

Supply Chain Risk Management: Discussion

Panelists

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The Challenges of Global Supply Chains

Supply chain used to be a linear function usually handled by purchasing heads but now it is beginning to become part of the strategy of the organisation. My presentation covers four areas: the current scenario; how important global supply chains are, especially to emerging markets like India; the disruptions caused by supply chain network risks; and future challenges.

Current Scenario

Companies have streamlined and optimised supply chains to bring about operational efficiency. They have achieved this by adopting best practices

Anchor Janat Shah

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Prof Janat Shah anchored the Panel Discussion and is the Guest Editor of the Discussion on Supply Chain Risk Management.

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such as lean manufacturing, just in time inventory, outsourcing, integrated supply networks and so on. These strategies can help minimise cost and free companies to focus on competencies, but they may also stretch a company's supply chain to its breaking point, which could lead to huge global disruptions. Profit maximisation has led to extended and complex supply chains which could break at anytime and cause huge losses. The recent economic disruption of 2008 is a case in point. Without realising it, a company's best intentions to become a fierce competitor can leave it vulnerable.

In recent years large global enterprises have been built by leveraging global supply chains. We are increasingly seeing that invention and discovery are not prerequisites for creating wealth. Instead, a company's ability to reengineer supply chains and the ability to bring an idea to the market in the shortest time can create businesses that are highly profitable and resilient. We call this 'smart innovation'. To quote Michael Dell, Founder and CEO of Dell Inc, 'We don't reinvent things that other companies invented. Innovation can occur in supply chain and logistics'. Dell has an efficient three tier supply chain comprising the company, its suppliers and direct customers. The components are made in different countries, and delivered by suppliers whose trucks line up outside the plant. In the final assembly it takes an engineer at Dell approximately 4.30 minutes to assemble and ship a computer out of the factory. Similarly, Apple conceived of the iPod, which is a huge success. The product combines components that already exist in the market. The key to the company's success was that the iPod could move from concept to market in less than a year.

Relevance of Global Supply Chains

Are these 'smart innovations' relevant to emerging countries such as India? Yes they are. If you take the case of Tata's Nano, it has a global supply chain portfolio. There are no dramatic new inventions, only improvements in the way things are done—both in manufacturing and at the supply chain level. Vendors were housed in the same

complex as ancillaries, therefore reducing transportation cost. Delphi is one of the suppliers to the Tata Nano project and it has developed the low-cost, centrally mounted instrument cluster that the mini-car features. The Nano has an uncommon 2-cylinder 4-stroke all aluminium engine made by Bosch. While the Tatas have not been an automobile giant historically, in the sense of a General Motors or a Ford, what they have done is create an integrated supply chain by combining their engineering expertise with a smart sense of the market. Their recent acquisitions denote a considerable amount of integration—Tata Steel (basic raw material), Corus (high end steel suitable for the automobile industry), Jaguar-UK (design and marketing), Tata Motors (engineering, human resources and manufacturing). This is a great story of leveraging the global supply chain.

We are increasingly seeing that invention and discovery are not prerequisites for creating wealth. Instead, a company's ability to reengineer supply chains and the ability to bring an idea to the market in the shortest time can create businesses that are highly profitable and resilient. We call this 'smart innovation'.

Global supply chains drive businesses and give them the leading edge in the market. Not only can companies compete more effectively but they can build new business by smart supply chain reengineering. This is why a global perspective on supply network risks is extremely critical for success. Amazon, eBay and Cisco are other examples of companies that have become market leaders through smart supply chain engineering

Supply Chain Network Risks

Global supply chains are becoming increasingly vulnerable as they have to continuously face challenges from a number of variants such as the global financial crisis and volatility of the global currency market, piracy, a spike in the oil prices, and related disruptions in the supply chain like raw material shortages and consequently steep increase in price, etc. War and terrorism have created an unstable environment which increases the risk premium of doing business. Such significant supply network disruptions can have a ripple effect reducing the revenue of companies, cutting into market share, inflating cost and threatening production and distribution.

For example, disruption of undersea communication cables by ships, underwater landslides, fires, alleged sabotage,

etc have seriously affected the operations of telecom companies, BPOs, air traffic and other businesses and conveniences. The 2008 submarine cable disruption involved damage involving up to 5 high-speed Internet submarine communications cables in the Mediterranean Sea and the Middle East from January 23 to February 4, 2008 causing Internet disruptions and slowdowns for users in the Middle East and India.

In the pharmaceutical industry, the price of Penicillin-G which is the building block of about 40% of antibiotics, dropped from \$10/bu (billion units) in May 2003 to \$5.8/bu a year later, due to aggressive pricing strategies by China who then began to dominate the raw material market. However, prices of raw material for Penicillin and other drugs rose after the Chinese government closed its drug making units owing to environmental concerns over the last one year in the run-up to the 2008 Olympics. This had a huge impact on the pharmaceutical market. Chinese firms were the largest suppliers of bulk drugs to India, controlling over 70% of the market. Indian drug manufacturers could not produce adequate volumes of Penicillin formulations due to a lack of supply and the prohibitive cost. The Indian National Pharmaceutical Pricing Authority (NPPA) had to raise retail prices of over 100 medicines to help the domestic drug industry tide over increasing raw material prices. Consequently, aid agencies in Africa were also unable to meet commitments for the supply of life saving antibiotics.

Future Challenges

Future challenges to the global supply chain could come from the clash of national interests over scarce resources such as unexplored oil and gas reserves in the Arctic region, increasing attempts to control communication networks, clashing nuclear ambitions, and ethical concerns in the genome area which could affect the pharmaceutical industry, to mention a few areas. Therefore, companies face a number of challenges in setting up the most optimum supply chain strategy to mitigate risks.

However, without the strength to endure crises, one will not see the opportunity within. It is in the process of endurance that an opportunity reveals itself.

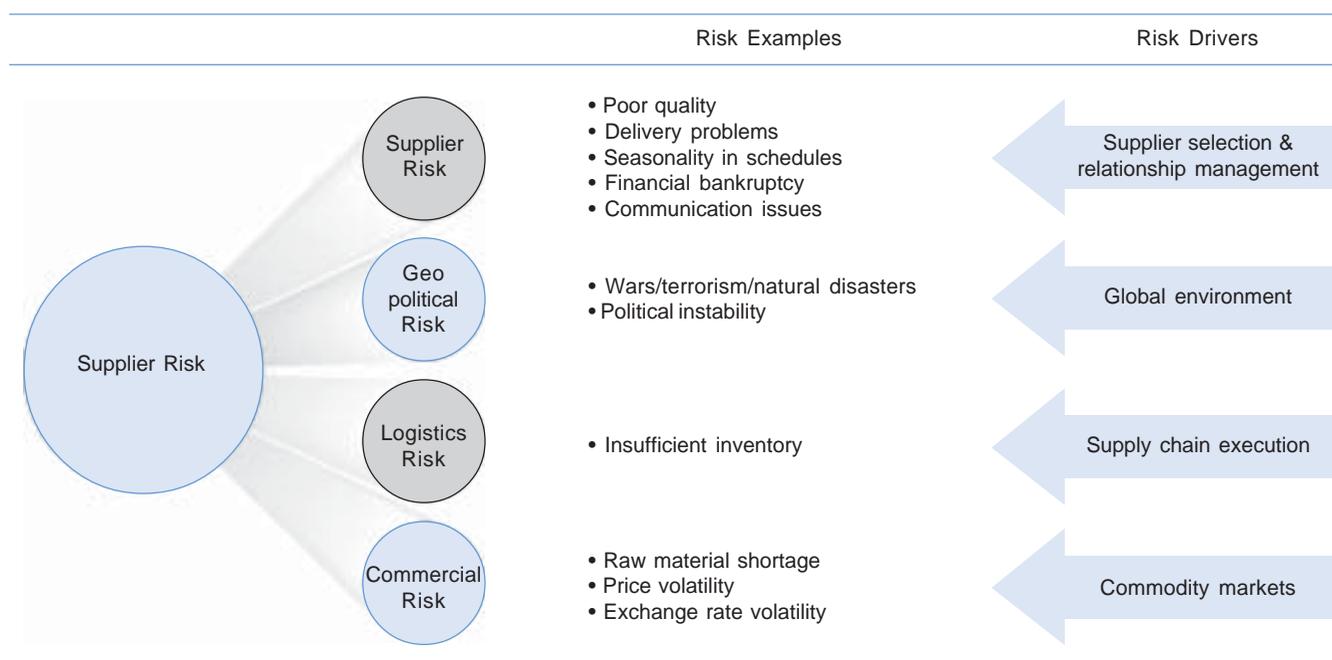
Suprakash Mukherjee

Risk Management

Global sourcing is an important part of business today and risk management is very important in terms of drawing up supply management strategy.

The major macro causes of risk can be summarised as: pandemics and natural disasters, geo political issues, manufacturing consistency and control, asset management, consolidation and flexibility management (this is related to the manufacturing industry) and cultural factors. The risks associated with the manufacturing and

Exhibit 1 Key Types of Risk



engineering industry can be consolidated under four major heads: supplier risk, geopolitical risk, logistics risk and commercial risk. Exhibit 1 explains the drivers of these risks and gives examples of each.

How does our company mitigate these risks?

There are two essential components in mitigating *supplier risk*—how you assess the supplier, and when you develop a relationship with the supplier, how you manage that relationship. Before the supplier becomes an integral part of the business, based on the orders he has executed and his service record, we assess the supplier's capability using tools that are common across the enterprise. This brings uniformity in the assessment. The assessing criteria are decided on the basis of our strategy. For example, we may conduct an audit on quality systems, process control, financial risk assessment and suppliers' regulatory conformity. We may consider intellectual property (IP), patent and confidentiality issues. This audit puts a number against the evaluation and we are in a position to compare the suppliers in Egypt with those in India or China.

The second part is the process control part, when we assess a supplier's capability of being a long term business associate, his potential for 'achieving excellence'. This is essentially evaluating the supplier's performance on the basis of his quality, delivery, technical support, the supplier's communication or wavelength/relationship, and cost management. On the basis of his scores in these categories, we put a number with respect to all these assessments and classify him as Partner, Key, Approved or Conditional. A Partner or Key Supplier is recognised for long term business and the management's focus would be to grow future business and his ability to invest in our future innovation and product development plans as well. The key is relationship building and how we will work together with respect to values, ethics and business.

Individual companies have little control over *geopolitical risk*.

We assess *logistics risk* by working very closely with third party logistic groups and by managing the warehousing business. We also assess suppliers' capability to meet our demand under various conditions. The assessment is a detailed one. It uses a powerful tool which assesses the supplier's capability to meet our order fulfilment process (OFP) i.e. starting from planning for the order, manufacturing and delivering. We look at the process aspect through its manufacturing cycle time under each category. This manufacturing cycle time establishes

the total cycle time indicating also the redundant activities for future improvement. Overall it establishes the supplier's ability to react under various demand scenarios. Suppliers are put through this assessment to assess where they are in terms of regular serial supply.

When we enter a long term agreement (LTA) with our suppliers, we assess *commercial risk* and try to share various aspects of the risk. This could be raw material risk, or volatility in price and exchange rate. We evaluate the risk across the table with the supplier. These are risks that we try to manage through internal discussions with the suppliers on regular intervals.

By managing risk, are we completely risk-free? No, because there are certain risks which crop up at certain points of time—such as a ship or container that goes missing—which we manage at that point of time, based on the situation. We resort to contingency planning based on risk category for which we use certain definite processes and tools.

B K Datta

BPCL Supply Chain Optimisation—Building a New Approach

As part of the quality initiatives taken in 1995–96, like other organisations, we at BPCL tried to manage the environment and minimise risk through controls and mitigation measures, with monitoring systems to ensure that those controls were working. We created an Impact Register, made a list of what may go wrong, the likelihood and the severity, and set yearly targets for improvement. We have always tried to dissect and learn from our mistakes and put our learnings into practice.

In the total supply chain process of an oil industry (Exhibit 2), crude is the fixed stock, which constitutes about 90% of the money. About 70% of our crude is imported and here, our quest for security involves a huge exercise, which goes on for 2–3 months, wherein we look at different price scenarios, we do sigma analysis for different crudes at different prices with differing demand scenarios and finalise the Term Crude Oil. We decide on our additional purchases as spot crude oil through tendering and this volume depends on our appetite for risk and our reading of market uncertainties.

The processes within the refinery are fraught with uncertainty and risk. Reliability of crude oil supplies, non-availability of infrastructure, and customer commitment

are issues to reckon with. The opinion is that we should be demand driven and not supply driven, but that becomes difficult in the face of uncertain customer demand. You have to build agility and flexibility into the total business process and work together.

Our main strategy in resolving these complexities is four pronged. First, the *Business Process* which cuts across from crude oil to the ultimate customer management and delivery. In our chain of the business process each business is a strategic business unit and there are seven strategic business units, all linked with the supply chain. The business process is a signed document between all the chief of business heads with the processes, sub processes, key holders all documented properly, accepted by everybody and signed. All the relevant practices, the cross checks and balances are built into the business process. Second, we have a huge thrust on *Technology*. We make about 37 types of products and each product may have up to 17 properties which have to be met before the product is delivered to the market. The information on each crude covers several pages, and so we have a huge data base. We have a linear programming model to deal with this which enables us to select the crude on the basis of scenario planning and sigma analysis, and also do the refinery planning. This involves assessing the assets

of the refinery and the corporation and selecting a product pattern within the band of volume desired by the business units, which negotiates between the minimum and the maximum demand. The minimum is the constraint demand or the committed demand which we want to meet 100%. Maximum demand consists of the aspirational volumes of the businesses which we try to look at positively to see if we can serve it. If the refinery is short on production, we meet the production gap either by inputs or exchanges, from local Indian refineries (Public and Private) or from imports.

Distribution optimisation management is very important and we look for the least cost placement of the product by the different modes of distribution, whether it is by the coastal ship, our own pipeline, by rail wagon or by lorries. There has to be a certain agility, otherwise you unnecessarily land up with a huge inventory which blocks money or working capital. We try to minimise that. To drive reliability and consistency, it is important to *integrate data across processes* so that quick action can be taken.

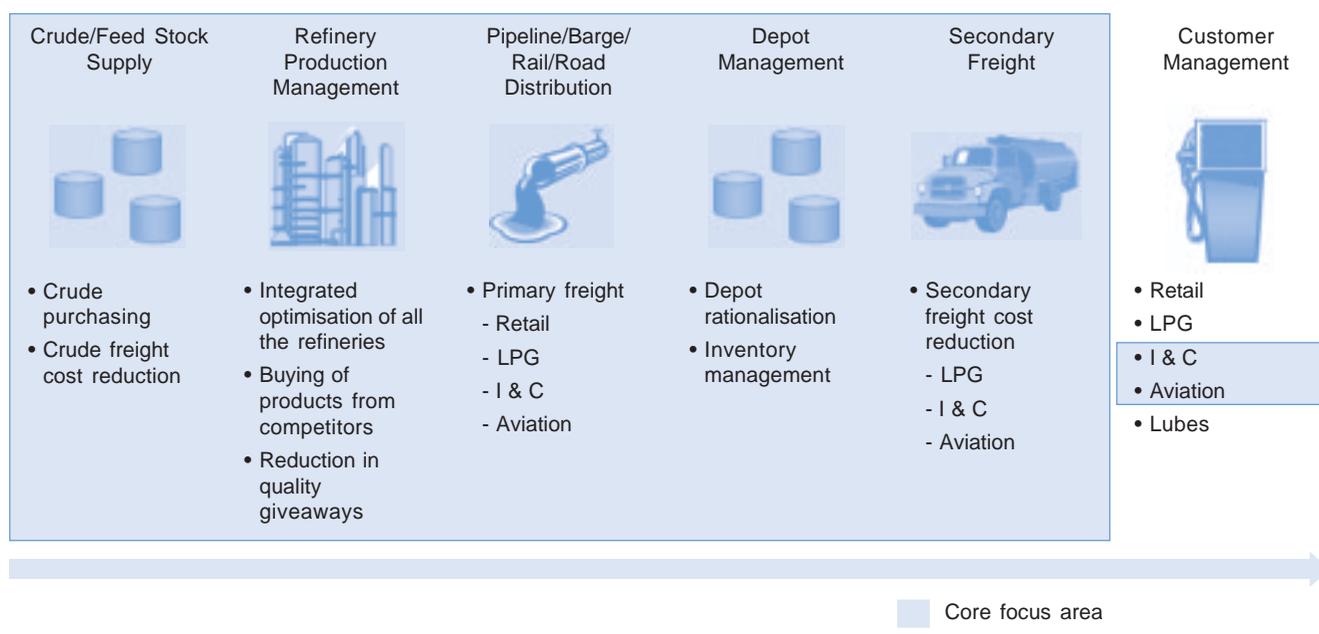
People form the core of all operations and we stress the development and training of our people, as well as the behavioural aspects.

Ultimately, there are different businesses running and the

Exhibit 2 End to End Supply Chain of BPCL



We have looked at end to end supply chain in the last nine months



supply chain is merely bringing corporate wise integrated planning to see all inflows in one single financial calculation. That is why we term our financial calculation net corporate realised (NCR) value. We look into a single value that the corporation ultimately earns by the different operations or actions by the different business units. All business plans and decision flows from NCR concept rather than into individual strategic business units' standalone margins. There are different trade offs by different businesses to reduce the risks at integrated level. And these business propositions work totally in a collaborative way. Collaboration among all businesses is very, very important and here, the behavioural attitudes of people play a very important role.

Harvansh Batra

The EADS Global Sourcing Network

EADS operates in aerospace, defence and related services, manufacturing a range of aircraft from commercial aircraft to satellite launchers and missiles and defence equipment. Of its five big units, one is Airbus, which is quite well known.

The supply chain in this industry is quite complex. For example, the components of the Airbus A380 are sourced from various parts of Germany, England, France and Spain to be assembled in Toulouse,

France. The wings are made in the UK, the tail in Germany and the fuselage in France and Spain, and since the components are too big to be transported normally, we have installed a complex logistics system, which includes special transport systems and specially widened roads. The electrical system too is complex to enable the elaborate lighting, entertainment and safety systems, and the interiors too are custom made.

There are four drivers to global sourcing: value for cost, market access, access to resources and risk management.

Since we operate in a high tech industry, currency risks, supply chain risk, geopolitical risk and intellectual property (IP) risk are very important. For continuous, uninterrupted supply chain it is very important for us to evaluate all

risks in advance.

EADS's external spend represents 70% of its revenues. The same effort has three times more impact if applied to sourcing rather than internal added value. Our growth rate is 18% (which is common for any Indian industry) and a major source of sales growth for EADS are the Asia Pacific region and America to which sourcing will be a key contributor. However, while our revenues are set to double by 2020, so will our spend, and we have considerable additional volume to source by then. Further, we buy in euros and major sale is in dollars. And a 10% exchange rate fluctuation can cost us a billion euros. Thus we put in place a sourcing strategy that supports the overall EADS strategy.

In evaluating a supplier, we categorise our suppliers into four different categories and evaluate them on performance, risk, importance for EADS and contribution to EADS's business field interest. Suppliers are then categorised into standard supplier, key supplier, risk sharing partner and strategic partner.

The elements of our sourcing strategy include supplier relationship management, global sourcing, and commodity management. On this basis we evaluate the depth of the value chain and see what the risks are. In supplier relationship management, supply chain performance is the key to market success and as our suppliers are our partners, market risks have to be shared between EADS and the supplier. In evaluating a supplier, we categorise our suppliers into four different categories and evaluate them on performance, risk, importance for EADS and contribution to EADS's business field interest. Suppliers are then

categorised into standard supplier, key supplier, risk sharing partner and strategic partner. The allocation to a supplier group determines the expectation towards the supplier and the elements and intensity of supplier relationship management. Supplier evaluation and development is crucial for us. We evaluate our suppliers on five common criteria: commercial; technical; quality; logistics, supply chain; and customer support. Here, communication and partnership with suppliers is crucial. In evaluating and developing our suppliers we use measurement tools, audit, we encourage self-assessment of suppliers, and we evaluate risk and consequences. Based on their performance levels suppliers are summarised in traffic light results. We learn from our green/excellent/ A category suppliers; B category suppliers are monitored

to align expectations and we bring in more resources to develop them; C or yellow category suppliers are asked to give us a committed development plan about how they are going to manage risk and come into the green zone; those in the red category are substituted or removed from the list.

Risk and opportunities from end customer market need to be shared with selected suppliers. As part of risk and opportunity management, risks are identified, prioritised and clustered. All business units have identified procurement policies and risk mitigation is defined in procurement policies. Risk sharing is enabled through common databases shared with our contractees with risk sharing elements specified. Our suppliers are trained and helped to mitigate the risks. However, it is a constant challenge to monitor market developments and harmonise implementation of risk sharing clauses in contracts. Our enabling tools include IT support tools that provide buyers with specific information on their suppliers and on their material groups. It is the backbone of our procurement policy and strategy, providing the right information to the right people.

Discussion

Janat Shah: Within organisations, who manages processes? Is it a staff function or a line function? How do you handle enterprise risk versus supply chain risk? Do you transfer your risk to your suppliers and customers? Do you look at supply chain risk in totality and work in a collaborative way and reduce risk for the entire chain or do you look at enterprise risk and transfer the risk to your partners in action? What is the philosophy you work with and how do you translate that in your actual operations? Further, you will have a lot of risk in common with your competitors. Do you collaborate with your competitors on managing some of your risks?

Suprakash Mukherjee: Risk has to be part of the supply management strategy. These days, particularly for companies planning to be global, strategies have to be integrated and can be integrated only when they are enterprise driven. Enterprise driven strategy helps the company to drive risk by following the right processes and using the right tools.

The sharing principle gets applied to a certain part of the risk. For example, in the year 2008, we saw tremendous turbulence in the commodity prices, a huge fluctuation in

the exchange rate. There is a risk associated with it because the costs are going up. Both sides are at risk. The common approach is that such risk has to be shared to the extent possible. However, certain things cannot be shared and either the supplier or the customer has to pay. Earlier, we had models with respect to the various changes that we anticipated and gave an indication to our suppliers that if the commodity prices go up, there will be a band beyond which we will share since both of us have to be in business.

Primarily we are all there to gain a certain amount of market share. So when it comes to sharing certain things with competitors, at best we can share how we will approach the risk. At present each individual company tries to manage its own risk with its suppliers.

Tobby Simon: Companies typically work in a matrix and risk management is generally an individual call depending on one's level of comfort. There is no mathematical formula as it has to do with a combination of various unpredictable forces.

B K Datta: The strategic business units are responsible, which is why scheduling—on a tactical, weekly and daily basis—becomes important. We emphasise integrated planning which is a collaborative process. People are very much part of the process and we want to make sure everyone understands what we are doing and why and what we are asking for. So everybody agrees if there is a trade off. But at the same time we try to insist on the right scheduling and the right structures. Apart from technical knowledge and understanding, the way we behave with each other is very important.

With competitors, we bring in synergy wherever possible. We share a lot of infrastructure with some of them. We have also considered joint imports of some crudes to minimise costs. We take our dealers into confidence and treat them like real partners. On the supplier side, we have a very tight relationship and all of them have a credit rating with us. Coming to exports, we have 30 types of vendors and here too we communicate openly with each other which is mutually beneficial.

Harvansh Batra: We identify a risk both from the supplier's side and from the EADS side, and then from EADS we give a feedback to the supplier. Ours is a high tech industry and we can't take much risk because the cost and consequences are huge. So we identify the potential risk at all levels and all departments, and we discuss them appropriately with our suppliers. On the

quality side we are working with the other majors to develop our worldwide quality systems.

Janat Shah: What are the special risks global companies look at when they consider India specifically or emerging economies, compared to the other parts of the world ?

Harvansh Batra: For us, global sourcing is not low cost country sourcing. We have to consider the best place to buy because our industry is totally different. The value for cost is very important. We consider the supplier base capabilities—their readiness to invest, technological capability; market access is also important for us.

Given the nature of our product, our design and engineering costs are huge. Our engineering resources are our real resources. So we evaluate a country on what real resources they have. Risk is also a relevant factor. We evaluate all countries and suppliers on all these factors and then see which makes sense for us.

Despite the meltdown, there are no cuts or delays in defence procurement in India, so market access is not a concern, except for commercial airplane business as the deliveries are being slightly delayed by the end customer. On the real resources front, things are all right for us. We have to evaluate the financial risk of the suppliers and strengthen them if need be.

B K Datta: When beset by sudden change, we do brainstorming with different scenarios and work out a viable alternative to plan for the period ahead.

Suprakash Mukherjee: We have defined and proven processes in place and when we go to a supplier we are concerned about how ready the supplier is to align processes with us. There are suppliers who have their own standalone processes and we have to be careful to see how well they align with our business needs.

India and China have certain cultural similarities, and one common aspect is that both of us do not know how to say no. Right from the time we commit business to the time we come to the supply stage, we tell the suppliers to come out with their problems and tell us right in the beginning, but this is a problem.

Another problem with these two countries is that there is a limitation to the extent the supply management people can take the business from one notch to a higher notch. After a certain point there is a critical factor that comes in the shape of the product development aspect, or new product development and the new engineering changes

for the improvement of the product. This is going to be the key. The deciding factor will be how fast suppliers can create or acquire the relevant knowledge base in their domain, and how committed the management is in this endeavour. That is what we are trying to look at when we are trying to develop the long term business relationship with the suppliers.

Audience Questions

Q (to B K Datta): Being at your level of management, do you feel an adequate stake in taking decisions so that you are ahead of the private industry? Second, when you conduct your monthly reviews and report shortcomings, is the management prepared to accept them or is there a limit?

B K Datta: We are very much part of the management. We review the alternate scenario when we have a doubtful case and certain symptoms are exhibited to see the robustness of decisions. Though there are government controls on certain things including price related matters, we do not feel any constraints as such. We do feel free to compete, even with the private sector. It all depends on our capability.

Q (to Harvansh Batra): Mr Batra, how do you manage IP risks in your organisation? Is it through industrial design protections or technical innovations protection or something else? Second, if a customer finds some fault in a product built or assembled by you, how do you then network with your suppliers and what are the risks involved in this reverse supply scene?

Harvansh Batra: We sign a non-disclosure agreement and we audit our suppliers—we examine their facility, and the history of their records, and only then enter into a business contract. The maintenance, repair and operations (MRO) department takes care of our after sales customer supports and a liability clause is built into our contract.

Q (to B K Datta): Mr Datta, when there is a demand and supply inequality and when you have to import crude from other countries, and you cannot get the crude at the right time and the right place, what is your organisation's supply chain strategy to deal with such crises?

B K Datta: This is actually a continuous event because 72% of our crude is imported from outside the country and the remaining 28% is from national oil companies. There are several aspects to be considered before we take a final decision, such as selecting the right crude mix, the

ratio at which it is to be processed in the refinery and the timing of delivery so that the product is ready before the ship arrives in the port—and we have a fixed time of 21 days or one month before the discussion takes place and things are finalised.

The variation in the demand, product wise, is as high as 8%–9% but we have been working on that continuously and have narrowed the demand variation down to 2%. The gap arises because our own supply is about 20% less than our demand. We have to make good the gap through imports or buying from locals, and the whole thing is a challenge. A lot of scenario analysis goes into this and we have a lot of model related discussions and analysis. Huge analytics goes into each part of the business and for that data visibility allows us to make quick corrections.

Q (to Suprakash Mukherjee): You said that your suppliers' reaction is very important for your organisation and that you select suppliers based on their alignment with your processes. Every year your selection process will have an analytical part and an intuitive part. What are your matrices in the analytical part? What part of your decision is based on analysis and what part is the intuitive decision?

Suprakash Mukherjee: This is something we continuously debate among ourselves. There are certain grey areas particularly where we have to depend on judgment. First, the analytical part. There are certain considerations such as the kind of facilities the suppliers have, whether they have quality systems, their regulatory mechanisms i.e. on IP, patents, child labour and so on. These are the things on which you can put a definite number associated with the suppliers' position. Similarly, in assessing the suppliers' ability to manage various aspects of risk, we can bring an analytical perception to the problems and issues.

To the intuitive part would fall aspects of our assessment of the commitment of the management on the suppliers' side, their readiness to invest in knowledge acquisition and so on. For example, if we go into a business and the business grows, we would look at the extent to which the suppliers' management would be interested in taking

growth forward. We try to address that through a value chain relationship at a fairly high level where we try and understand what kind of strategy the supplier has, what level of business he would like to have from the various sectors, whether he is trying to distribute the business to the various sectors or is being very focused, and other such issues. Our standpoint is that we generally would not like to expose ourselves to more than 25%–30% of any supplier's overall business, to contain risk. The key is how the supplier's management is going to react and if he is ready to invest in knowledge acquisition. There is a certain element of judgment there and we try to put all this together and share it with our enterprise strategic sourcing groups.

There are certain considerations such as the kind of facilities the suppliers have, whether they have quality systems, their regulatory mechanisms etc on which you can put a definite number associated with the suppliers' position. Similarly, in assessing the suppliers' ability to manage various aspects of risk, we can bring an analytical perception to the problems and issues.

Q: In the context of going global specific to emerging economies, isn't it important for the top level management to understand the legal frameworks of the countries they want to access and how they would affect management issues?

Tobby Simon: We need to be very conscious of the laws, business practices and conventions in the country of doing business. Otherwise one wouldn't be able to make a good start. A broad geopolitical study that looks at the environment, security risks and business conventions, etc is a good place to start. But the long term impact of our decision will also have to be assessed. Furthermore, it

would be wise to conduct a micro analysis, mostly based on common sense, to see whether one's business is strategically aligned. Otherwise, one has to consider making changes in processes and systems to conduct business more effectively. For example, if you look at a client or supplier in a country with free capital convertibility as against one's own environment where this is not permitted, you could be talking in two languages for buying and selling. Thus it is important to analyse and research the country in order to understand the possibilities.

Harvansh Batra: We study a country thoroughly before we start putting a business there. We send a complete team on a mission and they make a formal report, on the basis of which we take decisions. We assess the cost of

our position, right from the local tax structures to what we can export. We study the situation from the points of view of costing, risk, IP, and so on, in detail and then take a decision. There is no low cost country sourcing in purchasing, only best place to buy. And I would buy wherever I got the best price, quality service and technology. You should know the country in and out. Otherwise you are at risk.

Q: What kind of risk mitigating factors are built into the contracts? Text books speak of revenue sharing agreements, buy back contracts and so on. But there may be some contractual features that work within our country and some that work abroad, some that may work on a more informal basis here and are more standardised abroad. What lessons can we draw from that for institution building in emerging economies?

Harvansh Batra: This is a very broad question. We put in a lot of terms and conditions which cover the agreement and disagreement of suppliers, price, liability clause and so on. Negotiations take a long time especially if you are new in a country, but depending on the supplier, the amount of business we are providing and so on, we negotiate term and conditions (but some terms are not negotiable at all) and sometimes the annexure of terms and conditions can go up to 8 or 9 pages .

Q: Can you give us an example of a risk sharing contract that you worked out.

Harvansh Batra: We spelt out terms specifically such as the limits of raw material prices beyond which we would or would not share. Similarly, we worked out details or limits on liability, currency fluctuation, quality delivery, IP and so on.

Suprakash Mukherjee: In the manufacturing industry, specially now that you have large companies coming to buy out of India, risk sharing is a big question because the quantum of product liability which you have in Western markets is very large. When companies come to buy in emerging markets like India, for them the biggest question

is who takes the onus of product liability. Some of the larger companies insist that should there be a failure which results in a human cost, the manufacturing companies are equally liable. That is also one of the big deterrents in this industry, and a major reason why Indian companies do not sell directly in the US. Risk laws would normally be linked to the country where the business is happening. Today, if we have to take any new design for value engineering study for any particular country, the key issue would be how protective we would be in discussing various aspects of the design base, the supply base there and whether the IP laws protect us or not. So the offshoot of that would be what actions we can take at various geographical locations based on the law of the land.

Q (to Mr Harvansh Batra): You are dealing with high quality products and materials which are high technology and process technologies. Now with the scenario of emerging economies and India being more of a risk cover and IP issues being associated, to what extent are you able to develop sources in India for your aerospace requirements and to what extent are the countries responding?

Harvansh Batra: We started our sourcing office fifteen months back in India and that was the first sourcing office out of Europe. That shows that India is a very important country for us. There is an aerospace component in the defense domains which has opened up recently and many private companies are emerging in this space. So also with the automotive business. Many companies are injecting money, putting up capabilities and sharpening their tools to be global players. I see potential here mainly on the mechanical parts, on the engineering side at this moment but in the long run on the system equipment, electronics as well. So there is tremendous potential in India.

Janat Shah: Thank you all very much for an interesting and stimulating discussion.

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