

Supply Chain Disruption – Risks and Event Database

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Background

Business operates on the basis that risk is both a threat and an opportunity. Without a degree of risk there would be no justification for a risk premium to create an acceptable margin for those taking the risk; suppliers customers or a third party. Risk is part of every manager's job and is to be welcomed particularly when its nature and degree can be established to an acceptable level of probability and impact such that the basic calculation of the likelihood of an event occurring can be estimated and the economic impact on the immediate business and related upstream and downstream activities can be realistically established and managed.

Of course in the supply chain, disruptions can happen for many reasons, not all of which would be considered major enough for the disruption to impact on downstream activities for an extended period of time. In many cases day to day disruptions are what operational managers cope with, for example when supplier deliveries are late and some re-scheduling and re-allocation of resources and operations are required.

Much work has been devoted to the identification of risks and their management and mitigation and one might argue that this is an extension of the operational focus into bigger and more difficult areas, however there are some common themes which emerge.

1. Risks need a consistent system of classification so that we can be comparing like with like when we compare the relative risks and impacts of each. In addition the collection of data is dependent on the processes of coding so that database investigations are possible

2. Boundaries have to be established based on a level of seriousness to justify their being moved out of a narrowly focused and time limited operational impact into more extended effects; by what performance objective is the impact assessed and how far up-stream and/or down-stream the supply chain should the impact be measured?
3. Risks can be thought of as anticipatory in nature but when the risk materialises it becomes a Risk Event or Disruption to the supply chain
4. Some events have long antecedents before their first impact is realised. For example contamination of milk products occurred two to four upstream steps away from their impact being recognised in damaged children and the associated threats to other food products using some of the same raw materials but incorporated in much transformed intermediate products
5. The corollary to 4 is that some risk impacts ripple through downstream supply chains in divergent paths over extended timescales so that the economic impacts are hard to identify and quantify and may be very indirect. Hurricanes and floods are typical examples where years afterwards businesses may still not have been re-built and not be fully functioning because of the many agendas that must be completed to make recovery a possibility
6. The particular supply chain can be seen as the root cause of disruptions (that have wider impact). Conversely, disruptive events in the wider political, economical or environmental context can also have impact particular supply chains.

Collaborative relationships with key suppliers and customers are expected to be ones where disruption information is communicated immediately in order to give the partner time to consider their options but risk events can happen at some distance to the close collaboration with no direct communication lines in existence and by definition their scale and immediacy allows little time to react to the threat.

As the interconnectedness of our global society and supply chains has increased so have concerns about possible disruptions and the need to manage these risks and in some cases deal with the treatment of the financial consequences of these risks through insurance.

Thus businesses have a number of agendas relating to more knowledge about supply chain risks. Firstly there is the direct impact of business interruptions on their ability to continue to operate, often in extended networks. There are also increasing requirements to demonstrate concerns and actions for fair treatment of people in the extended enterprise and in wider society and to react appropriately at times of disaster. In some cases this is reinforced by environmental and business reporting requirements. The insurance industry has both market opportunities to create new financial instruments to offer their client base but also need to know how to price such services and to quantify the internal funds needed to support claims processing.

In all cases data is needed about past experience and possible recurrence of actual risks in order for this to be built into probability and impact numbers for evaluation.

Research Gaps

The groups represented by the authors identified that there were no existing databases of events that addressed the concerns of businesses in terms of supply chain disruptions. Existing risk management publications would often take well publicised

disruption events as examples of the impacts of risk and ways in which the risk management processes either were lacking or worked well. These were often more conceptual than empirical studies. The need was identified to construct a database of events to provide data of actual events and their measured impacts, where possible.

Process of Database construction

As a result a scoping exercise was designed to explore the definitions, data gathering processes and results of a historical review of public domain risk event reports and their economic consequences. A number of iterations of event definitions were required to get to a cohesive list which could be implemented consistently across multiple data researchers. A list of 12 event types each having up to 12 associated Event Triggers was used (a total of 87 unique trigger identifiers). We also structured the event information around who it impacted immediately and who else was affected by it, to address the directly linked entities downstream of the event site. In addition all available financial impact numbers were gathered along with more demographic information by reference to public domain documents where the original news information and description could be reviewed.

It had been decided from the beginning that only public domain reports would be used since the view was that such reports would only capture significant events rather than the more operational ones discussed earlier which would seldom emerge from inside organisational walls. Sometimes these would appear as throw away lines in annual reports but without enough data to be useful. Please note that other academic work had avoided this by simply correlating statements of supply chain problems with financial reports in subsequent reporting periods.

Internet search engines were employed along with specific publication databases



to search for the events and triggers as developed in the early phases of the exploration. Use of public news reports for example highlighted a major difficulty in such searches since we were clearly dependent on the particular interests, views and experiences of the reporters of the events. Since the concept of supply chains and risk events were not the focus of the reporters' investigations, a great deal of intelligent and critical review was necessary to qualify a report as useful. In a similar way the economic impacts of the events were not always reported in these terms if at all and some forensic investigation was necessary to chase down supporting information in parallel reports from other sources. It will come as no surprise that many reports seemed to be spawned by relatively few original reports.

The scoping exercise was terminated with a total of 918 fully qualified entries in the database. This was considered a sufficient number to both check the robustness of the search process using a number of participants and to establish that data format consistency could be demonstrated to be high.

Results

With the database constructed it is now possible to run all sorts of reports to look for patterns of events so that sectors, industries, regions or companies can all be cross linked to any others. Such a database therefore has the potential to be of use in all the ways discussed already to both potential parties impacted or affected by the event and to the financial institutions involved in the risk insurance business. The scale of reported losses can be quantified in billions of dollars for some reports and, if a fuller forensic investigation of all of the connected downstream losses were possible, could be many times more across the supply chain.

First mover advantage in having reliable data is not to be underestimated since it can inform operational decision processes as well as more strategic ones. It may be for example that the oil and gas sector has to operate in the Gulf of Mexico but how much hurricane damage and disruption to output do they need to factor into the production schedules and where will the replacement capacity come from?

Clearly ocean transportation companies and their clients have become very aware of the piracy problem off Somalia for some months but the scale and extent has not been reported on much until recent times when a \$3.2million dollar ransom seems to have been paid to release an oil freighter and its crew. When should a shipping company re-route to avoid these risks but incur longer and more costly shipping routes? Tracking the risk event coverage and actively searching for new reports might provide a crucial difference in earlier and more substantial data.

Future Developments

Proof of concept has been achieved and the group will now move into real time data collection which will make us less dependent on historical information. Real time news feeds can begin a search pattern for other current reports to complement the initial one so that a more complete and accurate picture can be built on an ongoing basis.

Sector, Region, Event Type and even company specific reports can be generated and reported on at intervals and the database population processes can be developed for a wider group of researchers and analysts.

Such information will now have the utility discussed at the beginning to better inform risk takers and insurers. We are now facing the prospect of quantifying the real effect of risks so that risk management processes can be based on some real data at last and provide a more holistic view to better inform risk takers and insurers alike than a traditional Enterprise Risk Management perspective would normally consider.

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Martin Murphy is MD of SCMG Limited and has consulted worldwide with companies on managing their supply chain risk. This includes clients in the public and private sectors ranging from Oil and Gas to Non Departmental Public Bodies. Globalisation has introduced levels of supply chain risk not fully considered by many organisations as procurement and logistics issues become more complex and in many cases less controllable.

He has worked with JVs, partnerships and alliances with a focus on strategic relationships and collaboration as a catalyst to improve performance and reduce costs.

Nick Wildgoose has held a variety of financial, supply chain and commercial positions in a number of industry sectors, working for companies such as PriceWaterhouseCoopers, BOC Group, The Virgin Group, and currently Zurich Financial Services. This has included working extensively across Europe, Asia Pacific, USA and South America.

He has spoken and written on a number of topics related to business intelligence and supply chain. He sits on the Board of the Chartered Institute of Purchasing and Supply.

He is currently leading the rollout of Supply Chain Risk products for Zurich Financial Services, which has given him the opportunity to interact with a number of companies and understand how they are addressing the real issues they are facing in terms of Supply Chain Risk.