

National Semiconductor and Silicon Graphics: A Fortune 1000 Comparative Case Study

National Semiconductor Corporation

National Semiconductor is the premier analog company driving the information age. It is listed as number 670 on the Fortune 1000 listing, despite being affected by decreases in the personal computer and cellphone markets, as well as upswings in interest rates and the costs of gasoline and energy. In 2001, it reported \$2.1 billion dollars in revenues. The company is 43 years old and has headquarters in Santa Clara, California; manufacturing facilities are in Arlington, Texas; South Portland, Maine; and Greenock, Scotland. Test and assembly sites are in Melaka, Malaysia, and Singapore.

Its mission is to connect people to information through its rich portfolio of intellectual property and system expertise to leverage its analog technologies. By creating chips which power mobile and cordless phones, Internet access devices, wired and wireless local area networks, TV set-top boxes and DVD players, National combines real-world analog and state-of-the-art digital technology in advanced displays, desktop-, portable- and thin-client computers, and a host of other electronic devices.

This corporation was selected as a comparative business to Silicon Graphics, Inc., which is headquartered in Mountain View, California. This 20-year-old corporation is currently listed as number 625 on the Fortune 1000 listing. NSC's products and services are very different; with respect to Internet connectivity and e-business sectors, National serves all markets not directly affected by Silicon's supercomputers. It is positioned to serve the business-to-business market and the business-to-customer market. This differs from the SGI marketplace in that there appears to be no direct presence in the business-to-government market.

NSC supports the vertical market sector for wireless handsets; information appliances; information infrastructure; and display and imaging technologies, reaching across all industry sectors; National reaches retail customers through distributors as well as direct mail order from its Santa Clara and Singapore facilities.

National and E-Commerce

E-commerce as a technological edge for a company market still implies that the internet infrastructure must sell itself. Many web pages today justify their cost through customers and their CEO's, thereby impacting both corporate infrastructure and executive leadership. Such e-business facilities are more centered on their own return on investment than National Semiconductor web page facilities, which directly reach a buyer's market. NSC's continuing customer base includes distributors as well as procurement and research divisions of corporations such as Dell, IBM, Motorola, Samsung, and Sony. Value-Added Reseller (VAR) managers empower their technical employees to interact directly with NSC, due to intended product quality and delivery times in highly competitive markets. Consequently, customer relations are built and maintained at the corporate technical level, rather than heavy reliance on corporate officers, casual Internet surfers, or "word of mouth" advertising. In comparison, SGI facilitates e-commerce infrastructure as a technological edge for its customers, so the CEO/CSO appeal in its web page is more apparent.

National Semiconductor uses several methods to enhance worldwide corporate operations in the electronics manufacturing marketplace. Two ways it supports its customers are online seminars and in-person events such as trade shows. Enabling customers to view NSC chips in operation puts their customers on equal footing with each other, as well as non-NSC VAR's who may wish to attend. For those who are not interested in travel, National Semiconductor's web page has a "chatty, electronics hobbyist" appeal to it, for the BSEE in denims rather than the assembler on the floor. It is offered in English, French, German, Italian, Japanese, Korean, Portuguese, Spanish, and both simplified and traditional Chinese.

NSC customer service value chain utilizes a "just-in-time" architecture, with a close watch on product shipping, to facilitate product purchases only when they are listed on the web page, and only at the Value Added Resellers listed. Although this approach may appear to snub the casual shopper, it actually reduces research time and product wastage, since chips are expensive to manufacture and replace, and can rarely be returned. It also

increases distance between proprietary designs or prototypes and the final product, which have been extremely subject to international theft since World War II. The ability to ask for chips by part number for estimated purchase locations and times improves relationships with resellers who prefer to separate shipment arrival from purchase on their own product order web pages. The correspondence between NSC manufacturing facilities and these VAR's is not immediately clear, possibly due to proprietary agreements for outsourced customer fulfillment. SGI's customer service value chain includes the capability to enhance client internal infrastructure as a form of outsourcing. National Semiconductor outsources to VAR's for international customer shipping, thereby delivering NSC products closer to customers without NSC's direct involvement. For customers that choose to purchase directly from National, mail order facilities are available through the web page "shopping cart", but there does not appear to be a bricks-and-mortar facility for casual browsing. NSC's in-person customer acquisition at trade shows is different from SGI's web page brochure approach. Purchase support accompanies outsourced Customer Fulfillment functions at Value-Added Resellers, rather than Customer Support Specialists available through the corporate web page or at the local business office.

NSC and Customer Service

National Semiconductor pioneered the concept of low-cost, low-power consumption Internet appliances optimized for Internet access. This approach to the Internet differs from the SGI approach of visibly subscribing to the Internet to empower customers in emerging markets who are just beginning to embrace the Internet as a form of corporate infrastructure. Whether the Internet is an inherent part of NSC infrastructure cannot be so obvious, as its direct and indirect markets create virtually every product that can communicate on the Internet. Its primary customer contacts are corporate technical scientists who work closely with trade secrets and patentable devices for major electronics manufacturers, and consequently National Semiconductor branding is not made obvious to the casual observer. This understated approach allows their customers' brands to be more visible to customers around the world, most of which are unlikely to service their own Internet devices. Those customers constitute not only casual consumers, but also telecommunications and healthcare/science industry specialists. After an NSC customer establishes a password-locked account, the customer service channel includes the opportunity to input electronic designs for verification against available chips and supporting electronic parts. This differs from SGI's onsite participation in designing client infrastructure. National Semiconductor markets to corporations whose electronics market focus is visible to the casual consumer; this implies that NSC's branding is internal to these customers and/or to their suppliers. This contributes to the company's success against corporations such as Advanced Packaging Technology of America, Lucent, and Knox Semiconductor. NSC's market share successes of 2001, as defined in its annual report, contained figures almost identical to Silicon Graphics.

Conclusion

Both National Semiconductor and Silicon Graphics have created high-performance computing markets, and offer partnerships to corporations interested in leading their own industries. SGI has kept their pre-emptive position within the market by reengineering the company according to the precepts of its senior leadership, whereas National Semiconductor pioneered the Internet appliance market. Both corporations present themselves via the Internet in at least a half a dozen languages, and their annual earnings for 2001 are approximately the same. In contrast, SGI focuses more upon executive leadership and its impact on internal infrastructure than the technological corporate level that requires assistance from National Semiconductor. It also works with the business-to-government sector that National Semiconductor does not address.

NSC puts its customers on a more equal footing by allowing them all to attend trade shows and seminars simultaneously; SGI's personalized service allows its customers to compete with each other on bases that may not have been shared with SGI. Due to the nature of proprietary designs in electronics manufacturing, NSC is not directly involved in customer product design and manufacture. SGI performs more services for its customers, including designing corporate infrastructure based around Internet technology.