



## THEORETICAL AND PRACTICAL ASPECTS OF RISK MANAGEMENT IN CONTEMPORARY GLOBAL SUPPLY CHAINS

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**ABSTRACT.** Globalization, off-shoring, outsourcing and pressure on cost reduction influence on the increasing complexity of supply chains and lead to higher risk. This may concern supplies, deliveries, manufacturing and transportation. Companies which source from distant countries have to implement risk management system. Examples of companies which use such systems prove, that it is possible to reduce uncertainty. Results concern shorter lead times, better quality and accepted cost level.

**Key words:** Off-shoring, supply chain, risk management.

### AIM OF THE STUDY

The first aim is to show complexity of contemporary global supply chains. The second is to present possible solutions that help companies to evaluate uncertainty and to manage the risk. In the last part, the best practices have been presented.

### GLOBALIZATION, OFF-SHORING AND OUTSOURCING AS THE KEY DRIVERS OF INCREASING RISK IN SUPPLY CHAINS

Contemporary supply chains are spread all over the world. The global economy still evolves, bringing new opportunities for companies, which may penetrate new markets or look for cost reduction chances. Companies became more willing to introduce new global strategies. This is often connected with the relocation of manufacturing operations to other countries. This may be also connected with sourcing from low-cost countries in East Asia or South America. Sourcing in China and other emerging countries became one of the most popular practices for manufacturers and retailers. They may increase profit margin by cutting production cost or to maximize savings by adding more emerging market suppliers. Details about reasons of such decisions have been presented in table 1.

Table 1. Motives of off-shoring  
 Tabela 1. Motywy offshoringu

	Companies with more off-shoring experience	Companies with less off-shoring experience
Labor cost savings	90%	90%
Part of a larger global strategy	78%	42%
Other cost savings	73%	64%
Access to qualified personnel	69%	65%
Competitive pressure	62%	61%
Business process redesign	59%	48%
Growth strategy	58%	70%
Improved service level	56%	49%
Increasing speed to market	52%	44%
Access to new markets	27%	19%

Source: Aird, Sappenfield 2009

The poll conducted among Fortune 1000 companies (more than 200 responded to the questions, mainly manufacturers and retailers) showed that 31.2% of those polled are "heavily penetrated in emerging markets" while another 31.2% have "already sourced some suppliers in emerging markets and are looking to expand low-cost country suppliers in 2010" [Berkowitz 2010]. These companies require efficient logistics systems, right performance of shipping service, experienced personnel, IT support, distribution centers and other resources. Off-shoring or global sourcing often require longer lead times for products or materials delivery, influencing the time which is needed to move products from manufacturing sites to a final place of destination. Enterprisers operating globally face many uncommon situations. Delays in transport, losses during shipping, export barriers, bureaucracy, legal contract enforcement, language barriers and corruption. It raises the importance of flexible logistics systems. Higher number of elements sourced from emerging countries, more complex logistics structures, less familiar environment bring to higher risk. Sometimes companies focus on low-cost sourcing ignoring it. Acting locally managers may easier understand what drives uncertainty and they can better manage risk. Within a global supply chain threats are more pervasive. Something wrong could happen at any level. Nobody knows when, and in which layers up or downstream in the supply chain something wrong may happen. Vulnerabilities are usually more relevant to organizations that operate global and are interdependent on others for example outsourcers. In such cases source of disturbances often lies outside the scope of control of the particular organization. Consequently supply chains are getting more complex. There is so much changing data, so much unpredictable factors. In parallel to them in the supply chains the main opportunity is to get products to customers as quickly as possible. Many companies expect short order cycles. Clients want the product in particular time and place. They don't care problems with transport, reloading, customs duty, etc. According to study by AMR Research Cambridge, 12% of respondents indicated that 50% of their suppliers had experienced disruptions [ Teague 2010]. Even 38% of North American manufacturers responding to MFGWatch survey said they've experienced a significant supply chain disruption in the past three months [MFGWatch Survey 2009]. This risk has been increasing recently due to manufacturers' focus on cost reduction. Generally it seems that in many cases cost reduction strategy may be the best option. But opportunities of cost reduction can easily be disrupted by worse service performance or engineering complexities. Initial contract savings may be quickly reduced by unexpected charges for shipping, storage or customs duties. Moreover labor costs in many "low-cost" countries began to rise. Exchange rate risk is also noticeable. Between 2005 and 2008 the Chinese yuan has gained 18% in value compared to the U.S. dollar. In the same period of time Chinese wages have risen by 44% [ Ferreira,

Prokopets 2009]. Logistics costs still account for about 20% of product costs in China [Contrill 2004]. This is even 3 times more than in developed countries. While Indian labor is certainly cheaper than US labor, it has been reported that the off-shoring boom is increasing Indian call center wages by 10-15% per year [Metters, 2009]. Consequently cost reduction is usually less than expectations. Rising oil prices also may hit transportation sector with higher freight costs. Very often companies pay attention mainly to the costs reduction without considering the risk. The top concern around suppliers in emerging markets is about product quality (25%), the financial viability of these suppliers (33.3%) and about regulatory compliance (41.7%) [Berkowitz, 2010]. Very important area of risk is poor quality. The quality of products made in China is still a concern for many Western manufacturers and importers. Chinese suppliers' component failure rates are higher than global standards. Rejected parts of incoming components run as high as 7% in some industries; 1% is the norm in supply chains in developed countries [Hexter, Woetzer, Shister 2008]. Finding reliable suppliers in China or another Asian country is a difficult process for many Western manufacturers. Many factories tend to induce buyers by over-promising to get the work, and then make under-qualified products. Chinese suppliers rarely share the same perspectives on quality standards. Confirming samples before signing the contract is a widely used approach, but it doesn't ensure right quality. In many cases, even when the buyer has spent a lot of money on an inspection to ensure quality standards, a supplier simply sends the "passed" item to the buyer after the inspection [Huang, Nguyen 2009]. An inexperienced buyer will assume that the qualified sample (including the material used in it) represents the whole lot of products approved for shipment. Yet, in reality the products from the production run may not meet the expected standards [Huang, Nguyen 2009]. This may lead to conflicts. A sharp buyer who demands quality improvement often encounters threats to raise prices or cut the relationship from aggressive and experienced suppliers who know how hard and time-consuming it is to find another supplier [Huang, Nguyen 2009].

Another type of risk is a capacity risk when suppliers will not be able to meet demand because they have been focusing on reducing inventory during the recession [Cable 2010]. Many factories across China were crippled by power shortage [Cheng 2004]. Some manufacturers were forced to reduce production volume.

Many companies were surprised when they discover how vulnerable their suppliers were in time of the recession. Buyers' managers were convinced that ordered parts are coming into their facilities. Some of them found out about supplier bankruptcies even months after they happen. Suddenly they were not able to produce goods that have to be send to their customers. A significant number of polled Fortune 1000 companies (71.4%) expressed that their biggest concern continues to be risk of supplier financial viability [Berkowitz 2010]. This shows the importance of assessing supplier financial situation.

Whenever adequate and appropriate arrangements and warranties were provided in the contract to address quality standard issues, there is no certainty of their fulfillment. In a country well-known for its "rule-of-man" (as contrasted to the "rule of law" that U.S. companies are familiar with) it is extremely complicated to take legal action in case of breach of contract [Huang, Nguyen 2009]. Firms from developed countries may meet difficulties dealing with legal issues in low-cost countries. For example Chinese regulations in a particular region typically are ruled by the local officials.

Another kind of danger is the "black eye" risk, it's not just whether the supplier can produce the product, but it's about how the supplier does it [Murphy 2009]. If the supplier or outsourcer is treating its employees well. It's a big problem to find out through the media that the supplier employs children or it turned out that top manufacturer of high quality products is making them in horrible conditions somewhere in Asia.

Despite presented concerns, more than half of the financial, procurement and risk executives polled have less than 20% of their supplier base under active risk management [Berkowitz 2010]. Companies often lack monitoring system of suppliers or outsourcers.

## BEST PRACTICES IN GLOBAL SUPPLY CHAIN MANAGEMENT

Facing with all the complexity of supply chain, the question is how to manage cost-effectively and how to reduce supply chain risk. How to realize purchasing and other logistics operations? Sometimes it becomes necessary for a company to use a strategy of postponement or to build a bigger stock of inventory. In some cases it is impossible. Volatility in consumer demand is often reason for considering other solutions like near-shoring.

There are basically three possibilities:

- on-shore: manufacturing located on land closest to end customers (e.g., both manufacturing unit and most consumers located in North America),
- near-shore: manufacturing located near end customers (e.g., manufacturing unit is in Latin America while the majority of consumers are in North America),
- off-shore: manufacturing located far away from end customer base in order to take advantage of low-cost labor and/or less-expensive raw materials (e.g., manufacturing unit in China with a majority of consumers in North America) [Bergmann, Ramachandran 2010]. The increased cost competitiveness of near-shore locations, as well as company desires to build a more balanced geographic portfolio to avoid some of the risks associated with low-cost-country sourcing [Miner 2009]. Near-shoring or on-shoring may be a perfect strategy for quick changing markets. The company which prefers near-shoring is able to avoid delays and still gains cost advantages connected with off-shoring, when total costs are close to a range resulted on far location. The example is industry strategy for JDA Software, a supply chain management software provider. This company has 50% to 70% of its supply produced in China but the rest produced in countries such as Mexico, Brazil or Canada [Miner 2009]. The overall cost would be somewhat higher than China, but lower than if produced in the U.S.

Many high-performing organizations focus on flexible manufacturing operations that blend off-shore or even near-shore facilities. This has place when particular company meets sophisticated customers requirements of frequent variant changes. Such enterprises require a comprehensive risk management solutions to provide risk management system. Not each company had developed such a system of risk management - from new suppliers evaluation to each-day operations audits.

Quality control and maintaining company's manufacturing standards are not always out of reach when procuring products from China, as long as the foreign buyer takes some appropriate precautions [Cao 2010]. First step is to identify sources of risk to be able to identify uncertainty. It makes also possible to be able to understand the impacts of different factors at different stages of supply chain and to identify critical places and risk events that may happen and cause the greatest damage. This gives information where to focus a special attention. Particular risk issues contain a need of monitoring situation in critical places. The target is also to prioritize different operations and point those with the greatest value.

In the area of suppliers' selection, companies can implement several quality control methods to ensure that products or materials meet the specifications contracted while minimizing costs and quality-related risks [Huang, Nguyen 2009]. Users can also combine internally generated supplier information with supplier reported data and a broad set of third party data validation and enrichment services, to provide a comprehensive view of supplier risk [Berkowitz 2010]. IBM has its own system for weighing important factors about a supplier's finances [Teague 2010]. The company checks financial statements, including details on cash flow. Buyers also look at evidence of social responsibility and the potential for natural disasters near the supplier's location [Teague 2010]. There are also other tools helpful in selecting suppliers. Identifying factories that have extensive experience manufacturing for or exporting to Western markets is usually a good beginning, in particular suppliers that have good references from past clients [Cao 2010]. Next step is to check their production capacity, technological level, management structure, openness for new manufacturing process requirements, including flexible packaging suites. It is especially important to visit supplier's manufacturing facilities. They must be pre-audited before manufacturing starts and before the buyer

place purchasing orders. Evaluation may focus on quality control standards and inspection procedures. The question is what kind of statistical methods are used. The other question is if future supplier adapts buyer's quality procedures and standards. If supplier will not try to entrust unknown outsourcer with realizing this order. Such a step would make quality control process much more complex. A solution is also to have short contracts with suppliers. In case of problems the change will not be so harmful.

After starting the cooperation there is a necessity of a permanent monitoring of supplier's activity. Main stages of production, shipments, contacts with customs office, sourcing of raw materials. Buyers commonly require their suppliers to use designated qualified raw material vendors, and frequently inspect the quality of the raw materials or require the supplier to carry out such inspections, before the materials are put into production by the supplier [Cao 2010].

Common strategies employed by importers include sending their own quality control specialists directly to the factory to conduct inspection, or hiring a certified inspection company or a third-party laboratory testing company to do the job [Huang, Nguyen 2009]. This is more convenient and cost-effective. The buyer informs the inspection company of the product's detailed contractual specifications, and often provides an approved sample. The inspection company must have complete knowledge of the quality characteristics of the specific product or component, including knowing the differences among different countries' standard systems and expectations [Huang, Nguyen 2009]. This helps ensure that proper decision have been made to increase the likelihood of success when the manufacturing process is implemented. One U.S. company holds monthly online performance reviews and evaluation of each vendor. Results of these reviews are public to competing suppliers, creating a unique pressure. The company also conducts direct performance inspections 2-4 times per year [Cheng 2004].

Some companies intend to shift design approval and ordering decisions from corporate offices in the home country to China. This is ranging from casting to machined parts to clothing to consumer electronics [Hexter, Woetzer, Shister 2008]. As a result time for getting a product or component into mass production can be dramatically shortened. Some of the time saved is through better sourcing can shorten lead times even by 30%. Many huge companies like Wal-Mart, Motorola or General Electric localized their sourcing centers in China [Cheng 2004]. This also allows suppliers to participate in product prototype testing.

## **CONCLUSIONS**

Implementation of global sourcing strategy leads to bigger complexity of supply chains and to higher risk level. There are more sources of potential disturbances. Several kinds of risk may be met in case of global flows of goods and materials.

To cope with these problems some tools may be implemented by managers. Firstly it will be the identification of sources of risk, secondly its evaluation, and finally implementation of chosen methods of management. These methods may contain process of monitoring the whole flow realized in a worldwide scale, permanent quality control system connected with focus on all fields of logistics activity. Some quoted examples prove that it may be a fruitful solution.

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## TEORETYCZNE I PRAKTYCZNE ASPEKTY ZARZĄDZANIA RYZYKIEM WE WSPÓŁCZESNYCH GLOBALNYCH ŁAŃCUCHACH DOSTAW

**STRESZCZENIE.** Globalizacja, off-shoring, outsourcing oraz dążenie do obniżenia kosztów przyczyniają się do wzrostu kompleksowości łańcuchów dostaw oraz zwiększają istniejące ryzyko. Dotyczy to takich obszarów jak zaopatrzenie, dostawy, produkcja i transport. Firmy, które zaopatrują się w odległych krajach, muszą wprowadzić system zarządzania ryzykiem. Przykłady firm, które wprowadziły takie systemy, dowodzą, że można ograniczyć niepewność. Rezultatem tych działań jest skrócenie czasu realizacji zamówień, wyższa jakość i akceptowalny poziom kosztów.

**Słowa kluczowe:** off-shoring, łańcuch dostaw, zarządzanie ryzykiem.

## **THEORETISCHE UND PRAKTISCHE ASPEKTE DES RISIKOMANAGEMENTS IN DER HEUTIGEN GLOBALEN LIEFERKETTEN**

**ZUSAMMENFASSUNG.** Die Globalisierung, Off-shoring, Outsourcing und der Schwerpunkt auf die Kostensenkung beeinflussen die zunehmende Komplexität der Lieferketten und führen zu dem höheren Risiko. Dies kann solche Bereiche wie die Beschaffung, die Lieferung, die Produktion und das Transport betreffen. Die Unternehmen, die aus fernen Ländern beschaffen, sollen das Risikomanagement-System implementieren. Die Beispiele für die Unternehmen, die solche Systeme eingeführt haben, beweisen, dass es möglich ist, die Unsicherheit zu reduzieren. Das Ergebnis ist eine Verkürzung der Vorlaufzeiten von Aufträgen, bessere Qualität und akzeptierte Kostenebene.

**Codewörter:** Off-shoring, Lieferkette, Risikomanagement.

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