and quality consistency as most manufacturing is labour intensive and vulnerable to human error.

All the PCBs are specific to OMNEX and are designed in house. Computer Automated Design (CAD) files are sent to the contractors (board houses) to use on their SMT equipment or to the in house manufacturing SMT team to populate the boards. Strategic advantages to in house SMT allow OMNEX to reduce the time to market on new products; prototype and beta runs can also be produced in house, thereby reducing turnaround time from two to five weeks to two to three days. In house SMT also allows for smaller batch sizes, more flexibility, and better control over quality.

All products are produced at OMNEX's manufacturing facilities in Port Coquitlam, British Columbia. OMNEX leases a 12,000 square foot building within short walking distance of its headquarters. All of OMNEX's production staff, including assemblers, technicians, shipping/receiving, stockroom staff, manufacturing engineering, NPI, and manufacturing management occupy this building.

Product assembly, testing, conformal coating and inspection are all performed in the house. A number of work cells have been created to focus on specific product lines. Employees within these cells are often able to work on most stages of product assembly for all products within the cell. Daily production can be changed within the cell to meet customer and production demands. Key manufacturing management personnel have been moved to the shop floor to ease communication of plans, to assist shop floor staff with production issues, and to assist with the creation and revisions of manufacturing processes and procedures. Technicians are employed in test positions with a senior test technician working on test procedure documentation and improvements and test staff training on a continual basis. In the meantime, R&D test services are working on creating automated test equipment to increase throughput and reduce the need for technicians to perform standard production testing.

5.11.10 Outbound Logistics

Either cell assemblers or test personnel bring packaged product to shipping, or shipping personnel print shipping instructions to pick product from finished goods shelves for daily shipments. As NAFTA requirements are difficult to navigate, experienced shippers are employed to ensure compliance. Once all documentation is complete and products are ready to ship, electronic courier documentation is completed and couriers are arranged. Couriers also perform the majority of OMNEX's customs

brokerage requirements. OMNEX's documentation is generally compliant as evidenced by rare border delays.

5.11.11 Sales and Marketing

OMNEX's distribution strategy is to actively seek alliances that provide channels to specific identified vertical markets, such as the sensor market. The ideal alliance partner would be a major player in one or more vertical market. OMNEX prefers to be the creative partner in each alliance, developing new technologies and generating new product ideas while retaining control of the resulting IP.

For the portable wireless products, the company pursues an OEM model. In this case, the OEM partner is the primary user, building it into their own products. The model gives OMNEX excellent opportunities to participate in the conception and engineering of new products for the partner, adding value to the partner's business through innovative applications of trusted wireless technology. In this instance, OEM account management is performed in house.

The major players in the industrial wireless industry use distributors and value added resellers to get their products to the industrial marketplace. Elpro offers exclusive territories to its distributors. MDS sells primarily to the oil and gas, and the water and wastewater industries through direct selling or the use of distributors. OMNEX will continue to use channel partnerships as its major method of distribution. The intention is to keep the internal sales force small with account management, technical support, and distributor sales force training as its internal sales activities. Phoenix Contact is the chosen channel for product distribution to end users and system integrators. Additional channels will be sought for industrial wireless products through OEMs primarily in the form of sensor manufacturers (temperature, pressure, flow, PH) and controllers manufacturers (PLC's, DCS's, etc.). The first OEM deal has just been signed with a company called Drexelbrook that is focused on level sensor products. Drexelbrook was given the choice of buying directly from OMNEX or through Phoenix Contact. Drexelbrook chose to buy from Phoenix Contact to take advantage of Phoenix Contact's superior logistics capabilities in the form of stocking, shipping, and records keeping.

OMNEX uses one direct salesperson to serve the after market, particularly for portable wireless customers who are unable to purchase OMNEX units through their equipment manufacturer. Direct sales also allows the company to provide initial

offerings of emerging disruptive applications of trusted wireless technology to early adopters. As these new applications gain recognition in the market, they will find their way into the reseller and/or OEM partner channels as end users start demanding that equipment comes standard with OMNEX's radios, thereby creating pull in the marketplace.

OMNEX does not expect to have a large direct sales force any time soon. Most of the direct selling is in the business development phase, seeking out OEMs and new channel partners. Channel partners, in particular, are used for more qualified markets and applications. OMNEX's strength then becomes good account management and participation with channel partners to jointly maintain contact with end users.

The company's relationship with Phoenix Contact promises to create very significant benefits for OMNEX by establishing channels to the global industrial wireless market. The products will be co-branded, and will bear the labelling: "Powered by OMNEX Trusted Wireless." Phoenix Contact is planning an extensive publicity campaign around the agreement, which will establish instant credibility and brand awareness for OMNEX in hitherto untapped global industrial wireless markets. Phoenix Contact has committed to specific sales volumes, which effectively guarantee OMNEX's projected sales growth for products destined for this channel for the next two years.

Phoenix Contact also provides significant marketing benefits that OMNEX would have difficulty funding by itself. Phoenix Contact USA participates in more than 30 tradeshows per year; it spends more than US\$400,000 annually on advertising for wireless products; and it provides sales channel training and sales channel tracking. OMNEX products are included in the Phoenix Contact catalogue that includes over 100,000 copies distributed worldwide and published in multiple languages. It is to be noted, however, that OMNEX must approve all co-branded advertising before it is published. Phoenix Contact also provides free certification testing services along with consulting services to help OMNEX make its products compliant. To date Phoenix Contact, Germany has provided product approvals in 19 countries. As previously stated, Phoenix Contact provides OMNEX with co-branding, which gives OMNEX a strong association with a well-established industrial brand. Furthermore, because of the close nature of the relationship, Phoenix Contact provides OMNEX with opportunities for learning in sales and marketing, manufacturing, and R&D.

As evidenced by the preceding discussion, advertising, and sales activities are partially outsourced depending on the product line. Marketing activities that are performed in house include channel selection, technical support, new business development, and branding activities. Market research is almost entirely purchased from available sources; however, available data is limited for this industry. Pricing is generally established through negotiations with OEM and channel partners. OMNEX attempts to target its prices between two and two and a half times its products' direct costs, but this is highly dependent on what the market will bear.

For the Phoenix Contact channel and large OEM accounts, product forecasting is relatively easy as these organizations either provide their own forecasts or place orders with long lead times. For the remainder of sales, forecasting is done in house through best guess estimates made by OMNEX's sales staff. OEM forecasts are based on projections for equipment sales that are provided to OMNEX. With new OEM accounts, projected sales data are often provided at start up. Over time, trends can be identified. Distribution sales forecasts are established with channel partners and are regularly reviewed.

5.11.12 Service

All of OMNEX's products are serviced in house. Service includes warranty repairs, billable repairs, and technical support. The service department includes only five employees, but assistance from R&D and manufacturing staff keep customer feedback surveys showing OMNEX's service levels as perceived as being of higher quality and responsiveness than OMNEX's competitors. OMNEX's management feels that its ability to service its products well in the North American marketplace is a core competency that few competitors can imitate. In house service also provides timely feedback to both the manufacturing and R&D staff so that product improvements can be implemented quickly. As the company starts to sell more products outside of North America, in house service may prove to be impractical. To date, little thought has been given to meeting service needs once OMNEX expands more into the global market. Indeed, OMNEX still struggles with serialization and labelling issues that will make servicing anywhere other than in house difficult.

Within the portable wireless business, OMNEX's service level is considered a core competency and a competitive advantage. Turnaround time on product repairs is

within two days compared to the six to eight weeks needed by OMNEX's competitors. Although HBC and Hetronics maintain North American addresses, major repairs are sent back to their offices located in Germany. Remtron is located in North America but has been well known for its poor service levels. Downtime is extremely costly; therefore, response time is critical. Users do not typically carry spare radios. Although most of the equipment can be operated without the radio, additional personnel are often required and the operation is slower.

Downtime with regard to industrial customers is equally critical; however, the products they buy are more standardized, catalogued products. Phoenix Contact carries spare products to send out as replacements; therefore, repair turnaround time is less critical.

OMNEX's exceptional service level is used as a means to promote the company and its products and is not viewed solely as a source of additional revenue. Although the company has not leveraged its service reputation well to date, it can be considered to provide a sustainable competitive advantage provided it is managed well going forward.

5.11.13 Value Chain Summary

As the company grows and matures, OMNEX's management is getting better at understanding its core competencies and assessing which activities should be outsourced. OMNEX has always performed the majority of its R&D in house and anticipates continuing this strategy well into the future, with the exception of some strategic alliances that help the company develop products more quickly and enable it to achieve greater market share.

Over the past several years, OMNEX has increased its manufacturing knowledge and capabilities, allowing it to vertically integrate more and more of these activities. This has afforded the company a number of advantages such as faster time to market on new products, better flexibility, and reduced inventory because of smaller batches to name a few. As manufacturing staff become more knowledgeable, it is expected that more of the manufacturing will be brought in house and automation equipment will be purchased to improve efficiencies and increase quality. OMNEX will need better in house manufacturing expertise to achieve many of its planned initiatives and to make significant quality improvements. At some point and depending on volumes, OMNEX

predicts that some production will have to move off-shore to lower-cost production facilities. When the size of the market grows to the point that the major companies begin to compete heavily in the industrial wireless arena, or smaller competitors introduce very aggressive pricing, moving high-volume production off-shore may be the only way for OMNEX to remain price-competitive.

Marketing is not viewed as the company's core competency; therefore, OMNEX will continue to seek joint ventures and alliance partnerships that assist the company in reaching broader markets. As the product is introduced into more countries, the company will need to reconsider how to service its products.

5.12 Financial Analysis

Until recently, OMNEX has been self-financed using traditional bank financing and reinvesting profits to meet its growth needs. Working capital (inventory and accounts receivable) is financed by an asset-secured line of credit and fixed assets are purchased with long-term bank loans. In the future, the majority of R&D spending will be paid for by TPC and tax credits, which will free up cash for sales and marketing and other activities. Even with TPC, OMNEX's chosen method of financing limits the company's investment activities and growth. The company is highly leveraged and often approaches its debt load limits. This financing approach is incongruous with the company's differentiation strategy.

To assess OMNEX's financial health, several financial ratios and calculations will be examined. These include OMNEX's Gross Margin, EBITDA Margin, and Net Profit Margin (see Table 9).

Table 9: *Income Statement Ratios*

Income Statement Ratios	1998	1999	2000	2001	2002	2003
Gross Profit Margin	37%	43%	42%	41%	36%	35%
Net Operating Margin	8%	9%	9%	7%	6%	5%
Net Profit Margin	4%	4%	3%	2%	2%	1%
Net Profit Margin - including bonuses	9%	8%	5%	5%	3%	3%

Gross profit is a measure of the profitability of a firm's product and separates the company's operating activities from the firm's financing activities. OMNEX's Gross Profit

Margin has ranged from 35% to 43% over the past six years, although this ratio is trending downward. Reducing margins will have significant impacts on the company. As Gross Profit Margins are eroded, the company will need to grow revenues to cover its overhead. Simultaneously, the company will need to reduce overhead as a percentage of revenues to ensure continued profitability. Significant pressure on margins comes from the dramatic decrease in the value of the US dollar over the past two years. All predictions indicate that the Canadian dollar will either continue to appreciate or maintain its position against the US dollar, indicating that OMNEX will need to effectively manage its overhead costs.

The EBITDA Margin measures the profitability of a firm's operations, net of both production and administrative expenses. OMNEX's use of government tax credits makes comparing against industry benchmarks problematic. The SR&ED program requires that taxable income be below \$200,000 to qualify for the highest refundable amount. In order to ensure that the taxable income stays below the \$200,000 threshold, the company must bonus excess profits to the shareholders to reduce the company's taxable income. Approximately 45% of the bonuses are paid in personal taxes and the majority of the remainder is reinvested in the firm.

EBITDA margin and Net Income are heavily affected by the above-mentioned SR&ED calculations making comparison to public firms uninformative. The EBITDA Margin for OMNEX ranges from 5% to 9% and Net Profit Margin ranges from 1% to 4%. Without the above-mentioned tax credits, the company would have shown a loss in 2000 through 2003. As long as the company continues to finance R&D through SR&ED, while pursuing sales growth, these two margins will continue to deteriorate.

Invested Capital (IC) measures the total of all funds that have been invested by financial asset-holders in a firm. IC calculations for OMNEX indicate an increase from 1998 to 2003 (see Table 10 and Table 11).

Table 10: Invested Capital Calculations

Invested Capital	1998	1999	2000	2001	2002	2003
Bank Indebtedness	751	322	1,181	956	1,775	1,778
Plus Short-term Debt	-	-	-	-	-	-
Plus Current Portion of Long-term Debt	36	82	400	131	144	227
Plus Long-term Debt	225	318	256	506	386	581
Plus Deferred Taxes	73	108	164	188	229	237
Plus TPC Payable	-	-	-	-	-	-
Plus Shareholder Loans	177	400	542	406	348	406
Plus Share Capital	0.403	0.403	0.403	0.404	0.404	0.404
Plus Retained Earnings	639	911	1,172	1,364	1,600	1,772
Plus Other Financial Assets	-	-	-	-	-	-
Invested Capital	1,901	2,141	3,716	3,551	4,481	5,002

Table 11: Invested Capital Balance Sheet

Invested Capital Balance Sheet	1998	1999	2000	2001	2002	2003
Trade Capital	1,505	1,637	3,121	2,965	3,878	3,905
Net Fixed Assets	395	504	595	586	603	1,097
Invested Capital	1,901	2,141	3,716	3,551	4,481	5,002
Bank Debt	787	403	1,581	1,087	1,919	2,005
Long-term Debt	225	318	256	506	386	581
Equity	889	1,420	1,879	1,958	2,176	2,416
Invested Capital	1,901	2,141	3,716	3,551	4,481	5,002

The IC Balance Sheet enables firms to analyze Balance Sheet items in a different way. The top half of the IC Balance Sheet shows the investments made by the firm into business operations. The bottom half of the IC Balance Sheet shows amounts invested by financial asset-holders. The IC components can be used to calculate some interesting ratios. The first is Debt-to-Invested Capital. This ratio is a measure of the debt use of a firm. OMNEX's Debt-to-Invested Capital ratios have been calculated from 1998 to 2003 (see Table 12).

Table 12: Debt-to-Invested Capital Ratios

	1998	1999	2000	2001	2002	2003
Debt-to-Invested Capital	53%	34%	49%	45%	51%	52%

OMNEX's 2003 results indicate that 52% of the investment made by the firm into business activities was financed by debt holders. Debt imposes additional risk on shareholders beyond the risk associated with a firm's operations. The average Debt-to-Invested Capital ratio for the electronics industry is 42.39%; the range is between 14.40% and 73.30%. The average for all industries is 46%. At 52%, OMNEX is not out of line with other general electronic companies; however, as a differentiator in a high growth industry, it is highly leveraged.

Another IC ratio that can be calculated is Trade Capital-to-Invested Capital. This ratio measures the fraction of the firm's investment in business activities that are short-term and are held to support the trading function of the firm such as accounts receivable and inventory. OMNEX's Trade Capital-to-Invested Capital results are reported for the year 1998 to 2003 (see Table 13).

Table 13: Trade Capital-to-Invested Capital Ratios

	1998	1999	2000	2001	2002	2003
Trade Capital-to-Invested Capital	79%	76%	84%	84%	87%	78%

Ideally, a company would like to reduce this number as much as possible without sacrificing sales. The industry average for publicly traded firms is 43.48%, and ranges between 10.18% and 66.36%. The all industries average is 30.97%. OMNEX TC/IC has ranged between 76% and 87%. At 78% in 2003, OMNEX's Trade Capital requirements are extremely high. In planning for the future, OMNEX needs to consider its Trade Capital investments. First, to alleviate some of its cash flow problems, it needs to concentrate on reducing the amount needed for Trade Capital. Second, in recognizing that Trade Capital is a large portion of its financing needs and as revenues grow in the future, the company must recognize and plan for the incremental Trade Capital investment that it will invariably need to finance its operating activities.

Another IC ratio commonly calculated is the Rate of Return on Invested Capital (ROIC), which is the rate of return that the firm earns for all financial asset-holders on

the funds originally invested. OMNEX's ROIC calculations are reported for the year 1998 to 2003 (see Table 14).

Table 14: Return on Invested Capital Ratios

	1998	1999	2000	2001	2002	2003
After tax shareholder bonuses	295	206	100	199	97	130
EBITDA	445	537	655	547	589	648
EBIT	403	437	529	435	469	407
ROIC	54%	39%	35%	20%	19%	17%
ROIC after Depreciation	51%	34%	29%	17%	16%	12%
ROIC after tax and after depreciation	46%	30%	25%	15%	14%	11%

OMNEX's growth over the past six years has caused the downward trend in this ratio; however, this measure can be insightful because it can be compared to market returns. With ROIC calculations of between 11% and 17%, OMNEX is still performing well compared to general market returns, which average around 12%. The shareholders are still getting value for their investment.

The Rate of Return on Equity (ROE) is the rate of return that the firm earns on funds originally invested by shareholders. It is calculated as Net Income over Book Equity at the beginning of the period. OMNEX's ROE calculations are reported from 1998 to 2003 (see Table 15). After tax bonuses have been included in net income for the following calculations.

Table 15: Return on Equity Ratios

	1998	1999	2000	2001	2002	2003
ROE	85%	54%	25%	21%	17%	14%

Comparing these numbers to general market returns, OMNEX's returns are favourable; however, OMNEX needs to be concerned with the downward trend. At 14%, the return in 2003 is good, but continued monitoring of this ratio is advised.

Liquidity Ratios provide information on whether the company has the ability to pay all of its current liabilities with only its current assets in the case of forced liquidation. The Current Ratio is current assets divided by current liabilities. Since inventory can lose its value, the Quick Ratio is often used, which is current assets less inventory all

divided by current liabilities. OMNEX's calculations are shown from the year 1998 to 2003 (see Table 16).

Table 16: Liquidity Ratios

	1998	1999	2000	2001	2002	2003
Current Ratio	1.40	1.91	1.60	1.73	1.58	1.51
Quick Ratio	0.82	0.97	0.85	1.02	0.92	.84

OMNEX is required to maintain a Current Ratio above 1.25 per its bank agreement. At present, the company shows no reason for concern with its bank; however, rules of thumb for the Current Ratio and the Quick Ratio are two and one, respectively, indicating that OMNEX's ratios are on the low side. Over the past three years, this ratio has decreased while growing revenues. This may indicate that the company is making more efficient use of its Trade Capital.

For many companies, particularly, OMNEX, monitoring Trade Capital is an important business activity. If a firm can reduce Trade Capital without reducing sales, the ROIC increases to the benefit of the shareholders. Several measures are used to assess the efficiency of OMNEX's Trade Capital utilization (see Table 17).

Table 17: Efficiency Ratios

	1998	1999	2000	2001	2002	2003
Sales	5,920	6,240	7,674	8,369	9,588	11,834
Cost of Goods Sold	3,719	3,568	4,422	4,901	6,103	7,664
Accounts Receivable	1,159	843	1,465	1,627	1,763	1,714
Inventory	1,031	1,258	1,865	1,785	2,081	2,202
Accounts Payable	259	386	560	805	773	707
Accounts Receivable Turnover	5.11	7.40	5.24	5.14	5.44	6.91
A/R Collection Period	71.47	49.33	69.67	70.97	67.13	52.86
Inventory Turnover	3.61	2.84	2.37	2.75	2.93	3.48
Inventory Conversion	101.15	128.67	153.93	132.90	124.49	104.85
Accounts Payable Turnover	14.37	9.24	7.89	6.09	7.89	10.83
A/P Payable Deferral Period	25.40	39.51	46.23	59.97	46.23	33.69

For the most part, all of these numbers could use improvement. Currently, it takes the company 53 days to collect from its customers. With typical terms at Net 30

Days, most of its customers are slow paying; however, there was a marked improvement in 2003. The company may want to consider methods to reduce collection time.

OMNEX is turning over its inventory 3 1/2 times per year or it takes approximately 104 days to convert its inventory into revenue. OMNEX could alleviate cash flow problems by increasing its inventory turnover, provided sales are not adversely affected. Easily obtained commodity parts would be targeted for rapid turnover, whereas difficult to source and custom designed parts will be stocked in higher amounts to ensure high service levels to its customers.

Accounts payable deferral should be extended as long as possible without causing suppliers to withhold products. The company is working at extending its terms (up to 120 days) and working towards JIT inventory arrangements to improve cash flow.

The Cash Conversion Cycle measures the length of time (in days) a dollar is outside the firm as it circulates through the firm's fundamental Trade Capital accounts: inventory, accounts receivable, and accounts payable. Most of the time firms want to shorten this cycle. OMNEX's Cash Conversion Cycles are reported for the years 1998 to 2003 (see Table 18).

Table 18: Cash Conversion Cycle

Cash Conversion Cycle	1998	1999	2000	2001	2002	2003
Inventory Conversion Period	101.15	128.67	153.93	132.90	124.49	104.85
Plus A/R Collection Period	71.47	49.33	69.67	70.97	67.13	52.86
Less Accounts Payable Deferral Period	-25.40	-39.51	-46.23	-59.97	-46.23	-33.69
Total Days	147.22	138.49	177.37	143.91	145.38	124.01

In 2003, it took the company 124 days to convert product into cash. Although there are really no good industry measures to compare against, companies want to look at trends. OMNEX is not trending upwards, which is good, but the company likely would want to continue to shorten this cycle to improve cash flow.

One of the most important measures to look at is free cash flow. Firms can be profitable and still struggle with insufficient cash. Poor cash flow, even for short periods, can be devastating. Free cash flow is defined as the net amount of cash that flows into a firm as the result of operations. The conceptual definition of free cash flow is all the

cash from a firm's operating activities that can be distributed back to financial asset-holders without affecting the current growth of a firm.

Although there are a number of methods to calculate free cash flow, the method used here is:

Free Cash Flow = Funds from operations (FFO) – Incremental Investment

Where, FFO = [EBITDA – CCA] x (1- tax rate) + CCA

And, Incremental Investment is the change in Trade Capital and Net Fixed Assets

OMNEX's results are given for the year 1998 to 2003 (see Table 19.)

Table 19: Free Cash Flow Calculations

	1998	1999	2000	2001	2002	2003
FFO	357	441	539	451	486	558
Capital Expenditures	111	308	342	215	257	752
Increase in Trade Capital	510	132	1,484	(155)	913	27
Free Cash Flow	(264)	1	(1,287)	391	(684)	(221)

OMNEX has seen both Free Cash Flow positive and negative years, but most years have been negative. These results are not surprising for a growing company. Careful monitoring of Free Cash Flow going forward is vital to OMNEX's success. This emphasizes the need for financing to assist with OMNEX's growth.

Many smaller firms feature a combination of rapid sales growth and owners with limited planning skills. Often, growing firms have the greatest need for incremental investment; therefore, these firms are prone to liquidity problems unless they engage in financial planning. Accounting information is not necessarily helpful for cash flow monitoring. Net income measures the increment in shareholder wealth arising from a firm's operations, but it does not equal cash flow and cash is what is really required to meet the firm's obligations.

The Sustainable Growth Rate is the maximum rate at which company sales can increase without depleting financial resources. The ratio can be used to assess available options should a company's target growth rate exceed its sustainable growth rate and, conversely, when growth falls below sustainable levels. In many companies, it

may be necessary to limit growth to conserve financial strength. During the growth phase of a company's business cycle, financing needs are the most pressing. If a company wants to increase sales, it must also increase assets such as inventory, accounts receivable, and productive capacity. If the company does not want to sell equity, the cash required to pay for this increase in assets must come from retained profits and increased liabilities. The Sustainable Growth Rate enables companies to determine limits at which they can increase sales. What limits the growth rate in sales is the rate at which owners' equity expands. A company's sustainable growth rate, therefore, is nothing more than its growth rate in equity (Higgins, 2001).

$$g^* = \text{Change in equity} / \text{Beginning-of-period equity}$$

or, $g^* = \text{PRAT}$

where,

P = Profit Margin

R = Retention rate

A = Asset turnover ratio

T = Assets-to-equity ratio (assets divided by beginning-of-period equity)

An important implication of the sustainable growth equation is that g^* is the only growth rate in sales that is consistent with stable values of the four ratios. If a company increases sales at any rate other than g^* , one or more of the ratios must change. This means that when a company grows at a rate in excess of its Sustainable Growth Rate, it had better improve operations (represented by an increase in the profit margin or the asset turnover ratio – sales/assets) or prepare to alter its financial policies (represented by increasing its retention rate or its financial leverage).

This is the crux of the sustainable growth problem for expanding firms: it is entirely possible for a company to grow too fast for its own good. This is particularly true for smaller companies. Such companies see sales growth as something to be maximized and think too little of the financial consequences. They do not realize that rapid growth has them on a treadmill; the faster they grow, the more cash they need, even when they are profitable. They can meet this need for a time by increasing leverage, but, eventually, they will reach their debt capacity, lenders will refuse additional credit requests, and the company will find itself without the cash to pay its bills. All of this can be prevented if managers understand that growth above the company's

sustainable rate creates financial problems that must be anticipated and solved beforehand.

OMNEX's historical growth rate results are reported from 1998 to 2003 (see Table 20).

Table 20: Historical Sustainable Growth Rates

	1998	1999	2000	2001	2002	2003
Sustainable growth	60%	48%	31%	16%	18%	10%
Actual Sales Growth	89%	5%	23%	9%	15%	23%

With the exception of 1998 and 2003, OMNEX's Sustainable Growth Rate has been consistently higher than its sales growth, which means that the company has been growing at a manageable rate. OMNEX's sustainable growth rates are reported, based on projections to 2012 (see Table 21).

Table 21: Projected Sustainable Growth Rates

	2004	2005	2006	2007	2008	2009	2010	2011	2012
Sustainable growth	45%	74%	74%	49%	46%	27%	23%	17%	12%
Projected Growth %	30%	40%	40%	30%	30%	25%	25%	20%	20%
Projected Growth \$000	15,600	21,840	30,576	39,749	57,673	64,592	80,740	96,888	116,265

The Sustainable Growth calculation provides a good picture of the feasibility of OMNEX's projected revenue growth. As long as sales growth stays below Sustainable Growth, the company can manage its growth on its own. OMNEX projects growth between 30% and 40% yearly for the next five years, which it should be able to finance on its own. However, within these forecasts are projected efficiency gains with revenues per employee expected to go from \$160,000 to \$275,000 by 2009, without significantly changing the company's value chain. These efficiency gains are primarily in overhead wages, although some factory automation is expected. Profitability is expected to improve significantly starting in 2006. Materials costs are expected to deteriorate somewhat over the next several years going from 45% of sales in 2004 to 49% of sales by 2012, but overhead improvements are expected to compensate this trend.

The company's growth projections, although ambitious by many standards, are modest relative to the growth potential of the industry as a whole. If the industry does

grow as quickly as expected and if OMNEX wants to have a significant share of the market, it will need to grow much faster than it has projected to grow. Although OMNEX's growth plans are well within the sustainable growth calculations, they may be based on unrealistically ambitious efficiency improvements. Also, if demand were to grow rapidly within the next year or two, the company would not have the cash to quickly respond to the demand.

6 ISSUES

6.1 Unclear Strategic Vision

OMNEX's Executive Committee is having difficulty clarifying and communicating its strategic vision. Strategy sessions are virtually non-existent and management members often express concern that the company lacks a defined strategy and accompanying plans.

On the one hand, Executive Committee members discuss the desire for OMNEX to become the "Intel" of the industrial trusted wireless market. Essentially, OMNEX would be seen as the place where consumers can get state-of-the-art technology, ranging from RF chips to RF modules to subassemblies to packaged products, and packaged in a form suitable for customer needs. On the other hand, the company's desire to design or revise a product specific to customers' needs indicates the company has an implied market niche strategy based on differentiation. It appears that the company is attempting to simultaneously pursue two strategic visions: one of becoming a dominant player and one of becoming a niche player.

OMNEX has always considered itself a niche player in the industrial wireless world. The niche is the "trusted" portion of the industrial wireless market regardless if it is based on proprietary technology or if it becomes the standard. It appears the company wishes to be dominant in this market segment or "niche"; however, the trusted portion of the industrial wireless market is not clearly identified. No estimate has been made regarding this segment's potential size or what share the company can expect to capture. In other words, it is unclear what a dominant position might look like.

OMNEX is clearly pursuing a growth strategy; however, the company's growth projections are conservative relative to the industry growth projections, further signifying a niche strategy. In 2001, OMNEX achieved C\$8.4 million in revenue on a North American market that was estimated at US\$80.84 million or approximately C\$125.3 million (see Table 2). This represented a market share of approximately 6.7%. The company expects that globalization will be an important factor in its growth over the next

few years. By 2006, the global market is expected to be C\$1.1 billion and the North American market is expected to be approximately C\$370 million. OMNEX's own revenue projection for 2006 is C\$30.6 million. If OMNEX's sales are all in North America, then the company is expecting 8.3% market share. If globalization is achieved by 2006, then the company is expecting 2.8% global market share. This share is far below a dominant position.

OMNEX's methodology for establishing growth targets tends to be overly simplistic; the analysis appears to be insufficient. For instance, revenue targets are calculated as a percentage of growth over the previous year's sales. Once an end figure is established, sales managers work backwards to see what customers and product lines can realistically contribute to this growth. This methodology has created only modest results. The company is projecting 30% growth in 2004 and 40% growth for the 2005 and 2006 fiscal years. The company has not managed more than 23% growth since 1998. (The 1998 growth was high primarily because of Schwing America.) Current indicators show OMNEX achieving approximately 23% growth this fiscal year, which is below its target. Before the company can make significant headway, the above-mentioned strategy issues must be resolved.

6.2 Weak Marketing Strategy

OMNEX has not clearly defined the marketing strategy that is appropriate for its products, markets, and overall strategy. At the moment, it appears that OMNEX is pursuing a slow skimming strategy, which includes high pricing and low promotion. In order for a slow skimming strategy to be successful in the technology industry, it is necessary to have patent protection and it needs to be difficult for competitors to develop. Neither of these conditions exists in this industry. OMNEX is an innovator in a young market and as the market grows, the company will have trouble competing with a slow skimming strategy unless it intends to remain a small niche player.

OMNEX is taking too passive an approach to its marketing by relying solely on channel partners. If the company wants a significant market share in its identified segments, it will need to be more proactive. The marketplace will not be aware of who OMNEX is without more aggressive marketing; however, OMNEX has neither the

resources nor the marketing expertise to create significant brand and product awareness.

It is fortunate that the company managed to secure a co-branding relationship with its first significant channel partner, Phoenix Contact. Typically, co-branding relationships are established between two companies of equal size and equal brand recognition. It is extremely rare to see co-branding relationships between companies of such dramatically different sizes. Despite this arrangement, OMNEX needs to be careful that it is not completely overshadowed by its larger co-branding partner.

6.3 Lack of Resources

OMNEX is in an enviable position considering it has developed technically superior products, it has ample opportunities, and it has an abundance of product development ideas in the pipeline. Unfortunately, the company lacks the resources needed to capitalize on many of its opportunities. The company is unable to generate sufficient positive cash flow to support its product development costs, so it relies heavily on government assistance to cover the costs. OMNEX's high R&D spending in relation to sales is appropriate for its differentiation strategy, but this level of spending will be difficult to maintain. Without SR&ED refunds, the company would not have shown profits over the past few years. Furthermore, without capital investment, OMNEX will likely remain small; forced to watch as companies with deeper pockets take over, regardless of OMNEX's technically superior products.

OMNEX's growth projections are modest relative to the industry's potential. Unequipped to support rapid growth, OMNEX will not be able to grow at the rate the market is expected to grow. The industry is expected to achieve CAGR of 47% over the next several years. Although this is still below OMNEX's Sustainable Growth Rate for the next few years, OMNEX's expected efficiency gains may be overly ambitious for a small company trying to grow, develop new products, and adjust to the challenges of globalization. There are substantial cash requirements associated with rapidly growing companies; however, in recent years, OMNEX has only been able to generate enough cash to support modest growth.

Lack of resources has created a conservative culture that permeates throughout all OMNEX's decision-making. Evidence of this conservatism can be seen in the

company's reluctance to hire additional staff to support its growth. Also, there are inefficiencies associated with being separated into two buildings and OMNEX is now running out of space; however, the owners are reluctant to invest in or sign any long-term leases for combined space for fear that revenues will be insufficient to support this commitment going forward. This conservative mindset also encourages OMNEX to try to do everything on its own; however, with only 104 employees, the company has neither the knowledge breadth nor the time to resolve all issues in house. Progress is slowed when resources are scarce.

6.4 Culture and Leadership

OMNEX has an inexperienced managerial team and a laissez-faire management style that is not conducive to its growth strategy. Its alliance partners will be more demanding going forward, and without a more disciplined culture, the company will struggle to meet its obligations. OMNEX may risk damaging the alliance relationships that it has worked so hard to establish.

OMNEX is witnessing organizational strain, typical of companies trying to grow. It may not have the ability to develop the systems, structures, and personnel needed to cope with a larger, more complex operation. Many of the managers are unclear about the direction to take within their departments. They want to ensure that the direction they take is aligned with the overall corporate strategic direction, but this direction has not been clearly communicated to them, so they struggle with respect to deciding which activities to pursue.

Currently, OMNEX's president is spending the majority of his time on business development and technology design. Also, he has moved to working only four days per week. With an inexperienced management team, a culture that lacks discipline, and a market poised for growth, it would seem the company needs more intensity from its leadership, not less.

6.5 Infrastructure and Execution

The company's "us and them" attitude is hindering progression and slowing product design and NPI. For instance, R&D often does not take responsibility for design

issues once the product is being manufactured. Believing that once the initial design is complete, they are no longer responsible for the product, design flaws are often not addressed by R&D. Manufacturing engineering employees rarely have time to resolve these flaws. Furthermore, products will be sent out for years with design flaws before the company takes these issues seriously. As a result, warranty repair costs have been very high at times.

R&D priorities change constantly, with product development being delayed on a regular basis. R&D personnel become frustrated as it appears nothing is ever finished. OMNEX has an abundance of ideas; however, the company struggles with execution. Timelines and milestones are often not set. If timelines are established, projects consistently run late. To date, OMNEX's customers have been patient, but it will not be able to be competitive in the marketplace if it cannot meet its deadlines and obligations.

Another major obstacle going forward is the ability to attract qualified technical staff. As a small, privately held firm, OMNEX does not provide stock options or profit sharing. Although this is not as big of an issue as it was during the dot.com hay days, there are signs that this will again become an issue. During the tech boom of the late 1990s and early 2000s, local companies such as PMC Sierra and large publicly traded US-based organizations, were luring the talent away with promises of high salaries, stock options, and signing bonuses. This made it very difficult for OMNEX to attract highly qualified people.

Finally, IT at OMNEX is under funded. The standard in industry for IT spending is between 3% and 5% of sales; however, OMNEX spends well below this level. As a result, excess overhead costs have been created as people struggle to manually create reports and other tools to help them get their jobs done. With the exception of ERP, IT projects rarely take priority.

6.6 Globalization

Achieving globalization may be more difficult than OMNEX anticipates. Obtaining certifications and standards approvals for each country within which OMNEX wants to sell will be expensive and time consuming. OMNEX has not properly assessed the costs of pursuing this strategy. Currently, Phoenix Contact, Germany is providing many of these services at no charge. Phoenix Contact recently indicated a reluctance to

continue these services at OMNEX's current consumption. Phoenix Contact estimates that it has spent approximately EUR\$400,000 to test, retest, and receive certification on OMNEX's products over the past year. This free service is only being provided for products that are destined for the Phoenix Contact channel. OMNEX intends to take many of its other products to the global marketplace. Unfortunately, OMNEX does not have a properly equipped test lab to ensure that its products pass once sent to certification labs. As a result, the company is forced to use expensive outside testing services. Often several rounds of testing are required before the product can be sent for final approval.

OMNEX has serious concerns regarding the traceability of its products. Different countries require different software, approvals, and labelling. At present, OMNEX has not implemented a solution that allows easy traceability to ensure that the right products are shipped to the right countries and to enable customer service to provide the appropriate customer support. OMNEX considers its customer support to be a core competency and a competitive advantage. The service department provides excellent customer repair responsiveness; however, there is no vision regarding what will need to be put in place for OMNEX to effectively support global product lines.

6.7 Intellectual Property Protection

To date, OMNEX has put little effort into protecting its intellectual property. The company has not obtained any patents, partially for strategic reasons and partially due to lack of resources. The two owners are concerned that patents leave the company vulnerable to imitation as patents become public record. OMNEX's competitors have had difficulty copying, or reverse-engineering, its technology; to date, no competitor has been able to create a wireless product that matches OMNEX's reliability and performance. Patenting poses a large risk particularly for Asian competitors who often ignore US and Canadian patent laws and use the patent information to create imitations.

Nonetheless, lack of patent protection can expose the company to imitation. For instance, a number of direct copies have surfaced at recent tradeshows; however, it is unlikely that the product quality could match OMNEX's products. No action is being taken to protect the company's IP.

6.8 Economic Dependency and Autonomy

OMNEX's economic dependence on two significant customers exposes it to a number of risks. OMNEX's cash flow is highly dependent on its customers' cash flows. Phoenix Contact is well financed, but Schwing America has not always been as successful with obtaining financing and managing its seasonal fluctuations. Cash flow is also an issue when either customer increases its demand dramatically. OMNEX is forced to purchase inventory and run overtime to meet on-time delivery requirements but may not get paid for several months. As a highly leveraged firm, often living at the very edge of its debt load, this creates incredible strain on the company's resources.

Economic dependency also weakens OMNEX's bargaining power. Often OMNEX has little choice but to agree to the terms its two large customers present. Even more disconcerting is that by partnering with larger, more powerful companies, OMNEX's product development could be dictated by, or, at the very least, heavily influenced by the desires of these partners. OMNEX must be careful that it is able to maintain its autonomy when partnering with such large players. A major concern is that if OMNEX's owners cannot maintain a strong bargaining position, they could lose control of their own company.

6.9 Distance from End-user

As OMNEX develops more channel partners and OEM relationships, there is less opportunity of selling directly to the end users and it risks losing contact with them. Although the company remains exposed to its end customers through its service department, this relationship is tenuous. For example, the company may be able to obtain good feedback from its North American end-users, but it is likely that globalization will require different servicing arrangements that may distance the company even further from the end-users.

7 RECOMMENDATIONS

7.1 Strategic Vision Clarification

OMNEX's first step is to take a more formalized, deliberate approach to strategy formulation and the development of its accompanying plans. Strategic planning sessions must become yearly occurrences, preferably in the July-August timeframe so that the strategy can be translated into shorter-term action plans and budgets that correspond with the company's fiscal year that starts November 1. These sessions need to go beyond vision formulation. In the past six years, the company has hosted only one two-day strategic planning session. This session took place in 1999, and since that time no follow-up has been conducted.

OMNEX has an appropriate differentiation strategy that is based on the strategic fit analysis (performed in Chapter 5). The company does not have the organizational capabilities to become a low cost provider and it is recommended that the company should avoid heading in this direction.

OMNEX has identified a sustainable competitive advantage to support its differentiation strategy. This includes a combination of quality (product performance and reliability), an understanding of the customers' needs, and an ability to provide superior customer support. Any one of these variables might be easy to imitate; however, it would be difficult for competitors to copy and match OMNEX's performance in all three areas. In particular, OMNEX's heavy R&D spending, relative to its revenues, would be hard for many organizations to accomplish and maintain.

OMNEX has clearly identified its product focus or core purpose: industrial trusted wireless. The company has also identified the markets addressable by OMNEX products: wireless to operators, wireless to devices, and wireless to nodes. Given the company's competencies, becoming a niche player is a reasonable option. The industry will support niche players and it is expected that niche players will service a small percentage of the market.

If it continues with its existing capital structure, OMNEX cannot realistically expect to achieve overall market share dominance. The projections for 2006 illustrate this point. For instance, if, by 2006, the global market is expected to be C\$1.1 billion, OMNEX's projected 3% share is far from dominant.

OMNEX's Executive Committee estimates that the market share position it could achieve in each of its identified segments is 20% (see Table 22).

Table 22: OMNEX Desired Market Share

Product Category	2006 (VDC Forecast)					
	NA	% Share	USD Share	Global	% Share	USD Share
Wireless to Operators	39.4	50%	19.7	118.2	20%	23.64
Wireless to Devices	99.1			297.3	20%	59.46
Wireless to Nodes	130.7			392.1	20%	78.42
Total (All):	269.2			807.6		161.52

OMNEX believes that 20% market share for this industry would be considered a dominant position. The company has benchmarked itself against Nokia. As the dominant player in the mobile-phone market, Nokia currently holds 29% market share. If OMNEX gets 20% of the market share, it would get annual revenues of US\$161 million or C\$210 million by the end of 2006. Realistically, OMNEX has little hope of achieving these revenues with its current capabilities and existing capital structure. To help the company better identify what its growth should be, the company needs to conduct more detailed analysis of the segments it wants to penetrate and what percentage it can reasonably expect to achieve. Then, it must formulate action plans based on these targets.

OMNEX may not be able to achieve overall market share dominance, but it could achieve a leadership position through its technology innovations. OMNEX is already considered a pioneer in the industrial wireless world; therefore, pursuing a technology leadership strategy would be appropriate. Both Sony and Hewlett Packard (HP) successfully engage in this strategy in their respective markets.

Many potential entrants are taking a wait and see attitude towards wireless for industrial applications, preferring to enter once standards have been finalized. OMNEX is at the forefront of standards development. To date, OMNEX appears to be the only wireless company capable of making radio products work reliably in industrial environments. For this reason, it is being sought out by several prominent organizations who desire assistance in developing this market. In order to achieve technological leadership, OMNEX should continue to develop strategic alliances that can help it with such things as standards setting. It could also use alliances to gain access to markets,

technology, lower-cost manufacturing, and larger brand associations. OMNEX has already demonstrated its ability to work with significant alliance partners such as Phoenix Contact, Honeywell, and Drexelbrook. OMNEX could potentially have more alliance relationships.

Attempting a technological leadership strategy raises a number of concerns. These concerns are: (1.) being the technological leader will require that OMNEX build brand awareness; (2.) OMNEX will have difficulty maintaining autonomy when dealing with large alliance partners; (3.) OMNEX must find a way to protect its assets and competencies; and (4.) technological leadership requires substantial investment in R&D.

Once OMNEX has committed to its strategy of technological leadership, OMNEX's Executive Committee must create a thorough plan to enable the company to succeed. The strategy and plans must be clearly communicated to the rest of the organization so that appropriate action can be taken to ensure all activities are aligned.

7.2 Marketing

At the moment, OMNEX is using a slow skimming marketing strategy that tends to be used when the market is aware of the product or technology and is relatively price insensitive. In this case, the industrial market is relatively unaware of adequate wireless solutions; therefore, the more appropriate entry strategy for industrial wireless products is rapid skimming, which uses increased promotion to create awareness in the market. Rapid skimming also enables pricing to remain higher than the competition, which is consistent with OMNEX's differentiation strategy

As previously stated, rapid skimming requires increased promotion to help build awareness, including brand awareness. Branding in the industrial market is very different from branding in consumer markets, in that it does not require television advertising. Instead, industrial branding requires a significant presence at the major tradeshows and requires increased print advertising in trade publications appropriate to the target market. For remote controls, advertising should be targeted to the equipment manufacturers. For the Industrial Products line, print advertising should be included in literature read by systems integrators and plant engineers.

Very little of the company's marketing material should be product specific as channel partners can provide the majority of product specific advertising. The reason

this approach can be successful is that OMNEX's radios provide an important piece of an overall solution. Essentially, OMNEX radios provide the wireless link between two devices or between the machine and operator. The wireless link can be either an external device or embedded in another company's product. Channel partners provide the full catalogue of products typically used by systems integrators and plant engineers. Branding the company, the concept of "Trusted Wireless," or the concept of "Powered by OMNEX Trusted Wireless," is a significant shift from the kind of promotion it has done in the past. Shifting the focus from promoting products to branding communicates the message that OMNEX is the leading industrial trusted wireless solution provider for embedded radio applications that require system critical dependability, distance through in-plant obstructions, and a high tolerance for interference and EMI.

Historically, OMNEX's marketing strategy has been to push product into the market. Now it is recognizing that it needs to create pull to complement its differentiation strategy. Phoenix Contact is attempting to create pull through its extensive advertising and tradeshow campaign; however, leaving the entire co-branding campaign to Phoenix Contact will not be sufficient. OMNEX must enhance these efforts through its own branding activities.

Channel partnerships need to be more actively managed. So far, only Phoenix Contact has been established as a formal channel partner on the Industrial Products line. Phoenix Contact is not doing as well as originally anticipated and is struggling to meet its commitments as set out in the MOU. Managing the Phoenix Contact channel needs to be more proactive with greater assistance from OMNEX, particularly with respect to educating Phoenix Contact's salespeople on how to sell wireless products. OMNEX also needs to hire a dedicated business development person who can work to find more alliance and channel partners. Alternatively, if a new CEO is brought in (see recommendation 7.4), OMNEX's President could undertake developing more alliance and channel partners as he understands OMNEX's technology, its markets, and its organizational capabilities. Having the President undertake these activities would ensure that alliance negotiations are managed with OMNEX's well known integrity and that alliance relationships are formed to enhance OMNEX as a whole.

It is unlikely that direct internet sales will play a large role for OMNEX in the foreseeable future since using channel partners is the preferred method of sales for the Industrial Product line and OEMs are used for the Portable Wireless products. At

present, the only products that could be sold through the internet are the ORIGA products. The internet should be used more for corporate branding activities. Also, it could be used for OEM and channel partner support activities such as distribution of training materials, internet order entry for key accounts, and order tracking.

Finally, OMNEX needs to increase its sales efforts overall. Adding a business development person for Portable Wireless and hiring an account manager to work with existing OEMs would be a good start in the plans to increase sales.

7.3 Resources

OMNEX's organizational capacity and available resources restrict it from pursuing the technology leadership and rapid skimming strategies mentioned previously. It is recommended that OMNEX seek equity financing within the next year or two through either an initial public offering (IPO) or through private investment. Preparing a company for an IPO typically takes at least one year. Seeking an appropriate investor can be equally time-consuming.

Since the company will need audited financial statements, it should move to achieve this by fiscal year-end October, 2005. This will have almost immediate implications as the company's inventory position fiscal year-end 2004 will need to be audited in order to receive an unqualified audit by 2005. If US markets are used, Sarbanes-Oxley regulations must be explored for compliance. The company's ERP data integrity will need improvement. Financial reporting will need to become more sophisticated. These activities will put a strain on the company's existing accounting staff, so OMNEX should consider hiring a controller to assist with these endeavours.

TPC financing is timely as it will help bridge the gap between activities the company will need to undertake over the next year and a half prior to receiving the IPO or other equity financing. OMNEX's owners may also consider selling the company to one of its alliance partners. Honeywell is a good example of an alliance partner that could potentially purchase OMNEX. The purchase would provide OMNEX the necessary cash to support R&D, marketing and growth activities. Honeywell would provide OMNEX access to higher volume markets. It would also give OMNEX access to Honeywell's lower cost manufacturing facilities, along with better buying power to reduce

parts costs. The purchase could also provide OMNEX with a recognizable brand name and give it more power and inclusion in standards setting activities.

Honeywell could be interested in purchasing OMNEX for a number of reasons. Honeywell would have immediate access to wireless technology and a product line it does not currently possess. Honeywell would achieve instant credibility in the industrial wireless world as it would have access to OMNEX's technical staff and RF expertise that, otherwise, could take years to develop. Potentially, Honeywell could achieve rapid rollout of high volume products and achieve shorter time to market on new product introduction.

7.4 Culture and Leadership

The Executive Committee members are conservative and will have difficulty implementing the above-mentioned recommendations. The company should hire a CEO who is experienced with growing a company. Familiarity with seeking equity financing would also be an asset. The company needs to shift its culture away from a laissez-faire culture to one that is more disciplined and aggressive. The new CEO could help with this cultural shift.

Differentiation and technology leadership both require flexible organizations. Flexible organizations rely on employees having the skills and initiative to identify and resolve problems, to initiate changes in work methods, and to take responsibility for quality. All of this requires a skilled and motivated work force that has the knowledge and capability to perform the requisite tasks. Therefore, training must not be neglected. It is recommended that training is provided in such a way that the skills and knowledge learned are transferred to others in the organization. Rather than the current isolated, non-transferable training and education, training could be provided to groups or be brought in house to enable employees to immediately transfer the newly acquired knowledge to the workplace. This kind of in-house group training supports increased communication through ensuring a common vocabulary and knowledge base.

Information sharing on such things as financial performance, strategy, and operational measures must be increased so that employees understand what is important and have the information needed to make timely decisions. Information sharing is essential for high performance and helps develop trust. Information sharing

will also help employees understand why specific decisions are made and help them see how they can contribute to the company.

7.5 Infrastructure and Execution

The company must separate the SBU leaders from their corporate resources functions. It is very difficult for these people to effectively manage both SBU demands and Corporate Services demands. The new matrix structure was designed to give each SBU the ability to streamline its processes and to provide freedom for each SBU to pursue activities appropriate for its specific markets and products. The Corporate Services groups were designed to provide the structure and discipline needed to achieve the company's goals. Allowing the SBUs more autonomy will help improve timely decision-making and ensure that OMNEX's employees are focused on their customers' specific needs. Keeping the SBUs small enables the company to stay closer to the customers and trends. It also enables the company to remain agile and responsive to customers' needs. Allowing more SBU autonomy will also assist in reducing the "us and them" attitude between R&D and manufacturing if the groups are seen as belonging to one SBU team.

OMNEX must allow the R&D members within the SBUs to work on product improvements and develop the next products for the marketplace. A creative team can be established at the Corporate Services level to work on innovating technology thereby ensuring its technology leadership position. The Corporate Services group can also coordinate knowledge transfer between SBUs. Separating the generative group (in the form of SBU teams) from the creative group allows the creative people to feed the generative people new technology; in turn, generative people can keep an eye on market opportunities and give feedback to the innovators. The SBU teams can focus product development on a one or two year time horizon, whereas the technology innovation team can focus on the next big innovation that might be two or more years away.

Additional financing will help the organization attract and retain high quality staff in all areas by allowing compensation to match local markets. The company will then be able to ensure that its R&D capabilities are appropriate considering its technology leadership strategy. It will also enable the company to increase its manufacturing

abilities through the hiring of experienced manufacturing personnel. Key functions that need to be addressed include quality management, process engineering, automation, and mechanical engineering. Also, experienced manufacturing management would greatly improve OMNEX's ability to deliver quality products.

The company should also increase IT spending with a target of between 3% and 5% of revenues. As a high-tech company, its IT is far from cutting edge. It is recommended that OMNEX should hire one more IT person who has a good understanding of business systems and how these systems can be integrated into a company to improve efficiency, reporting, and communication. The company does not need to be on the "bleeding edge," but it ought to be more advanced than it is at the present time.

7.6 Globalization

It is recommended that OMNEX create a full customer service department rather than merely a product service department. OMNEX should restructure the department and bring in a visionary leader who has experience with extended warranty plans and globalization. Viewed as a profit centre, this department could bring in considerable revenue through progressive warranty programs and by ensuring that services are appropriately billed to non-warranty customers. The department should also ensure that the company's service levels remain high so that this strategic competitive advantage is not eroded over time.

OMNEX should involve service early in the product release process to ensure that the service department is well informed and able to service the customer. If beta units are shipped to customers, there needs to be clear instructions on how to give feedback to the development team and how to clearly communicate to the customer that the product is a beta unit and how to get the unit fixed, if necessary. Finally, the service department needs to be informed if a group other than the service department (such as R&D) will be providing service on these units.

Manufacturing must bring in the expertise to assist it with developing a traceability plan that ensures that products with proper software and approvals are shipped to appropriate customers and countries. This plan must also accommodate

customer service requirements to ensure that it can provide timely and accurate product repairs.

7.7 Intellectual Property Protection

OMNEX cannot afford to ignore IP protection indefinitely. Currently the company contracts out the services of a global product certification and approvals specialist one day per week. Previously, the engineering personnel performed these activities. It is recommended that OMNEX take a similar approach to its IP protection by obtaining the services of a patent expert to help the company identify a plan of action and proceed with protecting the products it deems ideal for copying and worthy of IP protection.

7.8 Economic Dependency and Autonomy

Economic dependency will decrease as OMNEX gains a wider variety of OEM partners on the Portable Wireless SBU and more alliance and channel partners on the Industrial Products side. Pursuing the above-mentioned strategies should increase the likelihood of increasing its OEM and partnership base.

OMNEX must ensure that, as it enters into each new alliance partnership, it uses the exposure it receives as learning opportunities. Each alliance should be entered into with the understanding that the partner is providing something of value that it can do better than OMNEX. For example, Phoenix Contact provides a number of sales and marketing competencies that OMNEX does not have. OMNEX could sit back and allow Phoenix Contact to do all the work; however, if OMNEX is thinking strategically, it can gain valuable marketing expertise through its interactions with the Phoenix Contact staff.

OMNEX must ensure that it continues to provide strategic value to its partners to maintain the balance of power in these vital relationships. This could be in the form of continued technology innovations. Ensuring that both partners bring complementary core competencies to the table will help maintain the balance of power. For example, OMNEX provides wireless R&D capabilities while the alliance partner, Phoenix Contact, provides marketing competency.

7.9 Distance from End User

Better market research, customer feedback initiatives, increased number of personnel in company sales and marketing, particularly on the direct selling side, and a more proactive approach to its customer service will invariably help bridge the distance between OMNEX and its customers. OEM relationships should continue to be developed through sales and marketing and R&D partnering to keep product development ahead of the needs of its customers.

7.10 Recommendations Summary

In summary, OMNEX should undertake a technology leadership strategy in the industrial wireless industry along with its existing differentiation strategy. The accompanying marketing strategy would include rapid skimming, which includes maintaining premium pricing while increasing promotion to build brand awareness and to create pull in the marketplace. Alliance partners should continue to be used as a mode to gain access to complementary core competencies and to provide valuable learning opportunities. In order to achieve technology leadership and increase marketing activities, equity financing is recommended.

To assist with leadership and culture issues, OMNEX should bring in an experienced CEO. Separating SBU leadership and Corporate Services leadership will assist with the kind of flexibility and customer focus needed for differentiation and technology leadership.

The cash received through equity investment will help resolve infrastructure and execution issues by enabling the hiring of qualified staff in a number of key areas. These areas include R&D, manufacturing management, manufacturing engineering, IT, and service leadership. This investment would also provide the cash needed for globalization and IP protection activities.

Pursuing several OEM and alliance partners will help reduce OMNEX's economic dependencies. Despite these alliances, OMNEX must always maintain contact with its end users to ensure direct contact, thereby, providing it with the opportunity to fully understand its customers' needs.

Once OMNEX has fully formulated its strategic vision, it must communicate it to the rest of the organization so that all activities fully support its differentiation and technology leadership strategies. Future success will depend on an integrated and disciplined approach to achieving the company's vision.

REFERENCES

- Bukszar, E. (2004). *MBA 607 – Business Strategy class notes*. Powerpoint presentation, slide #10. Burnaby, British Columbia: Simon Fraser University, Faculty of Business Administration.
- Fildes, N. (2004). Nokia forecasts growth in handsets. *The Wall Street Journal Online*. Retrieved June 15, 2004, from http://online.wsj.com/article_email/0,,SB108720758758036181-IBjgoNhlaZ3nZymaYGHbaqHm5,00.html.
- Penner, C. (2004, February 9). Personal interview. Port Coquitlam, British Columbia.
- Porter, M. (1979). How competitive forces shape strategy. *Harvard Business Review*, March-April.
- Porter, M. (1985). *Competitive advantage: Creating and sustaining superior performance* (pp. 225 and 485). New York: Free Press.
- Higgins, R. (2001). *Analysis for financial management* (6th ed.). New York: Irwin/McGraw Hill.
- Shea, T., & Taylor, J. (2002). The North American market for wireless monitoring and control in discrete and process manufacturing applications (pp. 39, 45-59). Natick, MA: *Venture Development Corporation*.
- Wilson, P. (2004). Bell snaps up Vancouver's 360 networks, plans huge expansion. *The Vancouver Sun*, May 27, F1.