A STRATEGIC ANALYSIS OF AN ENGINEERING BUSINESS UNIT

by

Peng Yue Bachelor of Engineering, Wuhan University of Technology, 1992

PROJECT SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF BUSINESS ADMINISTRATION

In the

Faculty of Business Administration Management of Technology Program

© Peng Yue 2007

SIMON FRASER UNIVERSITY

Summer 2007

All rights reserved. This work may not be reproduced in whole or in part, by photocopy or other means, without permission of the author.

Approval

Name:	Peng Yue
Degree:	Master of Business Administration
Title of Project:	A Strategic Analysis of an Engineering Business Unit
Supervisory Committee:	
	Dr. Colleen Collins-Dodd Senior Supervisor Associate Professor
	Dr. Lindsay Meredith Second Reader Professor
Date Approved:	May 3, 2007



DECLARATION OF PARTIAL COPYRIGHT LICENCE

The author, whose copyright is declared on the title page of this work, has granted to Simon Fraser University the right to lend this thesis, project or extended essay to users of the Simon Fraser University Library, and to make partial or single copies only for such users or in response to a request from the library of any other university, or other educational institution, on its own behalf or for one of its users.

The author has further granted permission to Simon Fraser University to keep or make a digital copy for use in its circulating collection, and, without changing the content, to translate the thesis/project or extended essays, if technically possible, to any medium or format for the purpose of preservation of the digital work.

The author has further agreed that permission for multiple copying of this work for scholarly purposes may be granted by either the author or the Dean of Graduate Studies.

It is understood that copying or publication of this work for financial gain shall not be allowed without the author's written permission.

Permission for public performance, or limited permission for private scholarly use, of any multimedia materials forming part of this work, may have been granted by the author. This information may be found on the separately catalogued multimedia material and in the signed Partial Copyright Licence.

The original Partial Copyright Licence attesting to these terms, and signed by this author, may be found in the original bound copy of this work, retained in the Simon Fraser University Archive.

Simon Fraser University Library Burnaby, BC, Canada



STATEMENT OF ETHICS APPROVAL

The author, whose name appears on the title page of this work, has obtained, for the research described in this work, either:

(a) Human research ethics approval from the Simon Fraser University Office of Research Ethics,

or

(b) Advance approval of the animal care protocol from the University Animal Care Committee of Simon Fraser University;

or has conducted the research

(c) as a co-investigator, in a research project approved in advance,

or

(d) as a member of a course approved in advance for minimal risk human research, by the Office of Research Ethics.

A copy of the approval letter has been filed at the Theses Office of the University Library at the time of submission of this thesis or project.

The original application for approval and letter of approval are filed with the relevant offices. Inquiries may be directed to those authorities.

Bennett Library Simon Fraser University Burnaby, BC, Canada **Abstract**

The Spindle Service Centre (SSC) of SKF China Ltd. is considering how to grow its

revenue to be in line with the corporate parent's strategy of offering value-added solutions using

competencies from diverse platforms.

Market demand for machine tool spindle maintenance is tremendous and has grown over

last five years as China has experienced rapid economic development since the later 1990s.

Additionally, SSC has competitive advantages derived from product functionality, workshop

location, market coverage, and ability to provide complementary services. However, the

strategically important service business is underdeveloped due to insufficient sales resources.

This study was conducted to examine the impact of new product introduction on sales

management strategy and the effectiveness of the full-line sales organization. A series of

adjustments to the incentive plan, training program and sales role definition are recommended to

explicitly accommodate new products added to the existing product line.

Keywords: Sales management; New product management; Sales organization

Subject terms: Sales management

iii

To my lovely son and wonderful wife

献给我的妻子和可爱的儿子

Acknowledgements

I am grateful to a great many individuals who helped me with this project and in completing my MBA. Quency NG, Henry Wang and Sell Ma shared their depth of experience of the business of SKF. Dr. Colleen Collins-Dodd provided invaluable advice throughout the project. Finally, I thank my classmates and instructors in the MOT MBA cohort for creating a first-class learning experience.

Table of Contents

Abst	ract		iii
Dedi	cation		iv
Ackr	nowledge	ements	v
	_	ntents	
		es	
		es	
1	Introd	luction	1
1			
1.1		Descriptions	
	1.1.1	The Corporate Parent	
1.0	1.1.2	•	
1.2		Business	
	1.2.1	Strategy Evolution	
	1.2.2	Core Competences Related to Spindle Services	
1.3		rate Organization Structure Overview	
1.4		nt Strategy	
	1.4.1	Service Business Strategy	
1.5	Proble	ems Facing SSC	9
2	Intern	nal Analysis	13
2.1	The S ₁	pindle Service Business	13
	2.1.1	Spindle Maintenance Industry	
	2.1.2	SSC's Offerings	14
2.2	Value	Chain Analysis	16
	2.2.1	R & D and Component Manufacturing	16
	2.2.2	Component Purchasing	18
	2.2.3	Manufacturing	
	2.2.4	Sales and Marketing	
	2.2.5	Service	
	2.2.6	Technical Support	
	2.2.7		
2.3		Organization Analysis	
	2.3.1	Corporate Organization Structure and Governance	
	2.3.2	Incentive System Analysis	
2.4	2.3.3	Training Programsnt Sales Management Strategy Analysis	
2.4	Chirre	ni saies ivianagemeni shalegy Analysis	32

3	Exteri	nal Analysis	38
3.1		the industry	
	3.1.1	Basic Matrix for Corporate Parent	38
	3.1.2	PCM for SSC	
	3.1.3	Business Matrix	
	3.1.4	Summary	
3.2	Marke	t Demand Estimation	
	3.2.1	Imported Market Estimation	
	3.2.2	Domestic Production	
	3.2.3	Spindle Service Market Estimation Summary	47
	3.2.4	Market Growth and Derived Demand	
	3.2.5	Inter-Firm Cannibalization Company Portfolio Congruency	
	3.2.6 3.2.7	Company Product	
	3.2.7	Economic Value to Customers	
	3.2.9	Summary on Market Estimation	
3.3		uccess Factors	
3.4		etitive Situation and Current Corporate Strategy Analysis	
J. T	3.4.1	Competitor Analysis	
	3.4.1	Corporate Strategy Canvas	
4		egic Alternatives	
4.1		gic Goals	
4.2	Altern	natives	
	4.2.1	Status Quo	
	4.2.2	New Sales Management Mix	68
	4.2.3	Establish a Dedicated Sales Team for SSC's Offerings	69
	4.2.4	Establish a Dedicated Sales Team for Spindle Monitoring System	
4.3	Alterr	native Evaluation	
	4.3.1	Valuation Matrix	
	4.3.2	Discussion	
4.4	Sumn	nary of Alternatives	73
5	Reco	mmendations	. 7 4
Apr	endices		75
	endix 1:		
	endix 2:		
	endix 3:		
	endix 4:		
	endix 5:		
App	endix 6:	2003 Venicie Output in China	05
Ref	erence I	ist	90

List of Figures

Figure 1.1	SKF China Organization Chart	7
Figure 1.2	SSC Organization Chart	8
Figure 2.1	Spindle Service Value Chain	16
Figure 3.1	Strategy Canvas for Differentiation Group	64
Figure 3.2	Strategy Canvas for Cost-based Group	64

List of Tables

Table 1.1:	SKF China Sales Report 2005-2006	2
Table 1.2:	SSC's Performance 2004-2006	
Table 3.1:	Basic Matrix for SKF China	39
Table 3.2:	Product-Customer Matrix for SSC	41
Table 3.3:	Business Matrix	
Table 3.4:	Machine Tool Market Estimation	45
Table 3.5:	2006 Spindle Service Market Estimation	48
Table 3.6:	Supplier Performance Evaluation	
Table 3.7:	Key Success Factors	
Table 4.1	•	

1 Introduction

The purpose of this paper is to analyze the current strategy of a business unit of SKF China, the Spindle Service Centre (SSC), to assess the fitness of the current strategy, and to propose alternatives and recommendations for growing market share. The project will focus on positioning and competitive level strategy, to be specific, the sales management strategy, particularly the impact of new product introduction on the current sales management strategy.

1.1 Basic Descriptions

1.1.1 The Corporate Parent

SSC's parent group, SKF AB, was founded in 1907 with headquarters in Göteborg, Sweden, and has been historically recognized as a leading global rolling bearing manufacturer, reporting revenue of US\$ 6.8 Billion in 2006, with over 41,000 employees (www.skf.com, 2007). Currently, SKF organizes its business into three divisions, Industry, Automotive and Service, each operating worldwide.

Only 5 years after its establishment, SKF opened its first branch office in China. SKF is now represented by two units in China: SKF (China) Investment Co., Ltd., Shanghai, the holding company, with 9 manufacturing factories and SKF China Ltd., the geographic SBU.

SKF China Ltd., the parent company of our focal business unit, reported revenue of US\$ 289.2 Million in 2006, primarily from rolling bearings and engineering services. Like SKF AB across the world, SKF China leads the local market, not only in terms of revenue and profit but also product quality and offering variety, innovation, and application knowledge. In 1997, the

company began to expand its product line aggressively to include value-added services. Relying on support from the group, the Service Business Department has launched various new products in the last decade. Currently, the company delivers products from five platforms: rolling bearings, reliability systems, lubrication systems, physical asset management, and advanced engineering services, grouped into two sets of offerings - bearing-related and service-related products.

Table 1.1: SKF China Sales Report 2005-2006

MUSD	200	2006		
	Volume	Growth	Volume	Growth
Bearing-related Products	215.0	24.0%	265.3	23.4%
Rolling Bearings and Units	189.2		228.2	
Precision Products and Spindles	25.8		37.1	
Service-related Products	16.4	41.0%	23.9	46.0%
Reliability System	11.5		15.9	
SSC	0.4		0.7	
Other Services and Products	4.5		7.3	
Total	231.4	27.0%	289.2	25.0%

Data Sources: SKF China Ltd.

As indicated in Table 1.1, the company's sale revenue has grown rapidly. It has also doubled the number of employees in last three years, recruiting more than one hundred new employees, as well as establishing four regional offices in addition to the existing representative network. In 2006, the company had 198 employees in four central offices – Shanghai, Beijing, Guangzhou and Hong Kong, each representing a territory with seven offices dispersed in each territory.

1.1.2 Spindle Service Centre

The Spindle Service Centre, a subsidiary business unit of the Service Business

Department of SKF China Ltd, was founded in 2004 in Shanghai, China, to provide professional spindle maintenance services for Computer Numerical Control (CNC) machine tools in the local

market. In 2006 SSC had a repair workshop and twelve employees and reported annual sales of US\$ 0.667 Million.

Before SSC was founded in 2004, an SSC project team constructed a five-year investment proposal¹ as well as a market estimation and sales projection² for the local market. The SSC project was then executed based on the plan. SCC's workshop was situated in a factory of the Industry Division in Shanghai, China, with start-up investment of US\$ 800,000 in machinery, tools and lay out. Total start-up investment supported by the parent company is, in fact, much higher because it includes over-seas training costs, and local training and administration costs during the start-up stages.

The SKF Service Division funds the SSC project. However, it was implemented and led by a project leader from Global Spindle Service employing business concepts, working processes and systems set by Global Spindle Service. Local sales and administrative activities are supported by SKF China Ltd., with the workshop manager recruited internally from its Service Business Department.

1.2 SKF's Business

1.2.1 Strategy Evolution

SKF's early business was in rolling bearings and related industrial components, like housings, spindles, seals, and many other mechanical components. By the early 1990's, following a series of acquisitions, mergers and organizational changes, the technology-based company was changing its strategic position from a component supplier to an integrated solution provider for rotating machinery. This strategy was aimed at expanding opportunities for new products and

² Refer to Appendix 3, the SSC Market and Sales Projection.

¹ Refer to Appendix 2, the SSC Business Plan.

services with higher added value and profit levels when the traditional bearing markets stabilized or declined.

Conforming to the strategic evolution, a series of acquisitions and organizational changes occurred. During the last decade, intensive acquisitions of innovative companies and heavy investment in product and service development characterized the company. The majority of the development has been in service-related areas, such as reliability systems, physical asset management, advanced predictive maintenance, engineering services, and many others.

As a result, a variety of value-added products and services were launched and added to the existing product line. SFK chose China and USA as preferential markets for executing the strategy.

1.2.2 Core Competences Related to Spindle Services

SKF is a recognized supplier of products, solutions and services in diverse industrial areas using competencies from its five platforms. SKF also holds an increasingly important market position for high precision components, spindles and spindle services for the machine tool industry. SKF's main competencies related to spindle services can be summarized as follows.

- Brand Reputation and Quality Image. In China, SKF is seen by served industrial customers as a trustworthy and reliable supplier and partner.
- Extensive Customer Base. As the leading rolling bearing supplier, SKF has a market share of 25% in its rolling bearing business world wide³, with both OEM and after market customers. In diverse machine-intensive after market industries, SKF holds a dominant market position. Also, SKF is regarded as a major component supplier by such OEM customers as manufacturers of automobiles, machine tools and general machinery. Because of its extremely broad industrial customer base, the company enjoys the advantages of brand awareness and can market related value-added products and services to its existing customer base.

³ The market share is from SKF's 2004 market research report.

- Precision Bearing and Spindle. The company holds a leading position in major precision components for spindles, such as, precision bearings, ball and roller screws, seals and linear motion products. Also, SKF is a complete line spindle manufacturer. Relying on state-of-the-art application know-how, SKF is able to leverage its competencies in manufacturing to spindle repairing. Also, SSC can easily obtain significant economies of scale by combining component supply with repair services.
- Condition Monitoring Technology and Related Service. SKF's condition monitoring technology and related services differentiate it from other rolling bearing suppliers.
 Through intensive horizontal acquisitions, SKF is continuously improving its competence in the area. Through integrating the technology with competencies in industrial component manufacturing, SKF has launched a series of related products and services during the past decade. Therefore, condition monitoring technology is a strategic priority for all the business units in the service segment because it creates supportive conditions for service.
- Technical Support and Training. SKF's global certified spindle service network has now increased to 17 service centers, covering most industrialized manufacturing areas worldwide. A central expert database, which embodies accumulated experience, spindle data and standardized operating procedures, has been established to allow these service centers to benefit from knowledge sharing.

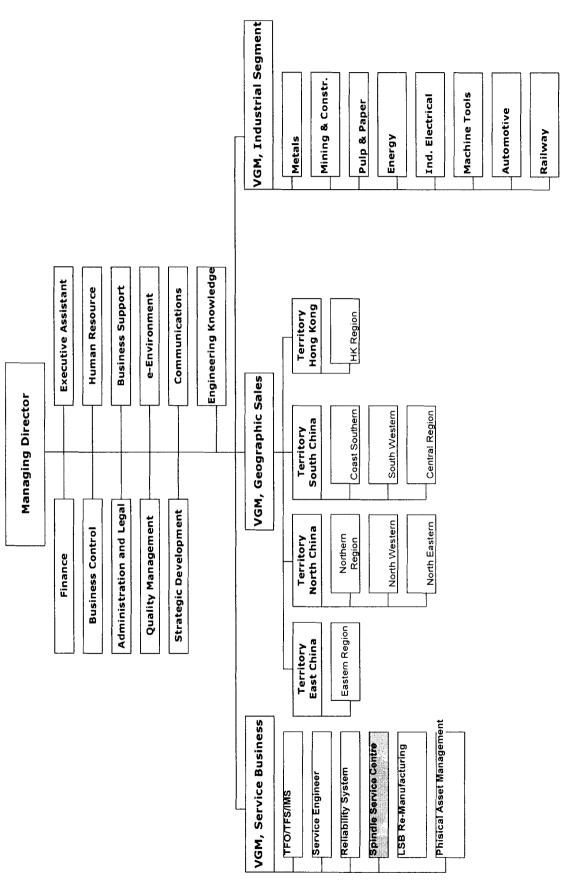
1.3 Corporate Organization Structure Overview

In a large multinational corporation like SKF AB, various organizational configurations exist at different levels. As illustrated by its performance reports and governance principles (SKF Corporate Governance Report, 2005), the SKF group is organized in a divisionalized structure following Mintzberg's designs (Mintzberg, 1981). The three divisions, Industry, Automotive and Service, are organized around customer type and industry category. Within each division, business is structured in a matrix configuration: the geographic companies and industrial segment, or product lines, comprise the rows and columns. SKF headquarters, the strategic apex, coordinates the business divisions but does not assume operational authority. To avoid redundancies in research efforts and to enable contributive development, SKF's R&D is centralized in oversight and purpose.

SKF China Ltd. is a subsidiary of SKF Asia & Pacific and is part of its Service Division. Similarly, SKF China organizes its businesses by regions and segments with IT, administration, HR, logistics and other support functions centralized in headquarters. To be consistent with the strategy of expanding the current product line with new products and services, SKF China has changed and expanded the organization greatly. Along with launching new products, the company has changed its organization from a divisionalized structure, with resources organized by geographic regions, to a matrix configuration organized around both regions and product lines. Currently, as illustrated by Figure 1.1, SKF China's organization chart, Geographic Sales is the regional dimension, while the segment dimension is comprised of two departments: Industrial Segment and Service Business Department, each of which is in charge of a group of products.

The Industrial Segment Department organizes its subsidiary segments around industrial categories. The subsidiary segments are responsible for marketing activities and technical support for bearing-related products. The Service Business Department, which organizes its subsidiaries by product lines, focuses on service-related products. Generally, the industrial and service segments share similar marketing and support responsibilities with their organizational resources in four central offices.

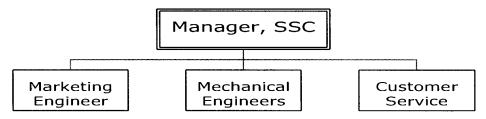
Figure 1.1: SKF China Organization Chart



The Geographic Sales teams, however, are organized by regions, and comprise more than ninety sales representatives⁴ distributed around the country. Supported by industrial or service segments, sales representatives in Geographic Sales teams are responsible for all products and services sold in a given region.

As a product segment with manufacturing capacity within the Service Business division, SSC, the focal business unit, has its workshop and support staff in Shanghai and shares the regional sales forces with other segments. As illustrated by Figure 1.2, SSC's Organization Chart, SSC currently has seven Mechanical Engineers in the workshop as well as a Marketing Engineer⁵ who is responsible for support activities.

Figure 1.2: SSC Organization Chart



The organization is governed through a flat and decentralized structure. Rather than being governed by their position in the organization chart, employees, particularly sales representatives and segment staff, largely define their own responsibilities. In addition, sales have considerable autonomy for daily operational activities, such as visiting scheduling, pricing and reporting. The flat and decentralized sales organization and governance structure has a profound impact on business development, especially when a new product is added to an existing product portfolio.

⁴ There are three types of positions in the Geographic Sales team: Sales Manager, Senior Sales Engineer and Sales Engineer. The terms "sales person" and "sales representative" will be used interchangeably referring to members of regional sales forces throughout the paper.

⁵ There are three positions in Industrial Segment team: Segment Manager, Specialist, and Marketing Engineer. The term "segment staff" or "segment member" will be used to refer to the segment personnel.

1.4 Current Strategy

1.4.1 Service Business Strategy

The current service business strategy is to differentiate SKF from other competitors by offering integrated solutions that combine its product and service roadmap, and to be a well-known leading industry service provider through adding value to customers and building up long term working relationships that can continuously make customers more competitive and result in superior customer entanglement⁶.

As a business unit of the service business, SSC is supposed to align its strategy with that of the service business. SSC's business plan sets several goals to ensure that SSC focuses development on homogeneous strategic goals:

- break even at year three;
- achieve a sales volume of US 3.2 Million in 2009 by repairing 1,000 sets of spindles per year; and
- achieve an IRR of 16.3% with a pay off time of 6.6 years.

However, the business plan needs to be reviewed as a new value-added product, the Spindle Monitoring System, was launched in 2005. As a result, SSC's 2009 sales target increased to US\$ 3.6 Million, of which 20% is expected by senior management to be from the new product.

1.5 Problems Facing SSC

Since its founding in 2004, SSC underperformed relative to projections, as demonstrated in Table 1.2. SSC's sales volume, although showing growth in the last two years, is far behind schedule and started to decelerate in 2006. SCC achieved its designed delivery capacity on schedule through intensive training of mechanical engineers and considerable investment in machines and facilities. However, its productivity level remains low due to lack of orders. The

⁶ The strategy statement is quoted from PDR, an internal document of the Service Business Department.

relatively low productivity not only prevents the business unit from accumulating experience and decreasing production costs, it also jeopardizes the company's strategy of building up core competency in the service business. According to the marketing projection completed by the SSC project team in 2004, the spindle repair market demand was estimated to be 407,000 units in 2003.⁷ In addition, a market survey of selected prospects indicated that considerable purchasing tendency for SSC's services existed in the marketplace⁸. However, SSC repaired only 355 units of spindles in 2006, representing less than 0.1% of the estimated market share.

Although the 2004 market estimation deserves re-examination, senior management does not believe that market size, customer satisfaction or price are the problems. Rather, insufficient sales skills and efforts are believed to be the root cause.

Table 1.2: SSC's Performance 2004-2006

		2004		2005		2006	
		Actual	Forecast	Actual	Forecast	Actual	Forecast
ng Ss	Spindle Numbers	56	80	185	250	355	500
Repairing Services	Customer Numbers	11	14	27	40	32	80
Rej Se	Sales Volume (TUSD)	112	160	365.0	500	639.5	1,000
ng s	Unit Numbers	-	-	2	8	8	20
Monitoring Systems	Customer Numbers	-	-	2	4	5	10
	Sales Volume (TUSD)	-	-	6.8	15	27.5	70

Data Sources: Sales report, SSC, 2006.

Further, the buying customer base is expanding slowly. In the past year, the growth rate of numbers of customers is lower than that of sales volume, which implies that the growth on turnover is primarily due to increases in the penetration level rather than market expansion. Since

⁷ Refer to Appendix 3. The market demand will be re-examined in Chapter 3 as one objective of the project.

⁸ Customer feedbacks from a market survey regarding expectations, price and quality are included in Appendix 3.

spindle service customers overlap, to some degree, with those of the bearing business, the company's buying customer base and sales network are supposed to be able to create extensive customer contact opportunities for the service businesses. However, visiting records show that only a few potential customers were visited for spindle service purposes, indicating that SSC's service is not yet broadly accepted and recognized by the market. Compared with SKF's successes achieved by established service centres in other countries and considering its leading position in spindle manufacturing and maintenance, it is reasonable to conclude that the business is underdeveloped in China.

Worst of all, the sales growth of the Spindle Monitoring System, the newly launched and strategically important product, is stagnant. This supports senior management's assumption that the current sales organization is either incompetent or ineffective in their efforts to market the new product.

Various aspects of the existing problems are identified below.

• Unclear and ineffective sales/marketing strategy.

Firstly, as we have seen from the visit records, Sales Engineers tend to sell products or services that are well recognized by the market, such as bearings and related products. These products are easier to sell because they are more readily accepted by the customers. Therefore it is apparent that the innovative, yet less recognized, product lines have insufficient incentives to encourage the sale force to undertake these more difficult sales.

Secondly, the spindle service's sales volume is relatively small compared with rolling bearings and other services. If the sales team prioritizes their efforts

⁹ SKF repairs more than 6,000 units of spindles world wide in its established service centers and is the recognized leading spindle service provider in some countries.

based on sales volume, the Spindle Service would not contribute to their sales as much as other business does, and consequently, might not be a priority.

Finally, the sales teams' autonomy makes the situation more difficult to manage sales' priorities.

• Competence and knowledge barriers among the sales force.

The Spindle Service, as well as other SKF products, requires professional product knowledge and application experience in diverse industries. However, due to rapid organization expansion in the last three years, Sales Engineers, each in charge of all sorts of products in a certain geographic area, might be not experienced and knowledgeable. Further, the existing sales force is used to selling physical products rather than services. Therefore, habit and lack of knowledge about the innovative service could inhibit the sales team from penetrating the spindle service market further.

Customer awareness.

SKF is still considered by the local market as a pure product supplier, rather than a solution provider. Customers in China remain relatively unaware of the integrated offerings, combining products and services that would differentiate SKF from competitors.

2 Internal Analysis

2.1 The Spindle Service Business

2.1.1 Spindle Maintenance Industry

Spindle maintenance is one of the complementary sub-industries of the machine tool aftermarket. Since Computer Numerical Control machines (CNC) were introduced in the 1940s, high-speed spindles were widely adopted in various CNC machine tools as a standard sub-system. There can be up to five spindles in a complex CNC machine, allowing cutters to move along a complex linear path in XYZ motion while rotating. Because they rotate at high speeds, spindles, as well as rotating elements like rolling bearings, are extremely precise components whose condition and quality determine machining accuracy and running time. To keep the spindles in proper working order, routine maintenance and prompt and effective repair are required. Maintenance and repair regimes employ diverse approaches.

Historically, spindles would not be checked and repaired until malfunction signals, such as reduced surface finish, size dispersion or unstable cutting, appeared. This type of "run-to-fail" maintenance was found to be an inferior approach for several reasons. Production would be interrupted by unplanned repairs. This could result in tremendous losses and, when spare parts were not available, the excessive down time could be disastrous. Time-based preventive maintenance has been widely adopted by machine tool manufacturing, especially in continuous production environments. In a preventive maintenance system, spindles are checked and repaired periodically, for example twice a year, to decrease unplanned down time in continuous production, and, most importantly, to prevent machining quality, and therefore product quality,

from declining. However, time-based preventive maintenance has been increasingly demonstrated as ineffective and costly: machines are either over or under maintained. Further, even with frequent and routine maintenance, unplanned interruptions are not eliminated and total down time and maintenance costs are significantly increased. Despite these limitations, preventive maintenance practices still dominate the machine tool aftermarket.

As Condition Monitoring technology emerged, an advanced maintenance strategy, Predictive Maintenance (PdM), was developed for rotating machinery. PdM techniques help to determine the running condition of machines and, through vibration analysis, predict when the machines need to be repaired. PdM, which is also known as condition-based maintenance, if implemented properly, offers significant cost savings over traditional time-based maintenance and improves productivity. However, specialized equipment and expertise are required to execute the advanced maintenance strategy. Even though the PdM approach has been increasingly adopted for general machinery in continuous production environments, such as power plants, paper mills, and steel mills, it is not yet prevalent in spindle maintenance.

2.1.2 SSC's Offerings

SSC offers integrated services for spindle maintenance, with products grouped into spindle repair services and spindle monitoring systems, each comprised of a set of products and services.¹⁰

Relying on specific equipment and facilities in the workshop, and, particularly, technical support and training from the global spindle service segment, SSC is able to provide full-function repairs for spindles, as well as supplying components through inter-firm outsourcing. In addition to mechanical engineering services, like machining accuracy checking, bearing mounting and

¹⁰ Refer to Appendix 4, the SSC's Offerings.

preload adjusting, revenue from component selling is considerable, as in many cases precision bearings are replaced in order to prevent problems developing during the repair interval. SSC is also trying to create customer value in component supplying. For example, by replacing the defective bearings with SKF hybrid bearings, which are manufactured with ceramic rolling elements, SSC significantly improves repaired spindles' high-speed performance and running life. This component advantage also enhances SSC's competitiveness.

Additionally, in 2005 SSC launched the Spindle Monitoring System¹¹ comprised of online condition monitoring equipment and PdM implementation services. The monitoring system was recently developed by SKF Reliability System for this specific application and market. Traditional on-line condition-monitoring systems, especially a high-end flagship product from a condition monitoring company, for example, the SKF Machine Analysis, are extremely effective in vibration signal collecting and analysis. The software associated with these products supports many functions and modules like Decision Support, Expert Systems, Physical Asset Management, Spare Parts Management, and many others. This kind of system is designed for plant-wide applications in machine-intensive industries such as electric power generation, petrochemical and pulp and paper manufacturing. However, they are not directly applicable to spindle maintenance due to sensor dimension and various technical instrumentation considerations as well as software functionality. Basically, the spindle monitoring system, SKF Multilog® On-line System, is a low-cost, compact, surveillance device with special features for monitoring high-speed machine tool spindles. It consists of compact sensors, data collection unit and analysis software with specialized functionality such as spindle crash detection and bearing failure monitoring. In summary, the SKF spindle monitoring system is a simplified, less expensive version of a high-end condition monitoring system with features and attributes specific

-

¹¹ SSC's spindle monitoring system includes application specific equipment, the SKF Multilog on-line system, and complementary PdM implementation services. Throughout the paper, the term "spindle monitoring system" will be used to refer to this bundle of monitoring equipment and services.

to spindle applications. SSC's PdM implementation services include a training program and consultant services that focus on improving the customer's capacity to predict problems through vibration analysis technologies. Usually, the complementary service is marketed in a bundle with the monitoring equipment.

Implementing a PdM strategy requires an investment of money and time over and above the purchasing costs. The total cost is significant. However, the spindle monitoring system and PdM helps to eliminate unplanned down time, increases machine tool utility and reliability, and decreases life cycle maintenance cost.

2.2 Value Chain Analysis

The value chain of spindle maintenance service is composed of six primary activities:

Research and Development (R&D) and Product Manufacturing, Components Purchasing,

Manufacturing and Monitoring System Installation, Sales and Marketing, Service and Predictive

Maintenance Implementation and Technical Support, as illustrated in Figure 2.1.

Figure 2.1: Spindle Service Value Chain

R &D and Component MFR	Components Purchasing	Manufacturing	Sales & Marketing	Service Predictive Maintenance	Technical Support
		Monitoring System Installation		Implementation	1 1

Activities outsourced or supported by the parent company

2.2.1 R & D and Component Manufacturing

As a typical technology-incentive organization, SKF has been deeply and broadly involved in bearing and related technology development. Since the 1990's, SKF has increasingly stepped up its pace of investment in innovative technologies and value-added services, significantly increasing its offering variety. This investment has increased SSC's ability to provide one-stop integrated service using a bundling strategy. For example, the R & D and

manufacturing technology for components such as precision bearings, monitoring products and spindles are significantly different from each other, as well as from machine tools. Consequently, only a few machine tool vendors make spindles in-house and none manufactures precision bearings. Most of SKF's traditional competitors in precision products, like FAG and NSK, supply high-speed spindles. None of these rivals offer spindle repairs, condition-monitoring systems or other related services in the marketplace. Therefore, SKF's product R&D and manufacturing ability helps differentiate SSC from its competitors.

In addition, SKF's R&D capacity creates competitive advantages in software development. The SKF analysis software plays a key role in vibration analysis and represents a large proportion of total cost. Most of this type of analysis software was developed for general applications and includes functions like vibration spectrum analysis and alarms for general defects and errors. However, most of these functions are not directly applicable to spindle monitoring. Further, complexity of use and considerable purchase cost prevent customers from adopting these general application systems. However, SSC's offering, with unique features and functionality specific to spindle monitoring, is cheaper and easier to use.

Further, both product and software development are executed on a global scale, with R&D costs leveraged by existing service centres and related business segments, for example, the Reliability System. SSC can, therefore, gain a technology advantage at a lower cost due to existing economies of scale. Indeed, the firm is pursuing a mixed strategy in its spindle monitoring business, trying to benefit from both cost reduction and differentiation. This strategy will be discussed and assessed in more detail in later sections.

2.2.2 Component Purchasing

As component and software purchasing costs represent a significant proportion of total costs, purchasing from its parent company through internal transfer pricing can be a significant cost driver for SSC.

With components supplied and stocked by its parent company, SCC is also pursuing advantages in component availability. However, SCC's component availability is not superior to its competitors because major components are either standardized or highly customized.

Components, such as standard precision bearings and seals, are easily acquired in the market. Highly customized components, like hybrid precision bearings, must be manufactured on order. Competitors who offer standard components can often provide customers better delivery time.

2.2.3 Manufacturing

In manufacturing, SSC is creating customer value through workshop location and manufacturing quality.

Unlike component supplying, SCC does spindle repair entirely in the local workshop in Shanghai, Eastern China. In 2005, as many as 5.2 million vehicles, accounting for 23.6% of the 2005 national vehicle output, were manufactured in the area¹². SSC is geographically close to its strategic market¹³. Further, the location creates significant customer value. Currently, the major spindle service providers -- the machine tool manufacturers -- serve customers through overseas subsidiaries. This results in extremely long lead times and significant transportation costs. Long delivery times incur additional cost, and, in some cases, is dangerous. In order to avoid possible interruption of continuous production, customers typically back up all critical spindles. If the spindle repair period is longer than its maintenance interval, customers would either have to stock

¹² Refer to Appendix 6, 2005 Vehicle Output in China.

¹³ Refer to Appendix 3. Automobile manufacturing industry was selected by SSC to be its strategic market.

more spindles to keep at least one standby on hand or risk production interruption caused by unpredictable spindle malfunctions. Stocking additional spindles is costly and a production line stoppage is a disaster. Hence, by providing local service, SCC is able to add customer value through faster service and lower total costs. In addition, the local service advantage allows SSC to expand opportunities for support service implementation and other service elements geared to the target market.

The SKF group reconditions over 6,000 spindles annually in seventeen certified service centres and has extensive expertise in spindle repairing. Through access to the established central expert database and by sharing employees' accumulated state-of-the-art know-how on spindle engineering and precision bearing manufacturing, SSC can provide service equal to that of the SKF group through standardized operational processes. Hence, manufacturing quality also differentiates SSC from its competitors.

2.2.4 Sales and Marketing

SSC's sales function is performed by the established direct sales network. The direct sales network is responsible for all products and services and is shared by various product segments firm wide. The segment staff, for instance the Marketing Engineer in SSC, will be involved in selling activities to some degree.

Regional sales representatives in areas where prospects are located are responsible for generating customer demand by articulating the service benefits when visiting, quoting, closing, and following up. Segment staff would not be involved in a standard sale. However, when customization is needed, the SSC Marketing Engineer would be responsible for cost analysis and would provide pricing advice. Regional sales staff remain responsible for quoting and contracting. Further, the Marketing Engineer is responsible for support activities, such as

targeting potential industries, handling complicated complaints and managing promotional materials and product literature. In addition, the Marketing Engineer is tasked with the role of internal trainer. If required and invited by regional sales, the engineer hold technical seminars for customers, which also provide on-the-job training for field sales. However, sales visiting reports, interviews with SKF staff, and customer information from the Customer Relationship Management (CRM) system¹⁴ indicate that, since SSC was founded in 2004, very few seminars and training sessions have been organized.

The existing sales force network provides unbeatable market coverage and an extensive customer base. In machine-intensive industries, few customers have never purchased from SKF, and even fewer do not know the brand name. Indeed, most of SSC's potential customers, like automobile and auto-engine manufacturers, are already served by existing business units. Established customer relationships with frequent contacts facilitate the marketing process. Also, SSC benefits from lower sales and administrative expenses through shared efforts with other units. Finally, similarities among the company's offerings are presumed to accelerate the training process for spindle services.

On the other hand, because of the independence of the sales force and differences among products and services, the full-line sales force's product specialization knowledge is unavoidably lower than that of a specialized sales team. The situation is at a critical juncture as the company is expanding its sales force due to rapid business development and frequent launch of new products. The potential product knowledge disparity between a full-line and a specialized sales team is exacerbated because sales are inclined to organize their efforts and skills based on their own

.

¹⁴ At the beginning of 2006, the company instituted a Siebel CRM system to include customer information and visiting records in the system. However, the project has not been successfully executed. Sales are reluctant to use the system. Currently, most visiting and customer information is reported to managers by email. Interviews with the SSC Manager and sales representatives demonstrated that only two or three joint visits have been completed since the foundation of SSC.

priorities. Compared with the sales volume of bearing-related products, SSC's business is relatively small and therefore contributes less to achieving the total sales target¹⁵. Consequently, if the incentive plan is not sufficiently effective, inadequate sales skills and efforts may be deployed on SSC's offerings, resulting in stagnant business growth, as discussed in Section 1.5, Problems Facing SSC.

Theoretically, the full-line sales management structure would add value in various aspects, such as high market coverage, extensive market recognition, and lower expenses, and would allow SSC to benefit from both differentiation and cost advantages. However, the effectiveness of the current sales strategy is heavily dependent on the successful implementation of support activities, such as, incentive management, human resource development and the definition of sales roles. This current sales strategy will be analyzed and examined further in Section 2.3, Sales Organization Analysis.

2.2.5 Service

The service section of the value chain is critical for SSC's long-term customer satisfaction. By themselves, the spindle monitoring equipment and the analysis software can neither increase machine utility nor create cost savings. The benefits derived from PdM cannot be achieved until the advanced maintenance strategy is implemented properly. Most existing competitors, like machine tools vendors, are either focusing on product selling, or, like condition-monitoring system vendors, do not have PdM implementation experience in spindle applications. Very often, customers' inadequate organizational resources and lack of expertise results in a high PdM implementation failure rate.

¹⁵ Refer back to the percentage of SSC's sales volume in Table 1.1.

SSC's PdM implementation service is designed to help customers successfully execute the advanced maintenance strategy. The offering consists of three components: training, on-site practice, and diagnostic services. All three components focus on improving the customer's ability and knowledge. SSC internally outsources the service activities to the Service Engineer team in the Service Business Department (Refer back to Figure 1.1, the SKF China Organization Chart).

In situations where customers do not have the necessary resources and personnel, SSC offers extended diagnostic consulting services. SKF's service engineers monitor the spindle conditions periodically through remote log-ons to the customer's server and submit analysis reports and suggestions for repairs and maintenance scheduling.

Diagnostic consulting services also help create customer demand for SSC's offerings. Initially, customers do not adopt the monitoring system on a large number of spindles. Rather, they run a trial project on two or three spindles to evaluate the effectiveness of the new maintenance practice. In this circumstance, implementation and diagnostic consulting services help to ensure the trial system is performing as expected and that positive outcomes are generated. When the trial project is implemented and assessed as successful, broad adoption of the system can be expected.

The Service Engineer team, consisting of certified reliability engineers, was established to implement all the service and consulting contracts signed by all service business segments. The team is well trained by the global service division and is knowledgeable and experienced in condition monitoring and vibration spectrum diagnostics. Similar to the sales force, the Service Engineer team's utilization level is high, primarily due to service contracts from reliability system business. Consequently, team members are able to accumulate extensive expertise and practical experience with diverse applications. As a result, intra-firm outsourcing of service performance activities can create considerable economies from integration. In addition, positive feedback from

customers indicates that the team's performance is of high quality. However, SSC has yet to significantly benefit from its Service component because sales from spindle PdM implementations are still relatively small.

2.2.6 Technical Support

Unlike service activities, support activity does not create a direct revenue stream. However, technical support is vital and emphasized by the organization. As the spindle service business is relatively new for the organization and the involved products and services are complex, SSC is actively providing technical support to external customers and the sales force. Indeed, the whole front line, including sales representatives and service engineers, actively provides post-sales service, following an existing operational procedure, the Complaint Handling Process. Although most complaints are determined to be "Non-Performance", a designation defined as "The quality of the product or service conforms to SKF's quality standard", the activity creates value through exploiting new business opportunities and improving customer satisfaction and the company's credibility. Further, since sales of spindle repairs are repeatable and can generate a continuous revenue stream, customer relationships play a critical role. The activities help build long-term customer engagement through frequent contacts.

2.2.7 Competitive Advantages and Strategic Weaknesses

The primary purposes of value chain analysis are to systematically describe the business unit's activities, identify value-add resources, and, in turn, determine competitive advantages and strategic weaknesses.

As SSC is pursuing both cost reduction and differentiation using a mixed strategy, its competitive advantages can be summarized in two categories, cost advantages and differentiation advantages.

Competitive Cost Advantages

- R & D at global scale.
- Purchasing products and software at internal transfer price results in cost advantage.
- Knowledge management reduces training costs and timelines.
- Sharing sales forces and service engineers leads to synergy economics.

Differentiation Advantages

- Unique software functionality and superior component quality.
- Location creates customer value through shorter delivery time and lower transportation costs.
- Sharing sales network with parent company results in benefits from high market coverage, established customer relationships and recognized brand reputation.
- Standardized operations and specific facilities ensure high manufacturing quality.
- Ability to provide PdM implementation service increases customer's willingness to pay.

A significant strategic weakness exists. SSC's current full-line sales organization does not possess sufficient skills or deploy sufficient effort on challenging new products and services.

2.3 Sales Organization Analysis

Based on the competitive advantages and strategic weakness identified in the Value Chain Analysis section, it is apparent that SSC's potential success relies heavily on how well it leverages the organization's sales resources to communicate its offerings. The problematic sales organization strategy deserves close examination. As the sales organization is treated as a strategic corporate asset and is shared by diverse industrial and product segments and business units, it is useful to begin firm-wide and then narrow the analysis to the sales organization.

2.3.1 Corporate Organization Structure and Governance

As introduced in Section 1.1.5, the Organization Overview and Section 2.2.4, Sales and Marketing, SKF China is divisionalized around both product segments and geographical markets. These divisions are intended to maintain a balance between geographic autonomy and product expertise. Regional sales force and segment support staff comprise the two dimensions of the matrix and represent major organizational resources.

The regional sales team is responsible for many different products and services, across a variety of industry types in a given area. Sales representatives report directly to regional managers but are coordinated by vertical segment staff. Within each area, sales representatives possess considerable autonomy over customer visit scheduling and expenditures, and therefore, exert great control on revenue. In a typical selling process, only the regional sales representatives participate and make decisions. Salespeople have considerable discretionary latitude. Based on their assessment of the selling situation, they are empowered to determine the appropriate degree of sales effort required. The company relies heavily on regional sales forces to understand product and market diversity and adapt to regional or market preferences. In addition, the sales representative is the critical organizational resource for collecting market information and feedback and for generating firm-wide responses. In a full-line sales structure, regional sales will organize their time and effort based on individual motivations if they do not have sufficient incentives to encourage them to promote specific products or target specific industries.

Segment Managers, Specialists or Marketing Engineers, supported by relevant global product or industrial divisions, manage the vertical product segment dimension. Although product segments have sales targets for a specific group of products, they do not handle customers directly. However, they exercise influence on the marketplace through the front line sales force. To a large degree, segment staff plays the role of internal sales. In addition, the segment staff take

responsibility for internal product training, marketing and pricing strategy, quoting on customized solutions, managing literature and providing technical support for complicated applications. In cases where customized solutions, complicated applications or special products are involved, a segment specialist or engineer will be invited by regional sales to contribute to the selling process regarding cost analysis and solution proposals. In addition, sometimes segment specialists will be asked, by regional sales representatives, to hold seminars or jointly visit customers. These joint activities also provide on-the-job training for the sales forces. However, the degree to which segment staff gets involved in the selling process is ultimately determined by individual sales reps and, consequently, varies by segment and region.

Segment specialists and managers are usually recruited internally from existing sales representatives who have extensive marketing and technology expertise in particular industry categories. Personnel with this combination of qualifications represent a very valuable and a very scarce resource. As SKF China has a long and successful history marketing rolling bearings in traditional segments like metals, pulp and paper, and automotive, there is a limited, but adequate, supply of these valuable resource people in bearing-related products. In this decentralized organization, these professionals - product specialists or experienced sales representatives-- have been given considerable autonomy over their routine work. They are often granted significant authority in operational activities such as customer visiting, solution customization, reporting, and pricing. For example, in routine operations, regional Sales Managers show a high degree of respect for segment specialists' and managers' opinions and, in some project-based business, free them from close control by administrators and colleagues. The specific role of a segment specialist or manager largely depends on how they define their jobs. Very often, specialists actually act as sales managers and exert significant influence. In addition, they are widely respected by regional sales staff and tend to be chosen to accompany the sales representatives when they visit prospects in their areas. As a result, segments with experienced specialists are

able to exert significant influence on the sales teams and, consequently, have more opportunities to promote products to the marketplace.

However, the role of segment specialists and managers is different in the newly founded service-related segments like SSC. Because the products are new and innovative, there are not as many comparably experienced personnel in the spindle maintenance realm, either within or external to the organization. For example, in SSC, a Marketing Engineer who joined SKF in 2005 is currently acting as a product specialist. Even though he has been trained in manufacturing and product techniques, compared to specialists in bearing-related segments, he has less practical experience and industry application knowledge. As far as the sales force is concerned, he has not yet satisfactorily demonstrated that he is competent to deal with complicated application problems. Consequently, he exercises less influence over the sales force. Daniel Yan, the SSC Manager, indicated in an interview that no SSC staff member had been selected by sales to hold seminars or provide on-the-job training in 2006. Generally, salespeople, especially those with years of experiences in bearing-related products, believe it could be risky to invite an engineer with questionable marketing experience and product knowledge to present seminars. The lack of organizational resources and joint activities leads to insufficient sales efforts deployed in the marketplace and inadequate product knowledge disseminated to the sales forces.

In addition, because the sales force is responsible for many different products and no one is dedicated to any new products, they naturally organize their learning activities based on their own priorities. If new products are not a priority, product knowledge suffers.

2.3.2 Incentive System Analysis

In addition to the influence exercised by direct management, sales representatives' priorities are affected by the company's explicit incentive system. Sales employees are

compensated in three ways: monthly salary, firm-based profit-share and team-based bonuses. The first is fixed and is reviewed every year. The latter two are indexed and represented as a multiple of the monthly salary. The profit-share is calculated on a portion of profits achieved beyond the annual target. For example, in 2005 SKF China shared 30% of "additional" profits with its employees. Each employee's profit share was 1.5 times their monthly salary. The bonus index is based on team performance and is evaluated by criteria and goals stated in a firm-specific scorecard system. A steering committee, consisting of the Managing Director, Vice General Managers, Human Resource Manager and Finance Manager, is in charge of the performance evaluation.

The employee compensation plan can be expressed as:

12 months x Base Salary + (Profit-share Index + Bonus Index) x Base Salary

Compared with the profit sharing component, the bonus is somewhat subjective as it relies heavily on performance evaluation results. Performance evaluation also influences the base salary review.

Top management's compensation plan differs from that of functional teams and includes only monthly salary and firm-based profit sharing. For top management - Managing Director, Vice General Managers and Senior Functional Managers - the scorecard is relatively simple. It includes goals such as sales volume, profit, employee satisfaction, quality management, and customer satisfaction. Employee satisfaction is measured through a "Working Climate Analysis" (WCA) survey implemented by a third party. Quality management is measured by the number of certified Six Sigma Black Belts¹⁶ and severe Non-Conformance complaints¹⁷. The main criteria

¹⁶ Black Belt is a Six Sigma role responsible for quality improvement projects and managing project clusters.

for customer satisfaction is the quality and speed of complaint handling as well as results from independent customer surveys. To align with the group's strategy of expanding into value added products and services, in 2003 sales quotas on new products with strategic importance were added to the scorecard used to assess top management. This addition led to a series of changes in scorecards at different levels.

Compared to that of top management, the team and segment levels' scorecard includes many more goals, criteria and activities. As illustrated in Appendix 5, The Geographic Sales

Team Scorecard, the sales teams' performance is measured from four perspectives, Shareholder,

Customer, Employee, and Process. Each has a set of explicit criteria and inexplicit goals. Explicit targets include total sales targets in the area, sales quotas for new products and product segments, number of seminar and training sessions, complaint handling lead-time, and many others. Implicit goals are even broader. They include employee competence improvement activities, time spent on new products and complaint handling quality. Segment teams and regional sales teams have similar scorecards. Unlike regional sales teams, the sales target for segment teams is determined by a specific industry or product rather than that set for an area. Team-based bonus allocations are determined by an evaluation of each team's performance. In addition to the annual team bonus, individual performance on the scorecard's goals influences the base salary review, which can significantly affect the total amount of each person's compensation.

The underlying rationale for the incentive system is to take both regional and product diversity into consideration while aligning employees' interests with those of the organization. For example, the economic climate and selling situation in each geographical area may vary significantly in terms of potential, growth rates, economic scale and competitive environment. In addition, the firm's products and services are not equally competitive in terms of product

¹⁷ Non-Conformance, a designation opposite to Non-Performance, is defined as "The quality of the product or service does not conform to SKF's quality standard."

attributes, quality and cost. Differences in economic development in diverse geographic areas and differences in products prevent the organization from adopting a simple incentive system.

Therefore, a range of sales quotas and target objectives are included to take territory and product specific goals into consideration.

In addition to various sales targets, knowledge acquisition and competence improvement goals are included in the scorecard. These consist of such things as time devoted to seminars and training. The organization is trying to encourage sales personnel to learn about new products and to update their knowledge of products and services from all five platforms.

A consequence of this multiple-perspective incentive system in a complex market is that considerable discretion can be exercised to justify what activities and which sales targets are prioritized. There is no firm policy that explicitly states or weights the importance of each goal and activity included in scorecards. Regional teams set their own priorities based on individual and group motivations and interests. To some extent, the autonomy of regional sales teams makes the incentive system's goal of advancing the priorities set by senior management harder to achieve. Not surprisingly, most regional sales personnel and their managers believe that total sales volume is the first priority above all others. Therefore, they also believe that the products that contribute the most to the total sales target in the area deserve the most time and effort¹⁸. This belief, formed when SKF was a pure rolling bearing supplier, has a long prevailing history in the organization. As a result, bearing-related products, which represent a significant proportion of sales, are naturally prioritized by sales forces. An interview with the project sponsor, Henry Wang, the Vice General Manager, Service Business, revealed that the total sales volume, although important, is not the only thing that concerns senior management. At this critical juncture, the successful launch of new products and services, as well as improved competency,

-

¹⁸ The opinion has been abstracted by the author from discussions with regional sales and their managers.

are top priorities as well. Therefore, the deviation between priorities set by senior management and those held by the sales organization results in a flawed incentive system.

2.3.3 Training Programs

As a knowledge-based engineering company, SKF highly values knowledge and learning, especially for the sales force. Management expects sales representatives to do more than simply sell products. They expect sales forces to provide consulting advice and solutions based on real application conditions for customers. Usually, product segment specialists, in addition to their support functions, act as product knowledge trainers by providing on-the-job training and inhouse seminars.

Several factors make it necessary for the organization to emphasize product training.

First, the full-line selling organization requires sales representatives to be "generalists" with knowledge of the full product line, rather than "specialists" in a one product-customer segment (Rao and Turner, n.d.). Currently, SKF offers a variety of products and services. The various products and services integrate competencies from five platforms that involve a great many applications and industries. Consequently, broad product expertise and application knowledge are required.

The strategic goal of expanding to provide integrated value-added solutions and services makes it important for the sales team to increase their knowledge base and to change from product selling to solution selling. Management believes that an experienced sales team with the ability to provide integrated solutions is a critical resource and a core competency that will differentiate the company from the competition. Further, the complex nature of the value-added products requires effective knowledge management. The ability to provide appropriate solutions increasingly relies on the extent to which sales representatives understand the characteristics of

the customer's industry and the attributes of the product offerings. Therefore, establishing a competent and proactive sales organization is a core strategic goal for SKF China.

However, conflicts exist between current training programs and management's expectations for new products. First, organizational resources for new products, like the spindle monitoring system, are inherently scarce. For example, most service-related segments have only one specialist or marketing engineer. While the scarce resources are evenly available to the entire sales team, the diluted training resources unavoidably result in the sales force receiving less than adequate product specialization training. This does not enhance sales prospects. The complex nature of the new products requires in-depth expertise to demonstrate the added value. Further, SSC and other new service segments currently have not built up their market awareness or their reputation in the marketplace and, therefore, need intensive promotional activities at this early stage. Second, the value-added products are inherently different from traditional bearing-related products. They require product knowledge and sales skills that diverge from those already possessed by the sales organization. Consequently, the challenges inherent in marketing new products sharpen the conflict between existing resources and those required by the market. Finally, since the sales force is geographically dispersed throughout China, new product segments like SSC may not have sufficient time or resources to provide the training and broad support required, and will be unable to develop sufficient product specialization knowledge.

2.4 Current Sales Management Strategy Analysis

The organization presents a complex sales management problem as it sells many types of products to all sorts of customers in a given geographic area. The current sales management strategy, although effective for bearing-related products, deserves careful assessment when applied to SSC's offerings.

The strategy has advantages. Firstly, the full-line sales force structure allows customers to have a single contact with the company. For example, for an automobile manufacturer, SKF offers arrays of products with different applications: rolling bearings and seals in wheels, gearboxes and chassis, condition monitoring systems on general machinery, precision rolling bearings in machine tools, and, in some cases, spindle repairing services and monitoring systems. If the sales force were managed on a highly specialized product basis, customers would be visited by as many as five or six SKF salespeople, each making strong claims for his unique products. No one would be responsible for providing solutions and handling complaints that involve two or three products. The current unique contact policy strengthens brand integrity and, concurrently, maintains local responsiveness. In a given area, regional sales can have a complete picture of what is happening with the customer, handle problems and take advantage of opportunities involving several related products, and, consequently, respond to the customer's needs.

Secondly, by marketing through the well-established sales network, the relatively small business unit can have an extremely high market coverage level. The benefit can be significant, as direct selling requires intensive coverage of a geographic area. Currently, the company has more than seventy regional sales representatives, each of whom visits customers frequently¹⁹. Essentially, frequent customer contact leads to a higher market awareness level and more sales opportunities. Further, as most SSC prospects in target segment industries are buying customers for other business segments, established customer relationships facilitate the marketing process.

Finally, sharing the sales force across products creates cost advantages and, if managed properly, increases selling effectiveness. By sharing selling functions with its parent company, SSC benefits not only from reduced travel and administration expenses but also reduced training costs. Since SSC's prospects greatly overlap with those of existing products, travel costs and time

¹⁹ Visiting records indicate that each sales representative visits four customers per week on average.

can be significantly reduced if salespeople introduce a variety of products at the same time. Further, as products in the company's product line, particularly bearing-related products, are relatively homogeneous, the knowledge management process is facilitated.

However, the full-line selling strategy also has disadvantages. Certain selling problems occurred, especially when new products and services, for example, the spindle repairing service and monitoring system, were added to the sales force's existing product line. Since its launch in 2004, SSC has underperformed relative to market projections. More significantly, in terms of growth rate, the seemingly promising spindle monitoring system is underperforming even when compared to the spindle repair business. Arguably, the current geographic sales organization and autonomous decision-making are ineffective and do not facilitate growth of the value-added service business for several reasons.

First, the full-line sales force may be unable to acquire the necessary knowledge and expertise, and, consequently, would not have the skills necessary to market the newly launched products. When a new product is launched, sales training that focuses on the unique features and benefits of the new product is needed. Training is also needed to identify the best prospects and assess their needs relative to their current situations, as well as to equip the sales force with the ability to measure how the new product compares competitively. Such specialized knowledge and comprehensive sales tactics decisively influence the ability of a sales representative to articulate the uniqueness and benefits of the proposed alternative over the customers' current solution.

When the selling proposition is complex, selling effectiveness declines with the number of products handled by a single regional salesperson (Rangaswamy, Sinha & Zoltners, 1990).

This is particularly true in the current organization. In keeping with its strategic evolution, SKF has added as many as four groups of value-added products and services to its existing product line in the past decade. Most are service related. For example, in 2004, the company launched spindle

services, a new version of reliability analysis software, and two types of rolling bearings, each with unique product features and benefits.

In addition, the current full-line sales force is aligned with customers across a variety of industries. Each industry has particular characteristics that require distinct application knowledge and market experience. The diversity of industries and products further increases the selling complexity.

The conclusion that this "full basket" concept of sales organization has created problems is supported by Henry Wang, Vice President, SKF China who stated: "Any single Sales Engineer with less than two years of experience in SKF; inspite of whatever he has been doing previously, is not able to effectively handle the business in his areas. Learning ability and attitude are of paramount importance …"

The existing gap in knowledge and experience prevents sales from effectively marketing challenging products and services. The situation is particularly noteworthy with regard to SSC's offerings, as both the sales team and the support segment lack sufficient experience and knowledge of the market and of product attributes.

As well, products in different lifecycle stages require distinct marketing strategies and tactics compared to the strategies and tactics required for the existing mature product line (Moore, 2002). However, the full line sales team limits the organization's ability to adopt appropriate marketing mix strategies for products in different lifecycle stages. Compared to mature products, products in an introductory stage require more effort to create market awareness, educate the market and establish a competitive position. Sales efforts on early-stage, newly launched products yield far lower sales revenue than products in mature stages. Therefore, incentive systems need to encourage salespeople to focus their efforts on these new products. At times, innovative products

and services, although strategically important, cannot contribute significantly to revenue growth in a short period of time, and, in some cases, never really take off. In order to achieve an area sales target, salespeople tend to allocate their sales efforts and skills to "low-hanging fruit" rather than unconfirmed time-consuming businesses like spindle maintenance, regardless of their potential.

"Based on my previous experience on SKF reliability systems, spindle maintenance business would not take off within two to three years, even if intensive promotion activities would have been executed. Our regional sales are not supposed to be interested in the business. That is why I had to organize a dedicated sales team in 2001." [Sell Ma, Manager, Reliability System Segment, personal communication.]

Since total dollar sales is valued and prioritized over new products with strategic importance but less immediate sales potential, the sales force focuses their marketing efforts on those businesses that are most likely to achieve their annual sales target.

Finally, the current sales management strategy, which does not take customer type into consideration, prevents the organization from capturing the benefits that would accrue to a sales force specialized by industry vertical. For example, due to SSC's workshop location advantage and industry composition, three of SSC's most important customers²⁰ in the automotive industry are located in Shanghai area. These three customers accounted for 60% of SSC's sales revenue in 2006. However, these accounts are handled separately by three different regional sales representatives. For each salesperson, each of the three customers represents a small proportion of his total sales volume²¹, and, consequently, is not his priority. Further, lack of focus and industry specialization prevents the sales person from developing a high level of expertise and deploying the required skills and efforts to penetrate the industry.

_

²⁰ The three key accounts are VW Shanghai Engine Branch, Wuxi Diesel and GM Shanghai. They are crucial for SSC due to either huge potential or reference position in the automotive industry.

²¹ Compared with the average sales volume of US\$ 5.0 million per person in the Shanghai office, each SSC customer represents a small proportion of each salesperson's total sales volume.

To summarize, the current full-line sales organization has advantages and disadvantages. The full-line sales structure allows the company to benefit from unique brand image, intensive market coverage of geographic areas, and significant economies of scale. However, new product introductions receive little selling effort in terms of sales force knowledge and expertise, sales strategy and tactics, and management programs. Tradeoffs and adjustments are needed. An appropriate sales management strategy must consider such variables as market size and potential, the competitive situation and interdependence among products and customer segments.

3 External Analysis

This chapter will focus on an external analysis, including industry definition, market size estimation, competitor analysis and strategic evaluation. The main purposes of the external analysis are to determine the attractiveness of the industry and which customer segment deserves attention, as well as to identify key success factors and reveal the competitive situation.

3.1 Define the industry

In order to understand the focal business unit's product and customers, and the interaction between them, different levels of Product-Customer Matrices (PCM) are constructed (Boardman & Vining, 1996). The primary purpose of the PCM is to address a basic strategic issue of the focal business unit and determine which product-customer segments to compete in and how to compete in them. Through a series of matrices, the company's corporate strategy and competitive level strategies are revealed and optimal strategic alternatives can be generated.

3.1.1 Basic Matrix for Corporate Parent

Compared to SSC, the parent company has a product line that covers many more customer segments. The parent company's customer segmentation differs greatly from that of a single business unit due to differences in product categorization, customer base and, particularly, core competences. However, in their article, *Define Your Business Using Product-Customer Matrices*, Boardman and Vining (1996) found that "the advantage of a corporate level PCM is valuable in providing a broader overview of all major corporate activities and a summary of the relative importance of each product-customer segment and of each business unit." (p. 39).

Table 3.1: Basic Matrix for SKF China

	OEM			After N	Percentage		
	Heavy Machinery	General Machinery	Distributor	Heavy Industries	General Machinery	Others	on each Product
Bearings-re	elated Produ	icts					91.7%
Rolling							
Bearings and	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark	86%
Units							
Precision							
Products and		✓	✓				5.7%
Spindles							
Service-rela	ated Produc	ts					8.3%
Reliability	✓			✓	✓	✓	5.5%
Systems				-		•	3.370
SSC					\checkmark	\checkmark	0.3%
Others	\checkmark		\checkmark	\checkmark	✓	\checkmark	2.6%

Data Source: SKF China business report, 2006.

Table 3.1 illustrates a simplified corporate PCM for SKF China across all business units. The company's offerings are grouped into Bearing-Related and Service-Related products. As indicated by the sales percentage for each group of offerings, the majority of the company's business comes from rolling bearings, which accounts for 91.7% of total sales. It is worth noting that, compared with rolling bearings from which the majority of sales revenues are derived, service-related businesses are underdeveloped, accounting for only 8.3% of total company sales revenue despite the expectation by senior management that 15% of revenue would come from service-related products.

Another fact worth noting is that the offerings in the product line, although serving homogenous industrial categories and sharing a similar customer base, are distinct from one another in various aspects. Contact people, distribution channels and purchasing decision making processes vary across offerings. Because the components are highly standardized and easily available, an automobile manufacturer, for example, would usually purchase precision bearings for machine tool repair from dealers and distributors. However, spindle services are marketed by direct sales representatives and demonstrate a different decision pattern. Typically, the decision to

adopt a spindle repair provider can be made by equipment management managers based on their previous experience and market knowledge. In contrast, the purchasing decision for rolling bearings entails a series of tests and homologation programs²², in which R & D, the quality management department and in some cases, third parties are involved. For example, wheel bearings must be certified by car makers through road tests to assure that the products meet the quality standard. As a result, the different purchasing decision making processes require distinct marketing approaches.

3.1.2 PCM for SSC

The PCM for the focal business unit is constructed in Table 3.2 with each cell containing product-customer segment sales as a percentage of total business unit sales. As explained previously, SSC's offerings are grouped into Spindle Repairing Service and Spindle Monitoring System. Currently, SSC primarily serves two customer segments: the automotive industry and general machinery. The former includes manufacturers of automobiles, motorcycles, trucks, engines, and related components and sub-systems. The latter comprises manufacturers of industrial electrical motors, industrial gearboxes, and many other types of equipment. A great proportion of SSC's sales comes from the automotive industry, which is booming and regarded as the most profitable customer segment in the marketplace. Further, high-end CNC machine tools are widely used by carmakers, which would indicate a higher purchasing tendency for SSC's offerings. In contrast, the general machinery industry is less profitable and characterized by traditional non-spindle machine tools, indicating a lower purchasing tendency.

-

40

²²In today's marketplace, products must be often homologated by OEM customers or public agency to assure that they meet standards for such things as safety and environmental impact.

Table 3.2: Product-Customer Matrix for SSC

Products & Services	Automotive Industries	General Machinery	Others	Total	Profitability
Spindle Repairing Services	79.7%	14%	2%	95.7%	Low
Spindle Monitoring Systems	4.3%	-		4.3%	High
Total	84%	14%	2%	_	

Data source: Business report, SSC, 2006

Traditional repairing services represent a greater portion of sales despite their lower margins. Spindle monitoring products and software, together with implementation service, represent higher profitability and could have great market potential because that constellation of products was launched less than two years ago and is still in a very early stage.

The primary difference between engineering services and spindle monitoring systems is sales repeatability. The former is subject to repeat sales while the latter tends to be "one-off" business. Once the customer establishes the PdM structure, it will not repeat purchase. However, one-off sales of spindle monitoring systems can be significant and last for a long period of time with one single customer. Another difference between these two is the nature of the service. From a customer perspective, mechanical repairing is, to a large degree, "compulsory" with few, if any, risks. However, the purchase of a spindle monitoring system tends to be "optional" and is seen as risky as it requires revolutionary changes to the customer's current maintenance strategy.

3.1.3 Business Matrix

Empirically, SSC's competitors are limited to those players who currently have a similar product line in the marketplace. However, the incompletely defined set of competitors does not prevent omitted firms from competing against SSC. Multiple perspectives are required to describe the competition situation. The inclusion of competitors in other industries would require expansion of the matrix both in product lines and in customer segments.

Machine tools vendors and independent spindle repair firms are considered competitors because they all offer similar repair services and serve the same market. Usually, if spindles can be repaired in-house, customers will not outsource maintenance. Therefore, customers' maintenance departments are regarded as competitive independent service providers. Some of these rivals, especially machine tool vendors, to varying degrees, provide one-stop repair services on all sorts of accessories and automation components for machine tools rather than for spindles only. This inherent customization ability allows these rivals to serve a broader set of customer segments, such as aerospace, shipbuilding and heavy machine manufacturing. These industries are characterized by highly customized professional or oversized machine tools, or linear motion non-spindle CNC machine tools. Hence, an additional customer segment, customized machine tools, encompassing these customers and a product line of non-spindle and customized components were added to the matrix.

Condition monitoring companies, although not currently active in the spindle monitoring arena, should be treated as competitors as well, as they have similar core competences in condition monitoring technology. In the future, these companies might develop alternative spindle monitoring application solutions and subsequently compete in the same product-customer segments served by SSC.

The matrix for the industry is constructed in Table 3.3 and includes a broader set of competitors, additional products and services, and extended customer segments.

Table 3.3: Business Matrix

Products & Services	Automotive Industry	General Machinery	Customized and Non- spindle Machine Tools
Spindle Repairing	A,B,C,E	A,B,E	B,E
Spindle Monitoring System	A,B,D	A,B,D	D
Repair service on accessories and automation components	В,Е	B,E	В,Е

A = SSC; B = Machine tool vendors; C = Spindle and bearing manufacturers; D = Condition monitoring companies; E = Independent spindle repairing providers and customers' maintenance departments

3.1.4 Summary

An examination of the offerings and customer segments reveals answers to such questions as who are SSC's customers, in which product-customer segments does SSC currently operate and who are SSC's competitors.

Unlike traditional spindle service suppliers, SSC is redefining the spindle maintenance business by blurring the boundary across component supplying, spindle repairing and condition monitoring industries. Consequently, companies with similar core competencies that offer similar services and serve the same customer segments are worth considering as competitors.

3.2 Market Demand Estimation

The Market Demand Estimation section will develop a model to estimate the market demand for SSC's offerings. The estimation is guided by Meredith's (2005) diagrammatical template for business market demand estimation as this template is applicable and relevant to a large geographical and national market. However, only components closely relevant and relatively important to spindle services and the market are examined and reviewed.

The total CNC aftermarket is comprised of domestic production as well as imported and exported products. Exports are not counted in the estimate because the localized business unit does not serve the export market. In addition, since locally made machine tools only penetrate the low-end, small machine market, only a small proportion of those firms equipped with imported

spindles, should be counted in the estimate. Most imported machine tools are believed to be highend CNC machine tools with complex design. This is based on the fact that China has tremendous manufacturing capability in general-purpose machine tools and assumes that only high-end CNC machine tools would be imported. The import market, therefore, deserves careful examination.

The estimate of the import market will start from the market size of CNC machine tools and then narrow down to market demand on SSC's offerings in two industrial segments. The domestic market will be estimated separately due to significant design differences. The estimate in this section was based on the author's abstraction of secondary data, primarily from the following sources.

- "Market and Sales Projection Spindle Service Centre", compiled in 2004 by the SSC project team.
- Interviews with relevant employees of SKF China, including Ola Jernberg, Manager,
 Industry Service Centre, Henry Wang, VGM, SKF China, and Sell Ma, Manager,
 Reliability Systems.
- Intranet and database of the focal company's sales' records and forecasts.
- Relevant websites, like www.china-customs.com, www.stats.gov.cn and www.autoinfo.gov.cn.
- Customer interviews (Nanjing FIAT Auto Co., Ltd and Shanghai Volkswagen Engine Plant).

3.2.1 Imported Market Estimation

As well as being a leader in machine tool output, China has been the largest consumer of machine tools in the world for the last five years. In 2002, Chinese consumption of machine tools was over US\$ 5.9 billion, of which US\$3.15 billion was imported. In 2003, consumption increased to US\$6.8 billion, of which imported machine tools were US\$4.0 billion. In 2004, the consumption value increased to US\$9.3 billion domestic and US\$ 5.8 billion imported (Gardner publications inc., 2007 & SKF Marketing and Sales Projection, 2004). The value of imported

high-end CNC machine tools increased 28% in 2003 and 44% in 2004. The market research conducted by SSC project team indicates that, in 2002, 232,000 units of machine tools, of which 24,800 were imported high-end imported machine tools, were purchased and installed in China²³. Assuming that the value and units grew at same rate over the three years, the units of imported machine tools installed would be 31,744 in 2003 and 45,711 in 2004, as summarized in Table 3.4.

Table 3.4: Machine Tool Market Estimation

	2	002	2003			2004		
					Growth			Growth
	Value	Units	Value	Units	Rate	Value	Unit	Rate
Total M/T (BUSD)	5.9	232,000	6.8	490,739	12%	9.3	693,598	37%
High-end Imported CNC(Unit)	3.15	24,800	4.0	31,744	28%	5.8	45,711	44%

The above machine tool market estimation, although well founded, is not the market size of SSC's offerings. A variety of factors, such as industrial segment, installed spindle quantity and repair frequency, that exert diverse influences on the market demand, should be considered. As well, additional assumptions and estimates would be needed.

As indicated in the product-customer matrix, only machine tools consumed by the automotive and general machinery segments should be counted in the estimate, due to limitations on manufacturing capacity and the customization level of the machine tools. The market demand in these two segments is estimated relative to their proportional position in the total machine tool market.

Automotive Segment

The investment of fixed assets in the automotive industry accelerated over the past five years and contributed the most to machine tool consumption. It is estimated by Aibin Ying, the

²³ Refer to Appendix 3, the Market and Sales Projection.

Chairman of Shanghai Auto Co., Ltd., that in 2004, as much as 70% of imported CNC machine tools were purchased by the auto industry. In China, vehicle output is growing rapidly²⁴ and naturally requires significant investment to expand manufacturing capacity. Compared with the proportions in developed markets, such as Germany and Japan, where 60% of machine tool consumption is in the automobile manufacturing industry (National Bureau of Statistics of China, 2007), the percentage in China, while still consistent with the mature markets, is a little higher.

General Machinery Segment

Estimating the proportion of machine tools consumed by the general machinery segment is a more subtle exercise, but should not be omitted. As SKF's precision bearings currently has 5% of market share in the general machinery machine-tool aftermarket, it is reasonable to estimate that the same proportion of machine tools in the segment can be covered by SSC. Thus, 5% of the total machine tool market is included in the estimate for the general machinery segment.

In total, the automotive and general machinery segments account for 75% of the imported machine tool market.

In addition to the effect of the industrial segment, a series of assumptions are made in order to estimate the units of spindles that could be served by SSC. These assumptions are:

- Every CNC machine tool will have 2 spindles.
- Each CNC machine tool will work for 3 years and each spindle will need to be repaired twice every year, if time-based preventive maintenance is applied.
- Machine tool vendors provide one year warrantee free of charge on spindles and machines.
 In the warrantee period, customers tend not to adopt SSC's services.

²⁴ Refer to Appendix 6, 2005 Vehicle Output. Car output increased 26.9% in 2005.

Based on the analysis of the automotive and general machine segments and the estimated units of spindles that could be served by SSC, a model to study the demand of imported spindle market size has been constructed and is represented below:

Imported Market Demand (Units) =

Cumulative machine tools installed in last two years x 75% (proportion of two segments) x 2 (spindle quantity per machine tool)

(The market demand on spindle repairing would be two times the units from the above formula as spindles are assumed to be repaired twice every year.)

3.2.2 Domestic Production

An estimate of domestic market size requires a different approach. A greater proportion of these machines are designed for complementary functions other than machining, like assembling, inter-plant conveying, welding, and are necessarily low-end and simple in design. The assumptions on spindle units for imported machine tools are not applicable to domestic production. Only those equipped with imported high-end spindles would be counted in SSC's market demand. SFK China's sales records indicate that an average of 20 to 30 sets of spindles are sold to domestic machine-tool vendors. Since SKF currently holds a market share of 15%²⁵ in the local high-end spindle market, the total volume of spindles consumed by domestic production would be 140 to 200 units per year. As a result, an average of 170 units per year is included in the estimate for market demand derived from domestic production.

3.2.3 Spindle Service Market Estimation Summary

To summarize, the total market size proxied by spindle units can be estimated by summing up domestic production and the import market as shown in Table 3.5. The estimate is

²⁵ The spindle market share was estimated by SKF in its marketing report.

for the 2006 market. Imported machine tools installed in 2005 and still within one-year warrantee will not be counted.

During 2003 and 2004, a total of 77,455 units of high-end machine tools were imported. Seventy percent were consumed by the automotive industry and 5% by general machinery.

Assuming that every machine tool installation would involve two spindles, the spindle quantity in these two segments would be 108,430 units and 7,740 units respectively.

Table 3.5: 2006 Spindle Service Market Estimation

(Units)	Machine Tools in service	Installed Spindle Quantity	Market for Spindle Repairing Services (Maintained twice per year)	Market for Monitoring Systems (one-off)	
Imported CNC Machine Tools in 2003 & 2004	77,455	-	- -	-	
Automotive Industry (Discounted by 70%)	54,218	108,430	216,860	108,430	
General Machinery (Discounted by 5%)	3,870	7,740	15,480	7,740	
Domestic Market (Consuming 170 sets of spindle every year)	-	170	340	170	
	Total Market Size (Units)			116,340	
Total Mar	Total Market Size (MUSD)			\$407	

Note that the demand for spindle repairing service is repeatable every year, while that for spindle monitoring is once off.

The domestic spindle market is 170 units every year as estimated by SKF's market share and spindle sales volume.

As each spindle will be repaired twice every year, the annual market for spindle repair will be two times the imported spindle units plus domestic production, totalling 232,680 units per year. However, because of the one-off nature of the offering, the market for monitoring systems would be equal to the spindle units in these two markets or 116,340 units.

In addition, the 2006 market is estimated in dollar sales volume based on the following assumptions²⁶:

- Average sales of US\$ 2,000 will be achieved per spindle on repair service
- Average sales of US\$ 3,500 will be achieved per spindle on monitoring system

As a result, the market size for spindle repairing and monitoring systems is estimated to be \$ 465 Million and \$ 407 million respectively.

3.2.4 Market Growth and Derived Demand

The total demand for spindle services is directly related to the fixed asset investment and the performance of final users' industries, particularly the automotive industry. In 2006, China's vehicle output reached 7 million sets, representing a growth rate of 27% compared with the previous year. Vehicle production is expected to grow steadily over the next five years (National Bureau of Statistics of China, 2007). Further, the capacity of auto engine and gearbox manufacturing, both CNC machine tool intensive industries, is believed to be far behind demand. This belief is supported by the fact that significant portions of such sub-systems are currently imported. Naturally, further investment can be expected in these manufacturing sectors. In addition, the demand for high-end precision CNC machines is accelerating in China. In 2004, high-end CNC machine tools increased 44%. In 2003, it was only 28%. Since the imported high-end CNC demand is growing at a high rate, it would be safe to conclude that the high-end machine tool industry is in an early stage in the market and will keep growing until the local production of high quality CNC machine tools increases.

In conclusion, examination of the performance of the auto industry reveals that further demand would derive from the final user industry and exert a positive effect on total demand estimation.

49

²⁶ The selling price is estimated from SSC's selling history and SSC project team's projections.

3.2.5 Inter-Firm Cannibalization

The estimated demand for spindle repair is based on the assumption that each spindle would be repaired twice every year under prevailing time-based preventive maintenance practices. This is a valid method for estimating market demand. As explained previously in SSC's Offering section, when a spindle is maintained or repaired in order to prevent possible problems, precision bearings and seals are, in most circumstances, replaced. Thus, significant sales from maintenance could be achieved, even when the spindle is still in working condition. Further, as time-based preventive maintenance currently dominates the auto industry, steady revenue from mechanical repairs and component sales could be expected. However, if customers subscribe to the SSC's spindle monitoring system, especially when a PdM strategy is implemented successfully, the spindle maintenance interval would be extended significantly, in most cases doubled. Thus, spindle-monitoring systems tend to cannibalize the spindle-repairing services.

This inter-firm cannibalization effect might be significant for SSC's demand as its current customer bases for both services in the product line completely overlap. On the other hand, not all cannibalization is destructive or the result of company error (Chandy & Tellis, 1998). First, the promising PdM approach will be widely adopted eventually, partially replacing the currently prevalent time-based preventive maintenance. If the company does not permit some degree of this type of cannibalization, undoubtedly competition from other condition-monitoring companies would emerge and invade the market. The circumstance is particularly possible in high-end machine-tool incentive industries as this sector is increasingly pursuing productivity.

Consequently, SKF would be better off to take first mover's advantages. In addition, spindle monitoring systems represent higher profit margins than repair services. As illustrated in the previous section, one-off sales for spindle monitoring systems are US\$ 3,500 per spindle, and average charges for mechanical service are US\$ 2,000 each time. Considering that a "monitored" spindle will still need to be repaired once every year, the total sales for a "monitored" spindle

over its three-year life cycle is very close to that of a periodically maintained spindle and is more profitable.

3.2.6 Company Portfolio Congruency

The SSC product portfolio congruency exerts positive influences on customer demand due to the existence of cross-selling potentials.

Initially, customers tend to purchase low-risk services on spindle maintenance, such as mechanical repairing, as they want to have a better sense of SSC's offering. If satisfactory outcomes are achieved from the initial purchase and as customers develop a sense of trust and become more reliant on SSC, they would have a greater tendency to purchase more expensive and higher risk products, like spindle monitoring systems. Similarly, spindle monitoring products and related complementary services would have similar positive effects, expanding the market share of all offerings in SSC's product line through increasing customer's reliance on SSC. This positive relationship was discussed previously in the Value Chain Analysis section. Therefore, favourable experience with spindle monitoring systems would positively affect customers' willingness to pay for repair services and vice versa.

3.2.7 Company Product

SSC's performance as a whole is compared with its competitors in Table 3.6. Each attribute listed in the left column has been assigned a hypothetical importance weight based on an assessment of factors considered important by the two segments in question. A score is given based on an evaluation of the performance of SSC and two groups of competitors for each attribute identified under the marketing mix variables of Product/Service, Price and Service.

Table 3.6: Supplier Performance Evaluation

		Performan	ce Evaluati	on			
Marketing Mix	Importance Weighting	SS	С	Machine To	ol Vendors	Local S Provi	
Attributes	Value	Evaluation	Weighted	Evaluation	Weighted	Evaluation	
Product/Service	e						
Delivery Time	3	4	12	3	9	4	12
Component Quality	3	5	15	5	15	2	6
Manufacturing Quality	2	4	8	5	10	1	2
Ability of Serving Customized Machine	1	2	3	5	5	3	3
Cost Purchasing Cost	2	3	6	2	4	5	10
Life-cycle Maintenance Cost	2	5	10	3	6	1	2
Service Complementary Services	2	4	8	3	6	1	2
Aggregate Comparative Scores			Σ62		Σ52	,	Σ37

Performance Evaluation: 1= Poor; 5= Excellent. Note that each group of competitors was evaluated as a whole on average performance. A few giant competitors like ABB deserve a much higher aggregate score.

SSC receives the highest scores for delivery time, component quality, lifecycle maintenance cost, and complementary service. These comparative advantages come from the workshop location, SKF precision bearings, the spindle monitoring system, and SSC's ability to provide PdM implementation services.

Nevertheless, there are several variables worth noting in SSC's aggregate score. First, SSC's advantage on delivery time is only valid in the Shanghai area when compared with machine tool vendors without local service facilities. However, there are a few giant machine tools vendors with spindle service networks, as opposed to one workshop, in the market. Indeed, only Eastern China was regarded as a strategic market by SSC when the company was founded in

2004. Narrowing the strategic market to Eastern China significantly reduces potential total market demand. Secondly, SSC's advantage in component quality is not sustainable as high quality precision bearings are broadly available in the market. Finally, and most importantly, SSC's life-cycle maintenance cost advantage is highly dependent on customers' success with the PdM strategy implementation. Due to a high failure rate in PdM implementation, only those customers with exceptional organizational execution ability can actually benefit from the spindle-monitoring technology through the reduction of life-cycle maintenance costs.

3.2.8 Economic Value to Customers

Both services in the SSC product line create customer value, albeit in different patterns. The spindle repair service is, to some extent, necessary from a customer point of view. However, only those industrial customers that highly value such attributes as short delivery time and high manufacturing quality will have a high purchasing tendency for SSC's service. Otherwise, customers would either repair the spindles themselves or seek local service providers whose services are much cheaper and, in many instances, faster.

The spindle monitoring system, however, creates customer value through eliminating unplanned downtime, reducing life-cycle maintenance costs, and, consequently, increasing equipment utility and plant productivity. The cost saving on spindle maintenance and value creation through increased productivity might be significant. However, the adoption of a spindle monitoring system will be accompanied by considerable start-up costs and post-purchasing costs in addition to purchasing costs. The real benefits of a spindle monitoring system would not be achieved until machine-tool owners set up a PdM system. In addition, successful implementation requires a significant investment of human resources and time to acquire the required knowledge and expertise. Further, a great proportion of this investment is sunk. Failure to implement the PdM strategy or inability to retain acquired resources in an organization would result in

significant costs. As a result, to some degree, concerns about being locked-in prevents customers from widely adopting the PdM strategy.

3.2.9 Summary on Market Estimation

To conclude, the automotive industry segment, primarily vehicle and related sub-system manufacturers, presents tremendous market potential. Quantitatively estimating SSC's market share is not realistic and beyond the project scope due to the magnitude of market size, existence of a variety of variables, and the great number of competitors in the market. SSC planned to achieve a production capacity of repairing 800 units of spindles in 2006, accounting for 0.34% of market. SSC actually repaired 360 units of spindles in 2006, representing 0.15% of market share.

Considering the fact that Eastern China (Shanghai city, Jiangsu, Zhejiang, and Anhui provinces) was selected as the target market because of SSC's location advantage, it is useful to estimate the market share in that strategic area. It is reported that 23.7% of a country wide total of 218 million vehicles were made in Eastern China²⁷. Assuming that the same proportion of spindles would have been installed in Eastern China, SSC currently has a market share of 0.46% in the strategic area. This calculation is based on SSC's sales' record that shows 70% of current sales coming from the area.

3.3 Key Success Factors

A major purpose of strategic analysis and this project is to analyse the competitive forces that drive the business and to determine Key Success Factors (KSF) (Porter, 1980). Based on the previous analysis of value chain activities and product-customer matrices, Key Success Factors for the spindle maintenance industry can be determined as shown below in Table 3.7.

.

²⁷ Refer to Appendix 6, 2005 Vehicle Output in China.

Mechanical repair services and spindle monitoring systems, although interrelated, are distinct and categorized in different industry sectors. Therefore, identified factors might be not equally relevant for both services. Even when the factors are applicable to both services, the weight of importance may vary, as illustrated in the Table 3.7.

Table 3.7: Key Success Factors

Key Success Factors	Spindle Repairing	Spindle Monitoring		
R & D				
Product Functionality	+	++		
Knowledge Management	++	++		
Manufacturing				
Workshop Location	++			
Component Quality and Manufacturing Ability	++	+		
Sales & Marketing				
Sales force Knowledge and Expertise	+	++		
Market Coverage	+	+		
Service & Support				
Complementary Service		+		

[&]quot;++": Highly relevant; "+" Relevant; "-": Irrelevant

Functionality of offerings, particularly analysis software, is the primary success factor for spindle monitoring system vendors. The success of PdM implementation is highly reliant on a reliability engineer's ability to forecast, at very early stages, potential spindle problems indicated by complicated vibration signals. The process is neither easy nor straightforward. It requires a great deal of mechanical engineering knowledge and specific dexterities. The analysis software, which is, in fact, a decision support system, helps analysts, through a number of tools and functions, to dig out problematic signals and make a critical decision - when the spindle need to

be repaired. A successful monitoring system vendor's offering must include software that provides various functions and specialized tools to facilitate the analyzing process.

Knowledge Management is considered to be a KSF for players in both product sectors. In the condition monitoring realm, firm-specific technology and accumulated engineering experience are regarded as valuable assets. These include such inherent abilities as proprietary failure detecting technology, application knowledge and problem analyzing expertise, which allow a company to differentiate from competitors. In the spindle repairing sector, vendors can benefit from such state-of-the-art know-how as precision bearing mounting and preload adjusting expertise for both higher manufacturing quality and lower average unit cost. Proper management and sharing of firm-specific knowledge allows the organization to develop and retain these strategic assets in house and create sustainable competitive advantages in the long run. For example, by relying on a central database and an expert system, which includes data and malfunction characteristics for more than one thousand types of spindles, as well as training from overseas specialists, SSC was able to establish an experienced and knowledgeable manufacturing team for its workshop with low training costs and within a relatively short period of time.

However, compared with the knowledge management in manufacturing technology, SKF's new product training programs designed for the sales force is not effective. Neither is the knowledge sharing between product specialists and sales representatives. The ineffectiveness of new product training and inadequate knowledge sharing prevents SKF China from successfully marketing SSC's offerings.

For spindle repair services, workshop location is crucial and can create significant customer value. Although machine tool consumption keeps increasing rapidly in China, few vendors of imported machine tools have localized their spindle repair service. Very broadly, machine tool owners suffer from sending spindles abroad for repair, resulting in considerable

transportation costs and, most importantly, extremely long delivery time. However, high-end CNC users, like vehicle manufacturers, always strive for shorter delivery times and higher equipment utilization and productivity, as continuous production characterizes the industry and the facilities represent significant investment. Therefore, the location of the spindle repair workshop can create significant customer value and competitive advantage.

Component quality and manufacturing ability is highly valued by spindle repair customers due to the engineering nature of the service. Component quality can be acquired easily, as there are diverse substitutes available in the market. Compared to component quality, high manufacturing quality and customization ability are more difficult to achieve as the processes of machining and bearing mounting require specific facilities and tools and specific state-of-the-art know-how. High-quality spindle monitoring products are not available in the market. Major condition monitoring system vendors employ a bundling strategy on their offerings that creates significant entry barriers for suppliers who might consider entering the business through outsourcing. Consequently, the ability to supply high quality components, like sensors, data collectors, as well as the relevant software, is also considered to be a key success factor for spindle monitoring system vendors.

Like many other innovative products, the sales force's knowledge and expertise plays a critical role in the spindle maintenance business. As the monitoring technology is still in an early life cycle stage, intensive promotion and customer education is necessary. Further, in order to articulate and demonstrate that significant benefits can accrue from the adoption of the system and the evolution of a maintenance strategy, as a premise, the sales force should have an in-depth understanding of the customers' current maintenance practices and possess solid knowledge of the product. Therefore, the sales representative's selling skills are strongly influenced by the extent of specialization that the sales organization possesses. Knowledge and expertise have

significant strategic importance, particularly for those vendors pursuing a synergy strategy through a sales force that markets a variety of products and services. The lack of specialization may inhibit the sales representative's ability to acquire the product knowledge necessary to achieve a high level of selling skills (Rao and Turner, 1978).

At times, the product itself, although important, is not the only thing that customers care about, and, at times, is not their first priority. Successful vendors in the spindle monitoring industry must have the ability to provide complementary services. When adopting spindle monitoring technology and implementing the PdM strategy, customers' ultimate expectations are cost saving and increased equipment utility. Failure to help adopters achieve the expected outcomes would, at best, result in loss of market share in the short term and, at worst, lead to eroded company trustworthiness in the long run. Conversely, vendors who are skilled in integrating monitoring system supply and complementary implementation services tend to have a superior market position.

3.4 Competitive Situation and Current Corporate Strategy Analysis

The Competitive Situation and Current Corporate Strategy Analysis section focuses on an analysis of SSC's competitors, including a comparison of their performance in a visualized strategic canvas. Subsequently, SSC's current strategy is evaluated in the context of Key Success Factors identified.

3.4.1 Competitor Analysis

As discussed in the product-customer matrix section, SSC's competitors should be identified from multiple perspectives, as SSC is competing in more than one industry sector. In addition, those firms with similar competencies should be considered to be competitors as, in the

future, they may enter the industry and offer close substitutes. Consequently, competitors are grouped based on similarity in offerings, serviced markets and core competencies.

- Machine Tool Vendors
- Giant vendors with local service network like ABB.
- Vendors without local service network.
- Local Spindle Repair Service Suppliers and Customers' Maintenance Departments
- Condition Monitoring Companies
- Companies with global presence, like Bently Nevada Corporation, the leading company.
- Local condition monitoring system vendors.

Machine tool vendors and local service suppliers repair spindles but do not currently provide monitoring systems and related services. Condition monitoring companies offer monitoring equipment and implementation services for various applications but have not yet entered the spindle monitoring system arena. Because of their vast resources and similar competency profile to SSC's parent company, giant machine tool vendors and condition monitoring companies like ABB and Bently Nevada are targeted in the analysis below.

Machine Tool Vendors

The spindle repair market is currently dominated by original machine tool vendors. As machine tool consumption increases dramatically, major machine tool vendors throughout the world have established representative offices and distribution networks in China. However, only a few giants like ABB and Siemens have established local repair centres.

The dominant vendors have well-established sales networks and offer a great number of products from extremely wide product lines. Knowledge management is also emphasized by these technology-incentive organizations. Their sales forces are inherently competitive, in both knowledge breadth and depth. Most supply monitoring or protection systems as optional

offerings. Usually, this capacity is acquired through outsourcing or acquisition. However, in most cases, the monitoring systems supplied by OE manufacturers are extremely simple and have only a fraction of the functionality required to implement PdM. Further, even the giant machine tool vendors are not interested in providing PdM implementation services. There are two reasons for this. First, the competencies required for PdM implementation are thought to be somewhat different from those required for machine tool manufacturing. Secondly, as machine tool vendors currently dominate repair and component supply, and the PdM approach seems to have a negative cannibalization effect on their existing business in the machine tool aftermarket, these vendors do not have sufficient incentives to enter the spindle-monitoring realm.

Spindle repair entails significant initial investment in specific facilities, tools, and, particularly, human resources. Further, a great proportion of the investment is sunk. The initial investment and exit costs present tremendous entry barriers, and, in addition, prevent small machine tool vendors from establishing local service networks. Small CNC machine tool vendors without local service centres serve their customers through their overseas subsidiaries and supply high quality components from long-term sub-contractors. Their manufacturing capacity and quality are superior as well. Further, as original equipment manufacturers, CNC vendors are able to repair highly customized or oversized machines and spindles. The manufacturing capability is particularly meaningful for customers in the general machinery segment. However, the services are usually available only for machines or spindles under their brands. The CNC vendor group is big, consisting of more than twenty competitors, such as, Mauser, Huller, Weiss, and Hitachi Seiki, but, in each segment of CNC machine tools, like milling, drilling and grinding machines, the concentration level is relatively high. The automotive industry sector is dominated by several vendors, each with considerable market share in certain types of machine tools. These competitors, also technology-incentive companies, all emphasize knowledge management. Each has a highly specialized sales team organized either by industry segment or product category.

Local Service Suppliers and Customers' Maintenance Departments

Currently, there are a large number of independent spindle repair companies in the local market. All of them are small and provide low-end services for a particular group of customers in a restricted geographic area. In some cases, customers' maintenance departments provide simple repair services and, therefore, are also considered to be competitors. Naturally, local service suppliers are not skilled in knowledge management and, pursuing a cost-based strategy, none has a widely dispersed sales network.

Local service supplier and in-house maintenance departments have location advantages and can compete on delivery time and transportation cost. Further, they provide services on customized machine tools through outsourcing related accessories and components. However, the manufacturing quality of the accessories and components is relatively low due to absence of specific facilities and limited machining accuracy. Further, competitors in this group are unable to supply spindle monitoring products due to major suppliers' bundling strategies and different competences required by the monitoring technology.

However, local services are close substitutes for SSC's offerings. By outsourcing from OE manufacturers, competitors can supply components of an acceptable quality and significantly increase their service quality as most components, like precision bearings, are standardized. Secondly, customers can decrease unplanned downtime through an over-maintenance strategy. Maintaining spindles on shorter intervals, although time-consuming and costly, can increase machine reliability and immensely lessen the risk of production interruption, presenting an alternative to spindle monitoring systems and the PdM approach.

61

Condition Monitoring Companies

Companies in the condition monitoring group are SKF's traditional competitors in the reliability system segment. These competitors focus on general machinery applications, like generators, gearbox and electrical motors, and provide integrated monitoring solutions, comprised of instrumentation and software that are much more complicated and expensive than the systems applied in spindle monitoring. Currently, these players have not developed close substitutes with attributes similar to the SKF spindle monitoring system. However, they may develop alternative products and software and enter the spindle monitoring market in the near future, particularly as high-end CNC customers are increasingly pursuing higher equipment utilization and productivity, and, consequently, are beginning to adopt PdM techniques.

Bently Nevada, acquired by GE Energy in 2002, has held a dominant market position in the condition monitoring realm for nearly half century. They are dominant in machinery-intensive industrial segments such as oil and gas production, electric power generation, pulp and paper, mining, and have a position in many other segments. By 2002, Bently Nevada had more than 1,000 active products in its catalogue, with sales exceeding US\$ 200 Million per year. Bently Nevada is undertaking significant product research and development in various condition monitoring technologies. In addition, the company has proven capacity to provide reliability consulting and implementation services through its well-established representative networks. Relying on its size and resources, GE Energy is able to organize its sales force as specialists to market a variety of products and offerings under the Bently Nevada name to one industrial segment. The specialization inherent in such sales organizations is assumed to be higher than that of sales forces comprised of generalists. However, product attributes and engineering knowledge required by the spindle monitoring application are different in degree to those required by the industry segments dominated by the competitor. Consequently, the competitor will not pose an

immediate threat to SSC's business until they develop a close substitute with similar characteristics.

Unlike Bently Nevada, local vendors, although small, can exert immediate impacts on SSC's spindle monitoring business. These players, who are usually serving one or two industry segments in a relatively small geographic area, can offer similar spindle monitoring solutions through outsourcing and customizing techniques. Direct competitors to SSC's spindle monitoring business could emerge from this group, especially when the PdM concept becomes more widely accepted by the automotive industry and when prospects look for comparable products prior to making a purchase decision. For these rivals, sales force knowledge and coverage is inherently weak, as is the organizational knowledge management ability. In addition, because they employ an outsourcing strategy and lack manufacturing capability, they are unable to acquire high quality components or software with the requisite functionality. This significantly impairs their competitiveness in the marketplace.

3.4.2 Corporate Strategy Canvas

Based on the analysis in the Value Chain and Organization Analysis sections, together with the above assessment of competitor performances on Key Success Factors, the SSC's competitive position is described in a visualized strategy canvas (Kim & Mauborgne, 2002). The strategy canvas approach is used to compare the strategic profiles of these main players visually, revealing similarities and differences in key dimensions, and, in turn, provide strategic alternatives.

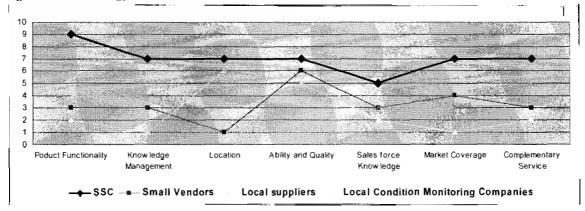
Due to similarities in strategic positions, players are separated into two groups: differentiation and cost-based, with strategic profiles illustrated in two separate figures. The differentiation group includes two leading companies in the machine tool and condition

monitoring industry, ABB and Bently Nevada. The cost-based group includes a number of competitors who employ a cost-based strategy, such as machine tool vendors without local service network, local spindle service suppliers and local condition monitoring companies.

10 8 7 6 5 3 2 1 0 Workshop Location Ability and Quality Market Coverage Product Salesforce Complementary Functionality Management Know ledge Service –SSC ---- ABB Bently Nevada

Figure 3.1: Strategy Canvas for Differentiation Group





Unsurprisingly, as illustrated in Figures 3.1 and 3.2, SKF's strategy is visibly distinct compared to the cost-based group and shares a profile similar to the two leading companies pursuing a differentiation strategy.

With unique product attributes in specific spindle applications, SSC is able to differentiate itself from these two competitors through superior product functionality. In addition, SKF's ability to provide complementary PdM implementation services gives SSC certain competitive advantages in the market. As the strategy canvas indicates, the three competitors with differentiation strategies receive similar scores on such factors as knowledge management, location, quality and ability, and market coverage. However, the gap in sales force knowledge and expertise diminishes SKF's overall performance. As indicated previously, SKF's inadequate sales force knowledge and expertise is believed to result from inherent offering complexity, the innovative nature of offerings and sales organization management. Fortunately, a variety of alternatives is available to address the existing problems.

4 Strategic Alternatives

Based on the analysis in previous chapters, problems in sales and marketing organization can be addressed. This chapter introduces four mutually exclusive sales management alternatives, each with advantages and disadvantages. The alternatives are compared and evaluated in a valuation matrix. To provide context for this analysis, SSC's strategic goals are re-examined.

4.1 Strategic Goals

As a service business unit, SSC should align its goals with that of the service business. The spindle monitoring system business, for instance, is crucial not only for business growth but also to align with the corporate parent's strategy evolution of offering value-added solutions by using competencies from diverse platforms. Further, business success entails encompassing different stakeholders' perspectives. Shareholders, customers and employees all need to be taken into consideration. Shareholders, for instance, might put profitability in the first priority, while, customers might highly value a full-line sales organization. Employees, however, may well prefer a higher exposure to all the products in the existing product line. Therefore, it is useful to include variety of factors and measures for business goals from multiple perspectives.

SSC's business goals are identified based on SSC's original business plan and the strategic goals of service segment.

• **Profitability.** The goal includes profitability in short run and long run. One of SSC's goals in short run is to break even in 2007, three years after inception. In the long run, SSC should achieve an IRR of 16.3% with a pay off time of 6.6 years.

- Business Growth. One of SSC's strategic goals is to rapidly increase market share and achieve sustainable growth. To be specific, SSC needs to achieve revenue of US\$3.2 million in 2009.
- Value-added Spindle Monitoring System. The value-add product and service business is highly related to sustainability. Management expects a great proportion of SSC's total sales to come from the spindle monitoring business in 2009. Also, since the product contributes a higher profit level, compared to the traditional repair business, the spindle monitoring system exerts a positive influence on SSC's profitability in the long run.
- Customer Satisfaction. SSC's scorecard includes a comprehensive customer satisfaction survey to be conducted by the company every two years on selected customers. The main purpose of the survey is to investigate customers' perceptions of the brand image and overall satisfaction level. From a customer perspective, satisfaction can be interpreted through market coverage level, service and support quality, sales team's experience and knowledge, and ability to provide value-added products. Also, customers want to have a unique contact with the company.
- Expertise and Knowledge Improvement through Knowledge Management. The corporate parent views skilled employees as a strategic asset. As one of the company's strategic goals is to establish a competent and proactive sales team, SSC should align its objectives with that of its parent company. Further, sales force expertise and knowledge helps the company build up its competitive advantage, as demonstrated in Section 3.2.

4.2 Alternatives

4.2.1 Status Quo

One obvious alternative available to SSC is to continue business-as-usual. Based on the historical performance, revenue growth is supposed to be slow, particularly for the spindle monitoring system due to its innovativeness and newness to the market. The main advantages of the business-as-usual alternative include market coverage, customer satisfaction, knowledge sharing, and brand integrity. While continuously improving knowledge and expertise, the sales team is supposed to be able to provide required selling skills and efforts for SSC's business. Hopefully, SSC's business will take off after a relatively long period of time.

4.2.2 New Sales Management Mix

SCC could adopt a new sales management mix. Under this alternative, SSC would retain its current geographic sales organization with a different management mix. A variety of incremental adjustments to the management mix would be made, specifically to current sales management variables and measurements. The incremental changes include the following activities.

- Modified Incentive Plan. The organization is currently using an incentive plan primarily based on total dollar sales of all products sold by the regional sales force. It is unlikely and unrealistic to radically change the incentive plan to accommodate the addition of SSC's products. However, fine-tuning of the incentive plan is feasible and could improve the sales force's involvement and commitment level. For example, if sales of SSC's offerings were assigned a higher importance weight, sales representatives would have more incentive to deploy their sales skills and efforts on SSC business. In addition, a formula, which explicitly relates the sales quota on new products and the sales team's compensation, should be developed. Finally, a special reward plan designed for SSC's offerings would be helpful. This would facilitate business growth without radically changing the current incentive structure.
- Special Training Programs. Currently, regional sales, dispersed over the country, are being trained equally in terms of written materials, on-the-job training and in-house seminars for spindle maintenance. However, all geographic areas might not be equally important to SSC's business due to differences in the competitive situation, economic development and market size. Sales in areas with strategic importance, like Eastern and Southern China, deserve more professional training programs, such as joint customer-visiting, overseas training and on-the-job training. Concentrating scarce training resources in these areas would help the organization benefit from a higher specialization level on required knowledge and expertise.
- Fine-tune Sales Roles. In a decentralized organization, sales' responsibilities are heavily dependent on how sales' roles are assigned. Therefore, the relative degree of selling skills and efforts expended by sales representatives can be adjusted if management redefines their roles (Rao and Turner, 1975). In Shanghai and Southern China, the sales representatives who have been trained in special programs could be assigned a

supplementary selling role. For example, they could be designated "staff specialists", responsible for providing other sales personnel with selling support. Further, in addition to their sales and support responsibilities, "staff specialists" in areas with strategic importance could be assigned the role of "Key Account Manager". For example, the three key automotive customers in Shanghai could be served by a "Key Account Manager" who also acts as regional "staff specialist" and maintains his selling responsibilities for other products.

4.2.3 Establish a Dedicated Sales Team for SSC's Offerings

Another alternative, which would be a radical change in the current sales organization, would be to establish a dedicated sales team for SSC's offerings. The objective would be to increase the sales team's specialization level and, consequently, increase penetration levels. With a dedicated sales team, SSC could organize its sales force based on geographic areas, product-customer segments and, eventually, key account management. In addition, an appropriate marketing strategy for SSC's offerings could be implemented more effectively with a dedicated sales team. However, the sales coverage would likely decrease significantly, resulting in lower market coverage.

4.2.4 Establish a Dedicated Sales Team for Spindle Monitoring System

Alternatively, SKF could establish a dedicated sales team for the spindle monitoring system. The goal would be to create a highly specialized sales team with a high level of expertise. This would facilitate the business growth for this specific value added product. As a result, a tailor-made marketing strategy for the newly launched product could be more easily implemented. However, the number of sales representatives would be decreased further.

4.3 Alternative Evaluation

This section evaluates the four viable alternatives in a valuation matrix. The advantages and disadvantages of each alternative are discussed in the context of identified goals.

4.3.1 Valuation Matrix

Table 4.1 compares alternatives in a visualized valuation matrix. The weights of goals are noted as "w". "Long Run Profitability" and "Business Growth" are weighted more heavily than other goals. Each alternative receives a score on each goal based on an evaluation of how well the alternative will address the goal. A rating of 5 indicates the alternative fulfils the goal the best. Total scores for each alternative are then calculated by summing the subtotals for each goal, presenting the overall effectiveness.

Table 4.1 Alternative Evaluation

				Alt	ternativ	es		
Goals	Stat	us Quo	Mana	New agement Mix		ited Sales for SSC	Spindle	ed Sales For Monitoring ystem
Profitability	Score	Subtotal	Score	Subtotal	Score	Subtotal	Score	Subtotal
Short Run (w=2)	2	4	2	4	3	6	2	4
Long Run (w= 3) Business	3	9	4	12	2	6	3	9
Growth (w= 3) Value-added	2	6	4	9	5	15	3	9
Products (w= 2) Customer	2	4	3	6	4	8	5	10
Satisfaction (w= 2) Competence	4	8	5	10	3	6	2	4
Improvement (w= 2) Total Score	4	8 Σ39	5	10 Σ51	3	6 Σ49	3	8 Σ44

4.3.2 Discussion

Table 4.1, Alternative Evaluation, indicates that the current sales organization receives the lowest total score, primarily due to its poor performance in business growth and value-added products. However, the current sales organization achieves a relatively high score in terms of

customer satisfaction and competence improvement. The reason for the relatively high customer satisfaction score may be that customers like to have a unique contact with the company and that employees tend to have a broader scope of knowledge if they are involved in all the products from various platforms.

The "New Management Mix" alternative receives the highest overall score. This alternative's goals are to improve business growth through increasing deployment of sales skills and efforts while strengthening the advantages of customer satisfaction and employees' knowledge breadth. It is noteworthy that the "New Management Mix" alternative scores highest in long run profitability as well. This alternative, although focusing company resources on selected customers and areas, keeps the full-line sales organization and allows the organization to continue benefiting from economies of scale. The combination of specialist and generalist sales forces, if implemented successfully, benefits the organization over the long run. As sales knowledge and expertise increases by adjusting training programs, both customer satisfaction and employees' competence are presumed to increase, resulting in higher scores for these two goals. The "New Management Mix" alternative, however, does not exert a visible positive effect on short run profitability. In addition, it has limited influence on the sales growth of spindle monitoring systems due to the lack of a specialized sales force.

A dedicated sales team for SSC products ranks second among the four alternatives. The establishment of a dedicated sales team facilitates business growth significantly, as specialized skills and dedicated sales efforts are deployed on SSC's business. Consequently, it is possible for SSC to adopt a more appropriate sales organization for its offerings. For example, SSC could assign a regional sales representative for both of its offerings in Southern China and keep a sales representative responsible for the automotive industry in the Shanghai area. Further, since the sales team could be recruited from the existing experienced sales force, which would require

relatively less investment in training costs and time compared with organizing a completely new sales team, the possible negative impact and the resistance to radical change would be reduced. As a result, the dedicated sales team alternative receives the highest score for short run profitability and business growth. However, the SSC business unit apparently cannot afford a wide spread sales network that would result in shrunken market coverage. In addition, customer satisfaction would unavoidably decrease as fewer resources would be available for support and multiple contacts. Further, in this specialized organization, sales representatives would be isolated from the broader product line. This would have a negative impact on knowledge and expertise improvement. Finally, the radical change to the sales organization would prevent SSC from sharing sales expenses and other costs with its corporate parent, resulting in a relatively low score on long run profitability.

The fourth alternative, a dedicated specialized sales team for spindle monitoring systems, is completely aligned with SKF's business evolution of offering value-added products and services. Implementation of this alternative would definitely facilitate launching this value-added product. In addition, due to first mover advantages, the spindle monitoring system, once it takes off, creates higher profitability compared with traditional repair services. Nevertheless, the dedicated sales force is costly and provides limited market coverage. In addition, to some extent the alternative is risky. Indeed, if the spindle monitoring business does not grow substantially in a relatively short period of time, SSC could not afford even one independent sales representative for this specific product²⁸. Further, the alternative raises a problem in that the spindle repair business and the monitoring system business might conflict with each other because of the interfirm cannibalization between these two offerings and the homogeneous customer base. Customers could, potentially, face two groups of SKF sales representatives, each claiming a distinct

-

²⁸ Sales on spindle monitoring system were less than US\$ 28,000 in 2006, while SKF China recorded an annual average sales volume of US\$ 3.2 million per sales person.

advantage for their spindle maintenance strategies. The potential problem of brand integrity conflict for the dedicated sales team alternative results in the lowest score for customer satisfaction.

4.4 Summary of Alternatives

The above four strategic alternatives were developed based on the degree to which the organization concentrates its organizational resources on the focal business unit. In order to analyze the possible impacts of each alternative, predictions and forecasts were constructed, assuming the existence of uncertainties. Selection of an alternative requires systematic thinking that views the organization as a coherent integrated whole.

5 Recommendations

A new sales management mix, which includes incremental adjustments to the incentive plan, training program and selling role, are recommended to address the existing problems.

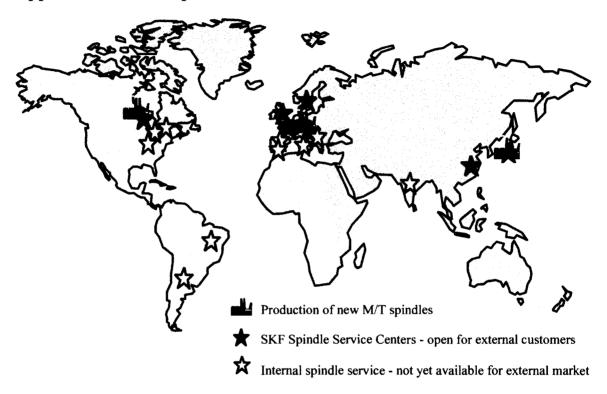
Unavoidably, the predictions and forecasts in the evaluation might be not 100% accurate. Uncertainties can come from the launch of new products, emergence of competitors, revolutionary technical developments in customers' industries, changes in political policy, and many other variables.

Moreover, a dynamic perspective is necessary. As time goes by, further adjustments or radical changes might be needed. For example, five years ago SKF China's reliability products were served by a product-specialized sales model. As the organizational expertise and experience with the products improved and the business rolled out, SKF decided to restructure the selling activities into a full-line sales organization.

Finally, the success of the recommended strategy is highly reliant on implementation quality. However, analysis and recommendations for a quality implementation strategy would require additional research.

6 Appendices

Appendix 1: SKF Spindle Service Network



Appendix 2: SSC Business Plan

	Bus	siness Plan S	SC China	a				
Assumptions:	(ksek)							
Average price per serviced spindle	15	Factory Costs: Pe	rsonnel, Add	i-on costs,	Rent, Depr	eciation, S	tart-up cos	its
Theoritical capacity & revenues		(Add-on costs:	GHQ/IME. All	ocations. S	hared Servi	ces. Shop s	upplies,	
Spindles per year & fitter	100	Serv & Util., St	&A., Gen exp)					
(Annual Sales Value per fitter)	1500	Personnel Cost	s:					
		Business L	.eader	300	5	ales Engin	eer	116
Direct cost /unit (HPB & SubC)	5	Customer	Service	97	A	ccountant		125
(Direct costs of total costs)	40%	Fitter		97				
(Profit margin at 10 000 T/O)	18%	Add-on factor:		0%	ľ	T expense/	head*	24
,		Facility rent per	vear		(increase by			
Capital employed		Start-up costs:	•		`		,	
Other than P & P (% of sales)	20%	P & P capi	tal	3000				
, ,		·	Depr/yr	10%				
			Interest	9.8%				
		Expenses		900	(500 exper	nses + 400	support)	
		Project expens	es	Plan	,		,	
Plan:					•	1 compute	r for all fitte	rs
			2004	2005	2006	2007	2008	2009
Business Leader			1	1	1		1	1
Customer Service			0	0.5	1	1	1	1
Salesmen			0.5	1	1	1	1	1
Accountant			0.2	0.2	0.25	0.25	0.5	0.5
Number of fitters			3	5	8	10	12	12
Thoeretical SSC capacity - Nr of sp	pindles		100	400	800	1000	1200	1200
Practical SSC output			80	250	500	600	800	1000
Start-up Capital investment			3000					
Start-up expenses			900					
S &A support -SKF China			8.5%	5%	4%	3.0%	3.0%	3.0%
Royalty for LM& PT			0	5.0%	5.0%	10.0%	10.0%	10.0%
Profit/Loss calculation: Costs: Direct costs			2004 394	2005 1230	2006 2460	2007 2952	2008 3936	2009 4920
Factory Costs	Relation							
Business Leader	Step		300	300	300	300	300	300
Customer Service	Step		0	48	97	97	97	97
Fitters	Capacity		290	483	772	965	1158	1158
Add-on's	Personnel Costs		0	0	0	0	0	0
Rent	Fixed		120	120	120	120	120	120
Electricity			15	47	75	90	105	131
Depreciation	Calculation		300	300	300	300	300	300
Set-up expenses	Plan		567	167	166	0	0	0
Project expenses	Plan		· · · · ·			300	400	500
Total factory costs			1592	1465	1830	2172	2480	2606
Total producion costs			1985	2695	4290	5124	6416	7526
Selling Expenses								
Sales Engineers			58	116	116	116	116	116
Travelling Exp			64	96	96	96	96	96
Administrative Expenses								
Accountant			25	25	31	31	63	63
Training Costs			19	20	25	21	25	16
IT Expenses	2		60	84	96	96	96	96
Share of Sale & Adm cos	st		102	188	300	270	360	450
S&A Expenses			327	528	664	630	755	836
Royalty to LMPT			0	188	375	900	1200	1500
Total Costs			2313	3410	5329	6654	8370	9861
<u>Sales</u>			1200	3750	7500	9000	12000	1500
201			-1113	340	2171	2347	3630	513
<u>301</u>								
Cost of Capital			316	326	358	380	395	42

Appendix 3: SSC Market and Sales Projection



Marketing and Sales Projection – Spindle Service Centre 2004-02-20 Page 1 of (9)

1 Executive summary

This document covers the marketing information for the set-up of the Spindle Service Centre in China with aspect to the overall growth in the Machine Tool Segment as well as the potential for Spindle Service Repair business provided by a SKF Spindle Service Centre located in Shanghai.

Today SKF Service Centre (named ISC in the rest of this document) located Shanghai focuses on a broad range of RS services. The emphasis of the ISC is to build long-term contracts and relationship with key customers to manage a consistently cumulative business. Presently the service is focused on machine condition monitoring and the ISC has no facilities for mechanical service jobs. The purpose of the Spindle Service Centre is to develop high processional mechanical service repairs and refurbishments of machine tool spindles that will give good synergies of the current operation and strengthen SKF's position to a very fast growth on the automotive and machine tool market in China.

The aim is to utilize the experiences gained in the Global Spindle Service Network to achieve the best synergies and leverage of SKF's global expertises in the area of machine spindle repair and refurbishment.

The Spindle Service Centre is intended to be the first phase of an expansion of the services SKF can provide to the Chinese Market. It is planned to be located in the ISC's current facilities in Shanghai, Waigaoqiao – Free Trade Zone. From Shanghai it is assumed that approximately 25% of the fast growing Chinese Machine Tool market could be served. Once this Centre is proven a success there might well be multiple Centres to keep the closeness to the customers developed in China.

2 Business Concept

As world leader of rolling bearings, SKF is operating more than 5000 Machine Tools worldwide. Thanks to SKF's in-depth knowledge of high precision bearing technology and spindle engineering, SKF has the necessary expertise for reconditioning machine tool spindles of all kinds used in a wide range of applications and industries. SKF is reconditioning and upgrading more than 6000 spindles yearly in its 9 state of the art Service centres all over the world.

The demands of machine tool spindle repair in the Chinese market increases fast, it is necessary to establish a spindle service centres to support these demands. SKF has 9 spindle service centres with same standards, procedures and quality; the business concept is to duplicate the set-up in the new spindle service centre in china. Through this Spindle service centre, SKF will be able to:

- Provide a spindle repair service which is not presently available in Chinese market.
- Save our customers time and money.
- Increase our customers' asset efficiency and productivity.
- Provide an alternative, cost effective way for our customers to realize a similar goal.

By adding these capabilities SKF will strengthen the position in the Machine Tool market for added services and solutions.

77



3 Background

Currently, main owners of imported machine tools such as machining centres, milling, grinding and turning machines are automotive companies and general machinery companies. The normal procedure for their machine spindle repairing is that once a problem is raised concerning the spindles, the owner will request the OEM of the machine tool to repair the problem spindles. Normally these spindles will be sent overseas, sometimes even in an illegal way. Using this method the price for repairing is high, it is a long delivery time and the customs are an evident risk.

Therefore SKF has a great opportunity to set-up a high precision spindle repair facilities in China, which can meet the requirement of these customers. Through our global support network description of the facilities, standard procedures, required tools and quality standards are incorporated and SKF China will be able to get up to speed with the services within 6 months

Also the market for this type of service increases with about 15% per annual in connection to the Chinese economical development.

4 Machine Tool Market Growth

China has been the biggest consumptions of machine tools (机床) in the world.

- In 2002, 232,000 units of machine tools, of which high precision CNC machine tools were 24,800 units, were produced in China.
- In 2002, the consumption of machine tools was US\$5.9 billion. Imported machine tools represented US\$3.15 billion. In 2003, the production value of the first 5 months increase by 31.5% as comparing with the periods of 2002.
- It is a growing trend of the demand for high precision CNC machines in China. In 2005, CNC machine tools will represent 50% of the machine tools market values whilst it only represented 10.69% in 2002, 2% in 1999.
- Local CNC machine tools are only in the low-end, small machine market. But they
 deploy import components including spindles.
- The consumption of machine tools relates directly with fixed assets investment and the
 performance of automotives, aerospace, power station equipments, ships and other
 heavy industry.
- According to the past statistics, the consumption of machine tools increase by CNY 0.08-0.11 billion for every CNY 10 billion of fixed assets investments. It is envisaged that the fixed assets investments of 2003 will be CNY 5000 billion or machine tools consumption will be CNY 55 billion (grow by 20%)
- In 2003, it is envisaged that the demand for cars will be 4.2 million units or grow by 25%. It is estimated by experts that the CNC machines market increase by 0.54% for the increase of small cars by 1%. In 2003, the CNC machine tools demands increase by more than 40%.
- Since the high end CNC machine market grows at higher paces and have bigger
 market shares in the machine tools market, the import of the CNC machine tools will
 increase until the local production of high quality CNC machine tools can pick up.

The machine tools industry is at the beginning phases and the growth rate for the next 3-5 years is expected to grow annually by 15%.



It is developed a model to study the demand for the spindle service services basing on the following assumptions:

- only the import CNC machine tools will be our target customers;
- assume that every CNC machine tool will have 2 spindles;
- assume that each CNC machine tool will work for 3 years and each spindle will be repaired twice every year.
- assume that each CNC machine tool amounts to US\$100,000.

The import CNC machine tools in 2002 were 32,000 units. Accordingly, the spindles available in market increase by 32,000*2*2=128,000 units.

In 2003, CNC machine tools expected to increase by 40%. Spindles increase by 32,000*2*2*1.4=179,200 units. The total spindles in the market are expected to be 407,000 units.

If we use 1,000 units to be repaired (2009 target) by our center, it represents 0.3% of the market shares of 2003

We do not have the market figures for the Shanghai, Zhejiang and Jiangsu areas. However, it is statistically reported that 16,000 units (or 64.5% of local CNC machine tools) of low-end CNC machine tools are expected to be demanded in 2003 for the private-owned enterprises in the Zhejiang, Jiangsu and Guangdong areas.

Accordingly, it is prudent to expect that 1/3 of the 407,000 units will be in the Shanghai, Zhejiang and Jiangsu area. Or our market shares will increase to 0.9%.

** Data is reproduced from www.chinacuttings.com

5 Marketing Survey

In order to in depth understand the demand of the potential customers that could be served from a Spindle Service Centre in Shanghai a marketing survey was conducted. The main focus industries in this marketing survey were, the automotive industry and the general machinery industry. During the survey the form in Enclosure B was used and the SKF brochure 5352E "Professional reconditioning of Machine Tool spindles" was presented to these customers.

In general the customers were seeking a partner for machine spindle repairs and there should be a good potential to gain several long-term co-operations in this kind of repair/refurbishment business.

The next page presents the results of the marketing research report in a consolidated form based on the visited customers.



Marketing and Sales Projection – Spindle Service Centre 2004-02-20

Marketing Research Report

Company Name	Location	Industry	Products		Spindle	Spindle	Annual repairing	Overseas Local repairing repair	Overseas Local repairing repairing	Feedback
			collings	Machine tools brands/type	brands/type quantity Quantity unit	Junent	Vuannik	unit	Tiun I	
Corning (Shanghai)	Shanahai	Changhai Autamoture		Cutting machines	-Nc	φ	٠,	2	5	3 spindles will be asked to be
Co., Ltd.	्राप्ता है गा व	a violent		comme macana	Setco	m	,	:		repaired after SSC is setup.
										We are asked to repair whole
					:				-	machine tools with rapid
Namerica FIAT Auto				Huller/Leadwell/Makino	Belt				Bering	response and on site.
Contract 14d	Nanjmg	Nanjing Automotive	Engine			n/a	20-30	n'a		They normally myste public
									200	bidding. And Beijing DeBao
					Hydro					is a qualified supplier for
					statical					them.
										We are asked to repair whole
										machine tools with rapid
NAVECO Engine				Gamfier	Motorized				:	response and on site.
Branch Company	Nanjing	Automotive	Engine			40	E/II	व	Beijing D.D.	Beijing DeBao have got some
NAVECO Ltd.)		Hydro				CEGGO	machine tools repairing
				Grinding/Milling	statical					contracts from NAVECO.
										They have one subcontractor
Naujing High Speed	N 25000	General	(searthown:		6)6	6	Ç	5		to repair spindles. The name
Gearbox	Smitter	Machinery	Court Coves		3 1	=	?	\$ ‡	<u>}</u>	of the company is not
				HOFLER/NILES/LIEBHERR						disclosed.
								Some	They have	They have IV supplier of Machine tool -
Www. Discol	117,000	Amtagasatura	Automorphical Disease and metab	_		S	7.0	machine		DaLian RiPing will replace
Dept Dieses		2.110	אוכאבו בחקיווב			}		tools are	precision	precision their spindles in 18 CNC
				Heller machining center				ın	repairing	repairing which have design problems.



Marketing and Sales Projection – Spindle Service Centre 2004-02-20

The customer is willing to get technical support to upgrade/redesign their spindlesfor their JV made machine tools.	There are 20 spindles with 100000 rpm speed. They need be repaired annually.	The customer worry about our capacity to repair these spindles.		The service lives of repaued spindles become shorter and shorter.		There are at least 32 sets of Grob CNC purchased in 1998.		The customer requested SKF to repair their 2 spindles immediately
ream.		i	yes/but	satisfied	n/a	8,व		
warranty team period.	8781	<u> </u>		e H	yes	B)CI		
		3	Ç.,	7	в/u	8/11		
	ţ	†	च	Ę	20	28		
Hydro	Motorized		Motorized	Junker/Weiss				
Saimp/IV RiPing	UVA		JUNKER/SAMAG/ALFING Motorized	GROB CNC	Mitsubishi-Machining center/HOFLER	GROB CNC		
	Oil pump for	Amomonye diesel engine		भारतेषद	Gearboxes	Engine	Plastic machinery	Gimbals, bearing unit for car. etc
		Amontonia.		Aviomonics.	Hangzhou Machinery	Shanghai Automotive	Масипету	Automotive
	·	EXTENSION OF THE PROPERTY OF T	7	Sustant	Hangzhou	Shanghai	Ningbo	Hangzhou
	2 444	discreption were	Shanghai VW Engine	Plant	Hangzhou Advance Gearbox	Shanghai GM	Ningbo HaiTian Group	Hangzhou WanXiang Hangzhou Automotive bearing unit Group



5.1 Feedback areas

1. Customer Demand

The main demands of these companies for spindle service centre are:

- Rapid response
- Reasonable repair price
- Short delivery time
- High repair quality
- On-site work and ensuring the operation accuracy of the whole machine tool

2. Current Spindle Repair Channel

Spindle repair channel for these companies is not clearly identified, especially for high complex and high frequency motorized spindles. Normally these companies will request machine tool agent to arrange to send damaged spindles to OEM overseas to conduct the repairs.

3. Current Machine Tool Supplier

The main Machine Tool suppliers for these visited companies in these two industries are using imported machine spindles, brands such as: Grob, UVA, Hofler, Mitsubishi, Gamflor, Huller, Leadwell, Makino, Setco, etc. SKF Global Spindle Service Network have experienced on spindles repair for these brands.

4. Price Expectations

It is quite sensitive for the customers to discuss this topic and not as good information was achieved, however an average repairing price of TRMB 15 was estimated as an average, and also used in the sales projection.

5. Quality Requirements

OEM overseas normally repairs high complex and high frequency spindles currently, so the quality issue is not concerned. But if these spindles are repaired locally, the repair capacity and quality are the basic and important issues.

6. Additional Information

In the market survey it was found that Beijing DeBao company, is a machine tools repairing service supplier in the market. Mainly this company is focusing on the repairing of whole machine tools, and not only the machine tool spindle. DeBao has got a few contracts from Nanjing FIAT and NAVECO through bidding procedure. It seems that their repairing quality is acceptable and they have already established good relationship with these two customers.

The other issue is that a lot of machine tools are newly imported and under warranty period. Normally if there is any problem concerning spindles, the end user will requested OEM overseas to repair them, sometimes it will be free of charge. In the survey limited information about other spindle repair players in the market was found, especially for joint-venture spindle manufacturer and some bearing institutes, further investigations will be conducted to gain this information.



Marketing and Sales Projection – Spindle Service Centre 2004-02-20 Page 7 of (9)

6 Sales Projection Based on Marketing Survey

Sales Projection SCC - SH

Potential Market Total Machine Tools Market High Complexity Design (CNC Machines)	Units 232000 24800									
High Complexity Design	Y 2004	Y 2005	Y 2006	2002 X	Y 2008	Y 2009	Y 2010	Y 2011	X 2012	Y 2013
5H VW - 26 High Complexed Spindles Wuxi Wei Fu - 20 High Complexed Spindles	ግ ሃሳ	» S	ជន	2 8	2 8	2 2	C 8	2 8	2 8	2 2
Shanghai GM - 32 High Complexed Spindles	7	Ø	5	13	b^1	15	5	15	5	15
Yantai GM - 20 High Complexed Spindles	٥	'n	01	10	10	10	01	10	0	10
Total 98 High Complexed Spindles	o,	~	90	99	90	09	90	99	90	99
SKF Sales Projection, repair work price in average TRMB 15	123	502	1,153	1,372	1,634	1,949	2,327	2.780	3,324	3,977
SSC in SH area could cover about 25% of the total Chinese market	31	125	288	343	409	487	582	695	831	994
Estimated Market Units that require repair 20% per year	1,240	1,488	1,786	2,143	2,571	3,086	3,703	4,443	5,332	6,398
Assumed SKF Sales Value	461	1.881	4,325	5,145	6.128	7,309	8,726	10,426	12,466	14,915
Humand Resource	Time Consumption	sumption								
Time Estimation for repair service based on 40 hours per repair job.	1,229	5,017	11,532	13,719	16,342	19,491	23,269	27,803	33,244	39,772
Human Rescuce based on 2000 working hours and a utalization of 70%	•	-1	ø	10	12	#	provide [~~	20	24	28



Enclosure B

Spindle Service Questionnaire 主轴维修问卷

1.0 General Information/=	一般信息:	
Date/日期:		
Company name/公司名称:		
Location of company/公司:	地址:	
Contact person/联系人:	Title	/职位:
		/职位:
	Title	/职位:
		••••••••••••
Internet/Email address互联	网/电邮地址:	
Type of industry primarily:	involved in/所属行业:	
Type of primary products n	pade/主要产品:	
		s/No* Name
AL IS NOW! I HAY I SALES IN SEC	191 · AEA 1 · AT 1991 · · · ·	
2.0 Required Information/	所需信息.	
		From Mildright Wells.
		上产的机床数量:
		上产时间 hours/小时
		sured in tomage/currency/吨/货币
Overseas/#FT		
		many and when it is imported:
_		-
如是进口机床,选择供应	商并指明机床种类、数	量和使用年份:
Berthiez	Harding	Nikon
Bridgeport	Haas	OKK
Cincinnati Mil.	Hatchi Seiki	Okuma
Colonial	Huller	Om/ai
Cometa	IBAG	Pope
Enshu	Leadwell	Reinecker
Fade	Makino	Setco
Gamfior	Matsura	Shin Nigon Kati
Gildimeister	Mazak	Struder
SKF Precision Technologies	Micromatic	Takisan
Gleason	Mitsubishi	Terra Pak
GMN	Modia	Toshiba
Grishaber	Monarch	Weiss
Grosite	Mori Seiki	

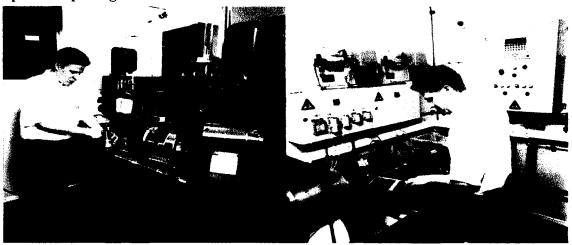


Marketing and Sales Projection – Spindle Service Centre 2004-02-20 Page 9 of (9)

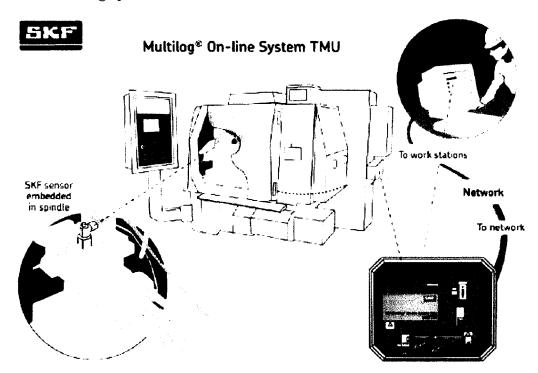
Other brands, please specify/其他品牌,请指明: Spindle types/主轴类型:
Running speed/运转速度: max/最大 min/最小 Historical average service life of new spindle/新主轴平均寿命: Historical average service life of repaired spindle/修复主轴平均寿命: Quantity of annual spindle repairing/年主轴维修数量: Current repairing channels/目前维修渠道: local/国内 overseas/国外 and where/何地 Name of local spindle repairing unit/国内维修单位:
Name of foreign spindle repairing unit/国外维修单位:
Any contracts with suppliers at the moment?/目前与供应商/维修单位有无合同? Delivery time/交货周期: local/国内 overseas/国外 How many stock for spindles/主轴库存: Stock value/库存价值: Average annual cost of keeping stock/年度库存平均成本: (15%?) Spare parts supplier/各件供应商: Spindle price/主轴价格: local/国产 overseas/进口 Actual repairing price/实际维修价格: local/国内 overseas (including transportation fee)/国外(含运费) Expected repairing price/期望维修价格: Annually purchased new spindles/年新主轴购买量: Quality requirement/质量要求:
Complex technology demand/主轴复杂性: high/高 average/中 low/低 Pattern of spindle failure/主轴失效模式:
Impact of spindle failure/主轴失效影响:
What is the average cost of Downtime / hour? /每小时主轴失效损失: Average production value per machine tool/每台机床平均产值: Any predictive maintenance program for spindle/有无主轴预测维修计划:
Customer's expectation for repairing spindles locally—price, delivery time, quality, etc.: 客户对主轴维修本地化的期望—价格,变货期和质量等
Any specifications/manuals of spindles available? /有无上轴详细说明/手册?

Appendix 4: SSC's Offerings

Spindle Repairing Services



Spindle Monitoring Systems



Appendix 5: Geographic Sales Team Scorecard

Key Ta	rgets - Shareholder Perspective		ssue No. 1/2005081
	Issue No. 1/2005081		Achievemen
1)	Total net sales 2005 (yearly total): 24.5 MUSD		
	- AFM-D net sales: 8.4 MUSD		
	- AFM-E net sales: 5.3 MUSD		
	- OEM-I net sales: 8.3 MUSD		
	- OEM-E net sales: 1.3 MUSD		
2)	New Product / Service Sales : 1.25 MUSD		
3)	Average monthly Order Intake (yearly average): 2.63 MUSD		
4)	Selling Price Level (Yearly Avarage): 165		
5)	Average A/R days and overdue $\%$ (yearly average): 28 days and 8 $\%$		
6)	Average stock days and surplus % (yearly average): 44.5 days and 14%		
Targets	Company Key Activities	PIC	Date
1-6)	a. Strategic account management via cross functional competences	<u> </u>	Q1-Q4 2005
	b. Global account management		Q1-Q4 2005
	Improved sales productivity and proactiveness through coaching, c. expanded customer contacts (width and level) and closer follow up of project businesses		Q1-Q4 2005
	d. Implement customer validation process		Q1-Q4 2005
	e. Regular review with segment team for improvement needs		Q1-Q4 2005
	f. Regular review A/R and held stock		Q1-Q4 2005
Кеу Та	rgets - Employee Perspective		Issue No. 1/2005081
		keview 02	Achieveme

Кеу Та	rge	ets - Customer Perspective	:	Issue No. 1/20050819
			Review Q2	Achievement
1)		hnical complaint handling lead time from received to PER < ND : 70%		
2)		d >3 product or service knowledge training/seminars to top ey accounts		
3)	App	lication engineering project : 2 per sales engineer		
4)	Hole	d >2 new catalogues launch seminars		
5)	<u>≥</u> 5°	% sales turnover from new accounts business development		
6)	_	% sales turnover from new product / service sales to ting or new customers		
Targets		Company Key Activities	PIC	Date
1)	a	Review monthly report to monitor the effectiveness of complaint handling		
	b	Enhance staff competence in handling customer complaints with quality & speed		
2)	a	Provide product and service training or seminar to specific accounts		
3)	а	Record, share and review application engineering project proposal & result generated for customer & SKF.		
4)	a	Organise customer gathering campaign to launch new Catalogue GC 5000, skf.com.cn & SKF new identity		
5-6)	a	Spend 1/3 time to new customer prospecting & new product promotion		

Key Ta	rgets - Process Perspective		Issue No. 1/20050819
		Review Q2	Achievement
1)	IQA score :		
2)	CAR - No. of recurred CAR within two years (yearly total): 0 Completion according to the 1st planned review date (yearly total): Increase 20% from 2004 actual Completion of outstanding CAR/PAR brought forward (yearly total): 100%		
Targets		PIC	Date
1)	a. Perform self audit to ensure effective implementation		Q1-Q4 2005
2)	a. Review monthly report to monitor the progress of CAR implementation		Q1-Q4 2005

Appendix 6: 2005 Vehicle Output in China

	Easte	rn China		China
Thousand, Units	Units	Percentage	Units	Growth Rate
Car	964.10	32.6%	2,958.4	26.9%
Motorcycle	4,022.50	23.6%	17,020.40	16.4%
Truck	194.10	10.2%	1,911.10	0.9%
Total	5,182.70	23.7%	21,889.90	10.8%

Data Sources: National Bureau of Statistics of China, 2007. Eastern China includes Shanghai City, Jiangsu, Zhejiang and Anhui provinces.

7 Reference List

- Boardman, A. E. & Vining, A.R. (1996). Defining Your Business Using Product-Customer Matrices. Long Range Planning, Vol.29, No.1, pp.38 to 48.
- Booz, Allen & Hamilton, H. (1982). New Product Management for the 1980's, New York: Booz, Allen and Hamilton, Inc.
- Gardner Publication Inc., (2007). 2007 World Machine Tool Output and Consumption Survey. Retrieved Feb 22, 2007, from Gardner Publication Inc. Web site: http://www.gardnerweb.com/consump/survey.html.
- Kim, W.C. & Mauborgne, R. (2002). Charting Your Company's Future, Harvard Business Review.
- Meredith, L. (2005). A Diagrammatical Template for Business Market Demand Estimation, Industrial Marketing Management.
- Mintzberg, H. (1981). Organization Design: Fashion or Fit? Harvard Business Review
- Moore, Geoffrey A. (2002). Crossing the Chasm, Harper Business Essential.
- National Bureau of Statistics of China, (2007), Retrieved Feb 15, 2007, from National Bureau of Statistics of China Web site: http://www.stats.gov.cn/tjsj/qtsj/qcmtccl/t20051124 402303161.htm.
- Porter, M.E. (1980). Competitive Strategy: Techniques for Analyzing Industries and Competitors, New York: Free Press, 1980.
- Rangaswamy, A., Sinha, P. & Zoltners, A.(1990). An Integrated Model-Based Approach for Sales Force Structure, Marketing Science Vol. 9. No.4, Fall 1990
- Rao, R.C. & Turner, R. (1984). Organization and Effectiveness of the Multiple-Product Salesforce, Journal of Personal Selling & Sales Management, May, 1984, pp.24 to 30.
- Wotruba, T. R. & Rochford, L. (1995). The Impact of New Product Introductions on Sales Management Strategy, Journal of Personal Selling & Sales Management, Volume XV, Number 1 (Winter 1995), pp.35 to 51.