



Consulting

Managing a Global Network:

Evaluating a Local vs. Low Cost Manufacturing Strategy

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INTRODUCTION

Penguin Products LTD (Penguin), a U.S. manufacturer of high-tech communications devices, has hired your consultancy to recommend a manufacturing strategy for its flagship wireless antenna business. The remaining Penguin operating units include a personal wireless device components business and a wireless accessory business.

Over the last 3 years Penguin has doubled in size, largely through acquisitions, and now needs to reevaluate its operational footprint. The company is faced with the decision to utilize either one or a combination of two manufacturing facilities to produce wireless communications antennas, including a plant in Guangzhou, China and another in Ciudad Juarez, Mexico. Penguin wants to understand the key trade-offs between production in China versus Mexico to develop a recommendation that optimizes the company's global manufacturing operations.

INDUSTRY BACKGROUND

Over the last 3 years, the industry has grown at a 15% compounded annual growth rate and has undergone significant consolidation. As a result, the wireless antenna business is facing intense global competition and significant margin pressures.

On a regional basis, North America accounts for 50% of global demand yet promises relatively slow growth of 3-5% over the coming years. The Asia-Pacific region accounts for 25% of the global market and significantly high growth (in excess of 25% per year), while the European market accounts for the remaining 25% and is projected to post middle-ground growth over the coming 3-5 years.

MANUFACTURING & ASSEMBLY

Operations

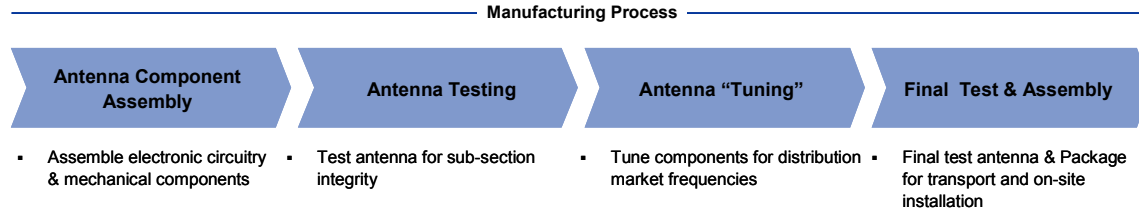
Penguin's wireless antenna production is highly labor and capital intensive. Additionally, the company is far from being sophisticated in managing the overall supply chain. As a result, global manufacturing operations have not been meeting profitability objectives. Penguin's sourcing and procurement organizations have been charged with investigating low-cost country supply sources while the VP of Operations and Supply Chain is tasked with securing proximate, low-cost manufacturing.

While the plants are not consistently profitable, they do have their individual strengths. Penguin's Guangzhou plant has access to components costing less than the same components sourced elsewhere around the globe, but manufacturing has quality and efficiency issues due to labor turnover. Juarez is the older operation, with mature equipment and a workforce that has productivity rates greater than the Guangzhou plant. Over time net production volume has shifted out of Mexico and into China. This trend has created capacity issues in China and overhead absorption issues in Mexico.

Manufacturing Process

The wireless antenna manufacturing can be easily described by four primary stages through which all products must proceed.

Exhibit A: Wireless Antenna Manufacturing Process



The first stage of manufacturing involves basic assembly of all subcomponents. The subsequent stage tests assembled antennas for effective functioning. The process then enters a phase of customization, where antennas are "tuned" for local telecommunications frequencies. The final stage involves tests to verify market frequency settings and the preparation for distribution via sea, air, rail or truck.

Penguin has the option to postpone Tuning and Final Test & Assembly to a time and location distinct from prior stages. This late-point differentiation approach creates flexibility; however, Penguin has not historically been successful using this approach.

FREIGHT & DISTRIBUTION

Transportation costs represent a significant portion of a wireless antenna manufacturer's costs of goods sold. Due to high demand variability (which is common amongst telecom customers), Penguin is constantly faced with the dilemma to ship finished products by air instead of ocean in order to meet delivery expectations. Air freight comes at a tremendous premium and generally presents a loss to product-level operating margins. The percentage of air versus ocean shipments varies from 0 to 100% across Penguin's competitors.

In-transit cycle times vary greatly depending on shipping decisions. Ocean-bound freight from China to the US can take up to one month with significant transit time variability from shipment to shipment. Air-bound freight over the same routes typically takes less than one week. Over-land freight from Mexico to the US is roughly two weeks.

All of these shipping options have implications on in-transit and safety stocks to buffer for longer lead times.

PRODUCTS AND COSTS

Penguin has nearly 1000 SKU's across 21 different wireless antenna product segments (representative SKU data for each segment is provided). Short product lifecycles and new product churn add to overall SKU count and complexity.

The two images below illustrate the overall size and shape of an antenna. The left image is an antenna close-up and on the right a view of how an antenna is mounted onto a cell phone tower.



While Penguin has 21 different product segments based upon technical specifications, the marketplace falls into two principal product groups based upon application profiles.

Premium Product Group – These products include wireless antennae sold to wireless service providers. Historically, this product group entails antenna with a large number of customized components. Opportunities for future growth have diminished through increased industry consolidation; however, the premium products still provide more substantial margins and remain a cornerstone of Penguin's growth strategy.

Low-Cost Product Group – Penguin's low-cost, standardized antennae are sold in large quantities to wireless infrastructure operators. These devices are integral to the functionality of cell phones and other wireless devices and the "standardized" products have little to no impact upon transmission quality.

CUSTOMERS

Penguin has two clear target markets – cell phone service providers and telecom infrastructure operators. The former group consists of such companies as Sprint/Nextel, AT&T and Verizon in the U.S. and China Telecom in Asia-Pacific. The latter group consists of such companies as Motorola, Ericsson and Samsung, all large international players with significant breadth of distribution across the service providers.

Cellular Phone Service Providers

Cellular Providers have shown significant interest in product expansion, partnerships and portfolio enhancements as in the case of AT&T/Cingular and Apple's iPhone launch. They are also expanding services into other wireless platforms including wireless computing,

packaging cellular phone services with mobile technology services such as GPS technology, wireless computing access, mobile music services and the like.

This particular customer group has undergone significant change over recent years including adoption of different wireless technology platforms. Frenzied merger and acquisition activity in combination with technology changes has severely impacted suppliers from manufacturing investment risks as well as obsolete inventory.

Telecommunications Infrastructure Operators

Infrastructure operators purchase antennas and integrate it with antenna transmission systems to sell it to cellular phone service providers. These entities leverage economies of scale to meet their thin operating margins relative to the cellular service provider market.

Both Cellular Phone Service providers and Antennae Operators expect high service levels from their suppliers.

KEY STAKEHOLDERS

Your team presented to a group of key stakeholders who evaluated your proposal and ultimately selected your consultancy for the wireless antenna global manufacturing strategy engagement. Your team has met with and interviewed these stakeholders individually since that initial meeting and looks forward to the final presentation with the same group at corporate headquarters in Phoenix, Arizona.

Business Unit President

Charles Errol is a recent addition to Penguin. But he's an industry veteran of over 25 years and is rumored to be a candidate for the CEO role given his track record for success. Charles aims to consistently grow his business while improving margins and beating corporate working capital targets added to the company's FY2007 goals. Ultimately, Charles believes the successful execution of an antenna manufacturing strategy that balances risks and costs is critical for his business and will be essential to keeping him in the running for the CEO slot. Given his aspirations and short tenure at the company, Charles has been cautious not to "rock the boat" since joining Penguin.

VP of Operations & Supply Chain

Nadia Laan is the project sponsor who was promoted ahead-of-schedule to her new role as VP of Operations & Supply Chain. Though her previous role as Plant Manager of Penguin's small Brazil facility ended on a sour note with the announcement of the facility's impending closure, she is lauded for making the tough decisions required to ensure long-term business performance. In her new role, Nadia has found it difficult to enact some of the changes she feels are necessary for the success of the company. Compounding these difficulties is a weak organization that is not skilled in Supply Chain strategy and planning.

Pressed by the CEO and Charles to improve antenna manufacturing margins and justify her early promotion, Nadia is keen to cut costs while evaluating the potential supply chain risk associated with any change. Nadia is aware that the margin potential promised by manufacturing in China is significant due to low material and labor costs. However Nadia is concerned with supply chain risk and the organization's shortcomings in Supply Chain planning.

Nadia is seen as an affable, friendly individual who promotes change through relationships.

Plant Manager: Guangzhou, China

Heinrich Konsen was hired one year ago from a consulting firm where he served as a Senior Manager in the firm's Supply Chain practice. Heinrich was recruited to Penguin as a result of a lean manufacturing engagement where he worked with Nadia and her management team in Brazil. Eager to prove his ability to enable achievement of ROI targets that justified the Guangzhou plant construction, Heinrich has identified opportunities to use excess capacity on the high-capacity lines to support antenna production.

Unfortunately, Heinrich has been consumed by local politics and employment concerns. Having found the local ways of working mystifying and embroiled in unwritten codes, Heinrich recently hired management staff from competitive firms to help push policies and "get things done".

Plant Manager: Ciudad Juarez, Mexico

From her first role as an assembly line operator, Helena Hidalgo has worked her way up through the ranks to line and shift manager to her current position as plant manager. Helena is deeply loyal to her plant compatriots and is generally ferocious when it comes to managing fixed and variable asset utilization. Likewise, she is proud of her plant's labor productivity, first-rate schedule adherence and consistent service rate of 98%. She intends to serve as a driver behind Penguin's goal to move fulfillment rates from 95 to 99% across the company.

VP of Sales & Marketing

Roscoe Smith is the company's customer service champion. A large portion of his compensation is tied to sales growth and customer service. He spends a great deal of time meeting with and understanding customer needs. As it turns out, Roscoe is the only person with whom your engagement team could not meet in person, as he was in China courting a cellular phone service provider.

Keen to capitalize on trends in the marketplace, Roscoe is bent upon continuously fostering Penguin's new product pipeline. Evidence of Roscoe's new product obsession and his purported tendency to "jump through hoops" for the customer lies in Penguin's highly customized set of antenna products.

Roscoe's organization maintains authority over the sales forecast, which has a significant bearing upon the company's production plans. His organization has little know-how around supply chain yet dictates demand forecast and heavily influences production. Few in Supply Chain choose to confront and deal with Roscoe's stubborn and brash personality as he wields serious influence in the organization.

VP of Procurement & Sourcing

Finding, analyzing and securing low-cost supplier is Ed Askeland's primary mission. All he can do is eat, drink and sleep "China". Though the Chinese market is highly untested and growth is expected to remain volatile, the Chinese market promises 15% savings off Mexican material costs. Naturally, Ed wants nothing more than to hit his direct material cost reduction targets for FY2007.