

1 Trends & Key Implications

Demand: Sales rose 3% in Q3 on higher global manufacturing output. Wind turbine, mining, and oil & gas orders will drive sales up 2.7% in Q4 and 6.5% annually through 2013.

- Large wind farm projects increased Coupling sales by 4.7%.
- A 3% increase in mining machinery purchases and a 4% rise in Asian construction activity will drive sales of Gears and Couplings up by 3% in Q4.
- A 20% annual rise in output from the Asian mining industry will drive the sales of Parts up 7.5% annually through 2013.

Supply: Capacity rose 1.5% in Q3. Capacity additions will keep pace with demand from 2012 Q1, stabilizing utilization at about 85% compared to 83% in 2011 Q3.

- Rexnord postponed a \$35m expansion project in the US from 2011 Q3 to 2012 Q1 to receive additional government funding.
- Gear and Bearing manufacturers such as SKF are highly dependent on the volatile automotive industry, making them wary of adding new capacity, which will let utilization rise to 85% and 87%, respectively.
- Utilization for Couplings will climb 0.5% per quarter in 2012 to reach 89% at the end of the year due to insufficient capacity additions. This utilization level will be maintained through 2013.

CONTENTS	
1	Trends and Key Implications...1
2	Tips and Recommendations...2
3	Scope Definitions..4
4	Vital Statistics...4
5	Overall Market Assessment...5
6	Gears...22
7	Bearings...32
8	Couplings...42
9	Parts...51
10	Mechanical Seals...61
11	Legend...63
12	Methodological Notes...64

Figure 1: Top Suppliers by Equipment Type

	<u>Gears</u>	<u>Bearings</u>	<u>Couplings</u>	<u>Parts</u>	<u>Mechanical Seals</u>
1	SEW (9%)	NSK (12%)	Rexnord (12%)	Veyance (12%)	Smiths (6%)
2	Sumitomo (7%)	SKF (12%)	KTR (11%)	Tomkins (Gates) (9%)	Freudenberg (4%)
3	Siemens (6%)	Schaeffler (11%)	Siemens (9%)	Fenner (7%)	SKF (4%)
4	MAN (4%)	JTEKT (Koyo) (8%)	Altra (8%)	Tsubaki (7%)	Flowserve (4%)
5	Rexnord (4%)	NTN (7%)	Emerson (7%)	Carlisle (5%)	Trelleborg (3%)

- WEG acquired an Austrian and Brazilian gear manufacturer, enabling it to bundle complete drive and control systems with its motors.
- Timken acquired QM Bearings to benefit from its establish distribution network in the US and China.

Prices: Prices rose 2% in Q3 on an 11% rise in rubber costs and a 6.5% rise for Chinese ferrous materials due to supply disruptions in 2011 H1 and high demand. Prices will rise slower in Q4 and 2012 Q1 at about 1% as falling metal prices alleviates cost pressure on suppliers. Suppliers will raise prices 9% through 2013 based on rising metal and Asian labor costs.

Key Sourcing Recommendations:

1. Discuss a possible agreement with Harbin Bearing, in which Harbin would defer the pass-through of increased labor rates in exchange for a multi-year contract to avoid incurring higher prices due to a minimum 13% annual increase in Chinese labor costs. See next page for detail.
2. Use Fenner's Ultra 140 wedge belts to save 40% energy, thanks to its higher power rating and greater longevity. See next page for detail.
3. Reduce inventory levels of 0.5-16 inch diameter metallic mechanical seals used for ANSI pumps. During H2, John Crane cut lead time for these seals by 25-50%. ANSI mechanical seals orders larger than 500 can be ready in at most two weeks. See next page for detail.

2 Tips and Recommendations

Gears

1. Source gears from manufacturers like Voith Turbo, Flender-Graffenstaden, and Amarillo Gear LLC whose prices will remain steady in 2012 in comparison to Philadelphia Gear, who will raise prices over the next two years, and Lufkin, whose 10% price increases in 2011 will begin to reflect in 2012 Q1.
2. Include WEG with Siemens, ABB, MHI, and Emerson, in bids for projects that require the supply of complete drive and control systems that include electric motors, frequency inverters, and gearboxes. WEG is the number five supplier of electric motors, and has recently entered into the gearing and power transmission industry through various mergers and acquisitions.
3. Buy Voith Turbo BHS's power distribution gear for use in future projects that require the high-power high-speed functionality of parallel shaft gears, such as gas-turbine to compressor applications. The power distribution gear can transmit up to 65 MW of power and has an operating efficiency of 99%, compared to 26 MW of power and 98% operating efficiency for a parallel shaft gear unit in the same application.

Bearings

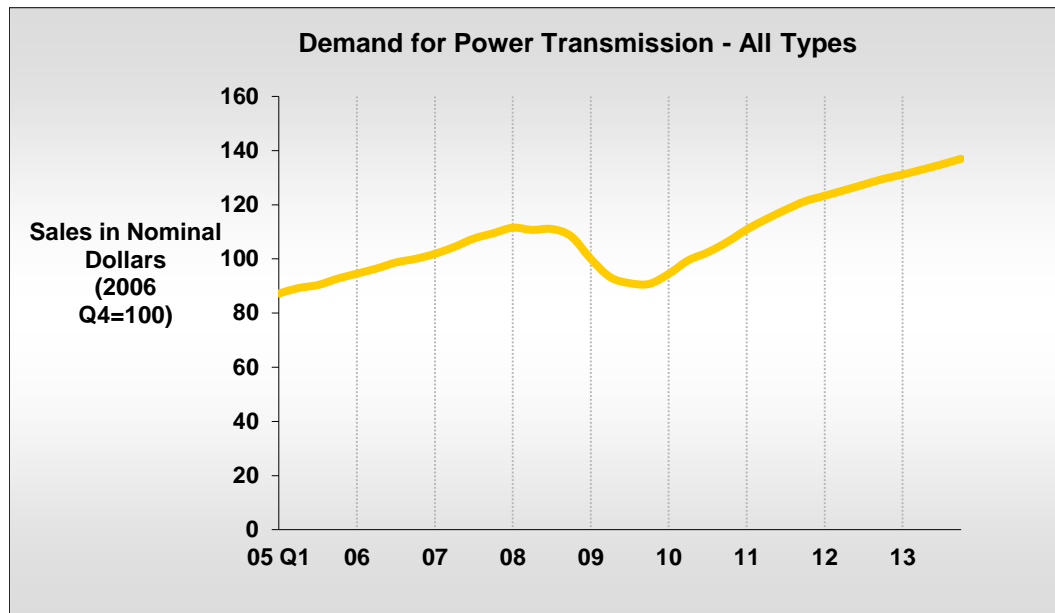
1. Discuss a possible agreement with Harbin Bearing, in which Harbin would defer the pass-through of increased labor rates in exchange for a multi-year contract to avoid incurring higher prices due to a minimum 13% annual increase in Chinese labor costs. Labor costs in its Eastern provinces (most manufacturing facilities are situated here) such as Sichuan and Guangdong will rise faster than the country average. The cost increase will take effect in January each year.
2. Install NSK's new energy efficient bearings for high efficiency motors in a monitored system to compare energy consumption of the equipment with that of standard bearings. NSK claims that it has 50% less friction loss compared to conventional roller bearings, thus saving energy. It also conforms to both IE3 and IE4 efficiency standards, which will be effective in Europe as of 2015 and 2017, respectively.
3. Bundle aftermarket services contract for bearings and seals with purchases from John Crane for lower prices as it has just acquired a bearing and seals service company, Turbo Components and Engineering, and will be looking to break even on incurred costs as soon as possible.

Couplings

1. For applications requiring extremely high torque, use Vulkardan G 84™ coupling launched by Vulcan to reduce wear, tear, and loss of power transmission, which can be used for torque range up to 63k Nm, two to three times higher than available elastomeric models of similar size (54-62cm) from most other suppliers. It uses elastomers that absorb vibrations and its membrane is made up of spring steel preventing axial, radial, and angular misalignments, thus mitigating for example 10% power loss for 5 mm of misalignment corrected.

Parts

1. Use Fenner's Ultra 140 wedge belts to save 40% energy, thanks to its higher power rating and greater longevity. Its inner load bearing chords are made from aramid fiber (strong synthetic fiber), surrounded with chloroprene rubber which provides greater resistance to heat, oils, and chemical exposure, thereby elongating wear life. Their higher power rating allows the use of fewer belts.
2. Use client position as a major customer with Hose Master to negotiate volume discounts for standard corrugated and stripwound metal hoses 2012 Q4 and 2013. Hose Master is currently constructing a new plant in Houston, Texas, that will become operational at the end of the year and lower overall company utilization rates from 80-85% to 75-80%.
3. Order G8K MegaSpiral® hydraulic hoses from Tomkins (Gates) for tight spaces with high temperatures, which leads to 47% cost reductions on increased wear life due to greater flexibility in bending applications. These have shorter overall hose assembly lengths of 18 inches, which is 18% shorter compared to the standard industry average and bends to one half of SAE (Society of Automotive Engineers) specifications. They can work at constant high pressure of 8k psi at high temperatures of 250°F due to its abrasion resistant MegaTuff® covers, which increase hose life and prevent leakage of hydraulic fluids.



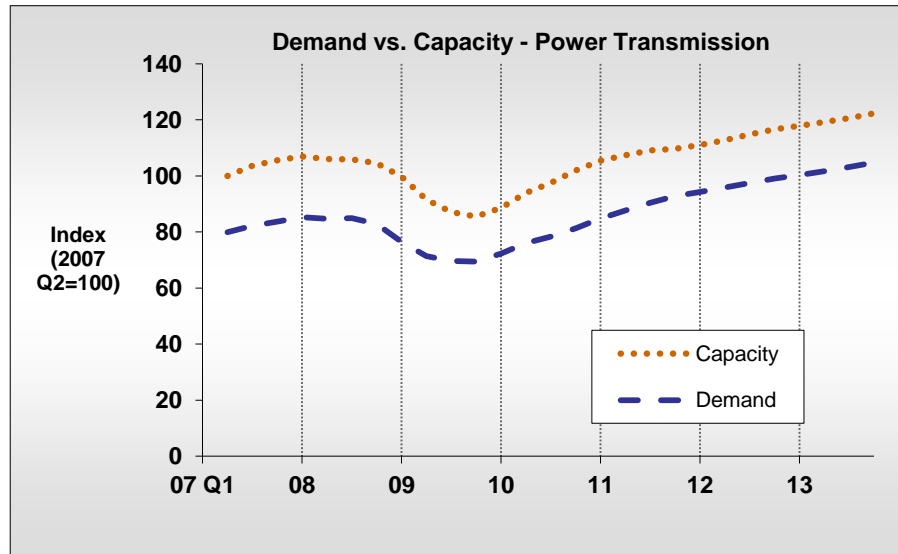
Sales will rise 7% in 2012 and slightly slower at 6% in 2013, supported by 15.5% and 12% growth in global industrial output, respectively. Sales in Asia will rise the fastest at 9.5% annually during the period, compared to 2.5% annually in the Americas and 2% in EMEA.

- The fast growing Asian sales will be driven by power generation projects and a 35% cumulative two-year increase in purchases of industrial machinery and domestic appliances. Activity in the Asian mining industry will also rise 20% annually through 2013, including 56 new mining projects in China.
- EMEA sales growth will drop from 3.4% in 2012 to 1% in 2013, due to the impact on the industry from the trailing sovereign debt crisis of Southern European countries.

5.2 Demand for large Gears and Couplings for wind turbines has led some manufacturers to operate close to full capacity in Q4, although the industry generally has ample spare capacity. Utilization will remain stable at 85% through 2013.

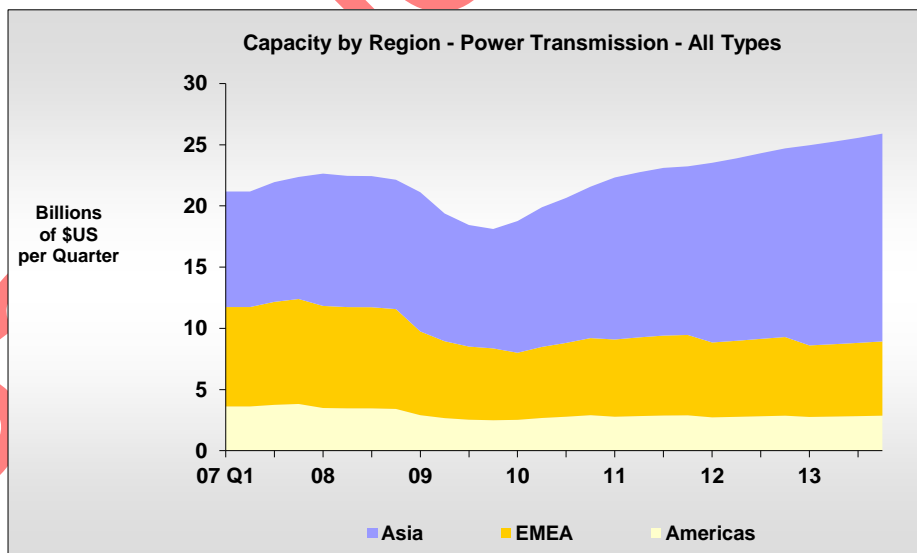
In Q3, ContiTech, Nord, SKF, and Tsubaki, among others, added 1.5% to capacity, responding to demand from power generation and oil & gas customers. ContiTech installed new machines at a German plant and Nord added 50% more floor space at a factory also located in Germany. NSK resumed production at 10 Japanese factories following the interruption of production caused by the Tohoku Bay earthquake in March. SKF opened a bearing manufacturing plant in China, and Japanese Tsubaki opened a facility in the US.

In Q4, industry will only add 0.5% to capacity because available capacity for Bearings will decline 1%, as SKF began reducing its temporary workforce of 4.3k employees due to weak demand for its products by European automakers and accumulating inventories. Total industry capacity will rise 1.3% in 2012 Q1 on additions by Rexnord, Siemens, and SKF.



Overall capacity utilization increased about 1% to 83% in Q3, as the 1.5% capacity added by suppliers was insufficient to keep up with demand growth. The lagging additions of capacity will continue in Q4, letting overall utilization rates in the Power Transmission industry rise to 84.6% before stabilizing at 85% in 2012 Q1. The rise in utilization rates from Q3 to 2012 Q1 will cause a 10.5% drop in capacity margin to \$3.5b.

In Q4 regional capacity utilization rates will align at 84.6% across the world's major regions. EMEA utilization rose as SKF began laying off temporary workers and Asian utilization rose due to fast demand growth. This will lead utilization in both regions to catch up with the rate in the Americas where demand growth will be slow in Q4.



Certain manufacturers are operating close to their full capacity, leaving them vulnerable to bottlenecks, such as Lufkin's troubles with bearing failures and carburizing that capped its production output in Q3. Couplings makers were the most highly utilized at 87% in Q4 and the Parts industry was the least utilized at 82.6%.

- Gear manufacturers Philadelphia Gear, Voith Turbo, and MAN are currently all about 90% utilized, making it difficult for them to accommodate large orders for custom made units.
- Altra Industrial Motion is 90% utilized in the US for its couplings, due to high order volume in Q4.
- Parts manufacturer Parker is about 80% utilized and can easily shift between producing different products, because they are manufactured on the same common machinery.

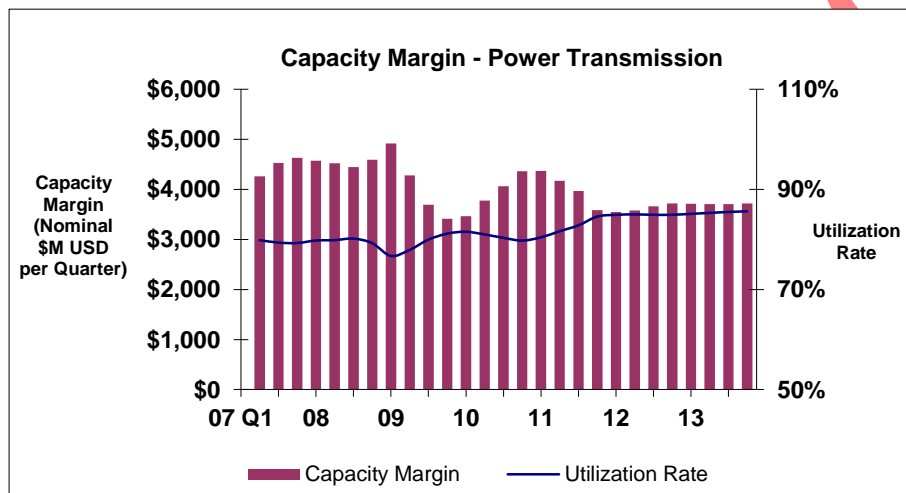


Figure 4: Reported or Estimated Capacity Utilization¹ Rates at Selected Power Transmission Suppliers

Type	Company	Country	Current Level	12-Month Forecast
Gears	Philadelphia Gear	US	90%	90-95%
Gears	MAN	US	90%	90%
Gears	Voith Turbo	Germany	90%	95%
Gears	Amarillo Gear Company	US	80%	85%
Gears	Flender-Graffenstaden	France	65%	60%
Bearings	Messinger (Kingsbury)	US	80%	80%
Bearings	Bearingsplus	US	90%	90%
Couplings	Voith	Germany	90-95%	95%
Couplings	American Vulkan	US	80-85%	95%
Couplings	Altra Couplings	US	85-90%	85%
Parts	Altra Industrial Motion	US	80%	80-85%
Parts	Hose Master	US	80-85%	80%
Parts	Parker	US	80%	80-85%
Parts	Altra Industrial Motion	China	80-85%	85%
Mechanical Seals	John Crane	USA	90%	90%
Mechanical Seals	Eagle Burgmann	USA	80%	80%
Mechanical Seals	Eagle Burgmann	Japan	85%	85%
Mechanical Seals	Eagle Burgmann	Germany	90%	90%

Global capacity will increase 6.3% in 2012 and 5% in 2013. The capacity additions will be sufficient to keep utilization stable at 85% through 2012 and 2013. Capacity will rise fastest in Asia while remaining unchanged in the Americas and even decline in the EMEA region.

- Capacity will rise fastest in Asia at 11% annually while capacity, which will be sufficient to keep regional utilization rates at 85% in 2013, 0.5% higher than in 2011 Q4.
- Capacity will remain unchanged in the Americas, causing utilization to rise the most, reaching 86.4% at the end of 2013, 2% higher than 2011 Q4.
- Capacity will decline 4% annually in EMEA as SKF sheds temporary workers in Europe.

Strong demand from wind turbines will push up utilization rates for Gears and Bearings the most in Q4. Utilization for Gears will rise from 83.7% to 85% and utilization for Bearings will rise from 85.3% to 87%. Capacity utilization will remain unchanged for Mechanical Seals at 86%.

In Q4, utilization for Power Transmission Parts will fall from 82.6% to 81% in 2013, as Gates, ContiTech, and Fenner will add capacity faster than demand grows.

¹ Capacity utilization means output as a percent of possible production where two shifts five days a week equals 100%. This methodology does not consider possible efficiencies from process improvements, which could free up capacity and reduce the effective capacity utilization rate.

5.3 Lead times will largely be unaffected by a \$400m rise in backlogs. Lead times will stay at 11.5-12 weeks through 2013.

Overall backlogs increased \$200m in Q3 to \$1.47b, but lead times for Power Transmission Equipment remained unchanged at 11.4 weeks, as there was still ample spare capacity in the industry with capacity margin at \$4b.

Overall backlogs for Power Transmission Equipment will increase \$400m in Q4 to \$1.85b, but will have little impact on average lead times, as there is still ample spare capacity available with capacity margin at \$3.6b. Lead times will rise by approximately half a day to 11.5 weeks in Q4, and lead times for all the individual categories will also remain steady.

- Lead times for Bearings were the longest at 16 weeks and did not change on the contraction of capacity, because the drop was due to scale backs in automotive bearing production, leaving industrial bearing inventories and lead times unaffected.
- Backlogs for Gears dropped 4.3% and capacity margin in the industry increased 5%, but lead times for API 677 gears held firm at 11.5 weeks. Noteworthy for oil & gas buyers lead times for API 613 gears averages more than twice as much at 32 weeks.
- Low utilization kept lead times for power transmission belts steady at nine weeks.

In Q1, overall backlogs for Power Transmission Equipment will only rise 2% to \$1.88b. Combined with the 1% drop in capacity margin, this will allow overall lead times to extend less than a day to about 11.6 weeks.

Then during 2012 and 2013 overall lead times will remain unchanged at 11.6 weeks, as capacity margin will remain high at \$3.6b - \$3.7b. Backlogs will also decline from their high in 2012 Q1 at \$1.8b to under \$1.7b in 2012 Q4, before stabilizing. Overall lead times in Asia will rise half a week from about 10 weeks to just under 11 weeks while lead times in the Americas will decline from 11 to 10.6 weeks.

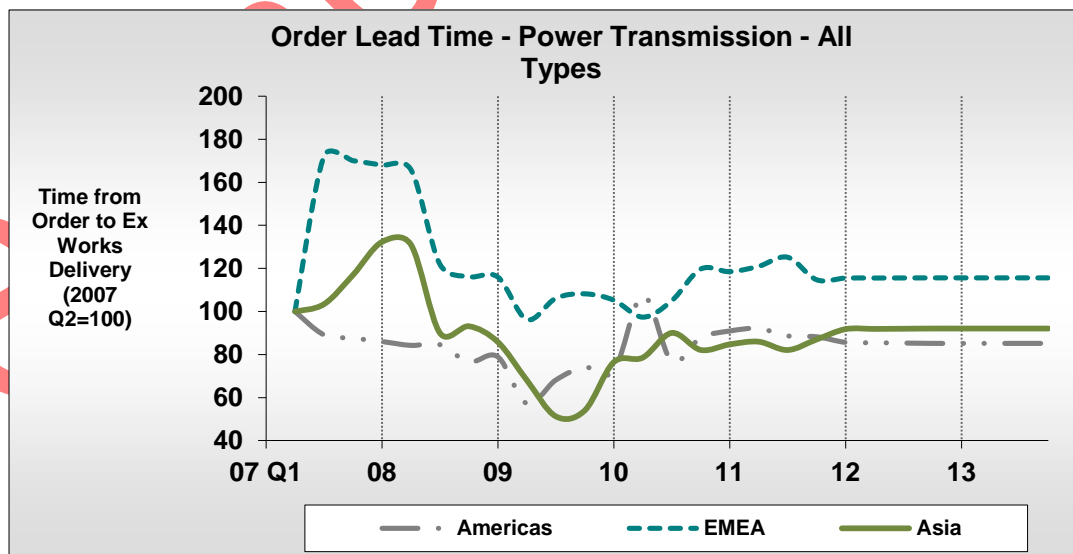


Figure 7: New Product Pipeline – Power Transmission Equipment, All Types

Type	Company	New Product
Gears	Voith Turbo	New power distribution gear with maximum operating efficiency of 99%.
Bearings	NSK	Bearings for use in high-efficiency motors complying with upcoming efficiency standards IE3 and IE4.
Bearings	NTN	New bearing with integrated rotation sensor and outer diameter up to 420 mm allowing for detection of rotation speed without risking damage or breakdown.
Bearing	Rexnord	Shurlok [®] heavy duty ball bearings provide 25% more holding force compared to set screw ball bearings.
Couplings	Vulkan Couplings	Vulkardan G 84 [™] coupling has torque up to 63k Nm, 2.5 times more than competing models such as its own Vulkardan G series.
Coupling	Ameridrive	New U-joint couplings are designed with 50% less bolts to correct misalignment and bear greater torque strains.
Parts	Fenner	New Ultra Plus 140 range of wedge belts transmits 40% more power than its previous wedge belts.
Parts	Tomkins	G8K MegaSpiral [®] hydraulic hoses can operate at 8k psi and have 50% greater bend radius.
Seals	Freudenberg	New FKM [®] material for mechanical seals can withstand coolant temperatures of 200°C, higher than any other available seal.
Seals	Trelleborg	Launched new Isolast [®] perfluoroelastomer seal line.

Sample Report



Boston Strategies International creates global growth opportunities through strategic supply chain management in capital intensive process industries that involve large commitments and long time horizons, such as Oil and Gas, Metals & Mining, and Materials. Our products and services, which are tailored to help make critical decisions that involve investment and risk, include:

- **Management Consulting Services** that helps supply chain leaders make high-stakes decisions related to strategic and capital investments, outsourcing, off-shoring, and make-or-buy.
- **Global Cost, Price, and Market Analysis Products** that help financial and operational managers plan and budget by providing benchmark, best practice, and forecast data tailored to their companies' supply chains.
- **Technology Solutions** that help build and maintain competitive advantage through technological leadership and differentiation.

Services, Products, and Solutions

Management Consulting Services	Cost, Price, and Market Analysis Products	Technology Solutions
<ul style="list-style-type: none"> • Best practices • Capital Investment Analysis • Entry & Exit Strategies • Merger & Acquisition • Organization Development • Policy Planning • Risk Mitigation Strategies • Supply Chain Strategies • Technology Strategies • Training 	<ul style="list-style-type: none"> • Benchmarks • Backlog and Lead Time Forecasts • Capacity Shortage Analysis • Cost Structures • Demand Projections • Market Outlooks • Price Forecasts • Supplier Assessment • Target Price and Should-Cost • Technology Outlooks 	<ul style="list-style-type: none"> • Advanced planning and scheduling • Asset management and pricing • Customer relationship management • Demand planning • Product life-cycle management • RFID • Supplier relationship management • Systems Integration • Transportation Management • Warehouse Management Systems