



Resilient and Sustainable Supply Chain

September 30th 2015

Resilient and Sustainable Supply Chain

Welcome

The presentation will begin promptly at noon Eastern.

Audio:

- There is not an option to listen via your computer.
- Audio Conferencing (toll-free) US: 877 681-0349
- Audio Conference (toll-free) International: 704 288-0599
- Conference ID 29638698

- To view the webinar, you must join via the unique URL provided in your confirmation email.
- If you are having technical issues, please contact WebEx support at 866.229.3239.
- For future Crowe Risk Consulting webinars, visit www.crowehorwath.com/events.
- For information about other upcoming events and webinars, go to www.crowehorwath.com/events or follow us on Twitter @Crowe_Risk.

Housekeeping

- All phones will automatically be muted upon entering the meeting. Please also place your phone on mute if that feature is available to you.
- An email will be sent tomorrow with links to a recording of the webinar, presentation handouts, and topic-related thought leadership.
- Please submit questions or comments through the Q&A function at the right-hand side of your screen.
- Questions will be addressed throughout the presentation and as time permits at the end of the presentation. We are committed to getting back to everyone about any questions we cannot respond to during the presentation.

Housekeeping (cont'd.)

You will be eligible for Continuing Professional Education (CPE) credit if you:

- Log in individually to the session
- Successfully complete at least 75 percent of the polling questions
- Click on the corresponding button to respond to polling questions within the allotted 20-30 seconds

You will not be eligible for CPE credit if you:

- Join only the conference call
- Fail to successfully complete 75 percent of the polling questions
- Fail to remain logged in to the session for the minimum required time
- View a recording of this session (CPE credit is awarded only for live sessions)

Evaluation:

- Upon completion of this program, you will receive an event evaluation.

CPE Certificate:

- The certificate will be emailed to you within two weeks.



Resilient and Sustainable Supply Chain

September 30th 2015

Today's Presenters



**Mike Varney, CIA – Partner, Risk Consulting Group
Crowe Horwath LLP**

Mike has over 20 years of experience in internal audit, risk management, accounting and financial reporting for manufacturing companies. He is currently focused on consulting with clients on addressing their risk and internal audit needs with a focus on Supply Chain related issues.



**Bart Kelly, Principal, Advisory Services
Crowe Horwath LLP**

Mr. Kelly's >20 years of experience includes a wide variety of businesses ranging from \$10 million to \$20 billion. He is responsible for developing client opportunities, determining overall financial impact, designing targeted improvement plans, and ensuring successful execution of engagements that drive measurable bottom line performance improvements.

Learning Objectives

After this session, you should be able to:

- Better identify the critical elements an organization should have in place to achieve a sustainable supply chain. During the webinar will focus and discuss the following areas :
 1. Provide a definition of a sustainable supply chain and review each critical element
 2. Review an approach for analyzing inventory activity to identify supply chain improvements
 3. How to leverage a robust supply chain risk assessment to drive internal audit activities relating to supply chain

Agenda

- Resilient and Sustainable Supply Chain Framework
- Supplier Segmentation
- Risk Assessment and Internal Audit Activities
- Questions

Ever Changing Supply Chain Structures



Source: Crowe analysis

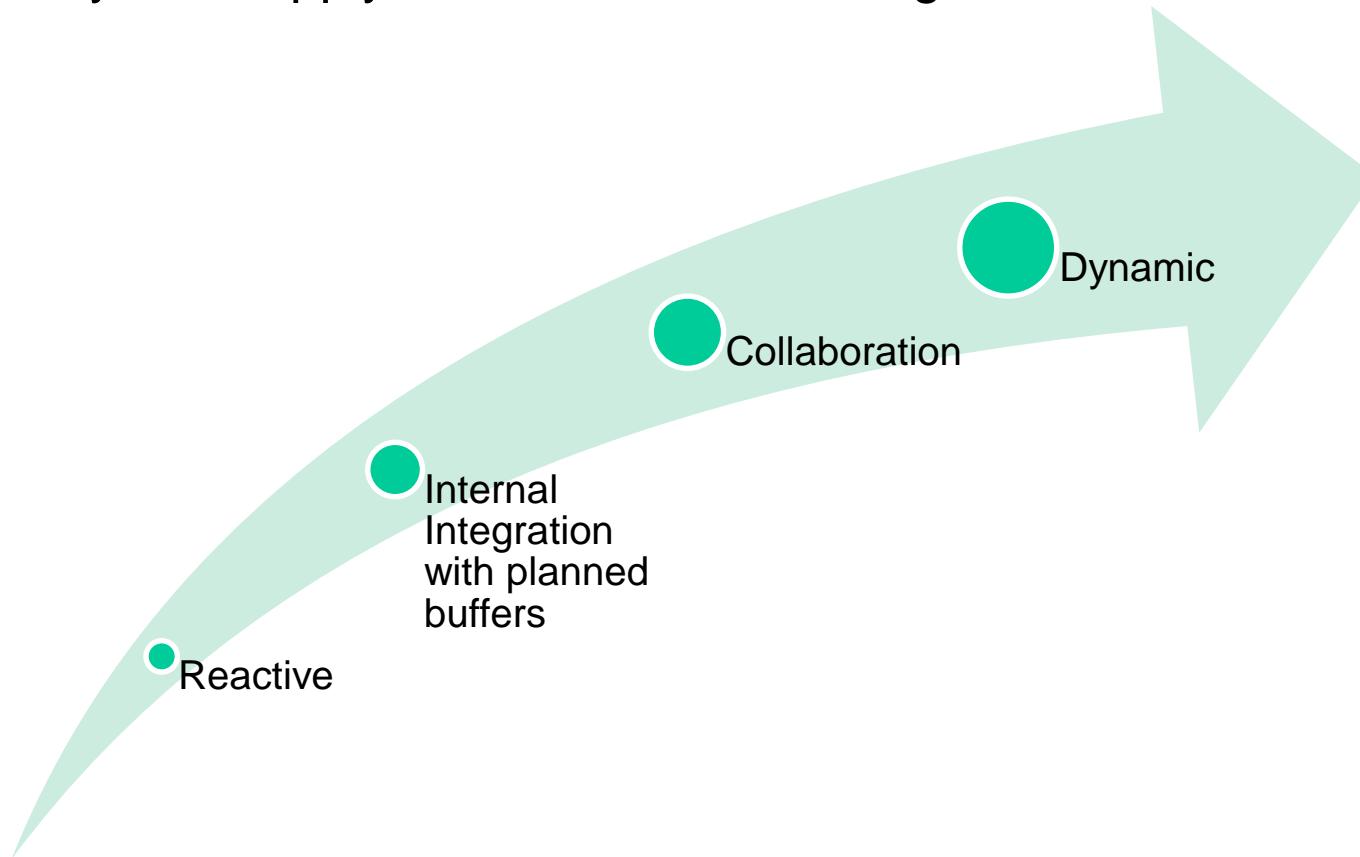
Ever Changing Supply Chain Structures



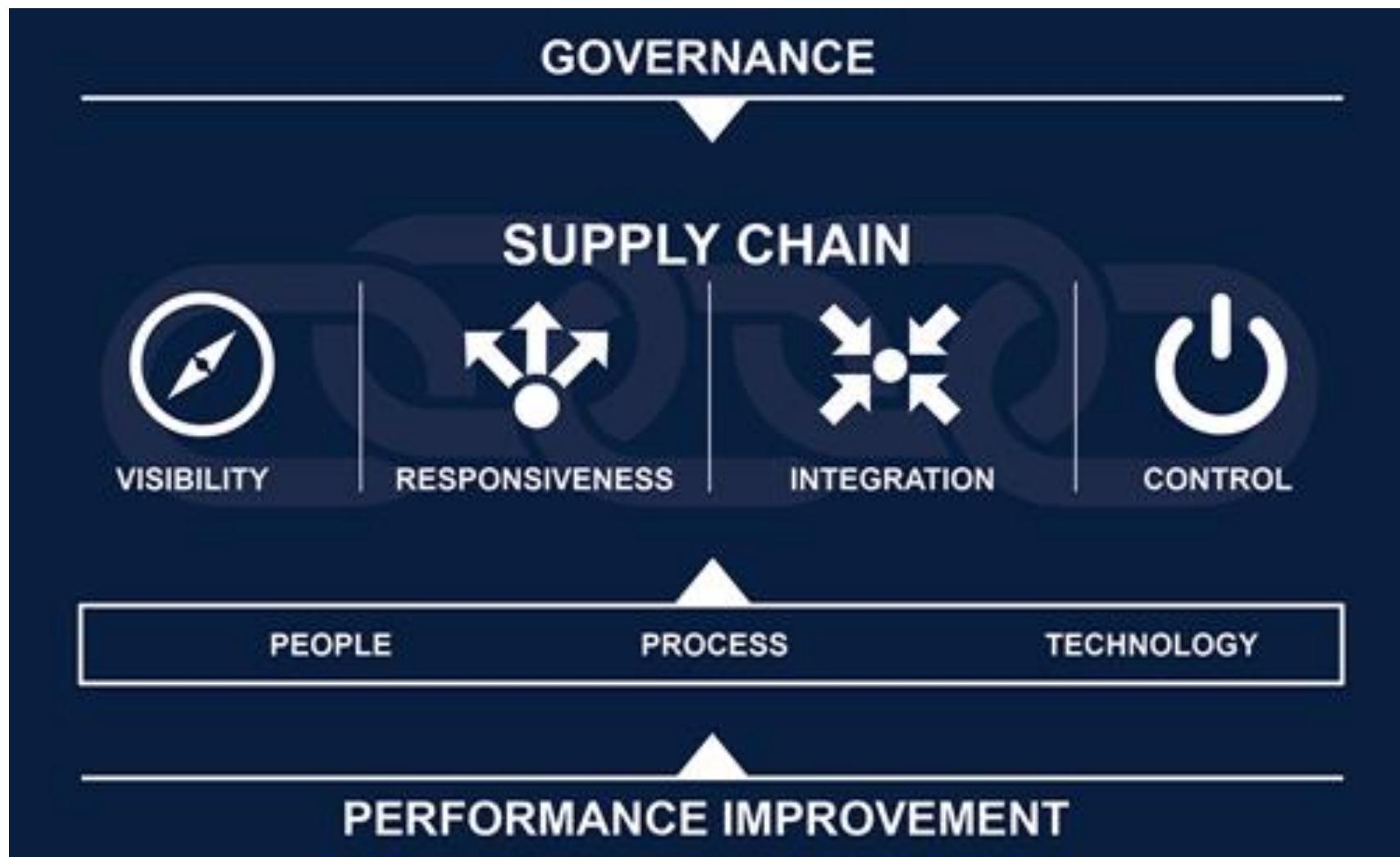
Source: Crowe analysis

Supply Chain Resiliency Defined

The ability of a supply chain to react to change



Sources: GT Nexus, Wieland, A. & Wallenburg, C.M. (2013): *The influence of relational competencies on supply chain resilience: a relational view*. International Journal of Physical Distribution & Logistics Management. Vol. 43, No. 4, pp. 300-320



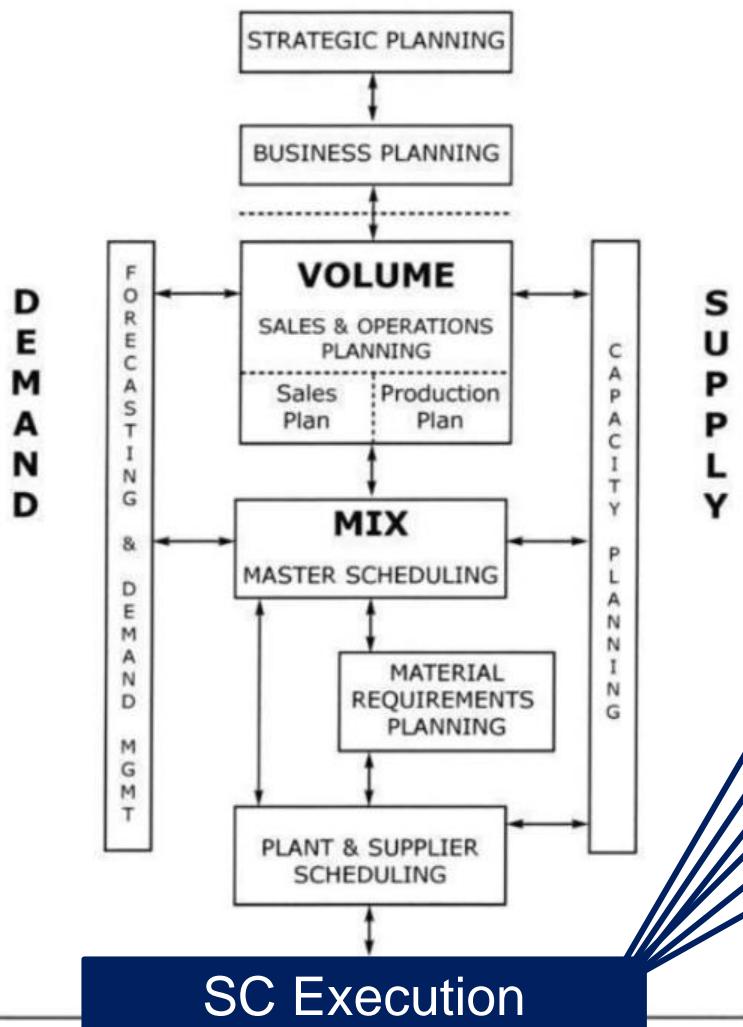
Source: Crowe Horwath LLP

Polling Question 1

What is most likely to affect your supply chains resiliency?

- a.** Lack of visibility across the Supply Chain
- b.** Responsiveness of suppliers to changing demand
- c.** Old or outdated technology tools
- d.** Lack of internal integration between Sales, production, procurement, and distribution
- e.** Control environment not aligned to complexity of organization
- f.** Unsure/don't know

Figure 1-2

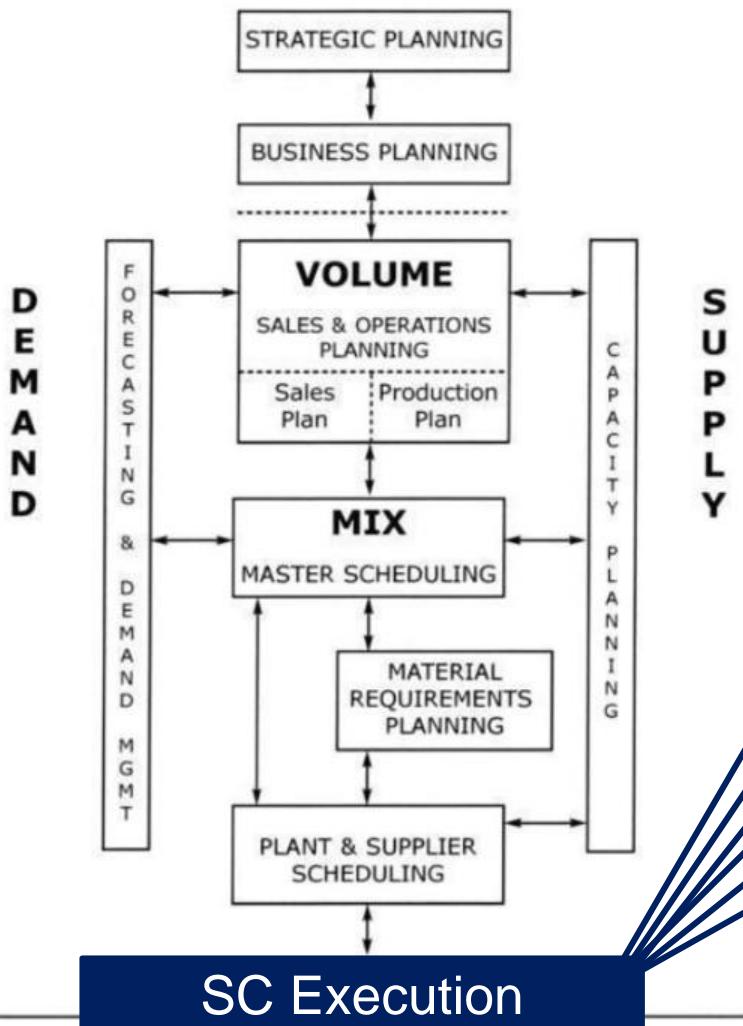
 THE RESOURCE PLANNING MODEL
 (Manufacturing Resource Planning, Enterprise Resource Planning)


SIOP and Supply Chain (SC) Value Stream

Where do you begin?



Figure 1-2

 THE RESOURCE PLANNING MODEL
 (Manufacturing Resource Planning, Enterprise Resource Planning)


SIOP and Supply Chain (SC) Value Stream

Where do you begin?



System Parameters

- What drives internal and external supply chain performance?
 - Reorder points
 - Safety stock level
 - Minimum order quantities
 - Economic order quantities
 - Planning lead times
 - Supplier lead times
 - Processing lead times

What role do each of these play in driving performance and inventory?



Purchasing, Planning & Scheduling

- With this level of impact, who sets, maintains, and updates these critical drivers?

Purchasing, Planning & Scheduling

- With this level of impact, who sets, maintains, and updates these critical drivers?



Source: Google Images

Purchasing, Planning & Scheduling

- With this level of impact, who sets, maintains, and updates these critical drivers?



The vast majority of organizations rely on individual Purchasing personnel to maintain the drivers for the products for which they maintain responsibility.

How does this conflict with the overall goals of the organization?

Source: Google Images

Case Study – Industrial Products

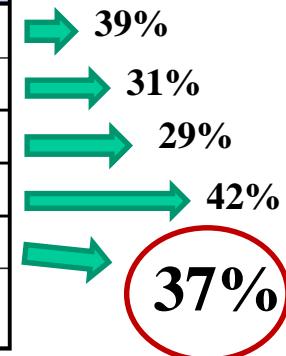
- Manufacturing organization
 - Highly engineered products
 - Acquired and grown
 - Approximately two inventory turns annually
- Lack of ERP system usage and adherence – heavy Excel
- No visibility or transparency
- Inadequate platform for growth

Case Study – Industrial Products

- Manufacturing organization
 - Highly engineered products
 - Acquired and grown
 - Approximately two inventory turns annually
- Lack of ERP system usage and adherence – heavy Excel
- No visibility or transparency
- Inadequate platform for growth

MRP Parameter Overview						
Count of RM & WIP SKU's with Inventory On Hand (Total SKU's = 3,600)						
Class	MRP Minimum Order Level	MRP Order Up To Level	MRP Safety Stock Level	MRP Planning Lead Time	MRP Reorder Level	Total SKU's By Class
A	0	5	0	383	130	626
B	0	6	0	546	157	794
C	0	2	0	558	140	784
D	0	3	0	808	124	1,396
Total	0	16	0	2,295	551	3,600
Percent of RM & WIP Portfolio	0.0%	0.4%	0.0%	63.8%	15.3%	100.0%

Percent of Items
Without Lead
Times



Inventory Summary – Raw Material and WIP

RM & WIP Inventory Aging - Date of Last Receipt								
Aging: Count of SKU's								
Class	<10	11 to 30	31 to 60	61 to 90	91 to 180	>180	Blank	Grand Total
A	9	13	16	27	39	147	375	626
B	13	23	28	46	69	270	345	794
C	21	26	26	47	83	350	231	784
D	214	328	379	497	981	9652	7368	19,419
Total	257	390	449	617	1,172	10,419	8,319	21,623
Aging: Percentage of SKU's								
Class	<10	11 to 30	31 to 60	61 to 90	91 to 180	>180	Blank	Grand Total
A	0.0%	0.1%	0.1%	0.1%	0.2%	0.7%	1.7%	2.9%
B	0.1%	0.1%	0.1%	0.2%	0.3%	1.2%	1.6%	3.7%
C	0.1%	0.1%	0.1%	0.2%	0.4%	1.6%	1.1%	3.6%
D	1.0%	1.5%	1.8%	2.3%	4.5%	44.6%	34.1%	89.8%
Total	1.2%	1.8%	2.1%	2.9%	5.4%	48.2%	38.5%	100.0%
Aging: Inventory Dollars								
Class	<10	11 to 30	31 to 60	61 to 90	91 to 180	>180	Blank	Grand Total
A	\$ 46,701	\$ 33,329	\$ 75,931	\$ 149,277	\$ 222,166	\$ 529,339	\$ 2,299,467	\$ 3,356,210
B	\$ 10,235	\$ 18,775	\$ 23,394	\$ 36,222	\$ 53,795	\$ 205,306	\$ 281,540	\$ 629,266
C	\$ 4,762	\$ 6,444	\$ 6,333	\$ 10,855	\$ 19,486	\$ 82,121	\$ 58,922	\$ 188,922
D	\$ 1,748	\$ (1,221)	\$ 2,253	\$ 2,994	\$ 7,277	\$ 30,047	\$ (22,263)	\$ 20,835
Total	\$ 63,446	\$ 57,327	\$ 107,910	\$ 199,348	\$ 302,723	\$ 846,812	\$ 2,617,666	\$ 4,195,232
Aging: Inventory Dollars Percentage								
Class	<10	11 to 30	31 to 60	61 to 90	91 to 180	>180	Blank	Grand Total
A	1.1%	0.8%	1.8%	3.6%	5.3%	12.6%	54.8%	80.0%
B	0.2%	0.4%	0.6%	0.9%	1.3%	4.9%	6.7%	15.0%
C	0.1%	0.2%	0.2%	0.3%	0.5%	2.0%	1.4%	4.5%
D	0.0%	0.0%	0.1%	0.1%	0.2%	0.7%	-0.5%	0.5%
Total	1.5%	1.4%	2.6%	4.8%	7.2%	20.2%	62.4%	100.0%

Polling Question 2

Does your organization leverage formalized segmentation methodologies to drive focus, action, and priorities?

- a. Not at all
- b. On an Ad Hoc basis
- c. All the time
- d. Unsure/don't know

Supplier Performance

Methodology based on segmenting suppliers based on multiple factors including:

- Sales
- Criticality
- Size
- Lead-times
- Sole customer/Sole supplier
- Locale
- Overall risk factor
- Relevant business driver, etc.

Then leveraging this methodology to drive targeted improvements based on a surgical view of impact.

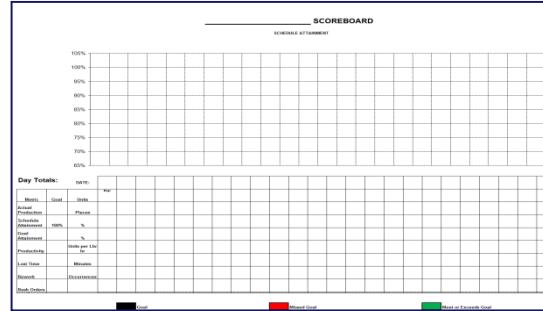
Not all suppliers are created equal.

Supplier Performance

1 Supplier performance and incidents tracked at a base level

LINE:	AREA:	GOAL:	GOOD	ACUM GOOD	SCRAP	ACUM GOAL	LOST TIME	COMMENTS	DATE:
1									
2									
3									
4									
5									
6									

2 KPIs, KPIs are rolled up against goals and trended on scoreboards



3 Performance is monitored and reviewed vs. SLAs

Components	Period Ending												Top Issues Affecting Schedule
	Goal	January	February	March	April	May	June	July	August	September	October	November	
Heads	Schedule Attainment (%)	93.1	92.3	93.2	96.5	96.5	79.6	91.5	94.5	94.5	94.5	94.5	Over time pressure
End Bearings	Part of Efficiency (%)	94.0	94.0	94.0	94.0	94.0	94.0	94.0	94.0	94.0	94.0	94.0	End bearing issues
Fuel Pumps	Total Labor Hours	4586.25	4708.25	4595.5	1182.75	1143.5	1245.5	311.1	311.1	311.1	311.1	311.1	Beds down 2.75 days on S60
Relay	Full-time Equivalents	23	23	23	23	23	23	23	23	23	23	23	Over Production, leadtime problem
Assessment	Overtime Hours	4033.5	3927.3	3460.5	921.0	821.0	335.0	335.0	335.0	335.0	335.0	335.0	CMMI Problem
Productivity	Vacation Hours	64	42	143.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Assessment	Sick Hours	93	64	12.0	30.25	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Productivity	Other Hours	275	80	176.0	0	0	0	0	0	0	0	0	Incomplete data
Assessment	Total	100	114.0	114.0	114.0	114.0	114.0	114.0	114.0	114.0	114.0	114.0	114.0
Productivity	Month	Goal	Actual	Previous	Trend								
Assessment	Year	1	2	3	4								
Productivity	Years	1	2	3	4								
Assessment	Decade	1	2	3	4								
Productivity	Decades	1	2	3	4								

Weekly Staff Meeting

The Purpose of the Weekly Staff Meeting is to establish, implement, and sustain the following objectives for the facility:

- Assign and develop accountability among the leadership of the plant for their actions and contributions to the objectives of the facility.
- Establish focus areas for specific areas of responsibility.
- Establish focus upon on-going activities designed to meet weekly and monthly objectives.
- Define and establish metrics to quantify activities, measure results, and evaluate performance.
- Ensure continuous support of manufacturing activities.
- Support prudent risks in achieving the objective of continuous improvement.

The Scope of the Weekly Staff Meeting is to communicate and address general and specific issues for the facility, and to review progress toward plant goals and objectives. Items of focus may include the following questions, primarily related to on-going activities, initiatives and performance:

- What was last week's performance to our goals?
- What activities occurred that caused the goals to be unrealized?
- What actions are being taken to overcome the problems and achieve the goal?
- What other outstanding issues and concerns may affect achievement of the plant goals?
- How is our progress toward our key major initiatives?
- What issues need further discussion (side bar)?
- What are the key activities for this week?

Attendees for the Weekly Staff Meeting are as follows and reports and other personnel requested by the Vice President/General Manager who can provide information within the scope of the meeting. The core group for the meeting is the Vice President/General Manager, Plant Operations Manager, Quality Manager, Facilities Manager, Materials Manager, Human Resources Manager, Information Systems Manager, and Controller.

5 Top-down, bottom-up goal alignment drives supply chain decisions

Key Performance Goals and Indicators															
	2010	2011	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	YTD
Safety (Incident Rate)	0.1	0.05	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Material Variances (\$)	150	150	140	140	140	140	140	140	140	140	140	140	140	140	140
External Quality (PPM)	210	210	140	140	140	140	140	140	140	140	140	140	140	140	140
Labor Productivity	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Customer Complaints	9	9	6	6	6	6	6	6	6	6	6	6	6	6	6
Operating Income %	12%	13%	13%	13%	13%	13%	13%	13%	13%	13%	13%	13%	13%	13%	13%
OEE	85%	85%	75%	75%	75%	80%	80%	80%	85%	85%	85%	85%	85%	85%	85%
On-time Delivery	70%	70%	Actual	x	x	x	x	x	x	x	x	x	x	x	x
Inventory Turns	15.0	15.0	13	14	14	14	14	14	15	15	15	15	15	15	15
	Actual	12.3	x	x	x	x	x	x	x	x	x	x	x	x	x

4 Supply chain activities are tied to vendor objectives/performance

Production Planning Worksheet															
	Aug Daily Order	Days Available	Projected Bookings	Business Plan	Current Order	Inventory Usage	Block Hold	Target Order	On Order	On Order Change	On Order Requirements	Total Daily Requirements	Current Order Plan	Days to Ship	Proposed Plan
BLOWERS		15	21	315	430	1st	239	20	153	74	79	150	484	23	16
COMPRESSORS		188	210	270	431	1st	231	194	153	143	143	143	431	31	15
END BEARINGS		26	21	546	783	207	239	301	2	265	491	23	23	23	11
FUEL PUMPS		52	21	102	1341	571	681	165	495	520	1640	78	50	54.5	8
GEAR BOXES		1200	1200	1200	1200	1st	1120	1120	1120	1120	1120	1120	4800	120	120
RELIABILITY HEADS		19	21	399	425	329	20	8	3	190	655	26	15	0	0
ROTARY AIR COMPRESSORS		240	240	240	240	240	240	240	240	240	240	240	240	240	240
COPPER COOLED COOLERS		112	21	232	220	948	193	519	474	1120	2674	127	120	100.0	100
COPPER COOLED COOLERS		0	21	21	21	3	45	0	0	0	42	204	204	10	10
TURBOS SERIES 60		108	21	2184	1878	53	773	154	155	155	155	155	48	95	74
TURBOS SERIES 60		46	21	2108	2407	738	5	1154	966	1080	2089	99	112	90.5	0
PLUS HEADS		14	21	21	244	429	149	0	6	4	140	207	14	18	0
DE PUMPS		31	21	651	562	548	361	239	121	310	1710	48	48	42.3	42
DE PUMPS SERIES 65		0	21	0	457	835	5	169	0	160	997	47	47	40.0	30
MTU ENGINES		0	2	2	3	0	0	0	0	0	0	0	0	0	2
TURBINE SERIES 140		6	21	0	126	15	5	0	0	0	75	2	2	0.1	2
CHAMBERS		2	21	42	84	27	29	62	26	46	209	0	0	0.0	16
GEAR BOXES		3	21	120	120	107	30	52	77	25	36	209	0	0	3.0
GOVERNORS		3	21	63	87	30	52	77	25	36	409	0	0	0.0	0
CAMERON'S		6	21	120	132	109	109	342	233	60	409	0	0	0.0	0
GEAR BOXES		0	2	0	12	1	1	0	0	0	0	0	0	0.0	0
CRANKSHAFTS		0	21	5	16	1	1	4	80	0	6	0	0	0.3	0
GFM KITS		0.5	21	10.5	14	3	3	0	0	0	10.5	1	0	0.0	0
GEAR GEARS		0	21	0	0	3	3	0	0	0	0	0	0	0.0	0

Source: Crowe analysis

Polling Question 3

How focused are continuous improvement efforts in your supply chain activities?

- a. Not at all
- b. As needed to address issues
- c. Activities are critical to success
- d. Unsure/don't know

Sustainable Risk Management



ORGANIZATION

Succession and continuity plans-move to strategy	Formalized business continuity and staffing plans
Roles and accountability	Three lines of defense accountability plan

CULTURE

Supply chain risks Identified and monitored	Defining and communicating risk
Relationships among stakeholders	Formalized communication plans

CHANGE MANAGEMENT

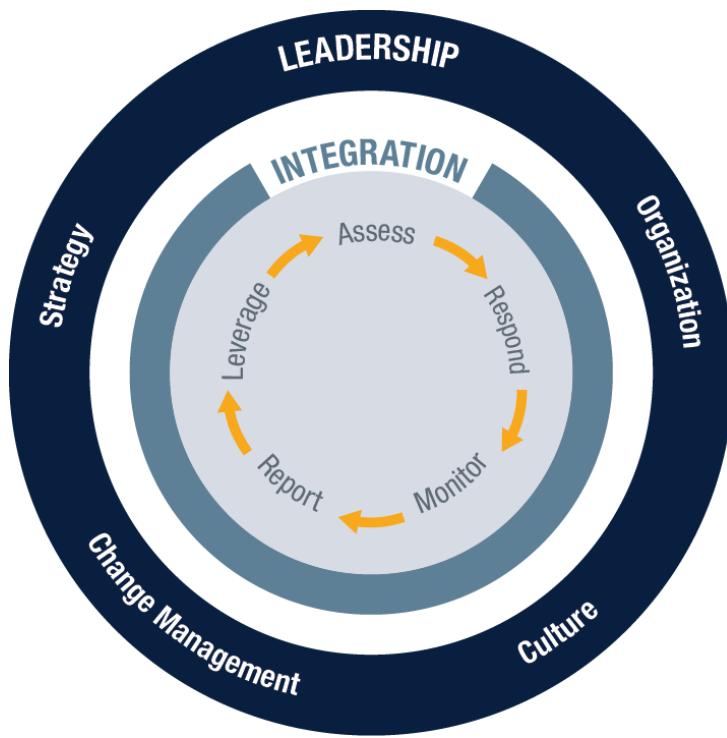
Mobilizing for changes	Prescriptive event response
------------------------	-----------------------------

STRATEGY

Business opportunity	Defined risk appetite and tolerance thresholds
----------------------	--

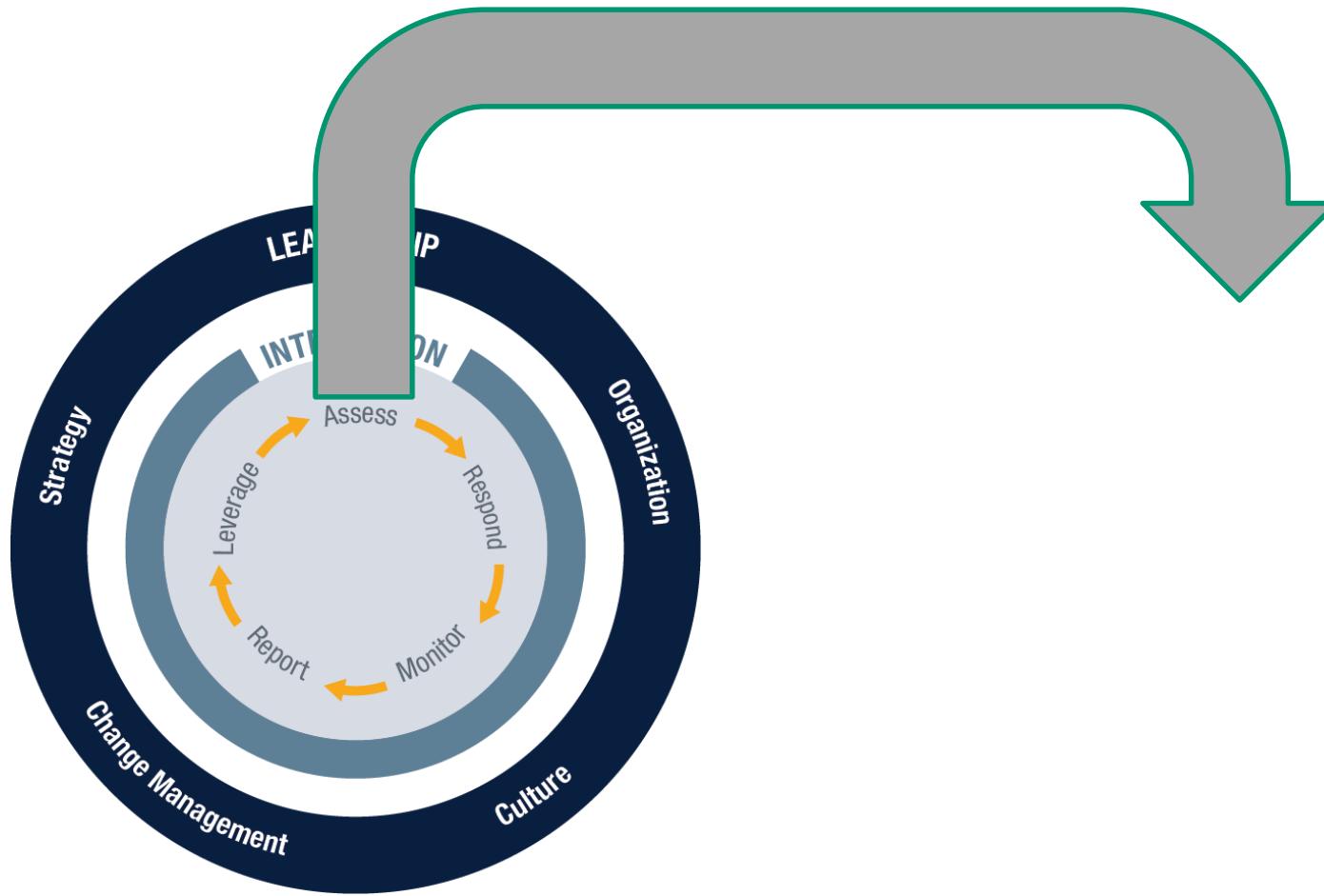
Source: Crowe Horwath LLP

Assessment of Supply Chain Risks



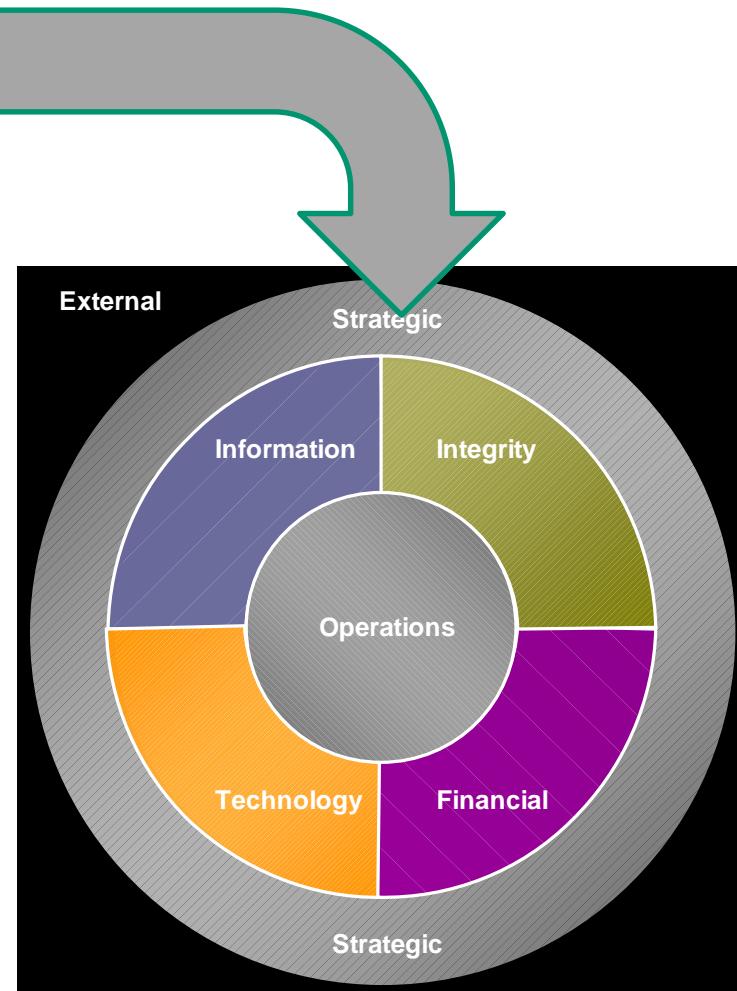
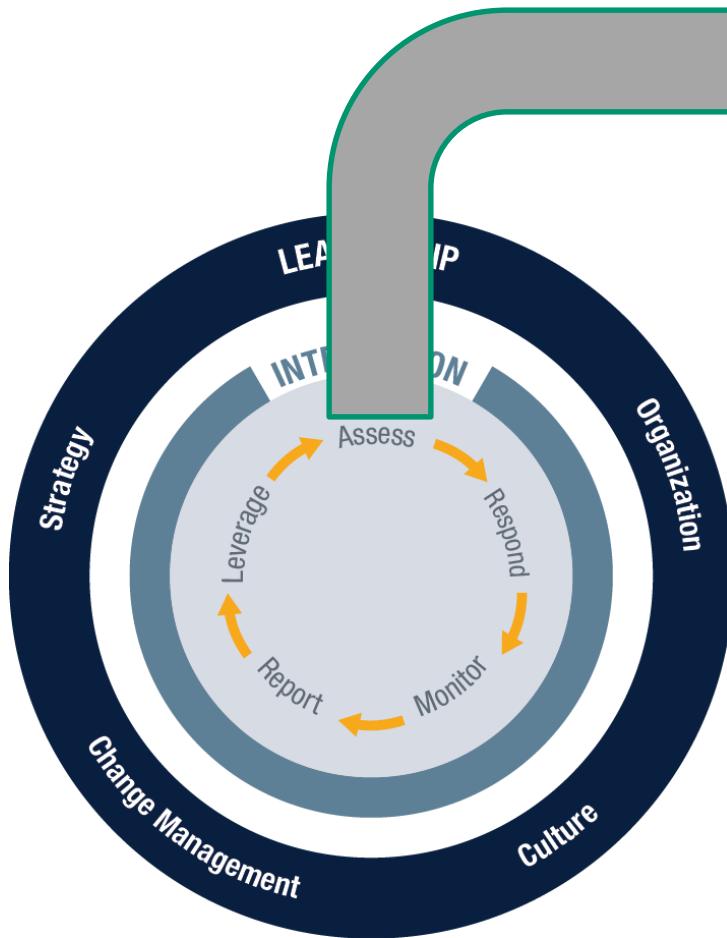
Source: Crowe Horwath LLP

Assessment of Supply Chain Risks

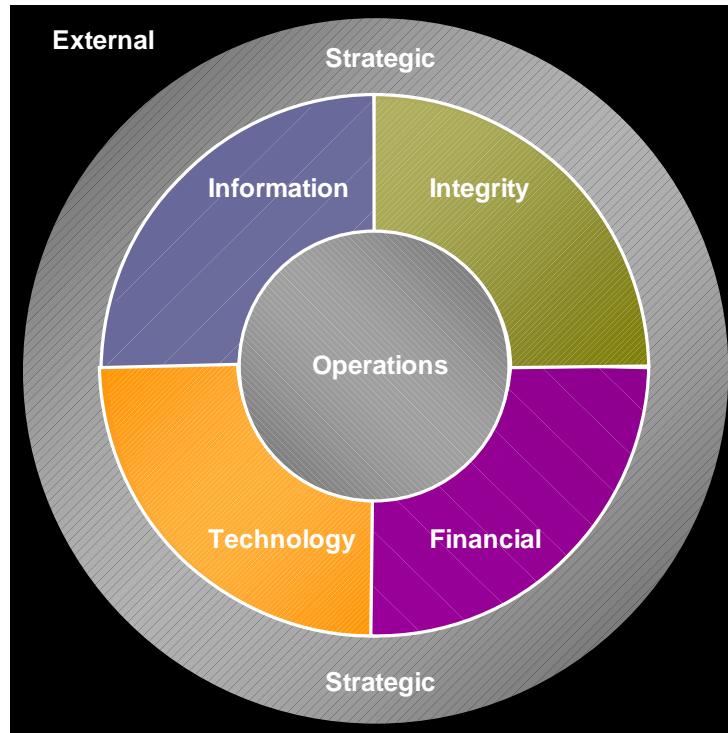


Source: Crowe Horwath LLP

Assessment of Supply Chain Risks



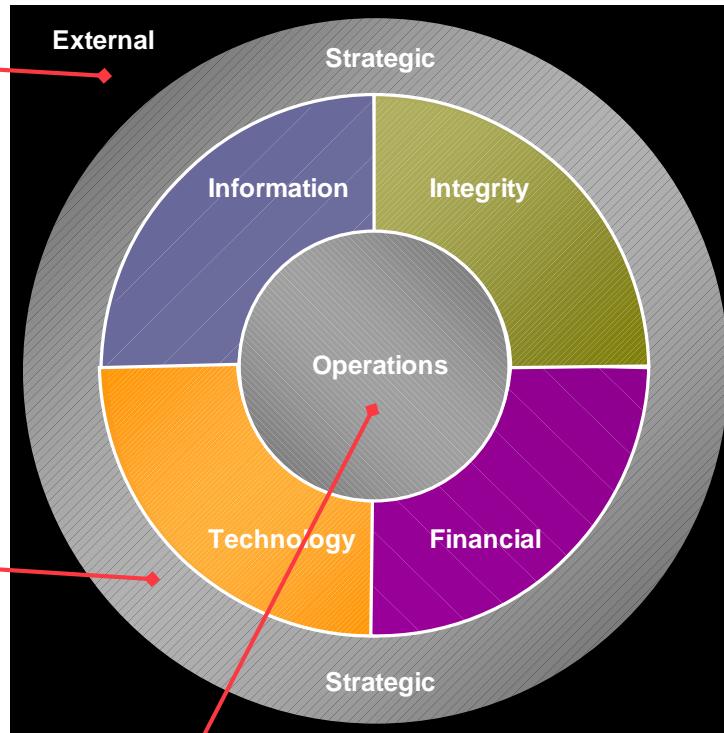
Source: Crowe Horwath LLP



Source: Crowe Horwath LLP

External Risks:

Regulatory / Legal
Public Interest Groups
Country/ Political

**Strategic Risks:**

Planning
Product Quality
Culture
Leadership

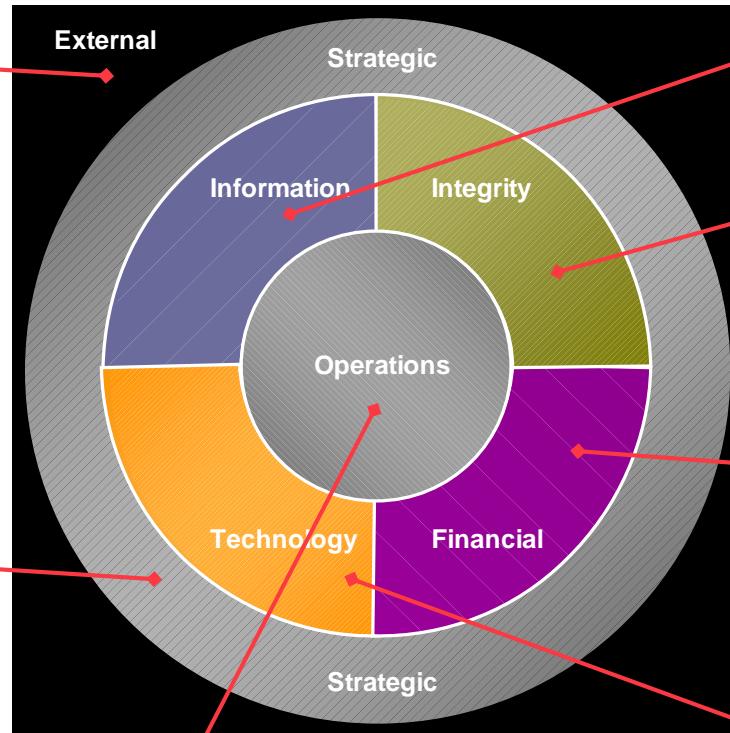
Operations Risks:

Cycle Time
Third Parties
Inventory Management

Source: Crowe Horwath LLP

External Risks:

Regulatory / Legal
Public Interest Groups
Country/ Political


Strategic Risks:

Planning
Product Quality
Culture
Leadership

Operations Risks:

Cycle Time
Third Parties
Inventory Management

Information Risks:

Performance Measurement
Forecasting

Integrity Risks:

Fraud
Reputation

Financial Risks:

Price

Technology Risks:

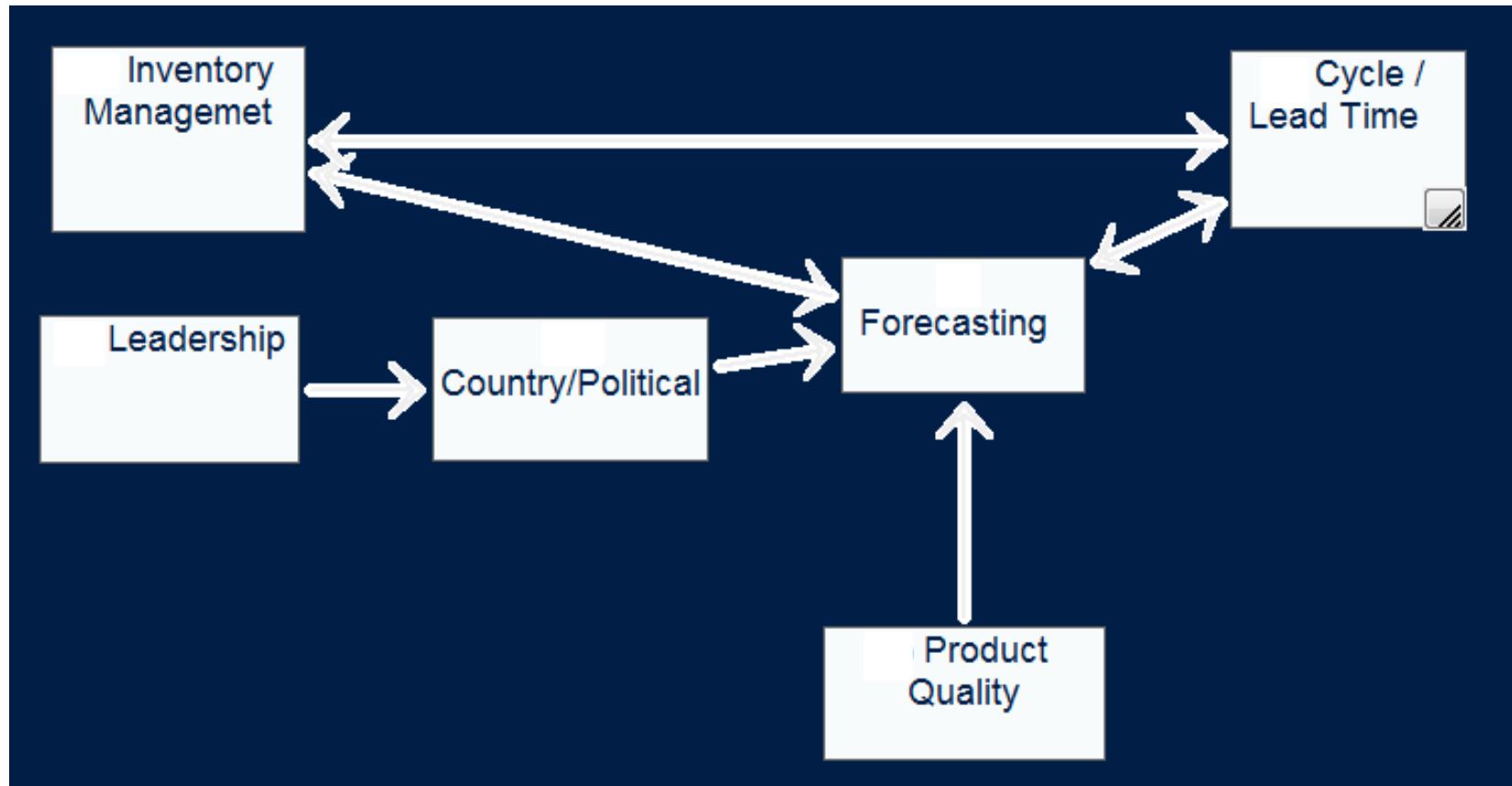
Access
Availability

Source: Crowe Horwath LLP

Polling Question 4

What does your organization believe is the greatest risk to your supply chain?

- a. Outsourcing/use of third parties
- b. Regulatory pressure
- c. Political/Country unrest
- d. Public interest group pressure (Sustainability)
- e. Quality
- f. Natural disasters
- g. Unsure/don't know



Source: Crowe analysis

Areas Internal Audit may focus

- Outsourced activities
 - What do you outsource
 - How is it outsourced
 - Risk to the supply chain
- Forecasting and impact to supply chain
- ERP System Drivers
 - How are they controlled
 - How are they monitored
 - Risk to supply chain and overall business performance
- Sustainability issues
 - Ethical sourcing
 - Conflict minerals
- Trade compliance

Questions

For more information, contact:

Mike Varney

Direct +1 216 623 7553

mike.varney@crowehorwath.com

Bart Kelly

Direct +1 404 442 1627

bart.kelly@crowehorwath.com

Crowe Horwath LLP is an independent member of Crowe Horwath International, a Swiss verein. Each member firm of Crowe Horwath International is a separate and independent legal entity. Crowe Horwath LLP and its affiliates are not responsible or liable for any acts or omissions of Crowe Horwath International or any other member of Crowe Horwath International and specifically disclaim any and all responsibility or liability for acts or omissions of Crowe Horwath International or any other Crowe Horwath International member. Accountancy services in Kansas and North Carolina are rendered by Crowe Chizek LLP, which is not a member of Crowe Horwath International. This material is for informational purposes only and should not be construed as financial or legal advice. Please seek guidance specific to your organization from qualified advisers in your jurisdiction. © 2015 Crowe Horwath LLP