USING THE SWOT MATRIX TO ADDRESS SUPPLY CHAIN VULNERABILITIES: THOUGHTS ON ALIGNING STRATEGY WITH CRISIS MANAGEMENT

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ABSTRACT

The SWOT analysis is a familiar tool to most business scholars and practitioners. In this paper, we extend the use of the SWOT analysis to include the SWOT matrix as a tool for addressing supply chain vulnerabilities. Strategies for practitioners are offered.

INTRODUCTION

An earthquake in Asia can eventually cause factories in the United States to temporarily shut down. Tornadoes in the Midwest United States can cause extensive structure damage, leading to new building efforts, which can cause shortages of sheet rock in the U.S. construction industry. A war in the Middle East can disrupt oil supplies, thus raising the price of food and other goods worldwide. These examples illustrate the vulnerability of today's supply chains when they are hit by a crisis.

Managing the supply chain is a difficult process, even when operations are running well. Unfortunately, unforeseen crises can hinder the smooth operation of the supply chain and consequently, supply chain risk is a growing concern (Ganguly & Guin, 2007). A crisis is a high impact, low probability event that can seriously disrupt the normal operations of the business (Coombs, 2007). For supply chain managers, a crisis is an event that can create a large-scale disruption to a company's supply resources. As a result, the company is then unable to meet the commitments it has made to its customers (Zsidisin, Ragatz, & Melanyk, 2005). Examples of crises that can disrupt the supply chain include major weather events, earthquakes, floods, transportation accidents, power outages, fires involving production and/or warehouse facilities, labor strikes, or wars.

Supply chain disruptions can also have a negative effect on stock prices. As Kumar (2009: 37) notes, "Supply chain disruptions have been found to impact negatively shareholder value by as much as 8-10% and are amplified in 'time sensitive' environments where early market introduction is critical to success." Furthermore, Hendricks & Singhal (2008) noted that supply chain disruptions can cause a shareholder value decrease of 10.28%.

The field of crisis management focuses on addressing such events. The charge of the crisis management team is to prevent those crises that may occur, and mitigate the ones that do occur (Pearson & Clair, 1998). In the past, much of the crisis management literature has addressed the negative publicity that often results from such unfortunate events. Such crises may originate from a corporate scandal, an industrial accident, or some other event that attracts a high amount of stakeholder and public interest. Indeed, many crisis management consultants are trained in the areas of communications and public relations. But the concepts of crisis management extend much further than just public relations. Crisis management deals with assessing crisis vulnerabilities, strategically planning for these vulnerabilities, addressing the crises when they do occur, and then seeking to learn from them after the crises have been resolved.

In this paper, we look at the relationship between a firm's SWOT analysis and supply chain vulnerabilities. This approach is utilized since the SWOT analysis is a strategic tool used by top management to plan for the long-range viability of the firm. We begin by examining the various levels of supply chain disruptions and their relationship to crisis events. Next, we use the SWOT analysis to identify supply chain vulnerabilities. We then develop the SWOT matrix to determine strategies for addressing disruptions to the supply chain.

CRISIS AND THE SUPPLY CHAIN

Crisis events can disrupt the operations of the supply chain. When supply chains are interrupted, the companies affected are not able to meet their commitments to their customers. This ripple effect can eventually upset a significant segment of the supply chain.

Levels of Potential Supply Chain Disruptions

There are at least four levels of disruptions that can impact a supply chain, ranging from minor to major.

- **Variability** – This occurrence is the normal variation in supply chain flows. It is predictable within established limits, controllable with normal practices, and does not present a serious threat to the welfare of the company. Example: the fluctuations in the arrival time of a truck delivery from the distribution center to a retail store.
- **Uncertainty** – This condition has wider variation that is sometimes unpredictable, although usually not unknown. It takes preventive or corrective action, and the company is vulnerable if actions are not taken to avoid or resolve the uncertainty. Example: the arrival time of the first shipment from a new supplier.
- **Risk** – This condition may be identifiable in advance but the timing and magnitude of its occurrence is uncertain. An eruption can cause significant disruption in supply chain flows, and requires preplanned responses to avoid serious consequences. Example: the arrival time of a ship from a new offshore supplier at a port with severe unloading capacity constraints.
- **Crisis** – This occurrence is a low probability but high impact event that is often unpredictable or unexpected. It requires prompt and exceptional skills to manage. The responses may be planned but often require extemporaneous adaptation to resolve the situation. Example: the arrival of needed inventory from an offshore supplier is delayed indefinitely because of an earthquake in the supplier's country.

Many supply chain risks can be identified ahead of time through careful analysis. Once identified, plans can be prepared to mitigate the effect of these risks if they do occur. However, if not identified or mitigated, risks can turn into crises. In addition, a crisis can arise from a natural disaster, such as a flood or fire that can be completely unexpected.

Supply chain risks can be identified through a number of means; however, in this paper we advocate the use of a familiar management tool from the strategic management discipline, the SWOT analysis. We advocate the SWOT analysis to identify crisis vulnerabilities because of its relationship with the strategic management of the firm. Oftentimes, crisis management and strategic management are carried out in separate departments (Preble, 1997). As a result, the strategic mission and its accomplishment may not consider the risks associated with various strategies. Using the SWOT analysis to identify crisis vulnerabilities can better alert strategic managers of the consequences of the firm's chosen strategies. The result is not to discourage an acceptable strategy, but to better plan for its potential shortcomings. In relation to the supply

chain, the ultimate goal is to identify supply chain vulnerabilities so that subsequent risks can be planned for.

THE SWOT ANALYSIS

Most readers are probably already familiar with the SWOT analysis so this review will remain short. The SWOT analysis is a tool used in the strategic management process to identify the strengths, weaknesses, opportunities, and threats that involve a particular organization. The SWOT analysis can also be a tool to assess crisis vulnerabilities (Crandall, Parnell, & Spillan, 2010). Figure 1 depicts how a corresponding strength, weakness, opportunity, or threat can be aligned with a potential crisis. Note that strengths and weaknesses reside within the organization while opportunities and threats are external. Note also that strengths and opportunities are generally viewed as positive events while weaknesses and threats are perceived to be negative.

FIGURE 1 - THE SWOT ANALYSIS WITH CRISIS VULNERABILITIES

<table>
<tr><th></th><th>Generally Positive Items
↓</th><th>Generally Negative Items
↓</th></tr>
<tr><td>Characteristics Inside the Company
→</td><td>Strengths
<table><tr><th>Identified Strength</th><th>Corresponding Crisis Vulnerability</th></tr><tr><td>1.</td><td>1.</td></tr><tr><td>2.</td><td>2.</td></tr><tr><td>3.</td><td>3.</td></tr></table></td><td>Weaknesses
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Organizational Strengths

Organizational strengths are traits or practices that are done well. They are internal to the firm. For example, the ability to consistently operate with little work-in-process inventory (WIP) can be considered a strength. Less WIP saves cash tied up in inventory, which can also lead to a

competitive advantage. Organizational strengths are desirable, but ironically, they can also be linked with identifiable crisis threats that management needs to be aware of (Crandall, Parnell, & Spillan, 2010). Figure 2 provides a list of strengths that are related to supply chain management, along with their corresponding potential for crises.

FIGURE 2 – INTERNAL ORGANIZATIONAL STRENGTHS

Identified Strength *An overall strength of many organizations is their use of JIT/Lean manufacturing processes. This practice results in:*	**Corresponding Crisis Vulnerability**
1. Carrying smaller inventories.	1. Lack of buffers can create inventory shortages which can halt production.
2. Using single sourcing for many inventory items.	2. Supplier may be incapable of making a delivery due to encountering its own crisis.
3. Utilizing daily deliveries in order to keep shop-floor inventories low.	3. Interruption in delivery can lead to shortages and possible production line shutdown.
4. Utilizing a manufacturing facility that is highly automated.	4. Equipment breakdown or a technology glitch can stop the production process causing a ripple effect throughout the supply chain.

Carrying smaller inventories. One of the main strengths in today's companies and supply chain partners is the application of JIT/Lean manufacturing practices. However, this strength lends itself to a number of potential crises. "Specifically, today's lean supply chains are becoming increasingly – 'fragile' – that is, less able to deal with shocks and disruptions that can have a significant, if not catastrophic, impact on the firm" (Zsidisin, Ragatz, & Melnyk, 2005: 46). Because companies are carrying less inventory with little buffers, interruptions in the supply chain due to a crisis event can lead to production coming to a standstill.

Single sourcing. Single sourcing is another practice in these lean styles of management. Unfortunately, when the main vender is hit with a crisis, the companies it supplies will be impacted as well. The same is true with venders who supply daily deliveries of product. An interruption in the delivery schedule can cause production to grind to a standstill. In a dramatic example of the impact of a crisis on a single supplier, consider the fire that took out the main production facilities of Philips Electronics in early 2000. Philips supplies radio-frequency chips (RFCs) to cellular phone makers. The crisis caused a $400 million revenue loss for the telecommunications company, Ericsson, and eventually led to their leaving the cell phone industry altogether (Rice & Caniato, 2003).

Daily deliveries. Daily deliveries and even multiple daily deliveries are utilized in some lean operating systems. However, daily deliveries also imply that there is little extra reserve stock in case of an interruption in a delivery. Even a minor crisis can cause a stoppage or delay in deliveries, which could lead to the shutdown of the production line in a lean system.

Automation. Another strength many companies strive for is a movement towards automation in the manufacturing environment. Automation helps buffer the impact of wage increases among workers, especially when new contracts are negotiated in union environments. Automation also cuts workplace accidents and injuries and can be utilized in areas where precision specifications are necessary, such as in the painting of cars or in welding processes. However, as the machinery and technology become more complex, the potential for equipment breakdown increases. When labor cannot be substituted for capital, breakdowns become more serious as the production process will be totally dependent on the technology working correctly.

Service environments can often continue operations when there is a breakdown in technology. For example, if cash registers were to cease operating in a retail store, cash could still be collected and change rendered, at least on a temporary basis. A restaurant can continue to operate, even if an oven breaks down or a fryer goes on the blink. Service time may be slower, but the restaurant will still operate. On the other hand, a highly automated factory that makes tangible products cannot continue production if a major machine breaks down. This can create a problem as well when the suppliers are highly automated. Their ability to deliver products through the supply chain will also be compromised in the event of equipment breakdown. This situation can create a ripple effect throughout the whole supply chain, causing production to slow down or halt.

As an example, consider the impact of Hurricane Ike on the highly automated refinery industry in the Gulf of Mexico. The Gulf of Mexico supplies about 20% of the nation's oil producing capacity (Lee & Thurman, 2008). When the storm hit in August 2008, refineries "shut in" operations to minimize damage to oil producing facilities. After the storm passed, production slowly resumed, but not fast enough to offset gas shortages in major cities such as Nashville, TN, Atlanta, GA, and Charlotte, NC. The shortages were made worse by panic buying and high prices.

Organizational Weaknesses

As we would expect, an examination of the organization's weaknesses can reveal potential crises. Figure 3 reveals several two common weaknesses and their corresponding crises potential.

FIGURE 3 - INTERNAL ORGANIZATIONAL WEAKNESSES

Identified Weakness	Corresponding Crisis Vulnerability
1. Labor contract is due for renegotiation.	1. A strike could cause production lines to stop operating if replacement workers are not used. If replacement workers are used, additional resentment between union members and management will result.
2. Equipment and facilities are in need of upgrading.	2. Equipment breakdowns can cause slowdowns or stoppages in production.

Labor contract is due for renegotiations. A separate, yet related problem occurs when the union contract is up for negotiations. If management and the union cannot agree on the terms of the contract, then two options are available: the union members can continue to work under the provisions of the existing contract, or, they can opt to go on strike. In the event of a strike, the company is faced with a grave decision; should it continue to operate and use replacement workers (what the union calls "scabs"), or shut down operations and lose revenue? The former option will continue to bring in a revenue stream for the company, but will create bad feelings with the union. The latter option will be a lose-lose situation, as both the union and the company forfeit their revenue streams. However, with no replacement workers, there may be more of an urgency to expedite the contract negotiation process.

Equipment/facilities need upgrading. Figure 3 identifies a second potential organizational weakness, the need to upgrade existing equipment and facilities. Operating with older equipment and facilities can offer an advantage; it reduces expenses and cash outlays (in the short-run) so that the company's bottom line looks attractive, and hence more inviting to those on Wall Street. However, the long-term ramifications can be devastating. Industrial accidents, workplace injuries, and lost production time can result when malfunctions occur.

External Opportunities

Opportunities are avenues available to management to increase revenue in some manner. These originate from outside the organization and are generally looked at in a positive manner. Figure 4 identifies three common opportunities for a manufacturing company in relation to its supply chain.

FIGURE 4 – EXTERNAL OPPORTUNITIES

Identified Opportunities	Corresponding Crisis Vulnerability
1. Upward fluctuations in demand due to a large order from a new customer, or a general recovery in the economy.	1. The required capacity in terms of human resources and physical plant may not be available.
2. Opportunity exists to offshore part or all of the production process to another country.	2. Will create negative feelings with domestic workers who lose their jobs. Quality problems may result from the foreign company which can create customer ill-will and negative publicity.
3. Opportunity exists to reshore manufacturing processes from an offshore location to a domestic location.	3. Sophisticated labor skills needed at domestic plants may not be available thus creating a human resource capacity crisis.
4. Opportunity exists to broaden the product line, thus increasing market share.	4. A broader product line can increase the complexity of the supply chain.

Upward demand for product. While opportunities are generally considered favorable options for the company, they can bring associated crises. Usually, opportunities are based on an expected increase in demand for a product. While this is a desirable occurrence, it can result in problems if the company's production capacity is not able to suddenly fulfill its obligations. Consider that many companies lay off and downsize their operations when the economy is contracting. However, a large order from a new customer or a strong rebound in the economy can create a capacity problem if the company cannot rehire and retool its facilities quickly.

Outsourcing/offshoring. One of the most widespread trends in the manufacturing sector has been to outsource certain aspects of operations to an overseas vendor. The obvious advantage to this strategy is lower labor costs. However, problems can arise if the contracted company does not make the product as specified, or if the product contains defects. In recent years, much attention has been drawn to the quality of products made in China, including toys tainted with lead paint (Crandall et al., 2010). Product liability risk must be considered when offshoring and has led to the infamous adage, "Made in China, Sued in the U.S." (Markham, 2011: 4).

While product liability crises can certainly occur with a domestic supplier, the situation is exasperated when the outsourcing decision resulted in a loss of domestic jobs. Such a situation leaves displaced workers and labor unions feeling betrayed.

Reshoring. A third opportunity that may exist for some companies is the chance to reshore some of their processes that are currently offshored. A recent study by The Boston Consulting Group indicates that a "manufacturing renaissance" is about to take place over the next five

years (Coy, 2011). The reasons for the return of manufacturing include wage inflation in China, rising oil prices, and natural disasters in Asia that interrupt supply routes of key components to the rest of the world (Johnston, 2012). While the influx of new jobs to the U.S. is encouraging, it does create a potential human resource crisis; skilled labor needed to operate the sophisticated machinery in modern manufacturing plants is currently scarce (Huss, 2012).

Broaden the product line. From a marketing perspective, adding variety to the product line is usually a desirable option because of its ability to gain market share. However, it can also increase the complexity of the supply chain and create more uncertainties in demand. With the added complexity and increased components in the system, the supply chain becomes more vulnerable to disruptions (Silva & Reddy, 2011).

External Threats

An external threat exists outside of the organization, but is within the domain of that organization's supply chain. Threats are negative in their impact and usually result in an interruption or damage to the supply chain. Figure 5 identifies potential external threats that can disrupt the supply chain.

FIGURE 5 – EXTERNAL THREATS

Identified Threats	Corresponding Crisis Vulnerability
1. Extended supply chains have more vulnerability points.	1. A number of transfer points exist where the supply chain may be interrupted.
2. Severe weather, earthquakes, widespread power outages or other natural disasters.	2. Suppliers may not be able to fulfill their orders, thus causing delays and cancellations in deliveries.
3. Labor strike at a supplier or manufacturer.	3. Deliveries may be delayed or cancelled.
4. War; or the threat of a war.	4. Transport of goods may not be possible in areas where the war is taking place.

Extended supply chains. In recent years, most supply chains have extended around the world; as a result, the risks of disruption have increased. The need to move goods over longer distances and the introduction of more transfer points in the transportation process increase the likelihood there will be a missed connection or in-route delay. Crone (2006) suggests ocean port congestion, inadequate surface-transportation infrastructure, escalating transportation costs, and supply chain security issues have increased risks in global supply chains.

A lack of information technology compatibility and process differences – both manufacturing and administrative – can frustrate effective communication and good flow. Furthermore, there is an absence of centralized management in most extended supply chains; consequently, it is

sometimes difficult to resolve otherwise minor points of contention (Crandall, 2009). While globalization may result in an overall lower cost of goods, it introduces threats that should be identified, quantified, assigned a probability and included in supply contingency planning (Barry 2004).

The complications of extended supply chains can also be seen in the food production industries, especially when there are outbreaks of E-coli that result in illness and deaths. Identifying the source of the problem can be difficult (Gessner, Volonino & Fish, 2007). As a result, traceability is an important requirement in food supply chains and the government will likely increase its requirements in this area because of the potential threat to human life.

Natural disasters. Natural disasters are a major threat to supply chains. Perhaps the most visible example in recent years was the disaster trilogy that occurred in Japan during March of 2011. The earthquake, tsunami, and nuclear meltdown at the Fukushima Nuclear Power Plant left the country reeling in human suffering with thousands dead and even more homeless. The impact on supply chains was massive, causing disruptions in the automobile industry in need of electrical components and shades of paint (Shappell, 2012).

The supply chain was both extended, and yet concentrated in one geographic area of vulnerability. In terms of the extended supply chain, components made in Japan were needed all over the world. However, in terms of concentration, many companies had single-sourced their suppliers in this region, which left them open to vulnerability since no backup was readily available for certain types of goods. For example, Japan is the world's largest producer of silicon wafers used in semiconductor chips and supplies these components to other manufacturing plants in Asia, North American and Europe (Civichino, 2011).

Supply chain disruptions can reduce revenue, decrease market share, and threaten production and distribution activities (Healings, 2012). Ultimately, these external threats such as a natural disaster can inflict significant damage not only on the supply chain, but a company's quarterly or 10-K annual financial report. As a result of the earthquake and tsunami in Japan, companies have disclosed they missed earnings targets in 2011 (Dempsey, 2012).

Labor strikes. Labor strikes at a manufacturer or supplier can interrupt the supply chain. Aircraft giant, Boeing, endured a major strike with its 27,000 union machinists in 2008. The 57-day strike caused supply chain ripples throughout the aerospace industry and delayed the delivery of at least 70 aircraft (Lunsford, 2008). To buffer against future interruptions in the delivery of its product, Boeing has moved some of its production for the 787 Dreamliner to South Carolina, where the workers are not unionized (Ostrower, 2012). Component suppliers to Boeing face a risk when the company is hit with a strike. Even the prospect of a strike is "one of the more significant risks not just for Boeing but for the entire (aerospace) supply chain in 2012" (Kesmodel, Cameron, & Trottman, 2011: A1).

War or the threat of war. A war can certainly disrupt supply chains in the region of the theater. However, indirect effects can also be felt via increased border security checks and disruptions to shipping and airline routes. In addition, the potential for terrorist attacks may be heightened (Aldred, 2003). Certainly, oil flow and consequently, barrel prices will be affected by the presence of war in an oil-laden region.

USING THE SWOT MATRIX TO ADDRESS SUPPLY CHAIN VULNERABILITIES

The SWOT matrix is a tool that helps top management align the organization's strengths, weaknesses, opportunities, and threats with its long-range strategic planning. In essence, it

extends the SWOT analysis by using it as a means for generating strategic alternatives for the firm (Parnell, 2008). The tool was originally referred to as the TOWS matrix in its first inception by Weihrich (1982). The matrix involves taking the elements of the SWOT analysis and aligning them with potential strategy alternatives. In this paper, we have created a SWOT matrix that addresses supply chain vulnerabilities based on the SWOT items discussed in the previous sections. Figure 6 depicts the SWOT matrix.

Insert Figure 6 about Here

The matrix lists the various vulnerabilities that are associated with each of the SWOT items. These vulnerabilities were originally listed in figures 2–5 above. The strategic alternatives that have been generated are listed in the lower right section of the matrix. Each alternative has been labeled with its associated vulnerability in parentheses. The alternatives are discussed next.

FIGURE 6 – USING THE SWOT MATRIX TO ADDRESS SUPPLY CHAIN VULNERABILITIES

<table>
<tr>
<td>In this Matrix, the vulnerabilities to each facet of the SWOT analysis are listed.

The strategies address each of the vulnerabilities raised.</td>
<td>Opportunity Vulnerabilities (OVs)

1. The required capacity in terms of human resources and physical plant may not be available.
2. Will create negative feelings with domestic workers who lose their jobs. Quality problems may result from the foreign company which can create customer ill-will and negative publicity.
3. Sophisticated labor skills needed at domestic plants may not be available thus creating a human resource capacity crisis.
4. A broader product line can increase the complexity of the supply chain.</td>
<td>Threat Vulnerabilities (TVs)

1. A number of transfer points exist where the supply chain may be interrupted.
2. Suppliers may not be able to fulfill their orders, thus causing delays and cancellations in deliveries.
3. Deliveries may be delayed or cancelled.
4. Transport of goods may not be possible in areas where the war is taking place.</td>
</tr>
<tr>
<td>Strength Vulnerabilities (SVs)

1. Lack of buffers can create inventory shortages which can halt production.
2. Supplier may be incapable of making a delivery due to encountering its own crisis.
3. Interruption in delivery can lead to shortages and possible production line shutdown.
4. Equipment breakdown or a technology glitch can stop the production process causing a ripple effect throughout the supply chain.

Weakness Vulnerabilities (WVs)

1. A strike could cause production lines to stop operating if replacement workers are not used. If replacement workers are used, additional resentment between union members and management will result.
2. Equipment breakdowns can cause slowdowns or stoppages in production.</td>
<td colspan="2">Strategies for Addressing Supply Chain Vulnerabilities

1. Implement double sourcing, multiple sourcing, primary sourcing with backup in place. (SV1,2,3)

2. Keep preventative maintenance and equipment upgrades on schedule. (SV4, WV2)

3. Consider longer contracts when negotiating with labor unions. (WV1)

4. Consider the total cost of ownership before outsourcing or offshoring. (OV2)

5. Ramp up capacity ahead of time if reshoring. (OV1,3)

6. Consider shortening and simplifying the supply chain. (TV1)

7. Introduce buffers to absorb disruptions. (SV1,2,3; TV2,3,4)</td>
</tr>
</table>

Alternative 1 - Implement double sourcing, multiple sourcing, primary sourcing with backup in place.

Although it has been in vogue to single-source as much as possible, such an arrangement leaves a company in a peril when its supplier runs into problems. Cisco, the San Jose, California–based provider of networking and communication systems is unique in that 95 percent of its production is outsourced (Harrington & O'Connor, 2009). Since most of its supply chain is global in nature, the company has adopted a program to gradually depart from single sourcing in favor of multiple sourcing. Such planning was important when on May 12, 2008, a 7.9 magnitude earthquake struck the Sichuan province of China, an area that is at the heart of Cisco's supply chain for that region of Asia.

Alternative 2 – Keep preventative maintenance and equipment upgrades on schedule.

For the company that is a major producer in its industry supply chain, it is important to not disrupt its own production due to an unnecessary or unplanned equipment malfunction. While production managers have known for years of the importance of preventative maintenance, there are still temptations to let equipment operate longer than it should without spending extra dollars on upgrades or other maintenance. However, a major equipment breakdown can stop production altogether, an occurrence that does not profit any party in the supply chain.

For some companies in the supply chain, an equipment breakdown can be more than just an interruption of supply, it can be deadly. On April 2, 2010, an explosion and fire erupted at the Tesoro Corporation, a refining company in Washington State. The explosion killed seven workers. The incident was investigated by the Washington Department of Labor and Industries and resulted in the issuing of 44 citations and a $2.38 million fine for safety and health violations (Washington state fines Tesoro, 2010). The department noted a number of problems in the postponement of maintenance procedures including:

- Continuing to operate equipment that was failing and should have been replaced
- Purposely postponing maintenance
- Inadequately testing for potential damage to equipment, including the heat exchanger that exploded
- Failing to protect workers from injury and death.

A major problem in refining and extractive industries (such as coal mining) is the lack of effective enforcement of existing regulations. The result can be an awkward situation in which companies challenge citations from regulatory agencies, in some cases, for years (Regulatory flaws, 2011). During the appeal process, the company is not required to make any equipment changes. In some cases, the company would rather pay a fine than make an equipment upgrade since this option may actually be more cost effective.

Alternative 3 - Consider longer contracts when negotiating with labor unions.

Manufacturers that have employees represented by a union are prone to interruptions when the labor contract is up for renegotiation. While three year contracts are considered the norm in many industries, some companies are negotiating longer contracts in order to provide more stability to both management and labor.

Boeing has endured five strikes since 1977 (Ostrower, 2012) from its union, the International Association of Machinists (IAM). Since the relationship has been volatile, Boeing has been seeking to make labor peace in more recent years as a strike is extremely costly for both the

union and the company. In its most recent negotiations with the IAM back in November 2011, Boeing reached a 5 year contract agreement (Goold, 2012). The longer length of the contract takes away pressure from both sides, management and labor, and allows them to do what they do best, make commercial aircraft without the worries of an impending interruption due to a strike.

Alternative 4 - Consider the total cost of ownership before outsourcing or offshoring.

Although many companies have moved some or all production of their products overseas, the dollar costs of offshoring have not always been calculated correctly. Harry Moser, a key player in what is now called the reshoring movement, maintains that the costs of global outsourcing should follow a total cost of ownership model (Markham, 2011). This model includes calculating all costs associated with manufacturing the product, including risk factors such as the stability of the country, the loss of business due to poor quality, the economic stability of the overseas supplier, and loss due to lack of innovation. More traditional costs are also included such as transportation and holding costs, damage to product while en route, and duty fees.

The convergence of labor rates in the United States and other countries, such as China must also be considered. Over time, the cost gap between a product produced in the United States and one produced in China has narrowed (Sprovieri, 2011). As managers become more aware of the logistic costs of moving production overseas, additional pressure may be put on them to bring production back to the home country.

Alternative 5 - Ramp up capacity ahead of time if reshoring.

While reshoring is an exciting alternative to consider, it needs to be planned in advance.
Two keys that are necessary for a successful reshoring venture are automation and a skilled workforce. As one business writer states, “Automation also requires a skilled workforce. The days of the dirty factory, with mind-numbing repetitive tasks requiring minimal training, are over. Today’s factory worker must be knowledgeable, committed to quality, and skilled in multiple disciplines” (Huss, 2012: 48).

Reshoring may not necessarily be applicable to the entire production process. As Johnston (2012: 28) points out, “blindly reshoring the entire manufacturing footprint is likely not the right answer.” Instead, producing products in Asia that are sold in that region may still be feasible while products sold in the U.S. (or home country) could be manufactured in the U.S.

Alternative 6 - Consider shortening and simplifying the supply chain.

Reshoring illustrates how moving the manufacturing process closer to where the customer resides helps to simplify the supply chain. Simplification occurs on at least two fronts. First, the distance from manufacturer to customer is shortened, thus simplifying the transportation process. Second, the number of contact points that can interrupt the supply chain are decreased as well. For example, reshoring eliminates the need to cross international borders, which reduces the administrative tasks of moving the product through customs. It also bypasses busy international ports, a contact point that can be subject to labor strikes, a crisis that interrupts the flow of goods.

Alternative 7 - Introduce buffers to absorb disruptions.

For short-term disruptions, adding buffers in the supply chain may be feasible to absorb the fluctuations in flows. Companies may use extra inventory as a buffer against late deliveries, or extra capacity as a buffer against unexpected demand. They incur the added expense to avoid

even greater expenses if the disruption occurs. Companies need flexibility to handle the fluctuations in demand and supply they may encounter.

CONCLUSION

As Reese (2007: 42) put it, “For better or worse, in this age of lean, expended and outsourced operations, ‘disaster-proofing’ your supply chain isn’t an option, it’s an obligation.” The SWOT matrix was presented as a way of strategically approaching the task of planning for unexpected interruptions in the supply chain.

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