De-commoditizing the Commercial Jet Engine Business

by

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ABSTRACT

This thesis project is a comprehensive application of the Delta Model at a major jet engine manufacturer. It will assess and contrast customer segmentation and customer value proposition via primary research. It will also assess and contrast the current and future state "bundle of competencies" within the firm. Utilizing the frameworks of the Delta Model, we will then define the mission of the business and the strategic agenda. Once these are understood we will determine the strategic agenda for customer targeting to determine how we attract and delight the best customers. And finally, this paper will assess the operational effectiveness of the firm to determine an agenda for improvement.

This analysis will be done utilizing the Delta Model's three strategic options and eight strategic positions.

- Best Product:
  - Low Cost ... what does it take to become the low-cost producer?
  - Differentiation... what differentiates in the market and is it enough to demand price premiums?
  - Total Customer Solution:
  - Customer Integration... have customer performed activities been assessed for integration? Can scale, technology, information systems and/or other innovations and competencies be leveraged to provide solutions that will enhance customer economics?
  - Customer Relationship... has the customer base been properly segmented in order to define differentiated treatment of customer tiers?
  - Horizontal Breadth... is revenue opportunities maximized at each customer tier by offering a complete set of product and services?
  - System Lock-in:
  - Exclusive Channel... is their barriers in place that makes it difficult for competitors to complete for the acquisition of customers?
  - Dominant Exchange... is their appropriate interface between Buyers and Sellers and is that interface difficult to displace?
  - Proprietary Standard... is proprietary standard possible in this industry?

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De-commoditizing the Commercial Jet Engine Business
Introduction

Introduction

The large commercial jet engine business is dominated by three companies, Rolls Royce, General Electric and Pratt & Whitney, that serves more than one thousand customers world-wide. Over time these customers have attempted to commoditize the commercial engine business. There argument is simple: the engines look alike, perform alike and cost about the same. The three companies all execute to similar levels of low performance and each offers similar customer support. Many customers believe the similarities are so telling that there is no need to compete on anything but price; hence, they are a commodity. And there in lies the opportunity. Commercial jet engine manufacturing is the quintessential producer goods industry. A huge amount of capital is required just to enter and then again to remain technologically competitive. So it is largely unlikely that any new competition will enter any time soon and the competitors you have are undifferentiated! It is time to seize the moment and it begins with a customer centric framework... the Delta Model!

The Delta model encompasses a set of frameworks, methodologies, metrics and tools that facilitate the development and subsequent implementation of winning business strategies. If properly followed, the Delta Model can de-commoditize everything soft drinks to toilet paper to computers and cars. The process is customer centric and forces management to understand existing and desired competencies. It helps develop a mission and strategic agenda that will align functional groups around a few key strategic thrusts. It organizes the process of customer targeting and assesses operational effectiveness, innovation and technological advantages. It is a comprehensive framework that will teach even the most senior executive elements of the business that were thought to be known. And it all starts with customer segmentation.

De-commoditizing the Commercial Jet Engine Business
Customer Segmentation and Customer Value Proposition

Customer Segmentation and value proposition

Customer Segmentation:

To effectively segregate customers in the Large Commercial Engine (LCE) business, we will establish five customer tiers. Each tier represents a differing level of customer bonding that closely correlates with the strategic positions on the Delta Model. For example Tier one customer's align with "system lock-in" while Tier five customers align exclusively with the low-cost position.

The Customer Value Proposition:

At a very basic level, Air framers make money by building and selling air planes. Airlines make money by flying people on those planes from point A to point B. At a high level it is just that simple. Over the years the value proposition has been encumbered with business distractions that focus executive attention away from the primary value creation to manage elements of the business that are not necessarily aligned to fundamental value creation. For example, most legacy airlines have vertically integrated up and down the supply chain to run businesses that have little to do with moving people. Large airlines often have their own propulsion overhaul units that employ significant technical and systems capabilities, but usually duplicate that of their supply chain. This "duplication" is ultimately funded by the end-users, the airlines, in terms of higher pricing from their suppliers and substantial overhead within their own operation.

In the past decade their have been a number of new start-ups that began operation utilizing a leaner business model. South West and Jet Blue are examples of airlines that started with a simple value proposition in mind. They did not encumber their operations with overhaul facilities; in fact in many cases they did not even own the planes. At the outset, these companies penned leasing deals for one kind of plane, with one type of propulsion system and

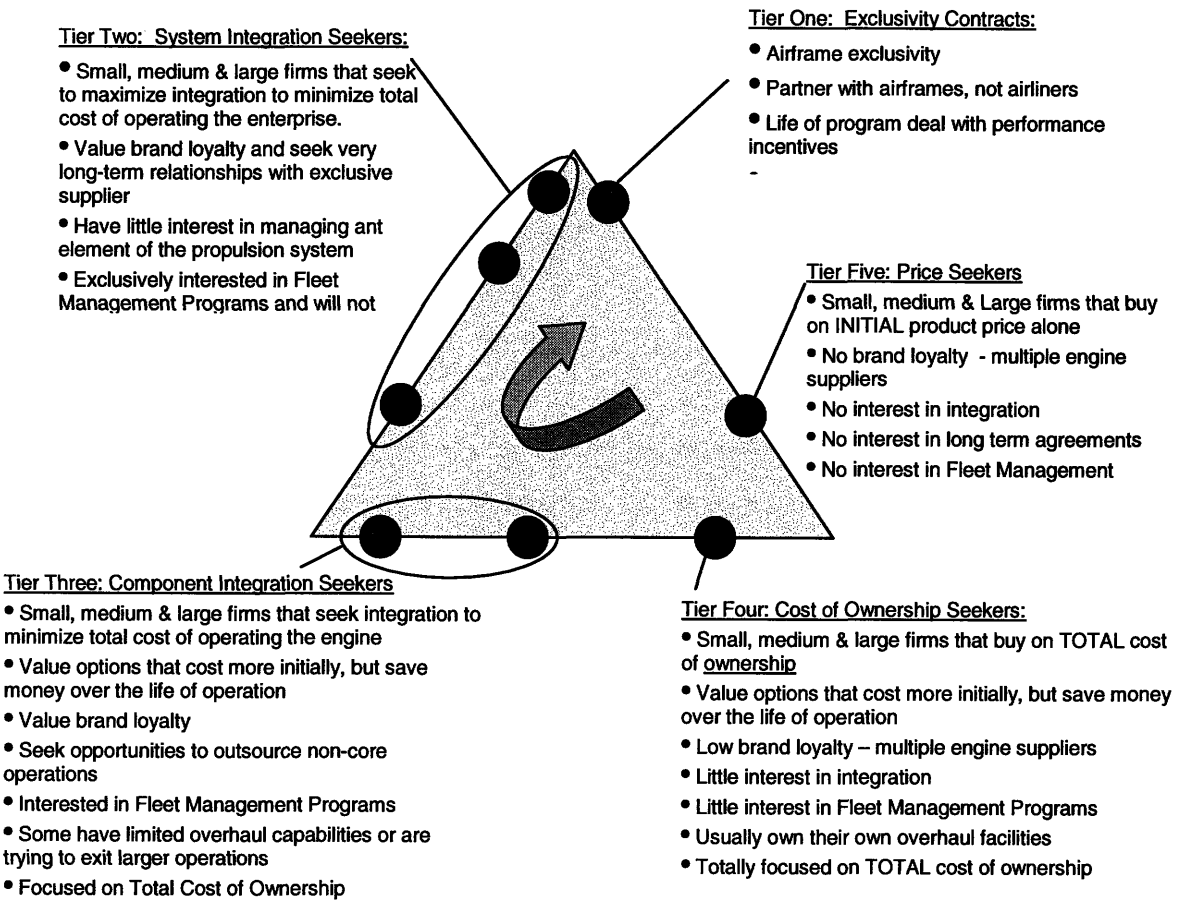
signed fleet management deals that leveraged their supply bases existing capability to service the engines. In turn, the additional volume reduced their suppliers overhead allowing them to achieve better pricing on the lease deals.

Over time it is likely that the entire industry will migrate to a similar business model and the propulsion company that can best increase the value proposition for the air lines and air frames will emerge victorious.

The value offering is straight forward. Change the customer experience by managing every aspect of the propulsion system - from order entry to overhaul and repair services. Require customers to carry minimal overhead in support of the propulsion system and focus their management effort on people moving, point A to point B. Provide IT solutions that monitor propulsion characteristics in flight and manage the scheduling of maintenance intervals. Provide tarmac services such as on-wing engine washing and point inspections and provide an on-site inventory of spare parts to manage the unpredictable maintenance issues.

Of course, not all customers are created equal and some are more willing than others to integrate with their supply base. To that end, we will create a uniquely specific value proposition for each customer tier:

Figure One: The Five Tiers of Customer Segmentation



Tier Five: Price Seekers

Business Dimension:

Tier Five customers are small, medium and large airline or leasing firms that buy almost exclusively on *initial* product price. They are solidly anchored at the "low cost" strategic position. They have no brand loyalty and usually do business with multiple engine or component producers. They are usually disinterested in long-term agreements and have little desire to establish more comprehensive relationships with the supply base. Tier five customers usually have their own overhaul facilities (if required) and seek to control more of the overall supply chain. They are also more focused on initial price than cost of ownership. Even if a higher price product can offer more value in the longer term, tier five customers opt for a shorter term focus to preserve cash flows and improve now-term profitability. Tier five customers are generally not interested in bolt-on aftermarket kits that are designed to improve the overall operating cost of the propulsion system. Examples of Tier Five customers may

include those legacy airlines that are in, or on the verge of entering chapter eleven or small "one-off" customers that are loyal to another brand, but buy a single service from you.

Figure Two: Business Dimension for Tier Five - Price Seekers

Customer Dimension	Customer Tier: Five
Products	Standard engine offering at low cost, low margin. Spare sales at full margin
Services	Overhaul and repair functions on T&M contract offering
Customers	Small, medium and large firms that buy on initial price only
Channels	Direct and some limited distributors for out of production spares
End Users	Air line customers and cargo transports
Complementors	Low cost producers in emerging markets
Unique Competencies	OEMMRO

Value Proposition:

Tier five customers are the least desirable category to do business with, but they are extremely important for two reasons. First, they generate revenue. And though they might have no desire to further integrate with your business they are a source of profit that needs to be nurtured. Secondly, Tier Five customers can migrate down the tier levels as their business condition change. But for now they are squarely anchored on the "Low Cost" strategic position and that is exactly what you need to give them...low cost, high quality and on-time delivery. And not just on your own product. If every customer in the world has multiple engine brands in their fleet, you must develop and deliver spare parts for each of those engines...flawlessly and for less cost than your competitors. Their "customer experience" has to be defined by "flawless execution" across their entire fleet!

It begins with ease of order as the customer selects one of several communication options. The "person-to-person" option is eased by a clear point-of-contact who is easy to reach, prompt and knowledgeable. The more automated channel is an on-line network that can process an order

with a few clicks of the mouse and return instant information on price and availability. After the order is processed the customer receives periodic electronic updates on the delivery status. In addition, they are immediately notified on shipment and offered the opportunity to take an on-line customer satisfaction survey that will net them a real-time price break on the order. If problems arise with the delivery, they are afforded several channels to inquire on the issue or request help. Once again these channels include the human point-of-contact option as well as an automated on-line network.

Figure Three: Value Proposition for Tier Five – Price Seekers

Customer Tier Five	Value Proposition Elements	
Set of experiences we will provide to the tier	Low cost product Very good tactical execution Advanced technology solutions	Automated order & tracking Clear POC at OEM
Set of value delivery systems needed to provide the Experiences	Lower cost sourcing strategy Improved execution Re-organization of customer service organization	
Value appropriation	**Value gained by customer:** Recurring overhead reduction Margin expansion Less operating disruptions Increased Revenue **Value Gained by us:** Increased revenue Increased profitability Opportunity to move customers to lower tiers Low-cost sourcing network International offset opportunities **Value Gained by both:** Increased revenue Increased margins Cost Competitiveness	International partnerships

Challenges:

The challenge in doing business in Tier Five is it is a highly competitive non-differentiated market sector that competes almost exclusively on original price. This is where you are competing commodities. It is important to compete however, because many Tier Five customers migrate towards Tier Four over time.

Tier Four: Cost of Ownership Seekers

Business Dimension:

Tier Four customers are those small, medium and large airline or leasing firms that buy on total cost of ownership. They tend to be centered on the "best product" position and straddle differentiation and low-cost strategic positions. Low cost is still their primary focus, but they tend to take a longer-term view on investment. For example, these customers value technological advancements that will improve fuel burn and emissions even at premium prices, as long as the long-term cost of ownership improves. There is some customer bonding, but these customers value cost of ownership more than brand loyalty. They usually do business with multiple engine and part producers as they tend to "bond" with suppliers that deliver recurring cost reductions. However, they move quickly to another supplier if there is an opportunity to save money. They have little interest in supply chain integration or Fleet Management Programs and similar to Tier Five customers, they usually own their own overhaul facilities.

Figure Four: Business Dimension for Tier Four – Cost of Ownership Seekers

Customer Dimension	Customer Tier: Four
Products	Standard engine offering at low cost, low margin. **Product upgrades to enhance fuel burn, emissions and noise** Spare sales at full margin
Services	Overhaul and repair functions on T&M contract offering
Customers	Small, medium and large firms that buy on total cost of ownership
Channels	Direct and some limited distributors for out of production spares
End Users	Air line customers and cargo transports
Complementors	Low cost producers in emerging markets Partner Companies with differentiating technology

Unique Competencies	OEMMRO

Value Proposition:

Tier four customers have begun the migration towards the "Total Customer Solutions" strategic position so it is critically important to show them a customer experience that becomes a discriminating factor in their decision making processes. We already know the importance of execution and doing what you say you are going to do across their entire fleet. What's different about this experience is your service goes beyond inexpensive product delivery and leverages technological solutions to deliver a lower cost ownership. It is in this strategic position that we have a customer that is willing to pay premiums for "bolt-on" solutions that "keep the fleet flying". It is here that a customer is interested in hearing about innovative ways to improve fuel burn, emissions, noise and product life through sound investment in new or improved products. So in addition to flawless execution at the low price position, this experienced is marked by bonding that takes place between technically oriented sales groups. The experience begins with the same ease of order and product tracking, customer service and follow-up, but here the follow-up is the critical discriminator. Here a customer is met with a knowledgeable sales force that understands the competitive nature of their business and has a briefcase full of solutions that will enhance their competitive position in the industry.

Figure Five: Value Proposition for Tier Four – Cost of Ownership Seekers:

Customer Tier Four	Value Proposition Elements	
Set of experiences we will provide to the tier	Low cost product Very good tactical execution Advanced technology solutions Low cost upgrades	Automated order & tracking Clear POC at OEM Bolt-on options for cost and performance improvement
Set of value delivery systems needed to provide the Experiences	Lower cost sourcing strategy Improved execution Re-organization of customer service organization	
Value appropriation	**Value gained by customer:** Recurring overhead reduction Margin expansion Less operating disruptions Increased Revenue **Value Gained by us:** Increased revenue Increased profitability	International partnerships

	Opportunity to move customers to lower tiers Low-cost sourcing network International offset opportunities **Value Gained by both:** Increased revenue Increased margins Cost Competitiveness

Challenge:

Tier four challenges are similar to that of Tier Five, but here one can begin the process of differentiation. The challenge is to develop technology that can in fact deliver a measurable performance enhancement that customers are willing to pay a premium for. Execution is also a critical differentiator as well. To date no company has been able to achieve and maintain differentiating performance in execution. That is because a jet engine is a highly complex system that is difficult to manufacture.

Tier Three: Component Integration Seekers

Business Dimension:

Tier Three customers are small, medium and large air line firms that are more centered around the "Total Customer Solutions" position on the Delta Model. Air framers could potentially fall into a Tier Three positions as well. Profitability is, of course, their primary focus, but they seek some integration with their suppliers in order to minimize the total cost of operating the engine. *Total* cost of ownership is their strategic thrust and they are generally open to any discussion that will improve their overall business. They are willing to invest up-front capital or pay a premium for goods and services that deliver longer-term cost reduction. These customers are generally loyal to a brand, but they usually do business with multiple suppliers in the interest of optimizing value. They do in fact value credible relationships throughout the supply chain, as long as they consistently deliver low cost solutions and improve their company's competitive posture. They seek opportunities to outsource non-core operations wherever legally applicable and economically feasible. However, they are often encumbered by legacy labor contracts.

Figure Six: Business Dimension for Tier Three - Component Integration Seekers

Customer Dimension	Customer Tier: Three
Products	Standard engine offering at low cost, low margin. Product upgrades to enhance fuel burn, emissions and noise Spare sales at full margin
Services	Overhaul and repair functions on T&M contract offering
Customers	Small, medium and large firms that buy on total cost of ownership
Channels	Direct and some limited distributors for out of production spares
End Users	Air line customers and cargo transports
Complementors	Partner suppliers
Unique Competencies	GMS

Value Proposition:

The relationship with Tier three customers is more involved and requires more sophisticated solutions. These are customers that migrated from "best product" to "total customer solutions" and in doing so have become more integrated and more dependent on their supply base. Their "customer experience" is also defined by low cost flawless execution from a low cost supplier who is integrated into the core of the business. The two companies have integrated information technology to jointly manage the propulsion fleet. Service bulletins, unscheduled maintenance as well as service intervals are all managed in near automatic mode by a supplier with aligned objectives. The same supplier plans spare parts inventory levels based on critical operating parameters and automatically re-stocks when minimum levels are reached. Customer representatives are integrated into the business and reside on-site to manage the propulsion element of the business. These customer representatives are technically oriented people that have an enhanced understanding of the customer's competitive position within the industry and continually offer technical and business solutions in support of increased customer profitability. Performance metrics are reviewed frequently and issues are resolved with expedience and professionalism.

Figure Seven: Value Proposition for Tier Three – Component Integration Seekers

Customer Tier Three	Value Proposition Elements	
Set of experiences we will provide to the tier	Lower cost product & service Improved logistics planning Excellent tactical execution Advanced technology solutions Technology Fleet Management Programs	Automated order & tracking Clear POC at OEM Leasing options Geared Turbo Fan Financing options
Set of value delivery systems needed to provide the Experiences	Lower cost sourcing strategy Improved execution and additional inventories Re-organization of customer service organization Joint re-stock activities Joint forecasting and planning activities GTF development Creation of the UTC Capital Group	
Value appropriation	**Value gained by customer:** Recurring overhead reduction Margin expansion Less operating disruptions Increased Revenue Increased focus on core competency **Value Gained by us:** Increased revenue Increased profitability Opportunity to move customers to lower tiers Low-cost sourcing network International offset opportunities **Value Gained by both:** Increased revenue Increased margins Cost Competitiveness Improved customer offerings	Less "ops" management focus Leaner more focused structure Improved cash flows More investment options Better customer offering International partnerships Fleet management experience Premiums Exclusive contract

Challenges:

Tier three presents the same execution challenge associated with tier four, but expanded to include the overhaul and repair business. The key in overhaul is to turn the customer products quickly. The worst possible scenario for an airline is aircraft on ground. They want there parts and engines back and they will pay a premium to get them. There are significant technical and product development challenges here as well. Bringing a new product such as the Geared Turbo Fan is costly and difficult and will need to be closely managed. The GMS strategy is

also a significant challenge. This must be a flawless entry into service or the competitors will seize the opportunity.

Tier Two: System Integration Seekers

Business Dimension:

These are small, medium and large airlines and the air framers that seek to maximize integration to minimize the total cost of operating the enterprise. Tier Two Customers are located between the "Total Cost Solutions" and the "System Lock-in" strategic positions. These customers value relationships and are brand loyal. They seek very long-term relationships with exclusive suppliers wherever economically feasible. They have little interest in managing any element of the propulsion system and they structure their supply chain accordingly. These customers prefer Fleet Management Programs over asset ownership and that strategy usually extends to their service sector as well. They generally have little or no overhaul capabilities and have no desire to manage that element of the propulsion supply chain. They recognize that their value proposition is in moving people from point A to point B and not in servicing engines. These customers constantly challenge their supply chain to extend their breadth of service. The term "systems integration" refers to elements of the business well beyond product. These customers integrate the supply chain in everything from strategic planning to tactical execution. Their information technology and delivery channels are integrated and their functional organizations are usually co-located.

Figure Eight: Business Dimension for Tier Two – System Integration Seekers

Customer Dimension	**Customer Tier: Two**	
Products	Standard engine offering at low cost, low margin. Product upgrades to enhance fuel burn, emissions and noise Spare sales at full margin	
Services	Fleet Management Programs Exclusive overhaul and repair contracts planning EMMP programs	Engine Washing Joint material Integrated

	forecasting Leasing programs
Customers	Small, medium and large firms that seek to maximize integration to minimize total cost of operating the enterprise
Channels	Direct
End Users	Air line customers and cargo transports
Complementors	Third Party Logistics Companies Third Party Overhaul & Repair Companies Suppliers/Partners
Unique Competencies	GMS; GTF

Value Proposition:

The tier two "customer experience" is defined by preferential treatment and superior service from the very start of a business venture. These are customers on the leading edge of lean who are laser focused on their value proposition to the ultimate customer; the consumer flying with their airline. Their propulsions supplier is completely integrated with their business. Their customer service representatives are co-located on site to manage the product life cycle of the propulsion system. From initial order entry, tier two customers are afforded leasing, fleet management and/or financing options not available to tier 3 or 4 customers. They are assisted in every aspect of the business decision by experienced and knowledgeable on-site customer representatives. Tier two customers don't just by an aircraft engine, rather they engage in a life-of-engine partnership with a company that provides nose to tail service at any location, at any service interval anywhere in the world! All service bulletins, maintenance requirements, logistics matters, spare part planning and overhaul is managed by their propulsion system provider. Tier two customers simply provide their propulsion provider with an annual flight schedule and then forget about the propulsion system. So from superior financial agreements to superior service… tier two customers experience excellence.

Figure Nine: Value Proposition for Tier Two – System Integration Seekers

Customer Tier Two	Value Proposition Elements

Set of experiences we will provide to the tier	Lower cost product & service tracking	Automated order &
	Improved logistics planning	Clear POC at OEM
	Excellent tactical execution	Leasing options
	Advanced technology solutions	Geared Turbo Fan Technology
	Fleet Management Programs	Financing options
Set of value delivery systems needed to provide the Experiences	Lower cost sourcing strategy	
	Improved execution and additional inventories	
	Re-organization of customer service organization	
	Joint re-stock activities	
	Joint forecasting and planning activities	
	GTF development	
	Creation of a Capital Group	
Value appropriation	**Value gained by customer:**	
	Recurring overhead reduction	Less "ops" management focus
	Margin expansion	Leaner more focused structure
	Less operating disruptions	Improved cash flows
	Increased Revenue options	More investment
	Increased focus on core competency offering	Better customer
	Value Gained by us:	
	Increased revenue partnerships	International
	Increased profitability experience	Fleet management
	Opportunity to move customers to lower tiers	
	Low-cost sourcing network	Premiums
	International offset opportunities	Exclusive contract
	Value Gained by both:	
	Increased revenue	
	Increased margins	
	Cost Competitiveness	
	Improved customer offerings	

Challenges:

Beyond the usual execution challenges on both the OEM front and the overhaul side of the business, there is a new set if challenges associated with Leased engines in a fleet management program. Tier two customers have little interest in owning assets so that burden falls to the leaser. Understanding the flight requirements and managing the maintenance intervals requires impeccable information technology and superb planning capacity.

Tier One: Exclusive Contracts

Business Dimension:

Tier One Customers come in one of two forms: airlines that have awarded exclusivity to one supplier to manage their fleet operations and air framers that have awarded exclusivity to one supplier for a given platform. Tier One Customers share all the same characteristics as Tier Two Customers, but in addition have granted exclusivity. Tier One Customers partner with the supplier on "life-of-program" deals that are contractually tied to performance incentives. Exclusivity on an air frame can only be accomplished via partnering with the air framers. The propulsion supplier must excel on all functional aspects of the product as well as all investment elements of the business plan. Exclusivity at an airline can only be accomplished through up-front investment of systems integration as defined by a Tier Two Customer and flawless execution on the tactical front.

Figure Nine: Business Dimension for Tier One – Exclusivity Contracts

Customer Dimension	**Customer Tier: One**
Products	Standard engine offering at low to moderate margins Spare sales at full margin
Services	Fleet Management Programs Exclusive overhaul and repair contracts EMMP programs Leasing programs Engine Washing Joint material planning Integrated forecasting
Customers	Initially the air framers... expanded to exclusive airlines
Channels	Direct
End Users	Air line customers and cargo transports
Complementors	Third Party Logistics Companies Third Party Overhaul & Repair Companies Suppliers/Partners
Unique Competencies	GTF, GMS

Value Proposition

Tier one customers are in a league all their own. These are customers that commit to propulsion exclusivity on a single platform and extend the partnership through all stages of the product life cycle. They are awarded a customer experience that is unparalleled at any other level. The tier one experience includes all the benefits of the higher tiers, but also encompasses financial partnering and risk sharing agreements that make each companies success mutually beneficial. Tier one customers have significant influence over technological investments at the propulsions provider and preferential delivery options for new technology that will provide superior financial performance.

Figure Ten: Value Proposition for Tier One – Exclusivity Contracts

Customer Tier One	Value Proposition Elements
Set of experiences we will provide to the tier	One Stop Shopping Fully integrated partnership (IT to financing) Zero propulsion management over-site/concern State-of-the art propulsion offering Lowest cost of operation
Set of value delivery systems needed to provide the experiences	Lower cost sourcing strategy Improved execution and additional inventories Re-organization of customer service organization Joint re-stock activities Joint forecasting and planning activities GTF development Creation of the UTC Capital Group
Value appropriation	**Value gained by customer:** Recurring overhead reduction — Less "ops" management focus Margin expansion — Leaner more focused structure Less operating disruptions — Improved cash flows Increased Revenue — More investment options Increased focus on core competency — Better customer offering **Value Gained by us:** Increased revenue — International partnerships Increased profitability — Fleet management experience Opportunity to move customers to lower tiers Low-cost sourcing network — Premiums International offset opportunities — Exclusive contract **Value Gained by both:** Increased revenue Increased margins

	Cost Competitiveness Improved customer offerings

Challenges:

Nobody wants to be exclusive with anybody! Air framers and airlines go out of their way to infuse competition into every campaign. History is riddled with exclusivity contracts that were followed by execution issues and prices escalation. Overcoming this history will require long-term flawless execution and strong contract language that guarantees performance. Exclusivity will come with financial liabilities that hold companies accountable for commitments.

The test of Value Proposition:

Tier	Uniqueness	Sustainability	Value Added	Degree of Bonding
1	H	H	H	H
2	H	H	H	H
3	M	M	H	H
4	L	L	M	M
5	L	L	M	M

To test the different tiers of value proposition we utilize a simply matrix that examines the uniqueness of the experience (is it truly differentiating), sustainability of the offering (lack of imitation), the customer value add (the magnitude of the customer) and the degree of bonding (the switching cost). The stated value proposition correlates with the strategic positions on the Delta Model. The "best product" position, where firms compete on cost and product differentiation, is not unique, nor sustainable. And while is of value to the customer, because it is exactly what they are asking for, it is not maximizing customer value. The switching cost is relatively high at any tier, but the lowest in tier four and five.

In contrast, the Tier One value proposition is extremely unique in the industry and considering the excessive switching cost associated with reversing exclusivity, this is a very sustainable position. It is also of great value to the customer as it allows them to focus their efforts on what they do best: moving people and cargo.

De-commoditizing the Commercial Jet Engine Business
Assessing the Firms Bundle of Competencies

Bundle of competencies

Defining the customer value proposition at each of the five tiers highlights competency requirements that a firm may or may not have. At this point it is critical to take inventory of the firm's current competencies and define the gap required to deliver on the aforementioned value propositions.

Figure eleven: Current Bundle of Competencies

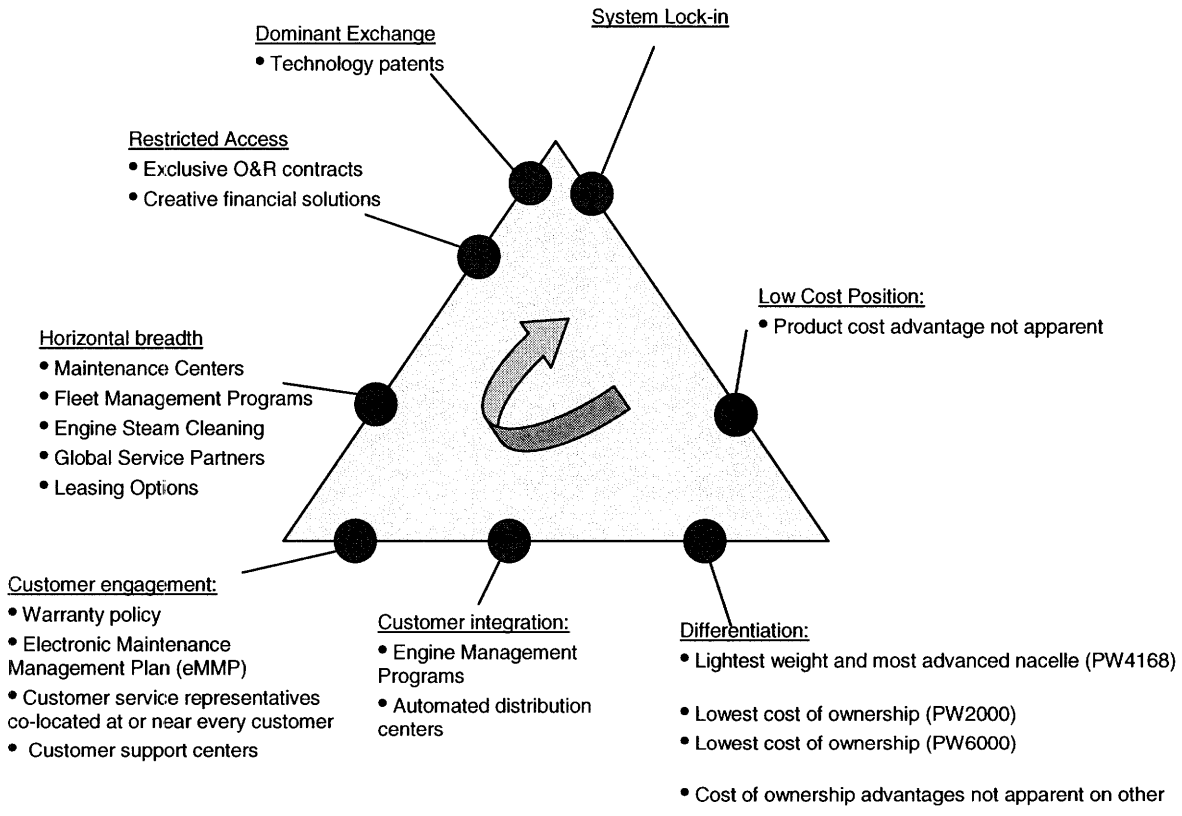


Figure eleven highlights the current bundle of competencies of the firm. Each of the "Big Three" engine makers are remarkably capable organizations with amazing technical breadth and global reach that most companies can only read about. However, none of the "big-three" differentiate themselves at

each of the strategic positions. The first one to do so will dominate in the industry! There are just five major differentiators that will increase customer bonding and reverse the commoditization trend.

1. Execution
2. GMS
3. Low cost of acquisition and ownership
4. GTF
5. Customer Financing

These become critical elements of the mission of the business and establish the ideal bundle of competencies:

Figure Twelve: Ideal Bundle of Competencies

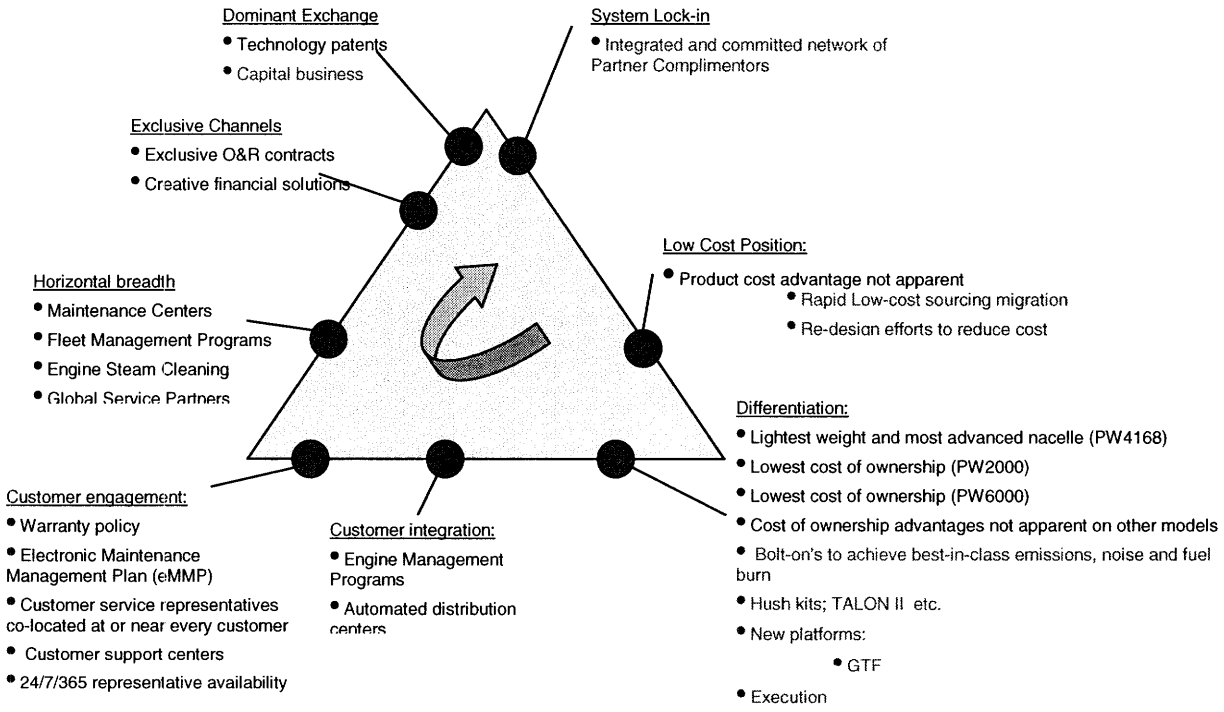


Figure twelve illustrates the ideal bundle of competencies and begins to establish an "agenda" for differentiation. With the five differentiators again being execution, GMS, Low Cost, GTF and Customer Financing.

Execution:

This is an industry that has been defined by execution. Aviation history is riddled with examples of arrogance and poor performance that lead to new entrants and eroded market share. Even today the dynamic is alive and well. As airlines struggle to survive they are demanding better service from the propulsion providers. They want lower cost, higher quality, better turn-times and shorter lead-times. They want superior product design and they want it delivered exactly on-time to preclude costly disruptions. And if they don't get it from their current suppliers, they have publicized the capacity to move to someone with better demonstrated performance. So the recipe for success is simple and succinct: He who achieves flawless execution first – wins! However, this is not breaking news. The fact is that the "big three" propulsion makers have been working to improve execution for years and have in fact posted some significant gains. These improvements are impressive from a historical view point, but unacceptable to the modern day aerospace customer. Even delivering 95% on-time and reducing quality escapes by 30% year-over-year has become non-differentiating performance. In order to differentiate your company via execution, companies must be able to sustain superior performance in each of the customer tiers.

The first step to sustainable and flawless execution is segregation of performance data. It is difficult, costly and perhaps unnecessary to achieve "flawless" at *every* tier. The objective is to achieve enough differentiation within a given customer tier to attract customers. So step one is to understand exactly how you're performing relative to the competition at each tier and take corrective action accordingly. Performance metrics must be segmented to the customer tier level or in some cases even to the customer specific level. It is not enough to manage by aggregated metrics that suggest "95% on-time delivery" is acceptable if all your misses are at a Tier Two customer. Once the data can be broken down to a more granular level, it is necessary to establish goals and objectives that will differentiate. Once the feedback mechanism is in place, corrective action can be taken to move the needles in the following elements that have been deemed critical by the customers:

- Product Quality
- Overhaul turn-times
- Customer fill-rates

Corrective action may mean that propulsion companies must concede to increased inventory levels in order to accommodate and ever-changing and unpredictable customer demand. The customer score card must be segmented by tier and appropriate measures must be taken to delight tier one and two customers, while satisfying tier three and four customers.

Product Cost:

Product and service cost is clearly an issue at every strategic position as well. Cost reduction at most of these airline customers has become more than a means of preserving profitability; it has become a necessary deliverable for survival. The good news is there is still plenty of opportunity to reduce cost. The larger portion of product and service still resides in North America. Low-cost emerging markets in Asia and Eastern Europe have proven fertile ground to deliver double digit cost reduction on improved infrastructure and cheaper labor. Though this sourcing strategy will not deliver a sustainable advantage over the competition, not moving the work will result in a significant cost disadvantage. This strategy must be applied to both the OEM and aftermarket businesses.

Another area of cost reduction that is ripe for harvest is product redesign. Segmenting the customer tiers helps determine the market for less expensive, lower technology solutions that will "delight the customers". Alternative material specifications and higher component standardization will have a dramatic and reoccurring impact on cost of goods sold and product pricing strategies.

Technology:

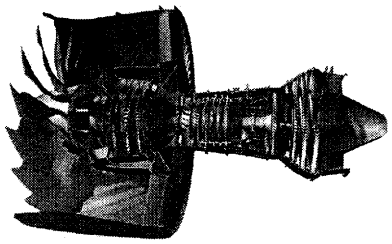
Technological improvements are needed to accomplish two primary objectives: a.) keep the large installed base flying and b.) Develop game changing technology that will provide a differentiation that cannot be overcome with capital at the negotiation table.

Keep the installed base flying: A substantial installed base is a competitor's largest barrier to entry. The switching costs are substantial and usually only motivated by compelling

economical gain or a complete lack of execution on the incumbent's part. Therefore, one major key to restricted access is keeping the existing fleet in the air. The important cost drivers in operating an engine are of course *fuel consumption*, but also *product life, emissions and noise output.* Research and Development dollars must continually be directed at technology to deliver fuel-burn advantages. Fuel is one of the airlines most substantial line items on the cost sheet and customers at four out of the five tiers will always have an interest in investing in fuel saving system improvements. Oil consumption is also a concern for the going-concerns. Not because of the price of oil, but because oil consumption usually correlates with product life. In addition, noise and emission are becoming an ever increasing financial liability to the airlines. As the world turns its attention to this issue of global warming, more and more emphasis will be placed on emissions and more stringent regulatory requirements are imminent. Airplanes not meeting ever escalating regulatory requirements are required to pay "fees" at every take-off and landing. And as air travel grows with ever increasing populations in every industrialized nation in the world, more focus will be placed on propulsion noise and improvements in that arena will become important differentiators.

Game Changing Technology: As air framers develop new platforms for the future, new technology such as the Geared Turbo Fan must be readied to deliver substantial improvements in the aforementioned areas. A 10-15% gain in fuel burn and a 20-30 decibel noise reduction is required to differentiate performance on the state-of-the-art applications of the new millennium. Combustion improvements must deliver a four-point improvement in NOx, CO and UHC emissions to meet or better all future regulatory requirements.

- Fewer parts; longer part life
- 10-15% fuel consumption improvement
- 20-30 decibel noise reduction
- 3-6 point improvement in emissions



Customer Service:

Customer service improvements must begin with measurement. Customer score cards must be segmented to align with customer tiers and metrics must be examined to determine relevance and effectiveness. Once companies have a granular and meaningful feedback mechanism in place they need to expand service centers to include emerging customers while

improving on-site presence at legacy customers. IT solutions must be enhanced to integrate with customer platforms and on-site representatives must be trained at tier one and tier two customers to utilize the interface.

Customer Financing:

If propulsion companies are to excel and prosper in today's market they must develop a financing branch of their operation. It is clear that tier one and tier two customers are more interested in leasing and partnering option than asset ownership. The price of entry on new platforms is capital infusion and the smart propulsion companies will find a way to profit through financial services. The Boeing 787 Dream-liner competition established a clear direction for future competitions. If propulsion companies want a significant position on going forward platforms they will indeed need to provide for fleet introductory assistance. And if that is the price of entry, than by default propulsions companies are in the financing business.... So they may as well get good at it!

The GMS game:

One common item found at nearly every customer and potential customer in the world is the competitor's product. The Aerospace market is immensely competitive and forces discussed earlier in this paper have caused most airlines to select product from any one of the three major propulsion providers. The other common fact of life at most major airlines these days is they are struggling financially. Some are in bankruptcy, many have just re-emerged, but most are fragile. The objective of "one-stop shopping" defined in the "horizontal breadth" strategic position of the Delta model demands "a complete set of ***customized*** product & service offerings". This can hardly be obtained at any customer unless you are prepared to offer a complete set of customized product and service offerings for your product and your customer's product. Imagine if you had the ability to provide your customer's spare parts and overhaul services better than they could... and for less money! Imagine the doors that would open at customers currently exclusive to your competition. Pratt & Whitney recently took steps in that direction with the launch of their new Global Manufacturing Solutions business. Global Material Solutions, an industry-revolutionizing initiative delivering OEM-quality life-limited and gas-path parts for GE's CFM56® engine at a competitive price, was announced in February 2006.

De-commoditizing the Commercial Jet Engine Business
The Mission of the Business

The Mission of the Business

The mission of the business is to provide dependable engines and engine service to the world wide customer base and make competitor's engines more dependable with superior technology and flawless execution. It sounds a bit like a commercial, but it really is that simple. Resources within the business must be aligned to close the gap between "desired" and "current" competencies in order to execute the strategy.

With customers appropriately segmented and firm competencies defined, it is the mission of the business to seize the resulting opportunities. It is the mission of technical community to develop new products that extend the useful life of legacy products in order to preserve and extend the earnings stream. It is also their mission to develop new technology that differentiates the company on new platforms in the future. In addition, the design team must now expand its scope to include innovations on competitor products in order to win in the GMS business. It is the mission of the operations team to achieve differentiation via flawless execution on both original sales and aftermarket support. Flawless execution is a critical differentiator at each strategic position of the delta model and this becomes one of the more critical missions of the enterprise. Within that framework, there are subtle, but important scope changes that need to be considered.

Customer Scope:

Existing customer scope is segmented around traditional lines. Large legacy firms are paid particular attention while sales and marketing resources are aligned around geographic lines. Boeing and Airbus rein supreme as the only two large air framers in the world. Leasing companies play a smaller role, but are still valued customers. History has taught the propulsion companies to pay particular attention to potential start-ups. Jet blue is a great example of how fast a new leaner enterprise can become a major player.

Figure thirteen: Existing Customer Scope

Existing Customer Scope	- -	-	E	+	++
Large North American Legacy Firms				■	
Large Mature European Firms			■		
Large Asian Firms					■
Large Mid-East Firms					■
Small Lean North American Firms				■	
Boeing					■
Airbus					■
Start-ups					■

New customer scope is segmented into seven categories, one representing each customer tier, one representing new airline start-ups and the final category representing new GMS customers. New airline start-ups require a separate segmentation that will inevitably overlap with an existing tier, but there is a critical zone of opportunity where an early start-up can be influenced to participate at a lower tier via intense customer bonding.

Figure Fourteen: New Customer Scope

New Customer Scope	- -	-	E	+	++
Tier One			■		
Tier Two				■	
Tier Three				■	
Tier Four					■
Tier Five					■
New PMA associated customers					■
New Start-Ups					■

Customer segmentation is central to the Delta Model frameworks. Segmenting along geographic lines and focusing in the best product strategic position will almost insure the commoditization of products. Customizing everything from marketing and sales to product and service along the segmented tiers will almost certainly expand customer bonding and lead to superior performance – for both links in the chain.

Challenges:

To effectively leverage all the opportunity of a tiered customer approach, firms must commit to the change. This commitment requires a new organizational structure in marketing and customer support. And it requires a more granular metric aligned to customer tiers. This seams obvious and logical, but most propulsions firms possess an old culture that changes slowly. In addition, new and additional GMS customers will only come with demonstrated performance at the launch customer. Word of mouth will carry the news throughout the industry if the news is bad. Advertising and word of mouth will carry the good news to otherwise skeptical customers. In either case, switching costs must make a compelling argument.

End-user Scope:

The ultimate end-user scope changes only as the global economic conditions change. Commercial Engine end-users are global consumers and large cargo carrying firms. Global consumer scope changes as developing countries improve the economic conditions to the point that impact air travel. As China and India, for example, continue unprecedented growth in GDP, more and more cargo transport is required and they become more of a player. And as their economic conditions improve more business and leisure travel occurs. This will be discussed further in the geographical scope section.

Channel Scope:

The channel scope in the jet propulsion industry is what we call "dual direct". This term refers to the fact that you sell direct to the air framers to win a position on the platform, but then you must sell direct to each air line customer in order to win a position on their aircraft. This is because the air lines have convinced the air framers to commoditize the propulsion offering an any given aircraft and let the "end user" decide. In the spare parts market, propulsion companies will continue selling direct to the end-users, bypassing distributors as much as possible. Complimentors will continued to be leveraged to win "in-country" support of product introduction through offset programs and investment strategies.

Figure Fifteen: Existing Channel Scope

Existing Channel Scope	- -	-	E	+	++
Direct to Air Framers					
Direct to Airlines					
Limited distributor agreements					

The new channel scope must also be aligned to a tiered customer platform. This will not impact the current approach at the air framers, but it will organize the channel scope at each tier. The better you serve the end users, the less pressure they will put on the air framers for choices.

Figure Sixteen: New Channel Scope

New Channel Scope	- -	-	E	+	++
Direct Sales to a tiered customer platform					
Exclusivity on new platforms at Air framers					

Challenges:

Exclusivity on a given airframe requires the full realization of the "ideal bundle of competency"...especially the "execution" competency and the "financing" competency. In addition, geography becomes an important factor as well. There are Asian and European companies that seek geographic offset and therefore having suppliers in Europe, for example, will benefit your customer sales in Europe.

Complimentor Scope:

The complimentor scope must change to keep pace with the ever escalating demand for fleet introductory assistance. The scope must be expanded to develop more risk-revenue sharing partners that are willing participants in the development of the next generation propulsion systems when it is time to launch. The complimetors must not only have the financial wherewithal to invest, they must possess the technical depth to design and develop engine modules that can then be integrated into the overall system.

Figure Seventeen: Existing Complimentor Scope

Existing Complementor Scope	- -	-	E	+	++
XXX - Risk revenue sharing partnership					
ABC - Risk revenue sharing partnership					
XYZ - Risk revenue sharing partnership					
ANS - Risk revenue sharing partnership					
HDS - Risk revenue sharing partnership					

Figure Eighteen: New Complimentor Scope

New Complementor Scope	- -	-	E	+	++
HAL - India					
Tata - India					
China - Risk revenue sharing partnership					
Mid-East - Risk revenue sharing partnership					
Singapore- Risk revenue sharing partnership					

Challenges:

The challenges associated with developing complimentors are similar to those challenges associated with executing M&A deals. You need to have willing participants on both sides of the deal and you need to have suppliers capable of technical and financial deliverables. They also need to be able to execute to bring that competency to reality.

Geographic Scope:

The geographic scope changes as international policy and economic conditions evolve. Globalization is a rapidly changing landscape that can have extreme effects on a company's top and bottom line. Not since the post world war II era has the world seen such economic expansion and this is having a profound impact on the commercial aerospace business. There are two primary factors that warrant attention in geographic scope: how many people in a region and their relative wealth. The United States, for example, has just over 300 million

people, which is just 4.58%[1] of the world's population, but it is the strongest economic power with $12,980,000,000,000[2] of purchasing power parity. The European Union combines for a number just short of the US AT $12,820,000,000,000, but both of these markets are well saturated by the "big three" engine makers (Rolls Royce, GE & P&W).

The next big growth market resides in Asia/Pacific and the Middle East. As China continues their historic economic integration with the rest of the world, domestic and international air travel continues to escalate. More international business people are traveling to and from China as they seek to capture a share of this booming market. In 2006, Beijing Airport had the highest growth rate of passenger traffic (18.3%)[3] in the world! And what's more impressive is the potential for further growth in the future. China has the largest population in the world with some 1,317,000,000 people or 20% of the world's population. And their economy is a booming with $10,000,000,000,000 in purchasing power parity. What's more impressive is their rate of GDP growth over the past half decade! As their economy continues to improve and their people's disposable income begins to grow, air traffic will likely continue to escalate. This makes China the largest potential growth market in the world and warrants more intense geographical focus.

India is another global giant with 1,124,800,000 people or 17.09% of the world's population. The undeniable difference here though, is their slow integration with the rest of the world. For decades India has been inwardly focused and aligned their trade policies accordingly. While China was working to embrace international business, India was passing policy to preclude their introduction. However, there are signs of improvement on the horizon. India's GDP has been growing at 8% per year for the past four years and thought their purchasing power parity is just one quarter that of the US and nearly a third of Chinas, they are still a hugely viable market that warrants attention.

Add to the current growth in China and the potential growth in India, Japan's amazing economic horsepower and Indonesia, Taiwan, and South Korea's amazing economic explosion, and one can begin to appreciate why aerospace companies need to re-double efforts and expand the geographic scope in Asia.

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[1] http://en.wikipedia.org/wiki/listofcountriesbypopulation
[2] http://www.cia.gov/cia/publications/factbook/rankorder/2001rank.html
[3] http://www.airports.org/cda/aci/display/main/acicontent.jsp?zn=aci&cp=1-592

Here is where we link the traditional supply chain management function to the sales and marketing function. Gone are the days when "purchasing" worked independent of the enterprise to master a single price oriented metric. Today, procurement is teamed with sales and marketing to target specific countries and regions to provide product offset for sales opportunities.

Figure Nineteen: Existing Geographical Scope

Existing Geographical Scope	- -	-	E	+	++
Global Sales and Support					■
North American Centric Suppliers		■			

Figure Twenty: New Geographical Scope

New Geographical Scope	- -	-	E	+	++
Eastern Europe & Asian Centric Suppliers					■
Middle East Suppliers					■

Challenges:

The challenge associated with developing new sales in Asia, Eastern and the Mid-East are common to any other challenge...people and politics. You first need to find the right people. People that have or can establish key relationships within the given country and understand and leverage cultural issues. The politics also play a major role in new business development. India represents an example of a historically closed society who's trade policy forbids free trade in some sectors. There are also unwritten laws that you need to overcome. Some countries buy products only from their country or with significant in-country content.

The Service Scope:

All three propulsion companies have comprehensive service offerings. These offerings include fleet management programs, overhaul and repair capabilities and on-wing diagnostics. Only Pratt& Whitney offers the OEMRO capability, the ability to produce and certify competitor spare products.

Figure Twenty one: Existing Service Scope

Existing Service Scope	- -	-	E	+	++
Engine & Fleet Management Programs					
O&R capabilities for OEM and Competitor					
Engine washing and emmp					

Figure Twenty Two: New Service Scope

New Service Scope	- -	-	E	+	++
GMS					

Challenges:

The challenge here is in convincing legacy airlines that they should not own their own overhaul and repair shops is a significant challenge. And even if you are able to convince them, getting through their labor commitments can be a daunting and sometimes fruitless task. This boils down to execution again. Execution, as measured by quality and turn-times, is a differentiating factor in this business. It is a weapon that nobody has been able to achieve or sustain over the long run.

Product Scope:

The product scope expands to include competitor product while concurrently focusing on the new propulsion system that will differentiate on the next new narrow body platform. The challenge here is in picking the right horse. On the GMS side of the business, it is not feasible to expand the scope to include all competitor products; hence, careful consideration must be given to internal capacity and external market shares. And with regards to the new platform scope, it is critical to assess and understand the true customer requirements in order to hone in on critical design parameters. The service scope remains relatively unchanged as it already has a global reach across existing and competitor products. However, it is necessary to recognize the opportunity afforded by the product scope expansion and align capacities accordingly.

Figure twenty two: Existing Product Scope

Existing Product Scope	- -	-	E	+	++
PW2000					

V2500					
PW4000					
PW6000					
GP7200					
ALL Legacy spares					

Figure Twenty Three: New Product Scope

New Product Scope	- -	-	E	+	++
GMS					
GTF					

Challenges:

There are some developmental challenges associated with the launch of GMS. In short, the worst thing that could happen to PW's GMS business is to have a product failure or a significant delay in production out of the gate. However, early indications and milestone testing support PW's published statements that the program is well in hand.

The real challenge here resides in the "game theory". What is the competitor going to do in response. Surely they will not sit idly by while PW profits from their market share.

There are significant technical challenges associated with GTF technology. This is ground braking technology that has never been done. If successful, it will deliver a significant competitive advantage. If it is unsuccessful, it could result in a substantial set-back that would further erode PW's market share.

There are supply chain challenges as well. PW needs to substantially increase the number of tier one complimetors (design and investment capabilities) to bring this technology to market with appropriate levels of FIA.

Unique Competencies

There are few unique competencies that provide sustainable differentiation within the Jet propulsion business. All of the "big three" engine makers offer extremely similar product capability and to date service levels have not differentiated. Recent activities at Rolls Royce suggest some long-term investment in high speed propulsion that will be very fast and very quiet, but that technology is decades away from realization. More immediate are technological and business developments at Pratt & Whitney. Their Geared Turbo Fan technology could

prove to provide unique capabilities within the next five years. And Pratt & Whitney's announcement to build GE CFM spare parts makes them the only OEMRO in the world.

De-commoditizing the Commercial Jet Engine Business
The Strategic Agenda

Strategic Agenda

The following bullet point summarizes an approach for achieving the aforementioned mission:

- Enhance supply chain delivery capabilities to achieve 99% on-time delivery while achieving gold level quality.
- Drive sourcing decisions that substantially reduce product cost while aligning with geographical sourcing strategies.
- Achieve product differentiation through improved environmental and economic performance.
- Flawless launch of GMS business.
- Secure exclusivity on the next generation Narrow Body Aircraft by successfully launching GTF.
- Develop a Customer Financing branch of the corporation.

We expand this brief summary via use of the Delta Model's Strategic Agenda where thirteen strategic thrusts have been identified. Each strategic thrust is assigned to appropriate functional owners and supporting functions have been identified. Business processes have been defined to facilitate discussion across functional groups and performance metrics have been defined to monitor progress.

Figure Twenty Four: Strategic Agenda

Strategic Thrusts	Operations	LCE Programs	Engineering	GTF Programs	HR	Finance	Business Dev.	CEO	GMS Programs	Communications	Sales & Marketing		Business Process	Performance Measurement
Establish Low Cost sourcing geographically aligned to the strategic agenda	1	2				2	2			2			OE	Purchase price variance and in country content
Redesign to reduce cost	2	2	1			2	2						OE	Unitized cost
Develop additional complimentors in strategically important regions.	1	2	2				1			2			CT I OE	Number of signed partners
Develop bolt-ons to improve emissions, noise and fuel burn	2	1	1							2	2		OE I	Emissions numbers, Decibels, Fuel Burn
Bring GTF to market	1		1	1		2	1	1		2	2		I	Successful launch on next generation narrow body
Bring GMS to market	1	1			2	2	1	1	2	2			I	Sales Growth
Develop Financing branch						1	2	1		2	2		B	Narrow Body Win
Recruit and develop talent in support of strategic thrusts	2	2	2	2	1	2	2	2	2	2	2		I B	Retention, success
Segmentation of customers into tiers		2					2				1		B	Completion
Reorganization of the sales & marketing team around customer tiers					2						1		B	Completion
Restructuring of customer score card around tiers - differing questions, different measures of success		1					2				1		B	Completion

Establish tier specific performance metrics and align the organization accordingly	2	1	2		2		2			2	1		B	Completion
Target tier 2-4 customers vertically, tier 2 customers horizontally.			2				2				1		B	Sales Growth

1 = key role in formulation and implementation
2 = Important role in support and concurrence
1 = Identifies the champion; who has the leadership role

B= Process that carries broad managerial activity)
OE = Cost Drivers
CT = Profit Drivers
I = Renewal drivers

These thirteen strategic thrusts become the central focus of the company's resources and the roadmap to revolutionizing the industry! To be certain the agenda will deliver the desired results, we will recall the five key elements of the strategy and project forward to a market where one company has executed the strategy flawlessly.

- Execution
- OEMRO
- Low cost of acquisition and ownership
- GTF
- Customer Financing

As previously stated, ***no engine company has sustained flawless execution*** over an extended period of time. However, executing flawlessly has quantifiable financial advantages to the customer that will in fact be considered in any competition. More importantly, execution is almost a prerequisite to customer bonding. No customer will increase bonding with any suppliers that adversely impact their business due to poor execution. So to some extent, those responsible for execution elements of the strategic agenda are your most important customer relations people.

The ***OEM MRO strategy is historic in nature*** in that it could change the very structure of every subsequent deal. The strategy of discounting "razor" to establish a market in which to sell the "blades" may in fact be in question. At the very minimum, this strategy opens doors to your competitor's customers in ways not previously considered. In "Hax speak" this strategy

provides a significant value proposition to those customers that would otherwise not jeopardize their "single platform" strategy to allow other engines on their common platforms. Selling superior spare products to a competitor's customer at a discounted rate will open doors into larger service arenas in the future. So the people working this element of the strategic agenda are in fact revolutionizing the structure of the industry.

Ever since the invention of the wheel, there have been programs of cost reduction. So these items on the strategic agenda might seem bland, but ***at no point in aviation history has this item been more important.*** This cost reduction program is every bit as rooted in revenue growth as it is in margin growth. As the market expands to large emerging economies so too does the manufacturing footprint. Low cost regions like India, offer an opportunity to leverage the indigenous manufacturing content with offset sales. Margins grow because of the substantial cost reduction a company achieves by sourcing there. So people working this strategy are not just working on the age old bottom line, but they have moved to a top line focus as well.

Unlike the electronics or automotive industries, new product offerings are not all that common in the jet propulsion industry. Here product life cycles are measured in decades, because switching costs are enormous. So while it is true that technical differentiation is not a sustainable strategic position, a company in this industry can get a decade long head start and capture substantial market share with a new mousetrap. The Geared Turbo Fan has that capability. If executed flawlessly, ***this new technology could afford a competitive advantage in fuel burn, emissions and product life cycle cost that will set industry standards for years to come.*** The people working on this strategic agenda item are literally revolutionizing the industry!

Customer financing is a prerequisite to attracting customers to the lower tiers. It's just that simple. If jet engine companies want to enjoy the fruits of increased customer bonding and exclusivity found in tier one and two, they must attract the customers there with attractive financing. ***If done properly, this strategic agenda item could launch a whole new company that could serve to advance every business entity within the business***. So people working this agenda item are building a foundation for future growth across the entire enterprise.

If each of these strategic agenda items is executed flawlessly the benefits are reinforcing and the resulting growth will exceed expectations. Imagine the competitive advantage realized by offering the global customer base the lowest cost, highest technology solutions through a set of international complimentors that enhance their business beyond the product offering. Imagine being able to offer your competitors customers a superior "blade" for the competitors razor! Imagine a global customer base that recognizes your company as the preeminent executer, such as Dell was recognized for years. They built an empire on flawlessly executing customer orders. And now imagine a market where you were the only one to achieve this. It's game changing!

So just how easy is it to implement? Does the company have the wherewithal to get it done? And how easy is it for the competition to duplicate? The wonderful thing about this strategic agenda is that most of what needs to be done is well within a company's ability to execute. The new technology required to dominate the field in performance and efficiency metrics is well in hand. The engineering resources and capital required to bring it to market are in place. This is now a matter of execution and appropriate processes are in place to insure success.

As Asia, Eastern Europe and the Mid-East continue their economic integration with the rest of the world, there is an enormous opportunity to develop a new set of complimentors in economically significant regions of the world. The company has the international diversity and organizational structure amongst it's workforce to leverage such opportunities and this too becomes an issue of execution.

This is not to say that this strategic agenda is simple to implement. In fact, nothing worth doing is done with ease. In fact, the capital requirements, technical challenges and people skills required to deliver such an agenda are the very things that will slow duplication. But make no mistake, the "Big Three" engine makers in this industry are formidable competitors that will what it takes to counter on every front. Sharpening a company's skills and renewing this agenda on some recurring frequency are paramount to continued success.

De-commoditizing the Commercial Jet Engine Business
Customer Targeting

Customer Targeting:

Throughout this paper we have referenced the issue of execution as a central theme in differentiation. It is that very issue that is so germane to the realization of the mission. In the customer targeting section we link execution and strategy. We determine the tactics necessary to attract, delight and retain the most desirable customers.

Customer Targeting Requirements:

The Delta model teaches us to assess customer targeting requirements associated with each strategic thrust. This insures that we link our strategic thrusts to the customers. There are thirteen strategic thrusts that can be summarized into four customer targeting categories.

Build execution capabilities:

There is no more important issue to any customer tier than that of execution. It is a differentiator that customer will pay premium for. It is necessary for the company to take a fresh look at its execution capabilities across the entire supply chain; from its ability to forecast schedule to its inventory management skills; from its measurement and information technology systems to its human resource and reward and compensations system. The company employ business processes and operational effectiveness to have a richer understanding of execution issues and a more comprehensive corrective action plan.

Expand vertical marketing at core customers:

This largely refers to the OEMRO strategy where greater revenues are achieved by offering competitor products with enhanced product life at a lower cost. This improves both the companies and the customer's business model. To do so, the launch of GMS must be a success and an aggressive marketing campaign must follow.

Win the Next Generation Narrow Body:

This is a critically important market for any propulsion company. The current narrow body fleet represents the largest market sector in aviation. Propulsion companies need to come to this competition with differentiating technology that is proven and flight ready. This competition will not take place until 2012-2014 so between now and then it is critical that propulsion companies understand futuristic customer requirements and develop products to exceed them. To that end, Propulsion companies need to integrate with the primary customer and complimentors to understand and deliver on requirements.

Develop a means to finance customers:

This is also a critical factor of market expansion. Airline customers increasingly look to the propulsion and air framers for Fleet Introductory Assistance (FIA). Propulsion companies must develop capital management skills in order to effectively compete in global markets of the future.

Figure twenty five: Customer Targeting requirements for strategic thrusts

	Strategic Thrusts	**Customer Targeting Requirement**
1	Establish Low Cost sourcing geographically aligned to the strategic agenda	Target strategically significant geographical locations for sourcing product in growth regions.
2	Redesign to reduce cost	Target tier one customers that buy exclusively on cost. Initiate marketing to move them to lower tiers
3	Develop additional complimentary in strategically important regions.	Target customer regions that value country content and source accordingly
4	Develop bolt-ons to improve emissions, noise and fuel burn	Target European customer requirements for noise and pollutant reduction.
5	Bring GTF to market	Target next generation narrow body platform at Boeing or Airbus
6	Bring GMS to market	Execute with launch customer and launch vertical marketing campaign at existing customer base. Also launch marketing campaign to competitor customers.
7	Develop Financing branch	Targeted at future campaigns to secure market shares on narrow body segment
8	Recruit and develop talent in support of strategic thrusts	Identify critical skills and skill gaps required to achieve the mission. Build on existing skill base and recruit talent to close the gaps.
9	Segmentation of customers into tiers	Break traditional focus on geography and revenue and target lower tiered customers for improvement initiatives
10	Reorganization of the sales & marketing team around customer tiers	Align human resource skills with customer requirements

11	Restructuring of customer score card around tiers - differing questions, different measures of success	Get tier specific feedback from different customers operating at different strategic positions.
12	Establish tier specific performance metrics and align the organization accordingly	Targeted performance to customer tiers
13	Target tier 2-4 customers vertically, tier 2 customers horizontally.	Target customers for vertical marketing

Environmental Scan:

Identification of opportunities and threats:

Globalization and economic development have created one of the most significant opportunities for aviation in recent times. At no point in history has the world been so connected both literally and virtually. The primary vehicles that make that connection possible are air travel and the internet. As large countries like India and China come of economic age, and as the world continues to shrink as a result of globalization, more and more people take to the air to get connected. This is an opportunity of historic proportion!

The jet engine business is populated with three primary players and in order of size, as measured by revenue, they are: General Electric, Pratt & Whitney and Rolls Royce. As stated earlier, none of these companies have differentiated themselves with execution or technology. All produce solid reliable products and all provide similar service levels to their customer base. Hence, this historically significant opportunity created by globalization and economic development is only enhanced by stale competition in a growing market.

There are threats as well. It is often said about the jet engine makers "he who execute flawlessly first, wins! If the rate and pace of improvement, at any one of your competitors, surpasses that of the other two: differentiation will be achieved. In addition, these three giants pour hundreds of millions of dollars per year into R&D activity in the hope of developing break-through technology that will revolutionize the industry and provide differentiation that will deliver price premiums.

This section of the paper will provide a broad scan of the environmental factors critical to the industry. Those factors will include:

- Competitive factors
- Economic factors
- Government & political factors
- Regulatory factors
- Technological factors
- Environmental factors

Figure Twenty Six: Market Factors

	Impact	
Critical Industry Factors	Positive (opportunities)	Negative (threats)
Market Factors		
Legacy customers in the US have huge cost pressures that is causing them substantial losses and threatening their existence. Many are in or have been in bankruptcy.	Huge opportunity to exploit "total customer solution" strategic position. Opportunities include taking over the customer overhaul and repair operations. Also significant opportunity to sell GMS as a means of performance improvement and cost reduction for the customers.	With the customer base economically fragile at best, there is business risk associated with funding customer initiatives.
Asian and Middle East economies are booming and load factors are at all time highs.	New markets emerging in real time. Opportunities to start new customers at lower tiers.	Significant competitive pressures.
Narrow body replacement strategy within the next 5-10 years	Systems lock-in with exclusivity on platform	Significant competitive pressures.

Analysis and Discussion:

The Delta Model is a customer centric framework that puts the customer at focal point of all business strategies. To that end, it is important to understand your customer issues and challenges. In doing so, opportunities for customer bonding can be leveraged as you present business opportunities for increased horizontal breadth. At no point in aviation history has this discussion been more timely or relevant.

The domestic airline industry has long been controlled by a handful of legacy players. Over the past couple of decades, several leaner business models have entered the market to varying

degrees of success. Jet Blue and South West prospered while Peoples Express and Eastern Airlines failed.

Figure Twenty Seven: Domestic Airlines - Revenue Passenger Miles [4]

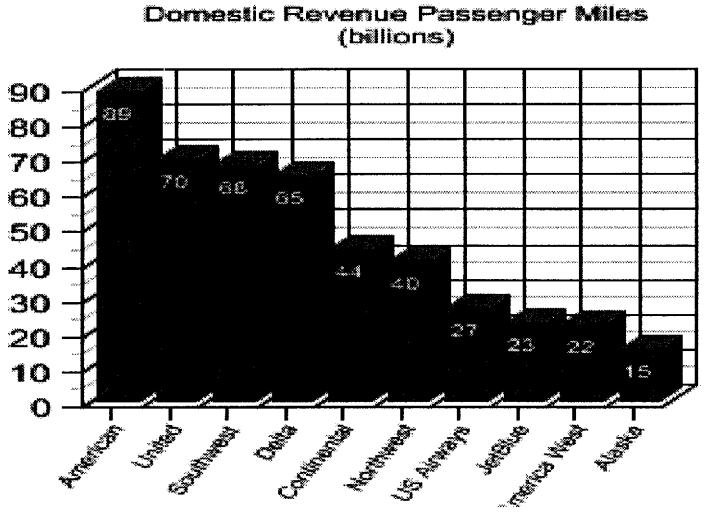


Figure Twenty Eight: Domestic Market Share[5]

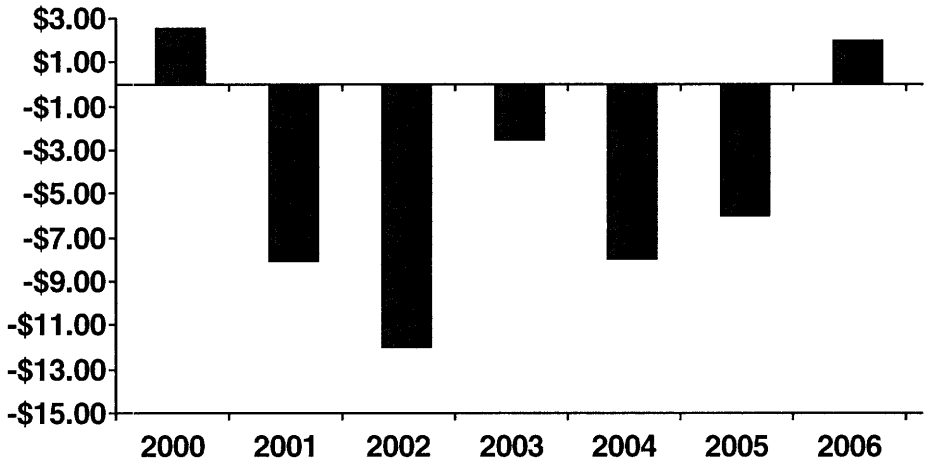
Airlines	Market Share
American	15.5%
United	12.1%
Southwest	11.8%
Delta	11.3%
Continental	7.7%
Northwest	7.0%
US Airways	4.7%
JetBlue	4.0%
America West	3.8%
Alaska	2.6%
Other	19.5%

Most of the major Airlines were profitable through 2000, but in early 2001 escalating costs and unbalanced pricing schemes sent the airlines trending to loss. This situation went from fragile to broken with the events of 9/11 and most large airlines teetered on the edge of disaster. Many went into bankruptcy as the industry as a whole posted unprecedented losses. Between

[4] http://www.transtats.bts.gov/
[5] http://www.transtats.bts.gov/

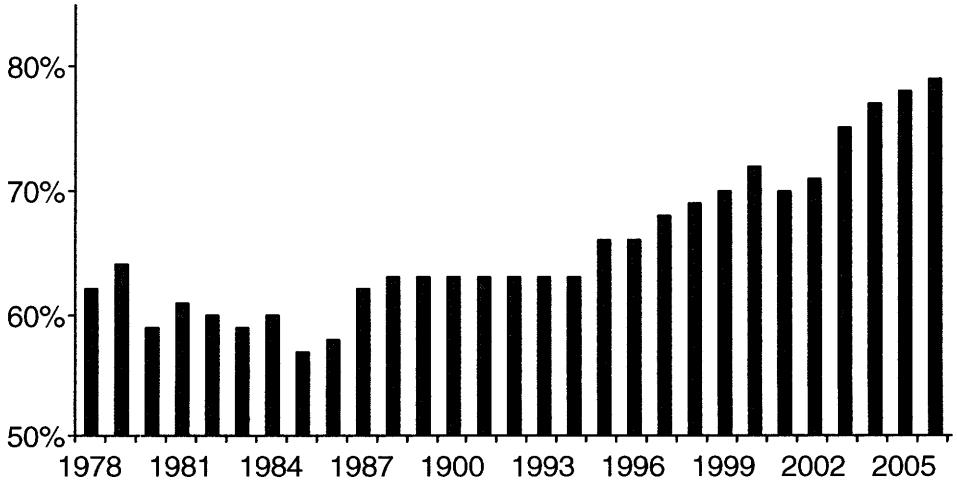
2001-2006 the industry as a whole lost $33 billion as the average net debt to capital climbed to 67%!

Figure Twenty Nine: Domestic Airline Profitability (in Billions of Dollars) [6]



While this half decade has not been kind to airlines, they may have weathered the worst of the storm. Prospects for the future look much brighter as load factors are up substantially to historic highs.

Figure Thirty: Domestic Load Factors [7]

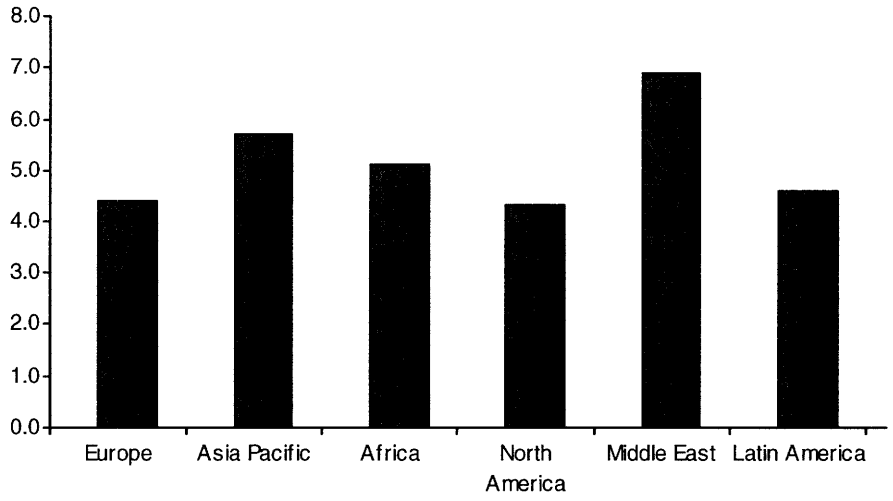


[6] ATA,DOT form 41 Data; Bloomberg; Bear Stearns estimates
[7] DOT Form 41 Data; Company Reports; Bear Stearns estimates

Industry experts suggest these load factors will provide air-coverage for escalating fuel costs. This will allow most airlines to return to profitability in 2006 and beyond. Bear Stearns estimates that domestic airline profitability could top $13 billion in 2007-2008. Though this outlook is promising, it aggregates the industry. Most experts agree that large legacy airlines still have an unsustainable cost structure even after emerging from bankruptcy. Once again, this presents significant opportunities to expand horizontal breadth as large airlines seek to rid non-core operations in continued restructuring efforts.

Asia and the middle-eastern airlines are dealing with rapid growth in international air traffic as well. And as large counties like China and India are increasingly integrating with the rest of the world, projected load factors look promising.

Figure Thirty One: Forecast growth in International air passenger traffic (2005-2010)[8]



This growth opportunity in Africa, Eastern Europe, Asia Pacific and the Middle East coincides with low-cost sourcing opportunities. This couples well with international offset requirements for in country content, but presents political challenges as companies seek to source work out of higher cost regions like the US.

[8] http://www1.messe-berlin.de/vip8-1/website/messeberlin

The final significant Market Factor is the replacement of the narrow-body fleet. The narrow body fleet is the largest fleet of aircraft in the world and includes the Boeing 737 and Airbus' A-318,319,320 and 321 airplanes. These platforms are aging and do not encompass the latest technological advancements in emission, fuel burn and noise reduction. Both Boeing and Airbus are contemplating a new product offering and the industry is waiting to see who blinks first. Once an announcement is made by one, the other must follow. Jet Engine companies are anticipating the move in the 2012 timeframe and readying technology accordingly. This is the highest stake poke in the industry and this competition will define market shares and companies for the next four decades.

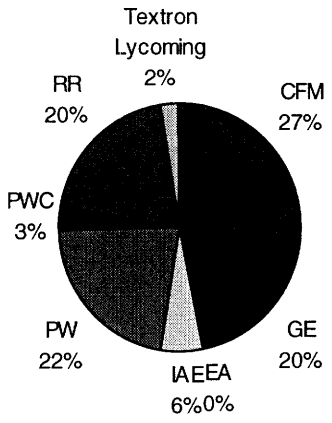
Figure Thirty Two: Competitive Factors

	Impact	
Critical Industry Factors	Positive (opportunities)	Negative (threats)
Competitive Factors		
Three companies create an oligopoly with similar capabilities, business strategies and global reach.	Seek partnership with one of the "big three" to leverage scale and international market presence... while blocking the third. Consider complimentors.	If the market is then split between the two entities, the single players wins greater market share by default.
Low-cost sourcing strategies in emerging economies creating price reductions	Increased market share in India and China	Risk of price war and commoditization
There Is relatively no technological differentiation amongst the big-three	Leverage a GTF strategy to win market share	Execution

Analysis and Discussion:

Three companies create an oligopoly in the jet propulsion business and each has similar capabilities, but GE has substantially more market share when you consider the fact that they own a portion of CFM.

Figure Thirty Three: Market Share [9]



GE won considerable more market share by forming partnerships and aligning complimentors in key market sectors around the globe. If a customer had a geographical bias, for example, a European customer wanted European content on the product, chances were GE could accommodate. They established an international stable of partners and complimentors that invested heavily in market share for longer-term growth of aftermarket. Then they bet on the right horse. Pratt & Whitney, for example was focused on wide body aircraft, believing that as more people took to the air, bigger was better. This of course proved to be the wrong answer as smaller narrow body aircraft like the Boeing 737 has dominated market.

Today, the competitive factors in the industry are more business related than product related. There is very little technological differentiation. Weight, thrust ratios, fuel burn, noise and product life in any given market sector are all remarkably similar amongst the competitors. A given company may have an edge on a given product, but no one company dominates with technical advantage.

On the service front, the competitive gaps have been narrowed or even closed over the past decade as both Pratt & Whitney and Rolls Royce have invested heavily in overhaul and repair capabilities. These capabilities expand beyond their own products and into the competitors markets. Further, each offer similar service programs such as fleet management programs.

[9] Company Reports

The competeive differentiation resides therefore, in execution and finance. As previously discussed, execution on deliver and service is a critical factor that demands a premium at the negotiation table. In addition, GE's financing business, GE Capital, delivers a powerful competitive advantage that is unmatched in industry. For example, if GE is technically deficient in fuel burn at a given competition, they can close the gap with financing incentives.

That fact puts considerable competitive pressure on product cost and technological differentiation. The lower the product cost the more competitive the customer offering can be, the more difficult it will be for GE to close the gap. And if disruptive technology can be launched to further widen the gap, this would become a significant competitive advantage. The Geared Turbo Fan (GTF) is the kind of disruptive technology that could warrant premiums at every competition the world over.

Figure Thirty Three: Economic Factors

	Impact	
Critical Industry Factors	Positive (opportunities)	Negative (threats)
Economic Factors		
Global GDP's on the rise with unprecedented improvement in China and India	Global air travel up significantly. New airlines emerging in China and India as well as the Mid-East and Russia.	Some concern about over-capacitizing in economic bubble
Low-cost sourcing options available in growth markets	Revenue offset opportunity to expand margins	Significant capital required to invest and ramp up slow
North American Airlines business model deficiency	Opportunity for horizontal breadth	Significant turbulence in industry forecasted

Analysis and Discussion:

The global economy is experience unprecedented growth that is having a profound impact on domestic and international air travel. Global GDP growth topped 5%[10] in 2004 which was the largest growth in a generation. The world continued to prosper in 2005 with a 4.5% growth and in 2006 wit nearly 5%! What's important is that both China and India, representing the largest populations in the world, are growing at substantially higher rates. And as their

[10] http://www.petersoninstitute.org/publications/papers/mussa0905.pdf

economic development continues, businesses the world over are anxious to capitalize and that means air travel! Pratt & Whitney's own projections suggest that the installed base of jet engines will grow from its current 37,827 to over 91,000 in the next twenty years. And much of that growth will come from Asia and the Mid East and that opportunity coincides with the low-cost sourcing opportunity in said regions.

Another significant opportunity is presented closer to home as legacy airlines grapple with a hopelessly inefficient business model. There infrastructures and contractual commitments have left them scrambling in and out of bankruptcy for a half decade and as they reconcile that challenge opportunity for horizontal breadth exists.

Figure Thirty Four: Government and Political Factors

	Impact	
Critical Industry Factors	Positive (opportunities)	Negative (threats)
Government & Political Factors		
India's political infrastructure is not efficient	N/A	Political leaders have many agendas and little power to speak for the nation. Policy changes required to better integrate with global partners are slow to come.
Long-term policy issues in China	Continued rapid integration with global partners... an open society	Potential for political unrest with Taiwan
Domestic pressure on large companies to stem off-shore sourcing	Opportunity to leverage tax incentives	Potential fall-out on Military business

Analysis and Discussion:

With global opportunity comes significant challenge. Dealing across differing cultures, religions and Governmental policy can be challenging in and of itself. Add to that challenge the politics of dealing across over 140 international boarders and you have today's global economy. India represents a good example of this challenge. This is an emerging country that is struggling internally with global integration. This is a young country that is attempting to shed their inwardly focused strategy of self reliance and open their economy to free trade. Yet

there remains strong opposition within their own political parties that has resulted in substantially more trade barriers than that of their large neighbor (China). This debate is slowing the development of their infrastructure as well which also slows progress.

There is also some long-term concern with China's Governmental policies. If history is any indicator of the future, China is capable of political actions that could stifle international integration and reverse growth trends. Though this is not likely, it warrants contingency.

Further, as companies form North America continue unprecedented outsourcing there is social unrest and political pressures mounting that could result in policy local change. Unions are lobbying congressional members to levy tariffs, legislation and provide tax incentives to force domestic sourcing. One examples of such legislation is the "Buy American Act".

Figure Thirty Five: Regulatory Factors

	Impact	
Critical Industry Factors	Positive (opportunities)	Negative (threats)
Regulatory Factors		
Export control regulations	N/A	Policy forbids certain technology from being exported to certain regions of the world.
International deregulation	A consistent trend of reducing most trade regulation in most countries will increase the amount and ease of free trade and open new markets.	N/A

Analysis and Discussion:

The aviation industry has significant export control regulations that must be considered at both the campaign strategy sessions and the international sourcing discussions. Domestic policy forbids the exportation of certain technologies to specific regions of the world. However, this trend has softened internationally as the World Trade Organization (WTO) works to open borders and promote free trade. A consistent trend of reducing trade regulation can be sited in virtually every country, the world over.

Figure Thirty Six: Technology Factors

	Impact	
Critical Industry Factors	Positive (opportunities)	Negative (threats)
Technological factors		
Geared Turbo Fan	Improved fuel burn, reduced noise and emissions	N/A
Disruptive technology	New disruptive technology can reap a king's ransom if leveraged appropriately. New markets can be opened up and existing markets can be expanded	Competitors disruptive technology can have devastating effects on a legacy competitor

Analysis and Discussion:

As previously stated, there is little technological differentiation in the jet propulsion industry. Pratt & Whitney's Geared Turbo Fan presents an opportunity to change that reality with superb fuel burn, noise suppression and emissions performance. Though this is not likely to be a sustainable differentiator, it will provide nearly a decade of competitive advantage if successful.

Disruptive technology always plays a role as well. Some suggest the GTF is "disruptive" in nature, but some suggest it's more incremental. Again, if history is any indication of future, there is no significant risk that disruptive technology will surprise anyone in the industry. This technology takes years to develop and is usually a matter of public knowledge long before it becomes a threat. That is because most of this technology is developed in collaboration with academia and governmental partners.

Figure Thirty Seven: Environmental Factors

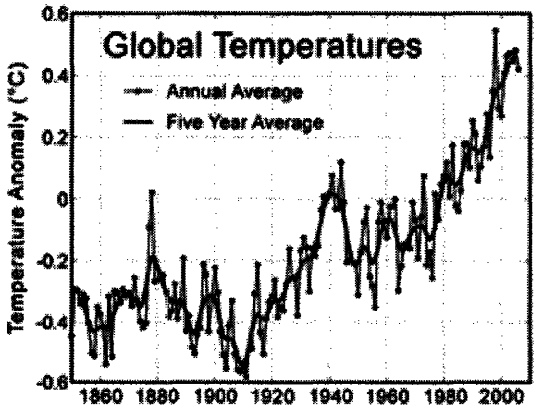
	Impact	
Critical Industry Factors	Positive (opportunities)	Negative (threats)
Environmental Factors		

Global emissions and noise standards continue to become more stringent. Heavy fees are levied on air planes that do not comply at every take-off and every landing.	Opportunity to improve emissions and sell upgrades to both OEM and competitor products	Discussions in Europe leading to ridiculously stringent requirements
Indian infrastructure (roads, utilities, airports etc.) is lacking and therefore slowing the progress of low cost sourcing	Complimentor investment opportunities	instability and unrest within country

Analysis and Discussion:

As the global warming debate roars on experts on both sides of the issue make claims about the seriousness of the issues. The environmentalist claim its almost too late. According to Climate Change 2007, "global average air temperature near Earth's surface rose 1.3 ± 0.32 ° F [11] during the last century". The Intergovernmental Panel on Climate Change (IPCC) concludes, "most of the observed increase in globally averaged temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic greenhouse gas concentrations which leads to warming of the surface and lower atmosphere by increasing the greenhouse effect. The "experts" on this side of the argument suggest the consequences of such change will have catastrophic ramifications in the not too distant future. Those opposed to the theory suggest that a one degree change in average temperature over the past century is a natural phenomenon that will have little effect on earth.

Figure thirty eight: Global Warming Trends[12]



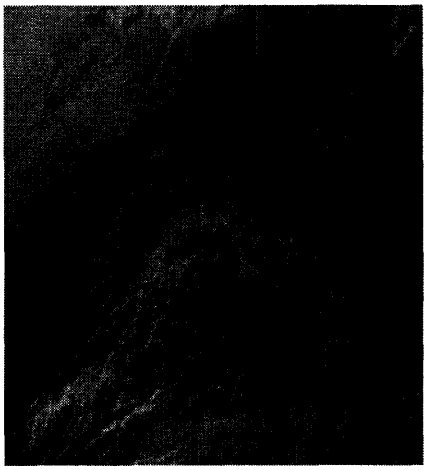
[11] http://en.wikipedia.org/wiki/global-warming
[12] http://en.wikipedia.org/wiki/global-warming

According to **Wikipedia,** *"The detailed causes of the recent warming remain an active field of research, but the scientific consensus identifies increased levels of greenhouse gases due to human activity as the main influence. This attribution is clearest for the most recent 50 years, for which the most detailed data are available.*

From a business point of view, it almost does not matter who is correct. The fact is that consumers and governments the world over are becoming increasingly sensitized to the effects of global warming and that is having real-time impact on regulatory and policy decisions.

In the aerospace sector emissions standards are becoming increasingly stringent. Some see this as costly regulatory requirements, but others see this as a substantial business opportunity. Aviation contributes 2%[13] of the global CO_2, but also emits Nitrogen Oxide which causes a warming effect by ozone formation. It also causes contrails and cirrus clouds.

Figure Thirty Nine: Arial View of Cirrus Clouds and Contrails [14]



It is estimated that by 2025, Global CO_2 emissions will increase by 110% on increased air travel alone and there are currently not enough technological breakthroughs planned to offset the growth. So this presents a challenge and a business opportunity. If technology can be

[13] http://en.wikipedia.org/wiki/global-warming
[14] http://en.wikipedia.org/wiki/global-warming

developed, disruptive or otherwise, to make substantial breakthroughs in this area, customers will pay a premium.

Customer Targeting Strategic Agenda:

	Strategic Thrusts	Operations	LCE Programs	Engineering	GTF Programs	HR	Finance	Business Dev.	CEO	GMS Programs	Communications	Sales & Marketing		Business Process	Perf. Measmnt.
1	Restructure the Sales & Marketing group to align with Customer Tiers		2			2					2	1		B	Completion
2	Restructure the balanced scorecard to align with the Customer Tiers	2	1	2				2			2	2		B	Completion
3	Launch Tier targeted marketing campaign	2	2	2	2			2		2	2	1		B	Completion
4	Develop employee training modules to enhance knowledge of tier specific customer tier requirements		2	2	2			2		2	2	1		B	Customer scorecard comments
5	Enhance customer service representation in competitor's customer regions		2	2				2		2	2	1		I	Growth of GMS
6	Establish an internal VC group to engage with external VC community on new airline start-ups		2				1	1						I	Ground floor start-ups

7	Develop Financing branch						1	2	1		2	2		I	Narrow Body Win
8	Recruit and develop talent in support of strategic thrusts	2	2	2	2	1	2	2	2	2	2	2		B	Retention, success

In order to effectively leverage the opportunities outlined in this customer targeting section there must be considerable effort focused on the Sales & Marketing strategy. This organization, as well as all their scorecards and support functions must be aligned to the customer tiers. Tier specific marketing campaigns must be developed to illuminate the new product and service offerings for each customer tier and the In-Field customer representatives must be educated on new tier specific customer strategies.

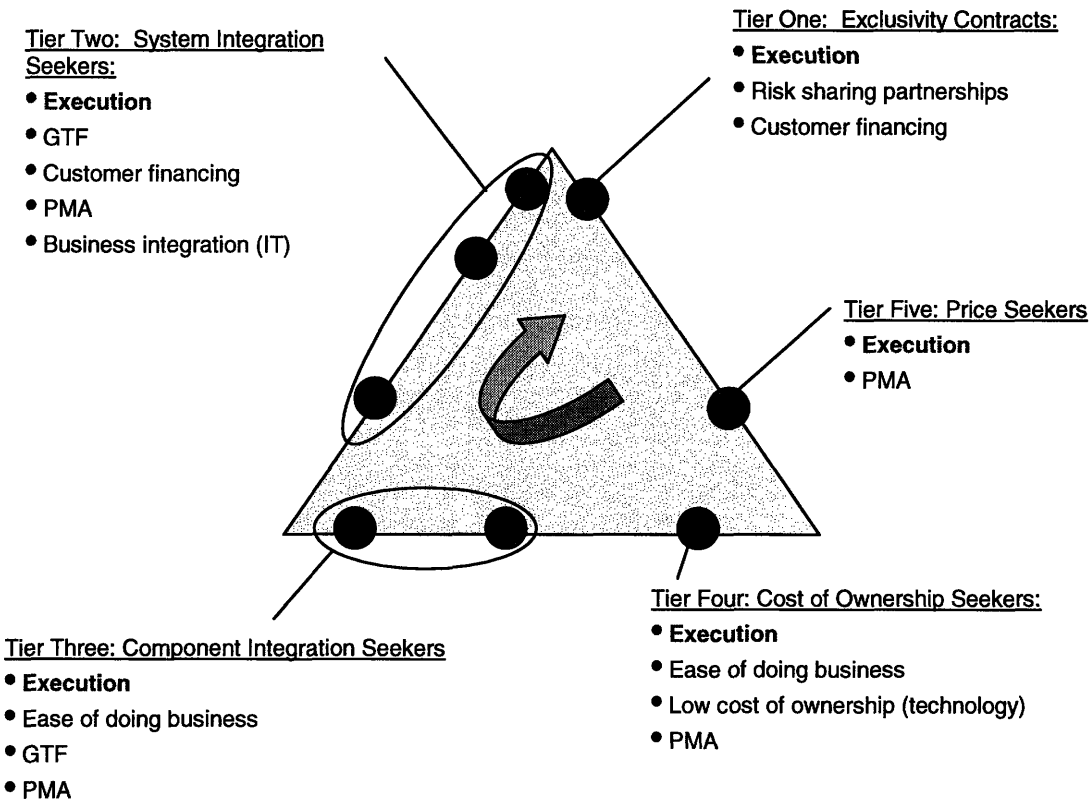
Further, as global aviation markets continue growth well in excess of GDP, new entrants are inevitable. The key here is to know what start-ups have the best opportunity to succeed and participate in their development. Starting these new ventures off at tier two or tier one positions will pay huge dividends in the future. For example, getting in the ground floor with a company like South West as their exclusive propulsion provider would have long-term advantages as they grew into a major player in aviation. Venture Capitalists have their ear to the ground and hear about these opportunities at all the appropriate times. Having internal VC capability plugged into such a network would afford early opportunities to invest in such start-ups. This could be a department within the previously mentioned financing organization.

De-commoditizing the Commercial Jet Engine Business
Operational Effectiveness

Operational Effectiveness:

Assessing differentiation at the eight strategic positions of the Delta Model, one can begin to understand the power and importance of execution in the Jet Propulsion business.

Figure Forty: Differentiation Roadmap



Executing flawlessly is a clear differentiator that is difficult to achieve and yet warrants a premium from customers. Louis Chenevert, President and COO of United Technologies, said of the Jet Propulsion business "whatever company gets to flawless execution first, wins"! In today's global environment and in the era of international sourcing, no company can execute flawlessly without a strong and integrated supply chain.

In this section, we will examine the critical operational effectiveness factors to assess the "current state" and "desired state" of operational effectiveness. The following factors will be examined:

- Market Factors
- Economic Factors
- Government and Political Factors
- Regulatory Factors
- Technical Factors

Figure Forty One: Market Factors

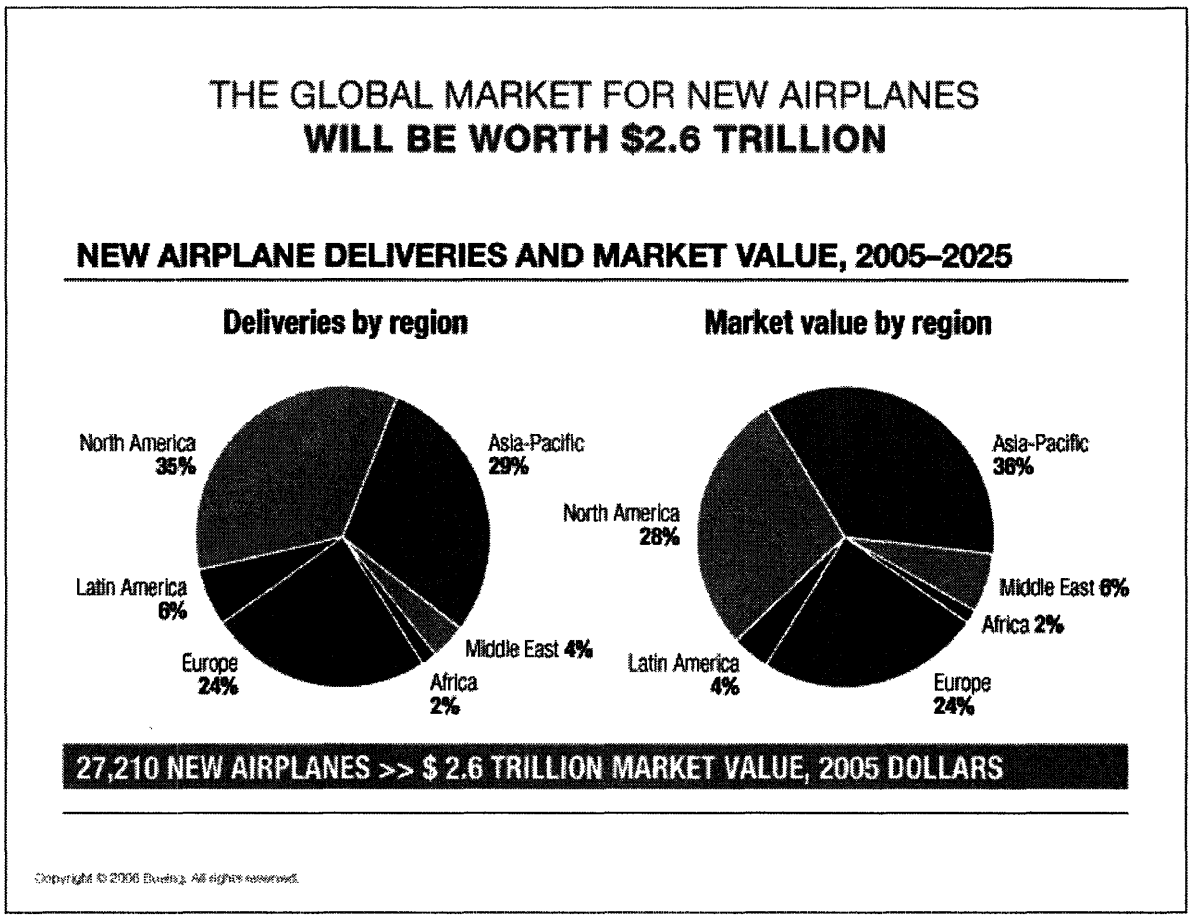
	Impact	
Critical Industry Factors	Positive (opportunities)	Negative (threats)
Market Factors		
GE currently has the largest installed base and their commercial market share is expected to increase over the next two decades	n/a	GE needs manufacturing capacity and they will be very aggressive on the acquisition front to secure existing capacity from other engine makers.
Small to mid-sized manufacturing companies are being purchased by larger corporate holding companies	These larger entities are improving their capabilities via acquisition in order to expand their horizontal breadth. This coupled with their corporate assets, makes them more capable of participating as critical complimetors on larger platforms.	Some of these holding firms have strategic agendas to grow and sell. They increase their capabilities and program content to the point that they become attractive targets to your competitors. If your competitors buy then, they can become a very disruptive source.
The "big three" engine producers are migrating their supply chains to low cost sources throughout Asia and Eastern Europe.	Ultimately, this SHOULD reduce the total systems cost of the propulsion system which should in turn reduce the cost of the Aircraft to the end users. This will help and already ailing industry.	Although this is a "must do" for cost and revenue purposes, it affords no sustainable competitive advantage

Analysis and discussion:

No matter who you talk to about air travel, industry experts all concur that growth is inevitable. And though experts disagree on the exact numbers, all suggest that as the world continues to

integrate on social and economic fields air travel will be the beneficiary. So to put this growth into perspective we will ignore the outlandish projections of some "experts" that suggest "an airplane in every driveway" by 2050 and focus on the forecasts from those people who's livelihood depends on the correct answers" Boeing. Although Boeing might have a more conservative view of growth into the coming decades, it is also more realistic.

Figure Forty Two: Boeing's New Aircraft Projections through 2025 [15]



Again, even with an assumed conservatism in the forecast, this is a booming market place that redefines the term "global". And what does this all mean to the Jet Engine makers? Well, there are at least two engines on every aircraft!

[15] http://www.boeing.com/commercial/cmo/regions.html

As mentioned previously, GE currently has the largest number of engines in the installed base for the commercial engine market sector. At current state (assuming nothing were to change), GE's lead will continue to grow.
GE and RR's installed base doubles over the next couple of decades while Pratt grows by nearly 50%. This growth presents some substantial challenges within the market place. The current Aerospace supply base is ill-equipped to handle the projected growth so companies up and down the supply chain are executing strategies to accommodate.

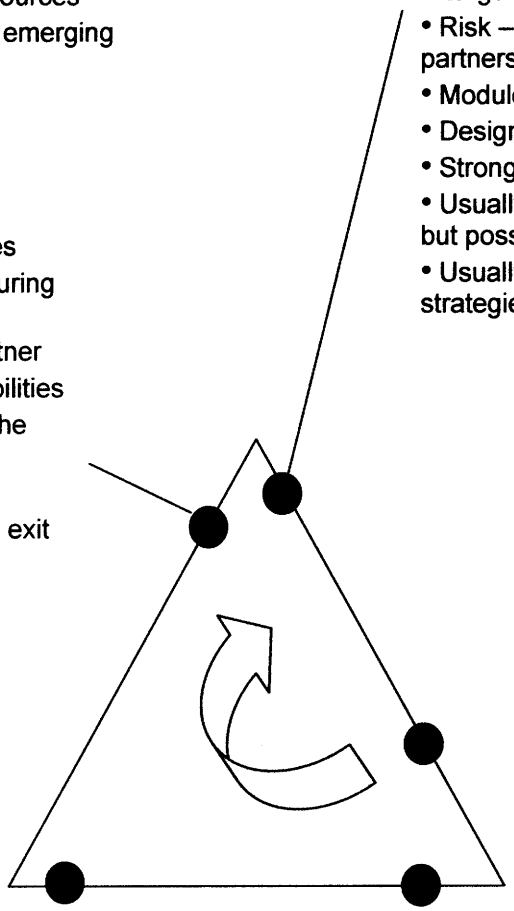
To understand the supply chain strategy, one must first understand who makes up this global supply chain. To accomplish that understanding we segment the global supply base into five "supplier tiers". These tiers range from "maintainers" to risk "revenue sharing partners". One must also have a rich understanding of aerospace history to fully comprehend the innovative spirit that runs through the veins of these suppliers.

Powered flight was born in 1903 with the inaugural flight of the now infamous Wright Brothers, who designed and built their own engine and captured the world's imagination. With that flight launched an international obsession with aviation and subsequently motivated thousands to innovators to design and develop technological breakthroughs that revolutionized an industry and shrunk the world!

Figure Forty Three: Supplier Segmentation

Tier Two: The Globe Trotters
- Usually large businesses
- International low cost sources
- Strategically located in emerging regions
- Ownership could vary:
  - OEM
  - Government
  - Corporate
- Have design capabilities
- Have unique manufacturing capabilities
- Have the assets to partner
- Part and Module capabilities
- Strong desire to grow the business
- An Acquisition target
- Usually do not have an exit strategy

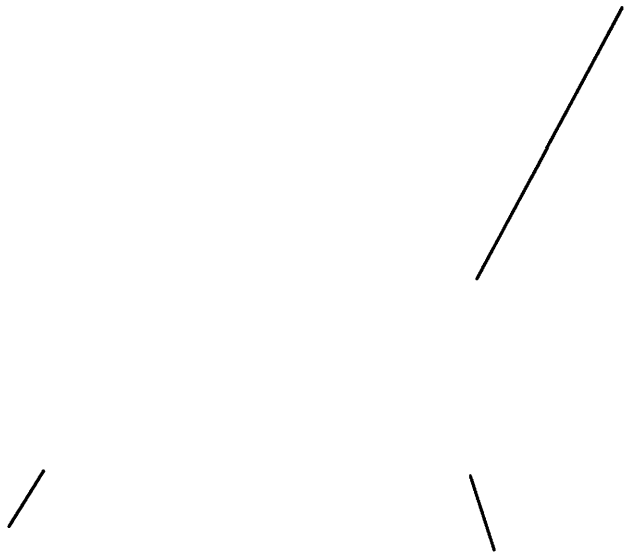
Tier One: Risk Revenue Sharing Partners:
- Large corporately held entities
- Risk – Revenue sharing partnerships
- Module orientation
- Design capabilities
- Strong desire to grow
- Usually not an acquisition target, but possible
- Usually do not have exit strategies



Tier Five: Maintainers
- Small to medium businesses
- Privately held
- Low cost DOMESTIC source
- Part orientation
- No unique manufacturing capability
- Desire to cap growth rate
- Not an acquisition target
- Do not have the assets to partner
- Longer-term strategy is to maintain business for the "next generation"

Tier Three: The innovators
- Medium to Large businesses
- Private or corporate held
- Low cost domestic or international source
- Part and Module orientation
- Some specialized manufacturing capability
- Some design capabilities
- Strong desire to grow the business organically or via acquisition
- An acquisition target

Tier Four: Progressives
- Small to medium businesses
- Privately held
- Low cost DOMESTIC source
- Part orientation
- Some specialized manufacturing capabilities
- No design capabilities
- Some desire to grow the business
- Not a significant acquisition target
- Do not have the assets to partner
- Could have an exit strategy



Segmenting these innovative suppliers into supplier tiers we can see a wide diversity of size, capabilities, financial resources, growth aspirations, and longer-term strategic desires. All of which are critical to the formulation of your own supply chain strategy.

Tier five suppliers:

These suppliers are generally small domestic businesses that are privately held by their founder. They have no strong growth aspirations and no desire to change their business model or investment patterns because the founder has become wealthy working in a commoditized arena of relatively few domestic suppliers. They have little interest in engaging with the international community because all their customers are usually domestic and local. They are not a particularly appealing acquisition target because they offer no unique capabilities and they are not large enough to bother with.

Tier Four Suppliers:

These suppliers are small to medium in size and are also privately held in a one owner situation. Their business model is similar to that of tier five suppliers in that they differentiate themselves with cost. The difference in tier five suppliers is that tier four suppliers are more progressive. They will invest in technologies that afford them differentiating capability in the interest of grow. Tier four suppliers are not a primary target for acquisition for two primary reasons: a.) they are not usually willing sellers and b.) they do not afford a willing buyer enough differentiation or mass to bother.

Tier Three Suppliers:

Tier three suppliers are medium to large firms that are either private or corporately held. They have a low cost domestic and/or international presence and they have differentiating capabilities. They generally have design capability and usually focus on module manufacturing versus part production. These companies have a strong desire to grow and they usually position themselves with each of the "big three" on multiple programs. They have the assests to partner and the capabilities to become strong complimentors. They are in fact an acquisition target and it is usually unclear if they have an exit strategy.

Tier Two Suppliers:

Tier two suppliers are usually large international concerns. They are generally located in emerging, low cost markets that attract OEM's for both their low cost sourcing and revenue generating opportunities. They could be owned by an OEM, Government or Corporate entity. They almost always have design and manufacturing capabilities that differentiate, especially at

the low cost strategic position. They have the financial wherewithal to partner on platforms and the geographical and governmental advantage that makes them critical complimentors. They are almost always acquisition targets, but usually do not have an exit strategy.

Tier One Suppliers:

Tier one suppliers are usually large corporately held entities that prefer to be risk revenue sharing partners on going forward platforms. They are definitely not part producers and usually only participate at the module level. They generally have superb design capabilities and differentiating manufacturing capability. They have a very strong desire to grow that is motivated by shareholder pressures. They are usually not an acquisition target, but in today's world of venture capitalism plentiful with plenty of funds for substantial investment, anything is possible.

With this understanding of the supply base we can now begin to comprehend possible supply chain strategies. As stated earlier the existing chain does not have the capacity to double output in the next twenty years so alternative means must be developed. There are several strategies that could play out:

Acquisition Strategy:

After a couple decades of international outsourcing in the interest of lower cost and higher revenue, some OEM's may be turning their attention to the issue of overall capacity… at any cost! It does not matter what you sell an engine for if you can't get the products to assemble. In January of 2007, GE announced the acquisition of Smiths Aerospace for $4.8 Billion. The Herald Tribune reported *"General Electric, the biggest jet-engine maker, said Monday that it had agreed to buy Smiths Aerospace for $4.8 billion, as rising demand for travel drives record sales of commercial aircraft at Boeing and Airbus"*.

Partnering Strategy:

More and more OEM's are looking to develop and partner with complimentors that both offset the initial investment requirements and provide unique capabilities that sharpen the competitive edge. As OEM's compete internationally, it is always helpful to leverage your

"in-country partner" for business consideration. Further, as international capabilities improve in emerging countries; their capabilities can outstrip those of the OEM's in niche technology sectors. It is incumbent on the OEM to leverage these capabilities and take them to market.

The brick & mortar strategy:

Another means of increasing capacity is the age old - tried and true method of "building it". And not necessarily building it in your own back yard. There are significant advantages to building manufacturing capacity in low-cost emerging regions around the globe. Governments with a keen interest in global integration will "pay" for OEM's to come to their region. They will pay in the form of tax and business incentives that could leveraged to impact both top and bottom lines. Building new factories in emerging economies could prove to be a win-win!

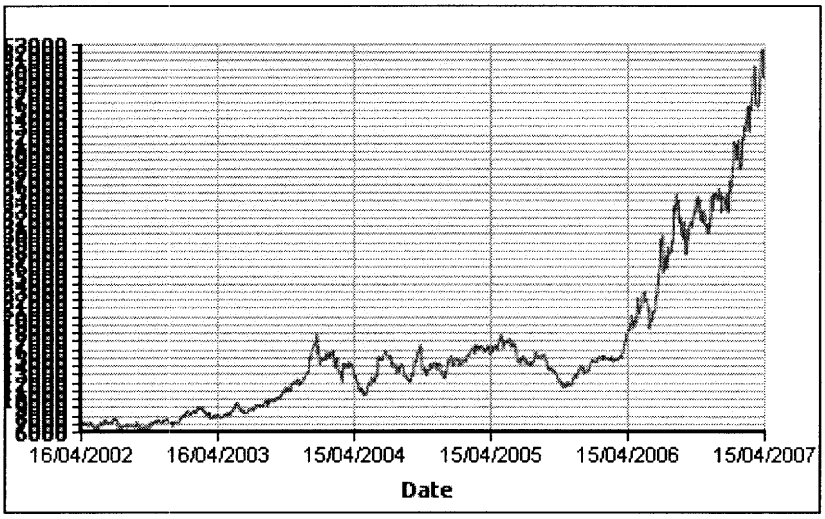
Figure Forty Four: Competitive Factors

	Impact	
Critical Industry Factors	Positive (opportunities)	Negative (threats)
Economic Factors		
Raw Material continues to escalate as a shortage of nickel and titanium drive prices up	This could encourage the investment in R&D to develop alternative materials. Further, it could begin to justify the acquisition of Raw Material suppliers.	Cost increases up and down the chain
Low cost sourcing provides competitive advantage	Early mover cost reductions and market access	Not a sustainable advantage

Analysis and Discussion:

Raw material escalation continues to drive product pricing in an adverse direction. The good news is that this does not afford a competitive disadvantage because each of the big three engine makers buys from the same raw material suppliers. However, it may afford an opportunity for an early mover to make investment in raw material houses via acquisition or partnering. This could provide an advantage for one of the big three if they structured the deal correctly.

Figure Forty Five: Nickel Prices [16]



We have learned from the Delta model that the "best product" strategic position is not a sustainable posture. Thus low cost sourcing to emerging companies alone is not enough to sustain a going concern.

Figure Forty Six: Government and Political Factors

	Impact	
Critical Industry Factors	Positive (opportunities)	Negative (threats)
Government & Political Factors		
There is mounting political pressure on domestic businesses to source domestically. Labor unions and some politicians are calling for legislation to limit outsource activity	This will force political figures to better understand and appreciate the costs and challenges of competing in a global environment.	Political leaders have many agendas and may pass adverse legislation even after understanding the issues.
Long-term policy issues in China	Continued rapid integration with global partners... an open society	Potential for political unrest with Taiwan
India is still a relatively young country with many issues to work out in terms of global integration policy.	If India takes a similar path to that of China, in terms of global integration, they will have longer-term prosperity.	If India succumbs to internal pressures and returns to their self reliance agenda, it could stifle growth and advancement for years to come.

[16] http://www.lme.co.uk/nickel

Analysis and Discussion:

Similar to the Government and Politics factors in customer targeting, India and China play major roles in supply chain factors as well. The same concerns exist over India's ability to develop an infrastructure conducive to global integration while the in-fighting amongst political parties continues to slow progress. Further, China presents concerns as the great experiment continues to unfold (communist country economically integrating with the rest of the world). Companies will be cautious about putting all their eggs in one basket if the basket is located in China. If the experiment goes wrong, it is one thing for companies to lose Chinese customers and associated revenue. But if your only source to support a global customer base is in China, the liability goes well beyond Chinese revenue generation. Lastly, there is mounting pressure to reverse the international outsourcing frenzy that has infuriated unions and domestic watch groups. Despite relatively low unemployment rates and relatively strong GDP numbers, domestic pressure continues to climb on international outsourcing. Though this could result in better tax incentives for domestic sourcing, it will likely not close the competitive gap created by Asian and Eastern European cost advantages.

Figure Forty Eight: Regulatory Factors

	Impact	
Critical Industry Factors	Positive (opportunities)	Negative (threats)
Regulatory Factors		
Export control regulations	N/A	Policy forbids certain technology from being exported to certain regions of the world.
International deregulation	A consistent trend of reducing most trade regulation in most countries will increase the amount and ease of free trade and open new markets.	N/A

In this case the supply chain regulatory factors are identical to the regulatory factor issues associated with customer targeting.

Figure Forty Nine: Technological factors

	Impact	
Critical Industry Factors	Positive (opportunities)	Negative (threats)
Technological factors		
Some suppliers have increased technologies over that of the OEM	Opportunity to leverage complimentor technologies and R&D investments to provide a superior offering to global customer	Opportunity for competitors to acquire complimentors
International sourcing does increase the technological capability at global suppliers	This develops capability throughout the supply chain and affords excellent supply chain sophistication.	In some cases you could be developing a future competitor

Analysis and Discussion:

The supply chain has become infinitely more sophisticated over the past several decades as innovators and strategists have attempted to climb the capability ladder. This increased sophistication has largely resulted from both supplier investments in capability and OEM investments in suppliers. This is "all good" when supplier becomes a complimentor and enhances your product or service offering to the end users. This provides the OEM with a quantifiable competitive advantage. Unfortunately, it also is unsustainable! Very few suppliers in the jet engine industry supply to just one of the big three engine makers. Most do business with at least two and the larger complimetors always do business with all three.

The other challenge associated with supply chain development is you might be developing your next competitor. As previously stated, GE just acquired Smiths Aerospace, a substantial supplier to both Pratt & Whitney and Rolls Royce.

Operational Effectiveness Strategic Agenda:

	Strategic Thrusts	Operations	LCE Programs	Engineering	GTF Programs	HR	Finance	Business Dev.	CEO	GMS Programs	Communications	Sales & Marketing		Business Process	Performance Measurement
1	Re-organize the procurement function to establish a separate low cost sourcing focus	1				2					2			B	Completion
2	Develop LCS engineering transition capability	1		2										OE	Completion
3	Establish complimentors in Asia, Mid-East and Eastern Europe	1	2	2			2	2						OE, I	Capability offerings, revenue
4	Stabilize schedule requirements	2	2					2				1		OE	Schedule changes
5	Seek capacity enhancing acquisitions in strategic regions	1	2	2			2	2				2		I	Overall Capacity
6	Assess design changes for R/M substitutes	2		1										OE	Cost Red. Capacity
7	Assess designs for complexity improvement	2		1										OE	Cost Reduction
8	Complete a skills matrix of the Operations team	1				2								B	Completion
9	Identify the required skills for the changing mission	1				2								B	Completion
10	Develop a training and recruitment plan to close the skill gaps	1				2								B	Completion

The operations strategic agenda is focused on establishing complimentors in strategically significant regions around the world. This coincides with the low-cost sourcing strategy to increase revenue and expand margins, but it also speaks volumes to enhancing your

technological capability and product offering. As emerging economies develop their technical capability more and more companies in said regions are enhancing their product and service offerings via technological differentiation. So these complimentors are offering capabilities well low-cost labor. Transition capability must be developed in the form of technical transition skills. These skills are absolutely necessary in establishing new aerospace sources in low cost regions. Without this capability, transition of hardware is slowed to a crawl and quality issues arise.

Another key element of the agenda is assessing the bench for skills and establishing plans to transition the skill sets to the new mission. International business skills, technical transition skills, business development skills and financial skills are required to execute this business plan. Once there is an understanding of the current and future state requirements a gap closure plan can be executed.

Design plays a major role in this agenda as well. Raw material availability and cost is a daunting challenge in the US. Imagine the challenges abroad. Design must reexamine material specifications to assess cheaper and more readily available substitutes. Further, they must examine possibilities to reduce the hardware complexity without jeopardizing performance.

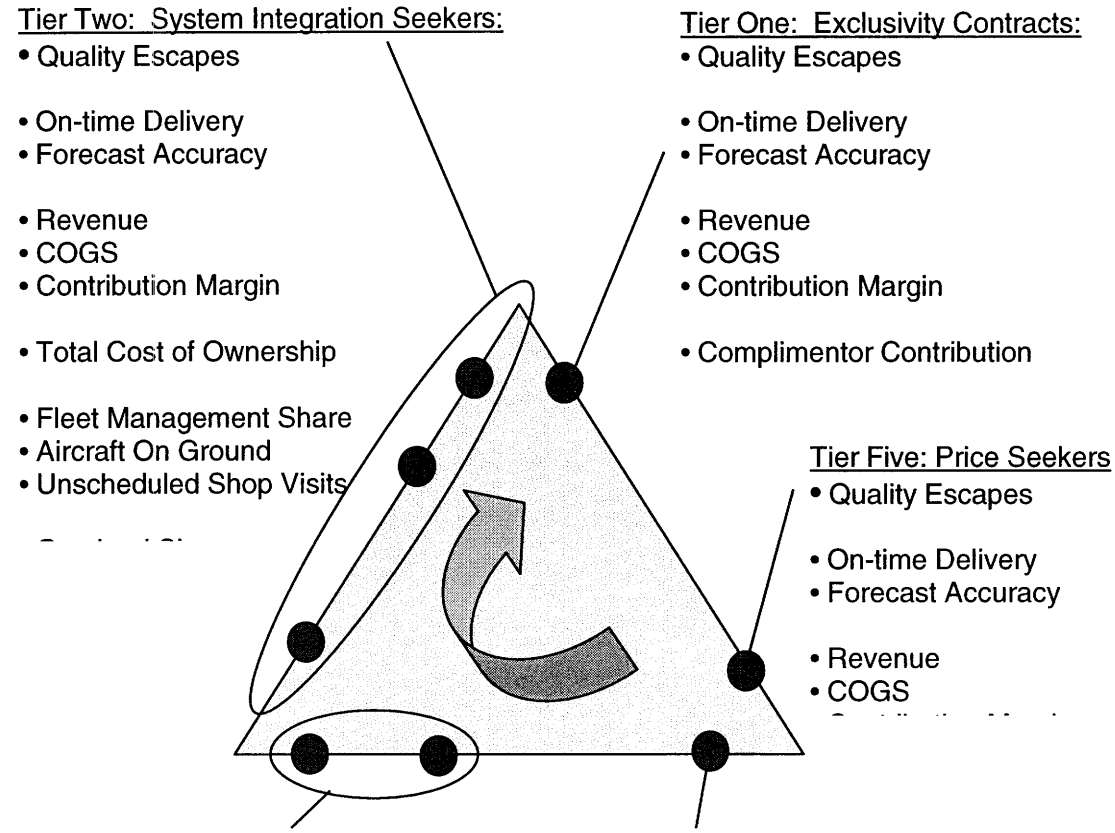
De-commoditizing the Commercial Jet Engine Business
The Balanced Score Card

The Balanced Score Card

It has long been said that "measurement drives behavior" and while this might be true, the temptation of management is often to over or under emphasize a given metric. Over emphasizing usually takes place when a management team employs too many measures and ends up diluting the meaningful measures. These managers utilize literally dozens of metrics that end up confusing employees with a lack of focus. Under emphasizing usually results when management focuses too heavily on one metric at the expense of others. The common mistake is for management to focus exclusively on finance, forgoing proper emphasis on quality and safety, for example. We've all seen management struggle to find the right measure, but one of the major "AH-HA's" in the Delta Model is simple segmentation. Perhaps many companies have had the correct scorecard all along, but they weren't segmenting the measures properly. For instance at least one of the "big three" engine makers aligns a mammoth organization around delivery metrics. They measure delivery performance at the highest level and boast a 96% on-time delivery! The untrained eye would assess that performance as "very good", yet there are still unhappy customers. In keeping with the Delta Model teachings we explore a new balanced scorecard.

Customer metrics should be customized and segmented along customer tiers to measure the customer experience in the eyes of customer. For example, Tier Two customers have different expectations that that of Tier Five. If a Mechanic at a Tier Five overhaul shop accidentally damages a part that was not forecasted for need, the customer carries the burden of the impact. However, under a Fleet Management Program agreement or on a leased asset within the Tier Two customer segmentation, it is the responsibility of the OEM to anticipate such events and carry appropriate inventory to recover in a seamless manner.

Figure Fifty: Segmented Customer Metrics:



The balance of the company metrics should be segmented and managed at the lowest possible level of the organization so that people can align themselves with a meaningful measure.

De-commoditizing the Commercial Jet Engine Business
Conclusion

Conclusion:

The opening sentence in chapter one of the "Delta Project" states:

"The Delta Model encompasses a set of frameworks and methodologies that we have developed in recent years to help managers articulate and implement effective corporate and business strategies"

This Thesis has utilized those frameworks and methodologies to better understand the changing forces within the jet engine market; and to formulate strategies to de-commoditize the product and better serve the customers.

The process in review:
The framework makes the customer the central theme of the strategy and facilitates a process of customer segmentation in order to customize offerings to a given strategic position on the Delta Model. This strategy, if executed appropriately, will increase customer bonding at each position and enhance both customer value proposition and OEM business models.

Once you have an excellent understanding of the customer tiers you move to the bundle of competencies. This is an eye opening experience that defines the gap between whom you are as a company and who you need to become. It is here where the first "ah-ha" takes place.

From there we moved to the mission and the strategic agenda where you employ the tactical methodologies required making the transformation from "existing to desired". This force's you to assess all functional groups and resources required to succeed in the transformation. It also facilitates focus.

Once you understand the strategic agenda, you move to customer targeting. Customer targeting assesses the necessary means to attract and delight desired customers in both a horizontal and vertical fashion. This leverages the aforementioned learning and affords you

the ability to hone in on a given customer segment with specialized offerings that command premiums.

Assessing operational effectiveness forces you to look into your supply base and completely understand the market, economic, competitive, regulatory and government factors associated with securing the capability with the chain to deliver on the desired outcome.

Lastly there is a very important section that is purposely missing from this thesis entitled "financial evaluation". This is a critical element of the Delta Model, because it quantifies the cost and savings associated with the strategy and tactics. It was left out of the published thesis for obvious reasons.

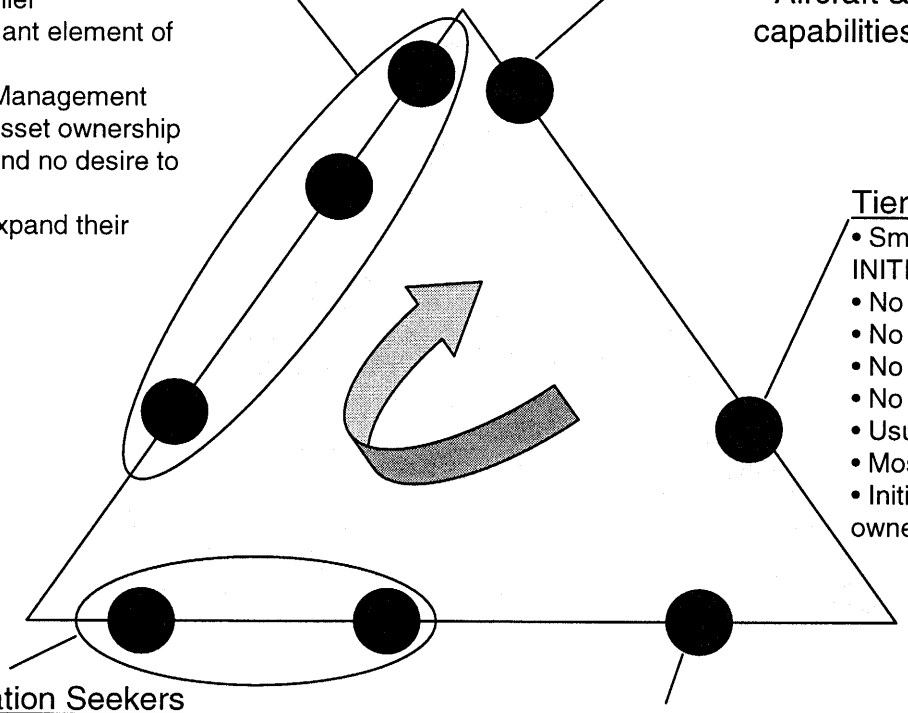
The findings:
In following this process we were able to develop a clear strategy to achieve de-commoditization of the engine business. The critical factors include:

- Flawless execution
- GMS
- Ease of doing business
- Differentiating Technology (Low-cost of ownership, GTF)
- Business Integration (IT)
- Customer Financing

Executing on these factors and delivering customized treatment to segmented customer tier will ensure increased customer bonding. This increase in customer bonding will yield increased revenue and premium prices tied to specialized services.

The balance of the Thesis outlines data and methodology required to achieve excellence in each of the critical factors.

Ideal Customer Segmentation



Tier One: Exclusivity Contracts:
- Airframe exclusivity
- Partner with airframes, not airliners
- Life of program deal with performance incentives
- Aircraft & engine propulsion overhaul capabilities

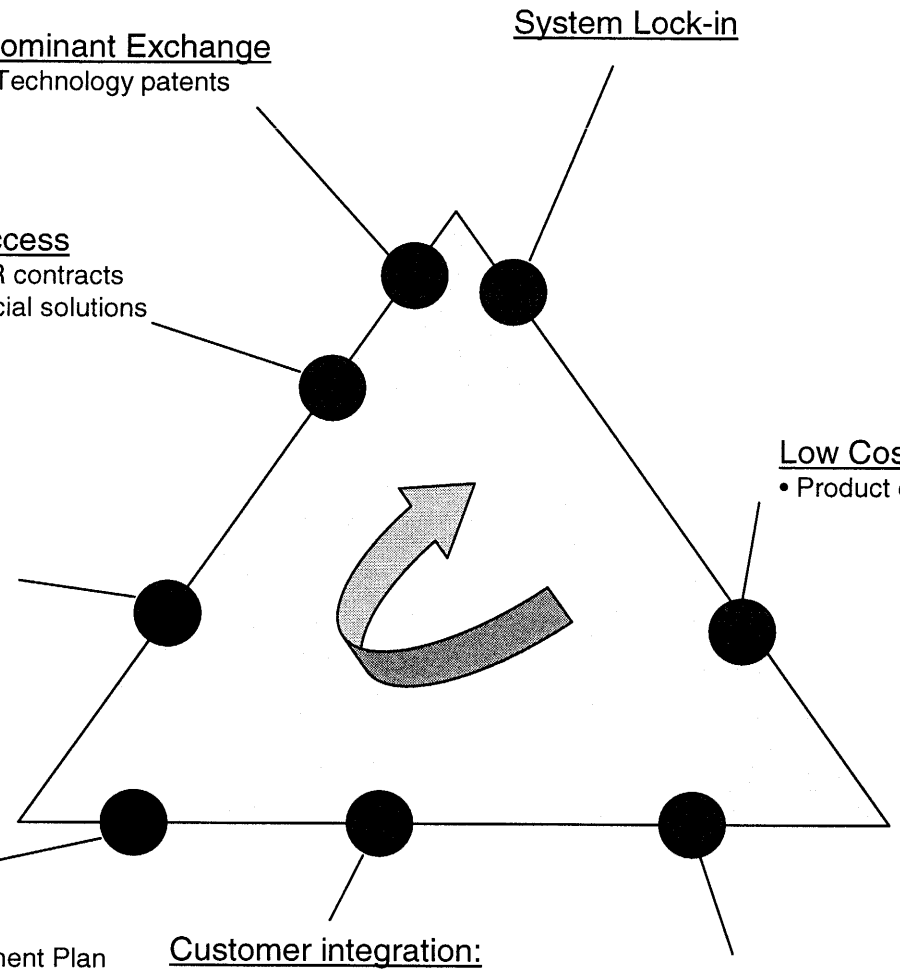
Tier Two: System Integration Seekers:
- Small, medium & large firms that seek to maximize integration to minimize total cost of operating the enterprise.
- Value brand loyalty and seek very long-term relationships with exclusive supplier
- Have little interest in managing ant element of the propulsion system
- Exclusively interested in Fleet Management Programs and will not consider asset ownership
- Have no overhaul capabilities and no desire to enter that sector of the chain.
- Challenge the supply base to expand their breadth of service

Tier Five: Price Seekers
- Small, medium & Large firms that buy on INITIAL product price alone
- No brand loyalty - multiple engine suppliers
- No interest in integration
- No interest in long term agreements
- No interest in Fleet Management Programs
- Usually buy low-end options
- Mostly own their own overhaul facilities
- Initial price is MORE important than total cost of ownership

Tier Three: Component Integration Seekers
- Small, medium & large firms that seek integration to minimize total cost of operating the engine
- Value options that cost more initially, but save money over the life of operation
- Value brand loyalty
- Seek opportunities to outsource non-core operations
- Interested in Fleet Management Programs
- Some have limited overhaul capabilities or are trying to exit larger operations
- Focused on Total Cost of Ownership

Tier Four: Cost of Ownership Seekers:
- Small, medium & large firms that buy on TOTAL cost of ownership
- Value options that cost more initially, but save money over the life of operation
- Low brand loyalty – multiple engine suppliers
- Little interest in integration
- Little interest in Fleet Management Programs
- Usually own their own overhaul facilities
- Totally focused on TOTAL cost of ownership

Current Bundle of Competencies



Dominant Exchange
- Technology patents

System Lock-in

Restricted Access
- Exclusive O&R contracts
- Creative financial solutions
- Installed base

Low Cost Position:
- Product cost advantage not apparent

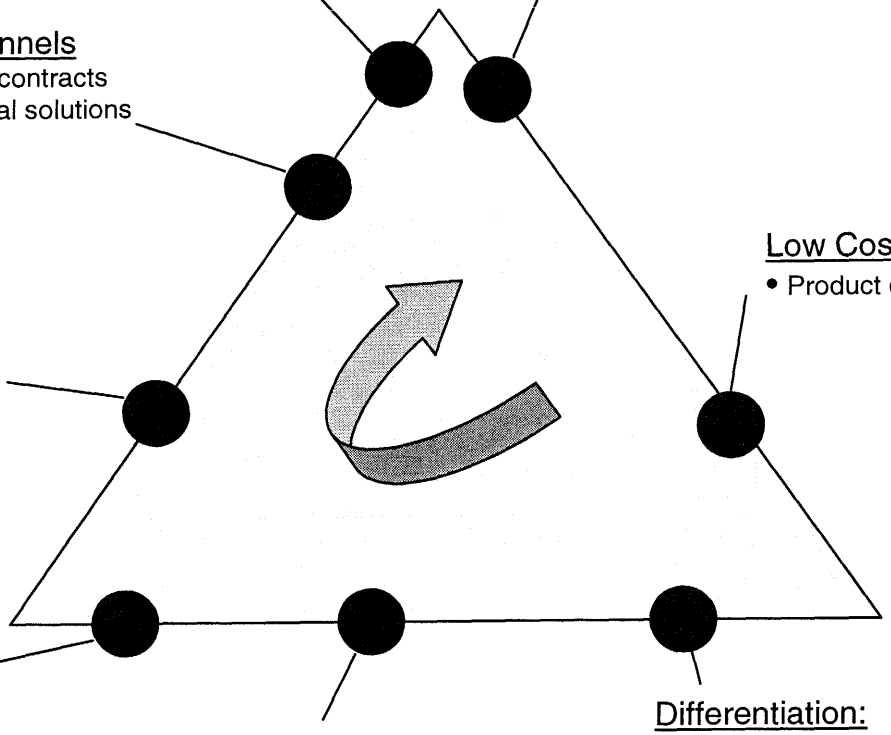
Horizontal breadth
- Maintenance Centers
- Fleet Management Programs
- Engine Steam Cleaning
- Global Service Partners
- Leasing Options

Customer engagement:
- Warranty policy
- Electronic Maintenance Management Plan (eMMP)
- Customer service representatives co-located at or near every customer
- Customer support centers
- 24/7/365 representative availability

Customer integration:
- Engine Management Programs
- Automated distribution centers
- Joint forecasting and planning
- Joint re-stock tactics
- O&R capabilities

Differentiation:
- Lightest weight and most advanced nacelle (PW4168)
- Lowest cost of ownership (PW2000)
- Lowest cost of ownership (PW6000)
- Cost of ownership advantages not apparent on other models

Ideal Bundle of Competencies



Dominant Exchange
- Technology patents
- UTC Capital

System Lock-in
- Integrated and committed network of Partner Complimentors

Exclusive Channels
- Exclusive O&R contracts
- Creative financial solutions
- Installed base

Low Cost Position:
- Product cost advantage not apparent
  - Rapid Low-cost sourcing migration
  - Re-design efforts to reduce cost
  - Additional partnerships (penny parts)

Horizontal breadth
- Maintenance Centers
- Fleet Management Programs
- Engine Steam Cleaning
- Global Service Partners
- Leasing Options
- GMS

Customer engagement:
- Warranty policy
- Electronic Maintenance Management Plan (eMMP)
- Customer service representatives co-located at or near every customer
- Customer support centers
- 24/7/365 representative availability

Customer integration:
- Engine Management Programs
- Automated distribution centers
- Joint forecasting and planning
- Joint re-stock tactics
- O&R capabilities

Differentiation:
- Lightest weight and most advanced nacelle (PW4168)
- Lowest cost of ownership (PW2000)
- Lowest cost of ownership (PW6000)
- Cost of ownership advantages not apparent on other models
- Keep the fleet running:
  - Bolt-on's to achieve best-in-class emissions, noise and fuel burn
    - Hush kits; TALON II etc.
- New platforms:
  - GTF
- Segmented execution

VALUE PROPOSITION

Customer Tier Five	Value Proposition Elements
Set of <u>experiences</u> we will provide to the tier	❑ Low cost products ❑ Very good tactical execution ❑Advanced technology solutions ❑ Automated Order Entry & Tracking (ease of doing business) ❑ Clear POC at OEM
Set of <u>value delivery systems</u> needed to provide the experiences	❑ Lower cost sourcing strategy ❑ Improved execution ❑ Re-organization of customer service organization
Value appropriation	**Value gained by the customer** ❑ Recurring overhead reduction ❑ Margin expansion ❑Less operating disruptions ❑ Increased revenue
	Value gained by us ❑ Increased Revenue ❑ Increased profitability ❑ Opportunity to move customers to lower tiers ❑ Low-cost sourcing network ❑ International offset opportunities ❑ International partnerships
	Value gained by both ❑ Increased revenue ❑Increased margins ❑Cost competitiveness

VALUE PROPOSITION

Customer Tier Four	Value Proposition Elements
Set of <u>experiences</u> we will provide to the tier	❑ Low cost products ❑ Very good tactical execution ❑Advanced technology solutions ❑ Automated Order Entry & Tracking (ease of doing business) ❑ Clear POC at OEM
Set of <u>value delivery systems</u> needed to provide the experiences	❑ Lower cost sourcing strategy ❑ Improved execution ❑ Re-organization of customer service organization
Value appropriation	**Value gained by the customer** ❑ Recurring overhead reduction ❑ Margin expansion ❑Less operating disruptions ❑ Increased revenue
	Value gained by us ❑ Increased Revenue ❑ Increased profitability ❑ Opportunity to move customers to lower tiers ❑ Low-cost sourcing network ❑ International offset opportunities ❑ International partnerships
	Value gained by both ❑ Increased revenue ❑Increased margins ❑Cost competitiveness

VALUE PROPOSITION

Customer Tier Three	Value Proposition Elements
Set of <u>experiences</u> we will provide to the tier	❑ Low cost products ❑ **Excellent** tactical execution ❑ Advanced technology solutions ❑ **Overhaul & Repair Capabilities** ❑ **Fleet Management Programs** ❑ Automated Order Entry & Tracking (ease of doing business) ❑ Clear POC at OEM ❑ **Leasing options**
Set of <u>value delivery systems</u> needed to provide the experiences	❑ Lower cost sourcing strategy ❑ Improved execution **and additional inventories** ❑ Re-organization of customer service organization ❑ **Joint re-stock activities** ❑ **Joint forecasting and planning activities**
Value appropriation	**Value gained by the customer** ❑ Recurring overhead reduction ❑ Margin expansion ❑ Less operating disruptions ❑ Increased revenue ❑ **Increased focus on core competency** ❑ **Less "operations" management focus** ❑ **Leaner more focused structure**
	Value gained by us ❑ Increased Revenue ❑ Increased profitability ❑ Opportunity to move customers to lower tiers ❑ Low-cost sourcing network ❑ International offset opportunities ❑ International partnerships ❑ **Fleet management experience/knowledge**
	Value gained by both ❑ Increased revenue ❑ Increased margins ❑ Cost competitiveness ❑ **Improved customer offerings**

VALUE PROPOSITION

Customer Tier Two	Value Proposition Elements
Set of <u>experiences</u> we will provide to the tier	❑ Lower cost product and service ❑ **Improved logistics planning** ❑ Excellent tactical execution ❑ Advanced technology solutions ❑ Overhaul & Repair Capabilities ❑ Fleet Management Programs ❑ Automated Order Entry & Tracking (ease of doing business) ❑ Clear POC at OEM ❑ Leasing options ❑ **Geared Turbo Fan Technology** ❑ **Financing options**
Set of <u>value delivery systems</u> needed to provide the experiences	❑ Lower cost sourcing strategy ❑ Improved execution and additional inventories ❑ Re-organization of customer service organization ❑ Joint re-stock activities ❑ Joint forecasting and planning activities ❑ **GTF development** ❑ **Creation of the UTC Capital Group**
Value appropriation	**Value gained by the customer** ❑ Recurring overhead reduction ❑ Margin expansion ❑ Less operating disruptions ❑ Increased revenue ❑ Increased focus on core competency ❑ Less "operations" management focus ❑ Leaner more focused structure ❑ **Improved cash flows** ❑ **More investment options**
	Value gained by us ❑ Increased Revenue ❑ Increased profitability ❑ Opportunity to move customers to lower tiers ❑ Low-cost sourcing network ❑ International offset opportunities ❑ International partnerships ❑ Fleet management experience/knowledge ❑ **Market expansion** ❑ **Premiums**
	Value gained by both ❑ Increased revenue ❑ Increased margins ❑ Cost competitiveness ❑ Improved customer offerings

VALUE PROPOSITION

Customer Tier One	Value Proposition Elements
Set of experiences we will provide to the tier	❑ **One stop shopping** ❑ **Fully integrated partnership (IT to financing)** ❑ **Zero propulsion management over-site/concern** ❑ **State-of-the art propulsion offering** ❑ **Lowest cost of operation**
Set of value delivery systems needed to provide the experiences	❑ Lower cost sourcing strategy ❑ Improved execution and additional inventories ❑ Re-organization of customer service organization ❑ Joint re-stock activities ❑ Joint forecasting and planning activities ❑ GTF development ❑ Creation of the UTC Capital Group
Value appropriation	**Value gained by the customer** ❑ Recurring overhead reduction ❑ Margin expansion ❑ Less operating disruptions ❑ Increased revenue ❑ Increased focus on core competency ❑ Less "operations" management focus ❑ Leaner more focused structure ❑ Improved cash flows ❑ More investment options ❑ **Better customer offering**
	Value gained by us ❑ Increased Revenue ❑ Increased profitability ❑ Opportunity to move customers to lower tiers ❑ Low-cost sourcing network ❑ International offset opportunities ❑ International partnerships ❑ Fleet management experience/knowledge ❑ Market expansion ❑ Premiums ❑ Exclusive contracts
	Value gained by both ❑ Increased revenue ❑ Increased margins ❑ Cost competitiveness ❑ Improved customer offerings

BUSINESS DIMENSION OF THE CUSTOMER TIER

Customer Dimension	Customer Tier: Five
Products	Standard engine offering at low cost, low margin. Spare sales at full margin
Services	Overhaul and repair functions on T&M contract offering
Customers	Small, medium and large firms that buy on initial price only
Channels	Direct and some limited distributors for out of production spares
End Users	Air line customers and cargo transports
Complementors	N/A
Unique Competencies	N/A

BUSINESS DIMENSION OF THE CUSTOMER TIER

Customer Dimension	Customer Tier: Four
Products	Standard engine offering at low cost, low margin. Product upgrades to enhance fuel burn, emissions and noise Spare sales at full margin
Services	Overhaul and repair functions on T&M contract offering
Customers	Small, medium and large firms that buy on total cost of ownership
Channels	Direct and some limited distributors for out of production spares
End Users	Air line customers and cargo transports
Complementors	N/A
Unique Competencies	N/A

BUSINESS DIMENSION OF THE CUSTOMER TIER

Customer Dimension	Customer Tier: Three
Products	Standard engine offering at low cost, low margin. Product upgrades to enhance fuel burn, emissions and noise Spare sales at full margin
Services	Fleet Management Programs Overhaul and repair functions on Long-term Agreements
Customers	Small, medium and large firms that buy on total cost of ownership and seek supply chain integration to outsource non-core operation to maximize operating efficiency
Channels	Direct and some limited distributors for out of production spares
End Users	Air line customers and cargo transports
Complementors	Third Party Logistics Companies Third Party Overhaul & Repair Companies
Unique Competencies	N/A

BUSINESS DIMENSION OF THE CUSTOMER TIER

Customer Dimension	Customer Tier: Two
Products	Standard engine offering at low cost, low margin. Product upgrades to enhance fuel burn, emissions and noise Spare sales at full margin
Services	Fleet Management Programs Exclusive overhaul and repair contracts EMMP programs Leasing programs Engine Washing Joint material planning Integrated forecasting
Customers	Small, medium and large firms that seek to maximize integration to minimize total cost of operating the enterprise
Channels	Direct
End Users	Air line customers and cargo transports
Complementors	Third Party Logistics Companies Third Party Overhaul & Repair Companies Suppliers/Partners
Unique Competencies	N/A

BUSINESS DIMENSION OF THE CUSTOMER TIER

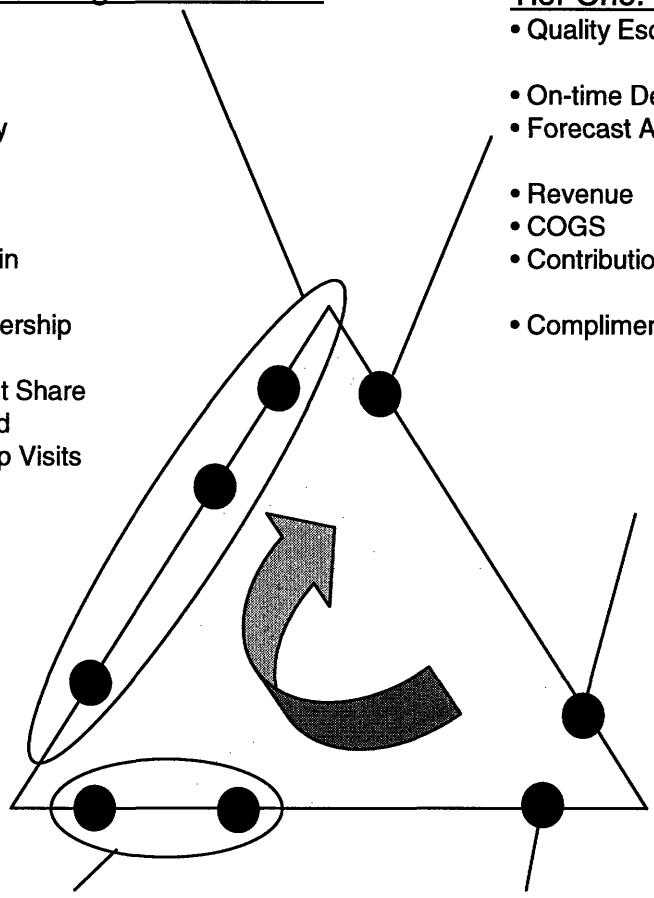
Customer Dimension	Customer Tier: One	
Products	Standard engine offering at low to moderate margins Spare sales at full margin	
Services	Fleet Management Programs Exclusive overhaul and repair contracts EMMP programs Leasing programs	Engine Washing Joint material planning Integrated forecasting
Customers	Initially the air framers… expanded to exclusive airlines	
Channels	Direct	
End Users	Air line customers and cargo transports	
Complementors	Third Party Logistics Companies Third Party Overhaul & Repair Companies Suppliers/Partners	
Unique Competencies	GTF, GMS	

Tier Two: System Integration Seekers:

- Quality Escapes
- On-time Delivery
- Forecast Accuracy
- Revenue
- COGS
- Contribution Margin
- Total Cost of Ownership
- Fleet Management Share
- Aircraft On Ground
- Unscheduled Shop Visits
- Overhaul Share
- GMS Share

Tier One: Exclusivity Contracts:

- Quality Escapes
- On-time Delivery
- Forecast Accuracy
- Revenue
- COGS
- Contribution Margin
- Complimentor Contribution



Tier Five: Price Seekers

- Quality Escapes
- On-time Delivery
- Forecast Accuracy
- Revenue
- COGS
- Contribution Margin

Tier Three: Component Integration Seekers

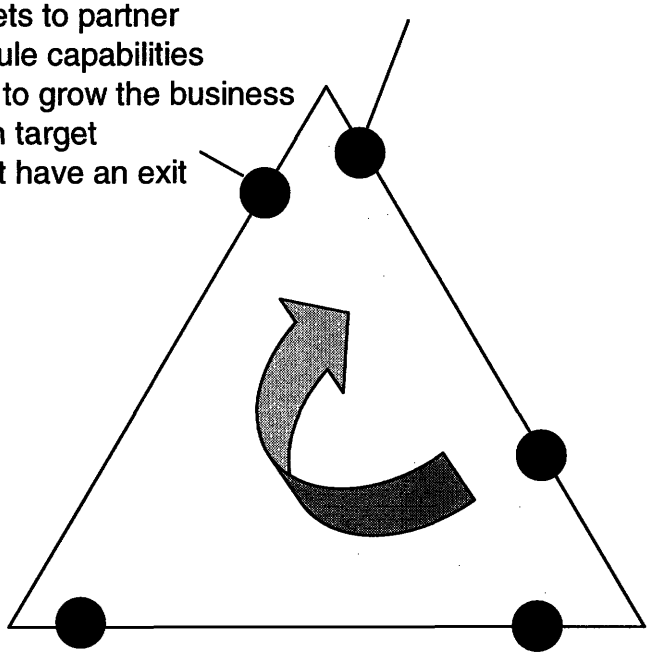
- Quality Escapes
- On-time Delivery
- Forecast Accuracy
- Revenue
- COGS
- Contribution Margin
- Total Cost of Ownership
- Fleet Management Share
- Aircraft On Ground
- Unscheduled Shop Visits

Tier Four: Cost of Ownership Seekers:

- Quality Escapes
- On-time Delivery
- Forecast Accuracy
- Revenue
- COGS
- Contribution Margin
- Total Cost of Ownership

Tier Two: The Globe Trotters
- Usually large businesses
- International low cost sources
- Strategically located in emerging regions
- Ownership could vary:
    - OEM
    - Government
    - Corporate
- Have design capabilities
- Have unique manufacturing capabilities
- Have the assets to partner
- Part and Module capabilities
- Strong desire to grow the business
- An Acquisition target
- Usually do not have an exit strategy

Tier One: Risk Revenue Sharing Partners:
- Large corporately held entities
- Risk – Revenue sharing partnerships
- Module orientation
- Design capabilities
- Strong desire to grow
- Usually not an acquisition target, but possible
- Usually do not have exit strategies



Tier Five: Maintainers
- Small to medium businesses
- Privately held
- Low cost DOMESTIC source
- Part orientation
- No unique manufacturing capability
- Desire to cap growth rate
- Not an acquisition target
- Do not have the assets to partner
- Longer-term strategy is to maintain business for the "next generation"

Tier Three: The innovators
- Medium to Large businesses
- Private or corporate held
- Low cost domestic or international source
- Part and Module orientation
- Some specialized manufacturing capability
- Some design capabilities
- Strong desire to grow the business organically or via acquisition
- An acquisition target
- Have the assets to partner
- Could have an exit strategy

Tier Four: Progressives
- Small to medium businesses
- Privately held
- Low cost DOMESTIC source
- Part orientation
- Some specialized manufacturing capabilities
- No design capabilities
- Some desire to grow the business
- Not a significant acquisition target
- Do not have the assets to partner
- Could have an exit strategy

Workshop #3

MISSION OF THE BUSINESS

THE MISSION OF THE BUSINESS

The mission of the business is to provide dependable engines and engine service to the world wide customer base and make competitor's engines more dependable with superior technology and flawless execution.

THE MISSION OF THE BUSINESS

	Now	Future
Product Scope	Engines: PW2000, V2500, PW4000, PW6000, GP7000 Spares: All Legacy PW Spares	Engines: PW2000, V2500, PW4000, PW6000, GP7000, GTF Spares: All Legacy PW Spares, GTF Spares
Services Scope	Engine and Fleet Management Programs, Comprehensive Overhaul & Repair capability for PW & Competitor product Engine Washing and eMMP	Engine and Fleet Management Programs, Comprehensive Overhaul & Repair capability for PW & Competitor product Engine Washing and eMMP GMS
Customer Scope	Global Air framers and Airlines, Leasing Companies and Limited Distributors… minimal segregation.	Global Air framers and Airlines, Leasing Companies and Limited Distributors segregated by customer tier
End-User Scope	Air line customers and cargo carriers	Air line customers and cargo carriers
Channel Scope	Majority of sales are Direct to Airlines Limited distributor agreements on out of production spares	Majority of sales are Direct to Airlines Limited distributor agreements on out of production spares
Complementor Scope	Limited risk-revenue sharing partnerships Limited design and investment capacity/capability in the supply chain	Expanded risk-revenue sharing partnerships Comprehensive design capability and capacity in the supply chain
Geographical Scope	Global sales North American centric suppliers	Global sales Eastern Europe and Asian centric suppliers
Unique Competencies	Minimal	GMS, GTF

THE MISSION OF THE BUSINESS

Scope	Priority	The Product, Consumer, Channel or Geographical Location...
Existing	--	... is being divested or exited from
	-	... will be assigned to a low level of importance
	E	... will continue to receive the current level of resources
	+	... is assigned a high level of importance and additional resources to achieve a better competitive position
	++	... is assigned the highest level of importance and the resources needed to achieve as outstanding a competitive position as possible.
New	--	... is very tentatively considered for business activity
	-	... is tentatively considered for business activity
	E	... will receive the necessary level of resources
	+	... will be assigned a high level of importance and the necessary resources to achieve a strong competitive position
	++	... will be assigned the highest level of importance and the resources needed to achieve as outstanding a competitive position as possible

THE MISSION OF THE BUSINESS

Existing Product Scope	--	-	E	+	++
PW2000 Engines		■			
V2500 Engines					■
PW4000 Engines			■		
PW6000 Engines				■	
GP7000 Engines			■		
All Legacy Spares					■

THE MISSION OF THE BUSINESS

New Product Scope	--	-	E	+	++
GMS					
GTF					

THE MISSION OF THE BUSINESS

Challenges from Changes in Product Scope
There are some developmental challenges associated with the launch of GMS. In short, the worst thing that could happen to PW's GMS business is to have a product failure or a significant delay in production out of the gate. However, early indications and milestone testing support PW's published statements that the program is well in hand. The real challenge here resides in the "game theory". What is the competitor going to do in response. Surely they will not sit idly by while PW profits from their market share. They will likely drop the prices and launch similar tactics on PW's spares business.
There are significant technical challenges associated with GTF technology. This is ground braking technology that has never been done. If successful, it will deliver a significant competitive advantage. If it is unsuccessful, it could result in an substantial set-back that would further erode PW's market share. There are supply chain challenges as well. PW needs to substantially increase the number of tier one complimetors (design and investment capabilities) to bring this technology to market with appropriate levels of FIA.

THE MISSION OF THE BUSINESS

Existing Services Scope	--	-	E	+	++
Engine and Fleet Management Programs					
Comprehensive O&R capabilities for PW and competitor product					
Engine washing and emmp					

THE MISSION OF THE BUSINESS

New Services Scope	--	-	E	+	++
GMS					

THE MISSION OF THE BUSINESS

Challenges from Changes in Service Scope
The challenge here is two fold. a.) Convincing legacy airlines that they should not own their own overhaul and repair shops is a significant challenge. And even if you are able to convince them, getting through their labor commitments can be a daunting task. b.) This is about execution. Execution as measured by quality and turn-times is a differentiating factor in this business. It is a weapon that nobody has been able to achieve or sustain over the long run.

THE MISSION OF THE BUSINESS

Existing Customer Scope	--	-	E	+	++
Boeing					
Airbus					
Global Airlines					
Limited Distributors					

THE MISSION OF THE BUSINESS

New Customer Scope	--	-	E	+	++
Tier one through five focus on specific deliverables					
New customers associated with GMS					

THE MISSION OF THE BUSINESS

Challenges from Changes in Customer Scope
To effectively leverage all the opportunity of a tiered customer approach, PW must commit to the change. This commitment requires a new organizational structure in marketing and customer support. And It requires a more granular metric aligned to customer tiers. This seams obvious and logical, but PW is an old culture that changes slowly.
New and additional GMS customers will only come with demonstrated performance at the launch customer. Word of mouth will carry the news throughout the industry if the news is bad. Advertising and word of mouth will carry the good news to otherwise skeptical customers.
[ ]
[ ]
[ ]
[ ]

THE MISSION OF THE BUSINESS

Existing Channel Scope	--	-	E	+	++
Direct to Air Framers					
Direct to Airlines					
Limited distributor agreements on out-of-production spares					

THE MISSION OF THE BUSINESS

New Channel Scope	--	-	E	+	++
Direct sales to a tiered customer platform					
Exclusivity on new platforms at Air framers					

THE MISSION OF THE BUSINESS

Challenges from Changes in Channel Scope
To effectively leverage all the opportunity of a tiered customer approach, PW must commit to the change. This commitment requires a new organizational structure in marketing and customer support. And It requires a more granular metric aligned to customer tiers. This seams obvious and logical, but PW is an old culture that changes slowly.
Exclusivity on a given airframe requires the full realization of the "ideal bundle of competency". Especially the "execution" competency and the "financing" competency. In addition, geography becomes an important factor as well. There are Asian and European companies that seek geographic offset and therefore having suppliers in Europe, for example, will benefit your customer sales in Europe.

THE MISSION OF THE BUSINESS

Existing Complementor Scope	--	-	E	+	++
Risk revenue sharing partnership					
Risk revenue sharing partnership					
Risk revenue sharing partnership					
Risk revenue sharing partnership					
Risk revenue sharing partnership					

THE MISSION OF THE BUSINESS

New Complementor Scope	--	-	E	+	++
HAL in India - Risk revenue sharing partnership					
Tata in India - Risk revenue sharing partnership					
China Risk revenue sharing partnership					
Singapore Risk revenue sharing partnership					

THE MISSION OF THE BUSINESS

Challenges from Changes in Complementor Scope
The challenge associated with developing complimentors are similar to those challenges associated with executing M&A deals. You need to have willing participants on both sides of the deal and you need to have suppliers capable of technical and financial deliverables. They also need to be able to execute to bring that competency to reality.

THE MISSION OF THE BUSINESS

Existing Geographical Scope	--	-	E	+	++
Global Sales and Support					■
North American Centric Suppliers		■			

THE MISSION OF THE BUSINESS

New Geographical Scope	--	-	E	+	++
Eastern Europe and Asian Centric Suppliers					
Middle East Suppliers					

THE MISSION OF THE BUSINESS

Challenges from Changes in Geographical Scope
The challenge associated with developing new sales in Asia, Eastern and the Mid-East are common to any other challenge…people and politics. You first need to find the right people. People that have or can establish key relationships within the given country and understand and leverage cultural issues. The politics also play a major role in new business development. India represents an example of a historically closed society who's trade policy forbids free trade in some sectors. There are also unwritten laws that you need to overcome. Some countries buy products from their country or continent.

THE MISSION OF THE BUSINESS

Existing Unique Competencies	--	-	E	+	++
None.					

THE MISSION OF THE BUSINESS

New Unique Competencies	--	-	E	+	++
GMS					
GTF					

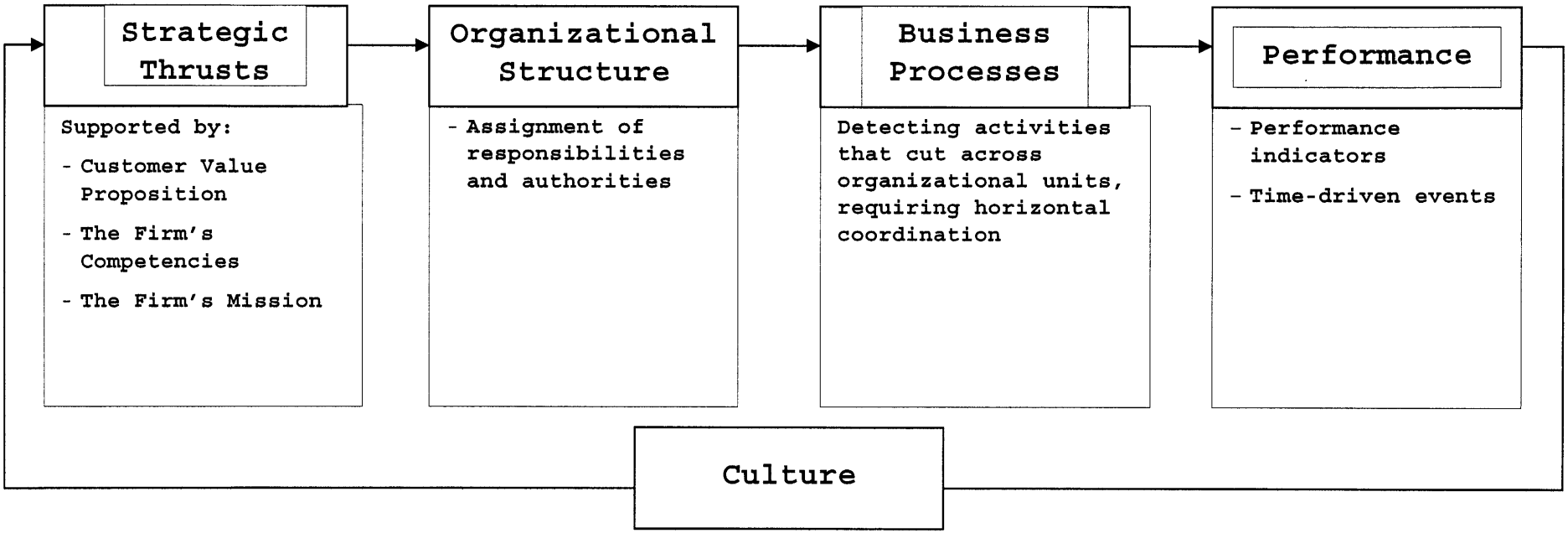
THE MISSION OF THE BUSINESS

Challenges from Changes in Unique Competencies
Executing the development of GMS products.
Executing the development of GTF technologies.

Workshop #4

STRATEGIC AGENDA OF THE BUSINESS

THE COMPONENTS OF THE STRATEGIC AGENDA



CORPORATE STRATEGIC THRUSTS

Corporate strategic thrusts are the primary action-oriented issues the business has to address in order to achieve the desirable strategic positioning.

- **The statement of strategic thrusts should include:**
- **Specific planning challenges - the assignment of responsibilities at the corporate, business, and functional levels for the formulation and implementation of strategic programs addressing each strategic thrust.**
- **Relevant measurements of performance - Identification of appropriate indicators to monitor the operational and strategic results associated with each thrust.**

STRATEGIC AGENDA

Strategic Thrusts	Operations	LCE programs .	Engineering	GTF Programs	HR	Finance	Business Dev.	CEO	GMS Programs	Communications	Marketing									Business Processes	Perform. Measure-ments
Establish low-cost sourcing geographically aligned to the strategic agenda	1	2				2	2			2										B	Purchase Price Variance In country content
Redesigns to reduce cost	2	2	1			2	2													B	Unitized cost
Develop additional complimentors	(1)	2	2				1			2										Oe	Number of Signed partners
Develop bolt-ons to improve emissions, noise and fuel burn	2	(1)	1							2	2									B	Emissions numbers Decibels Fuel burn
Bring GTF to market	1		1	(1)		2	1	1		2	2									B	Sales
Bring GMS to market	1		1			2	2	1	(1)	2	2									B	Sales
Develop Capital						1	2	(1)		2	2									B	Narrow Body win
Recruit and develop talent in support of strategic thrusts	2	2	2	2	1	2	2	2	2	2	2									Oe	?

1 - Key role in formulation and implementation
2 - Important role of support and concurrence
(1) - Identifies the 'Champion', who takes leadership for the strategic

B - Business Model
OE - Operational effectiveness

STRATEGIC AGENDA

Strategic Thrusts	Operations	LCE programs .	Engineering	GTF Programs	HR	Finance	Business Dev.	CEO	GMS Programs	Communications	Sales & Marketing									Business Processes	Perform. Measure-ments
Segment each customer into a specific tier		2					2				1									B	Completion
Organize the sales & Marketing team around customer tiers											1									B	Completion
Restructure the customer score card around tiers – differing questions, different measures of success		1					2				(1)									B	Completion
Establish tier specific performance metrics and align the organization accordingly	2	(1)	2		2		2			2	1									B	Completion
Target tier 2-4 customers vertically, tier 1 customers horizontally			2				2				(1)									B	Sales

1 - Key role in formulation and implementation
2 - Important role of support and concurrence
(1) - Identifies the 'Champion', who takes leadership for the strategic

B - Business Model
OE - Operational effectiveness

ASSIGNMENT OF PRIORITIES TO STRATEGIC THRUSTS

Strategic Thrusts	Priorities			
	A	B	C	Weight
Establish low-cost sourcing geographically aligned to the strategic agenda				
Redesigns to reduce cost				
Develop additional complimentors				
Develop bolt-ons to improve emissions, noise and fuel burn				
Bring GTF to Market				
Bring GMS to Market				
Develop Capital				
Recruit and develop talent in support of strategic thrusts				

A - Absolute first priority (postponement will hurt competitive position significantly).
B - Highly desirable (postponement will affect competitive position adversely).
C - Desirable (if funds were available, competitive position could be enhanced).