Using Failure Mode Effects & Analysis to Manage Supply Chain Risk

**Dr. Sime Curkovic** [Supply Chain Risk Management](https://www.industrystarsolutions.com/blog/category/supply-chain-risk/) Jul 28, 2018

Supply chain risk management (SCRM) is a key component of both supply success and firm success, and several supply chain risks can be mitigated by the qualification and selection of appropriate supply partners. In our recent research study of manufacturers, we identified how companies manage supply chain risks, with a focus on the use of [Failure Mode Effects and Analysis](http://www.industrystarsolutions.com/blog/2018/04/origins-structure-pfmea/) (FMEA). Our research was largely exploratory, so a purposeful sample was used. The research questions were explored in two steps.

First, a survey was sent to 67 perceived supporters of SCRM. Second, after review of the survey data, respondents who indicated they’d used FMEA as part of a supplier qualification process were contacted. This research first uses survey data to determine that FMEA is seldom used for [supplier risk assessment](http://www.industrystarsolutions.com/blog/2018/01/10-financial-tools-supplier-risk-assessment/), but it provides a powerful tool for proactive SCRM.

The study also showed that the supply chain can be managed in much the same way as product and process defects, and that FMEA can play a major role in the process of managing risks through supplier assessment and selection.

**Traditional Use Cases for FMEA**

FMEA is a long-standing technique used to assess the risk failures in product and process designs. All potential failures are evaluated in terms of likelihood, severity, and detectability. A higher FMEA score implies higher risks. Common variables used to quantify risk in these circumstances are:

* Frequency of an activity associated with the defect
* Quantity of parts associated with the defect
* Ability to detect the defect
* Probability of the defect
* Severity of the defect

A risk priority number (RPN) is calculated for each potential failure, where a common RPN is the product of probability of failure, detectability of failure, and severity of failure.

**The Seven Steps to Complete an FMEA**

FMEA is a mainstream tool used to collect information related to risk management decisions for most companies in an engineering capacity, but not in a supply chain capacity. There were several documented procedures to complete an FMEA across industries in this study, especially in automotive and most managers supported a modified version of the tool that could be used to help evaluate the risk of SCM decisions. The seven steps involved in completing an FMEA are as follows:

1.  Identify risk categories

2.  Identify potential risks

3.  Rate the opportunity, probability, and severity of each risk

4.  Calculate the RPN for each risk

5.  Analyze risks by RPN by using techniques such as a Pareto distribution.

6.  Develop actions to mitigate risks with a high RPN

7.  Reassess risks with another cycle of FMEA

For several of the firms in this study, FMEA is a well-documented and proven technique commonly used to evaluate the risk for failures in product and process designs. Supply chain management (SCM) decisions can be evaluated in much the same manner as product and process defects.

**FMEA for SCRM**

Most managers felt that proactive risk mitigation efforts applied to the supply chain is not common practice, but is required for minimizing disturbances. There was a general impression that with an FMEA-based SCM risk assessment tool, unforeseen problems that may have impacted the success of SCM efforts can be avoided.

Most managers want tools and procedures for implementing FMEA in a supply chain environment. They also want to know the critical success factors to the implementation process; managers were concerned with the inconsistencies in the ranking of severity, occurrence, and detection and the inaccuracies that may delay effective FMEA implementation in a supply chain. Managers want guidelines for customers in correcting these problems in FMEA applications, so they can adopt and integrate their FMEA process into a supply chain environment. For example, furniture manufacturer Steelcase provides direction for managers by emphasizing that supply chain FMEA can’t be viewed as purely an engineering exercise, and by ensuring that the terms and measures used in FMEA are driven by the key stakeholders.

The supply chain can be managed in much the same way as product and process defects, and our research uncovered several industry examples that showed how FMEA can play a major role in the process of managing risks through supplier assessment and selection.

**Conclusion**

In our research, managers agreed that without a systematic technique to assess risk, much can go wrong in a supply chain (i.e. unexpected cost, extended lead times, poor quality, etc.). Analyzing the risk associated with SCM is a relatively new concept, and little has been done to assist managers with this process. But one thing is certain, documenting and analyzing supply chain risk must be an essential part of continuous improvement. Thus, FMEA could be a critical tool and easily understood method to identify and manage risk in your supply chain.

-Sime