

# EVALUATING SUPPLIER RISK IN AN EFFICIENT WAY

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## ABSTRACT

Supplier selection is often a costly and lengthy process for a buying company. There is a need for developing an efficient and low-cost method to evaluating supplier risk for the screening process of potential suppliers. This is especially important when there is limited information about suppliers which are under evaluation. This study develops a fast, low-cost, reliable, and measurable method to evaluate supplier risks for industrial practices.

## INTRODUCTION

In recent years, supply chain risks have forced companies to take an in-depth look at their supply chains. Disruptions from both within supply chains and from the external environment have had a significant impact on a company's performance. Supply chain risk management, can be defined as "the management of supply chain risks through coordination or collaboration among the supply chain partners so as to ensure profitability and continuity" (Christopher (2002)). However, among a large number of research on supply chain risk index, there is a few research on measuring supply chain risk and provide a quantitative index for industries to use; Liao et al. build a conceptual model of natural disaster risk index on supply chain (Liao et al., 2015)

The purpose of this research is concerned primarily with providing buyers, large and small, with the ability to assess suppliers based on several important metrics and risk indicators. Risk factors have been identified and explained, as well as given an equation to measure total risk based on the average total weights of those factors. Users of this equation will have a better insight into potential risks of disruptions from suppliers as a whole based on country risks, economic risks, and financial risks.

## BUILDING SUPPLIER RISK INDEX

Contained within each variable are various characteristics that give the user a complete picture of risk, as well as smaller sources of localized risk.

### Risk Formula

$$R = \frac{K1F + K2C + K3O}{3}$$

K1F represents financial risk; derived from gross margin and current ratio.

K2C represents the country risk; derived from economic, political, and natural disaster risk.

K3O represents the operational risk; derived from inventory turnover and certification level.

### Financial Risks

Financial risks associated with supplier outsourcing must be carefully considered when determining the nature of relationship with suppliers, particularly in other countries. These risks can be associated with changes in the prices of goods and/or services purchase, commodity price fluctuations, currency exchange rates and supply shortages and interruptions. (Johnson, Leenders & Flynn, 2011)

Currency and money flows, in and out, including debt and investments are also included in this broad-reaching category. Classification of a supplier's financial position is critical to identifying risks involved in contracting with a given supplier. In order to better understand the ramifications of poor liquidity or margins, one must realize that the financial position and capabilities of a supplier are of utmost importance, and are typically found to be one of the many criteria in supplier selection. In fact, supplier's financial position, along with managerial capacity, were among the two most frequently cited criteria in a research analysis done by Eric Ng. (Ng, 2010).

Supplier liquidity is a factor we have identified and selected through research as a consideration for manufacturers to carefully assess. Measuring a supplier's liquidity is simply a matter calculating current ratio; which is accomplished by viewing the financial statements, and then we look at current assets and current liabilities. (Kieso, Weygandt & Warfield, 2010).

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

Current ratio is the insight into an organization's financial strength and position to pay short-term liabilities (debts and payables) with short-term assets (cash, inventories, receivables), with the higher the ratio, the better the company's ability to pay these obligations whilst not having a detrimental effect on operations of cash flows. (<http://www.investopedia.com>) Small portions of buyers are managing and actively dealing with the risks of supplier failure (Deloitte, 2009.), and in a global marketplace where there is an increasing reliance on suppliers (Moeinzadeh & Hajfathaliha, 2009), liquidity of a supplier must be a consideration buyers investigate before making a sourcing decision for products and commodities.

Another excellent metric for measurement of supplier's financial stabilities and capabilities is the gross margin accounting equation. (Landhuis, 2012) Gross margin is a simple calculation which gives outsiders insight into the financial position of a company, simply by gathering a few, typically readily-available, financial pieces of information. (Kieso, Weygandt & Warfield, 2010) To calculate gross margin percentage we first pull the revenues and cost of goods sold from the financial statement. The calculation is as follows:

$$\text{Gross Margin Percentage} = \frac{\text{Rev} - \text{COGS}}{\text{Rev}}$$

With this simple calculation a buyer or researcher outside of the supplier's company can weigh the risks of taking on that supplier given their financial position. Gross margin is a well-established measure of an organization's financial health, perhaps even more insightful than management effectiveness. In other words, gross margin illustrates what percentage of revenue a company will retain after the production of its goods. A poor gross margin could be a result in poor management from the supplier, or even further down the supply chain with tier-2 and tier-3 suppliers. If COGS is not available on the

financial statement, simply add beginning inventory, purchases, and ending inventory (COGS=BI+P+EI).

## **Country risk**

Supply chain is defined as the process of working collaboratively and cooperatively with suppliers to expand or improve their capabilities. Supply chain management in a country is the process of helping suppliers to manufacture effectively and efficiently quality products. The companies making up the supply chain seek to reduce the costs and other risks in the supply chains. Supply chain management is also geared towards increasing flexibility so that the needs of all the customers are better met and thus the strategic supplier relationships are enhanced and increased. Only the manufacturers who employ standards which are consistent with the supply chain strategies remain in the supply chain. Protecting the positions of the manufacturers in the supply chain is done by being innovative, fast and lean.

Although there are a significant number of unique country risks buyers and suppliers must face when sourcing in unfamiliar regions; the primary sources of potential problems and disruptions political instability, economic downturns, and natural disasters. It is notable that natural disasters, political upheaval, and economic downturns impact global trade. The unrest created can result to overnight barriers to imports, piracy activities in key shipping lanes, added taxes to exports as well as other significant obstacles to global trade (Dun & Bradstreet, Inc., 2013).

Political risk is chiefly concerned with the stability of a given government in the country of interest, or in other words, the country in which a potential supplier has their operations. With the global supply chain, it is expected that while some companies will consider buying certain products from low-cost sourcing regions where lower cost suppliers operate, or countries that can most efficiently produce goods given scarce natural resources or more friendly governmental regulations. However, since a country cannot always provide all required commodities or finished goods, it is logical that a buyer would consider sourcing other products from suppliers in other countries that can effectively and efficiently produce them.

A country's supply chain is also supported highly by the political state in the country. When a country's political state is unstable, the products produced in that country fall in supply and prices increase. A good example was the case in Libya in 2010, in which as a result of civil war, gas and oil prices immediately rose from \$95 per barrel to \$125 in around 12 weeks (A D & B Special Report, 2011). This affects the supply chain as the supply sources are negatively impacted for globally consumers, especially as it pertains to a commodity which is only available in a few regions globally.

In order to measure and quantify the political stability of a country, simply, cheaply, and efficiently, a buyer can simply use Economist's website, or more specifically, the Economist Intelligence Unit's measure for political stability.

Political stability (P) is measured using the Economist Intelligence Unit's country index (<http://viewswire.eiu.com>) system. This system gives a quick and efficient numerical value assigned to any country based on several metric factors described. Arriving at a numerical value of 1-10, with 1 being low risk and 10 being high risk, we simply multiply this by a factor of 10—for equation consistency—and arrive at a value that can be plugged into the country risk variable, and ultimately into the final total risk equation. We can illustrate this with the United States, if we are quantifying political

risk for the United States, given a supplier's location within the U.S., we then view the EIU's index score of 5.3, multiply by 10, and arrive at a factor value of 53.

$$\text{Political risk} = (\text{EIU Index Score}) * 10$$

A supplier is also affected by economic factors that result to increases in prices of commodities globally, or poor economic conditions in a supplier's home country. Commodity prices have risen over the last few years as a result of slow recovery of the economy. Among the major effects of the 2008/09 global crisis is the high level of currency volatility. This is majorly contributed by government policies in order to boost exports (Dun & Bradstreet, Inc., 2013). Boosting exports is great move for the countries who are involved in the exporting process while it is a blow to the imports.

Economic Risk is weighted by the Standard & Poor's (S&P) credit rating index. (<http://www.standardandpoors.com>) AAA, AA, A, BBB, BB, B, with anything below a B-rating being discarded as an unacceptable risk based on S&P's rating criteria giving a value for a given country's economic stability and prowess. As we have six total credit ratings, and based on the 1-100 scale, we assign higher values to the lower credit ratings, the scale is as follows with intervals of approximately 16.67

AAA	16.67
AA	33.33
A	50
BBB	66.67
BB	83.84
B	100

## **Operational Risks**

Operational risks can occur internally as well as externally and have drastic affects if preventative measures are not in place.

Inventory Turnover is the amount of "turns" or how fast a company sells or replaces its inventory in a given year. A higher inventory turnover is indicative of an efficient management and organizational system. The more "turns" will also inherently reduce risks operationally and financially (Cancro & McGinnis, 2004) Subsequently, various costs associated with holding inventory are significantly reduced. Inventory turnover is perhaps one of the most important metrics to consider in evaluating the risk of disruption. The lower the ratio is from the standard, the higher the disruption risk.

## **CONCLUSION**

Research provided useful insight into the inner-workings of the supply chain, as well as identified factors critical to supplier selection and methods to measure and quantifies suppliers based on simple research by the user of the risk equation model. This paper identified supplier risk factors from financial risks, country risks, and operational risks and left the user of the equation with a benchmarking number that is quick and easy to use from an outsider's perspective. Further research and testing are needed to better prove the equation's validity, and to provide a simple indexing system for users to categorize suppliers.

**Reference Available Upon Request**