Identifying, assessing, mitigating & managing risk is core of business behaviour
Low-cost labor: Think hemispherically

- LCCs are viewed as best places to acquire goods & services
- Companies assumed permanence of inexpensive labor and underemphasized the impact of other costs: raw materials, transportation, and energy & made long-term contracts.
  - Iron ore contracts between Brazil, India, and China
- Brazil ships across the Pacific, 17% of the iron ore that China uses to make products for Americas
  - When you add up the incremental transport, energy, and inventory expenses for such trans-shipment, China’s labor cost advantage over places like Brazil or Mexico largely disappears.
  - A whole lot of product is moving an extra 10,000 miles without realizing significant savings.
The Credit Squeeze in the Financial Supply Chain

Physical Supply Chain
Movement of Documents
Data & Physical Goods

Financial Supply Chain
Movement of Documents
Data & Money

N. Viswanadham
Bird flu outbreaks in the World

Source: FAO/WHO
Institution Risks
Economic and Political Related Uncertainties

- **Affect Businesses across all industries**
  - **Economic**: economic slow down, country policies and ratings, foreign exchange, interest rates
  - **Political**: War, Country to Country relationships, Changes in Governments
  - **Government policy changes**: Price controls, Free trade zones, Inadequate public services, Nationalization, barriers to earning repatriation
  - **Security** related: Terrorist attacks

- **Protectionist behavior**
  - Countries hiking the duties against the trade agreements
    - Textile Quotas abolition by USA and EU in January 2005
    - Auto components Malaysia AFTA
    - Antidumping
The most pervasive and subtle forms of discrimination against the MNCs is regulatory discrimination
- Anti dumping
- Changes in rules and regulations particularly in taxes and tariffs
- Foreign exchange regulations
- Corruption: Inspections, site visits, delayed payments
- Local company preference for indirect materials for Govt. contracts

These measures are sometimes intended to shield uncompetitive locals and also to protect natural resources

Walmart could not enter Indian retail market and MCC was vandalized
Before 2005, India protected only process patents—not product patents—for drugs.

- Indian companies can produce the drug if the chemical synthesis of the manufacturing process differed from the patented one.

Ranbaxy has set up sophisticated laboratories with hundreds of world-class chemists and also invested in state-of-the-art factories to synthesize drugs that were going off patent.
China is the top contributing region for 9 of the 15 risks, including intellectual property infringement, supplier and internal product quality failure, and security breaches. **This creates a dilemma for many global companies**.
Regions that contribute the most to each Supply Chain Risk: US and China for different risks; China for quality and supply failures

<table>
<thead>
<tr>
<th>Risk Category</th>
<th>U.S.</th>
<th>Canada</th>
<th>LA</th>
<th>China</th>
<th>India</th>
<th>Other AP</th>
<th>MEA</th>
<th>E/C. Europe</th>
<th>W. Europe</th>
<th>Not a risk in any region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regulatory compliance</td>
<td>22%</td>
<td>1%</td>
<td>5%</td>
<td>34%</td>
<td>8%</td>
<td>6%</td>
<td>5%</td>
<td>2%</td>
<td>8%</td>
<td>10%</td>
</tr>
<tr>
<td>Supplier product quality failures</td>
<td>4%</td>
<td>0%</td>
<td>8%</td>
<td>55%</td>
<td>3%</td>
<td>8%</td>
<td>4%</td>
<td>1%</td>
<td>3%</td>
<td>12%</td>
</tr>
<tr>
<td>Supply failure</td>
<td>11%</td>
<td>0%</td>
<td>8%</td>
<td>27%</td>
<td>11%</td>
<td>14%</td>
<td>3%</td>
<td>3%</td>
<td>13%</td>
<td></td>
</tr>
<tr>
<td>Internal product quality failures</td>
<td>6%</td>
<td>2%</td>
<td>7%</td>
<td>47%</td>
<td>7%</td>
<td>5%</td>
<td>8%</td>
<td>4%</td>
<td>2%</td>
<td>13%</td>
</tr>
<tr>
<td>IP infringement</td>
<td>4%</td>
<td>2%</td>
<td>2%</td>
<td>59%</td>
<td>8%</td>
<td>4%</td>
<td>4%</td>
<td>3%</td>
<td>1%</td>
<td>16%</td>
</tr>
<tr>
<td>Immature physical infr.</td>
<td>3%</td>
<td>1%</td>
<td>10%</td>
<td>18%</td>
<td>15%</td>
<td>15%</td>
<td>17%</td>
<td>3%</td>
<td>1%</td>
<td>17%</td>
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<tr>
<td>Volatile labor cost</td>
<td>20%</td>
<td>4%</td>
<td>9%</td>
<td>20%</td>
<td>8%</td>
<td>4%</td>
<td>4%</td>
<td>5%</td>
<td>8%</td>
<td>20%</td>
</tr>
<tr>
<td>Lower consumer spend</td>
<td>47%</td>
<td>2%</td>
<td>7%</td>
<td>5%</td>
<td>5%</td>
<td>2%</td>
<td>6%</td>
<td>5%</td>
<td>2%</td>
<td>20%</td>
</tr>
<tr>
<td>Volatile transp. costs</td>
<td>14%</td>
<td>1%</td>
<td>5%</td>
<td>20%</td>
<td>7%</td>
<td>11%</td>
<td>11%</td>
<td>4%</td>
<td>7%</td>
<td>20%</td>
</tr>
<tr>
<td>Volatile energy costs</td>
<td>31%</td>
<td>2%</td>
<td>7%</td>
<td>11%</td>
<td>4%</td>
<td>5%</td>
<td>8%</td>
<td>8%</td>
<td>5%</td>
<td>20%</td>
</tr>
<tr>
<td>Commodity price volatility</td>
<td>22%</td>
<td>3%</td>
<td>9%</td>
<td>17%</td>
<td>5%</td>
<td>8%</td>
<td>6%</td>
<td>4%</td>
<td>6%</td>
<td>21%</td>
</tr>
<tr>
<td>Shortage in mgmt talent</td>
<td>7%</td>
<td>2%</td>
<td>10%</td>
<td>20%</td>
<td>4%</td>
<td>12%</td>
<td>14%</td>
<td>5%</td>
<td>1%</td>
<td>26%</td>
</tr>
<tr>
<td>SC security breaches</td>
<td>4%</td>
<td>2%</td>
<td>8%</td>
<td>32%</td>
<td>6%</td>
<td>8%</td>
<td>11%</td>
<td>4%</td>
<td>0%</td>
<td>26%</td>
</tr>
<tr>
<td>Natural disasters</td>
<td>12%</td>
<td>1%</td>
<td>5%</td>
<td>21%</td>
<td>5%</td>
<td>22%</td>
<td>3%</td>
<td>2%</td>
<td>0%</td>
<td>30%</td>
</tr>
<tr>
<td>IT risks</td>
<td>9%</td>
<td>1%</td>
<td>2%</td>
<td>26%</td>
<td>11%</td>
<td>8%</td>
<td>8%</td>
<td>5%</td>
<td>0%</td>
<td>32%</td>
</tr>
</tbody>
</table>

% Based on total respondents

What region or country contributes the most to each of the risks listed?
Sustainable development means adopting business strategies and activities that meet the needs of the enterprise and its stakeholders today while protecting, sustaining and enhancing the human and natural resources of the future.
65% of the companies named government policy uncertainty as the biggest risk.

Several sectors, such as the electricity sector, are regulated both at the federal and at the state level by policies that often vary state-by-state.

National priorities shift with elections. President Clinton’s clean car initiative, which aimed to address fuel efficiency, safety, and emissions, gave way to a hydrogen fuel initiative under President Bush. Now, President Obama is focusing on electric cars.

**Market acceptance.** Will customers pay more for electric cars and other highly fuel-efficient vehicles? The answer may change depending on fuel prices, the state of the economy, government policies.
Community risk In India

- Tata Singur
- Nandigram
- Vedanta mining – Orissa
- Posco in Orissa
- Goa SEZ
- MCC Bangalore
- Reliance fresh banned in several states
Location Decision: Conflict with Farmers

- Tata Motors a case point:
- Land acquisitions for projects of about 92,000 acres ($54 B) were stalled by protests launched mainly by peasant farmers
Infrastructure Projects: Time & Cost Overruns

- Delays and cost overruns have significant implications: people have to wait for the provision of public goods and services longer, limits the growth potential and reduce the competitiveness of the economy.
- Delays in land acquisition, shifting of utilities, environmental and inter-ministerial clearances, shortage of funds and contractual disputes are the major causes behind time and cost overruns in India.
- Governments go for PPP but even those are equally vulnerable to the contractual and organizational failures. Projects for the upgradation of the Delhi and Mumbai airports, construction of the Bangalore Metro and the Delhi-Gurgaon Expressway PPP experiencing major time and cost overruns.
- **Execution of infrastructure projects is not well managed**
The Changed Nature of War

- In the 20th century the world was confronted by adversaries who were stationary, observable, and conventional. The enemies' weapons of choice were tanks, planes, bombs, ships, and so on; and an individual soldier was not a significant threat to any nation's security.

- The adversary today is agile, unconventional, and stealthy. His weapons are Microsoft, suicide vests, machetes, AK47s, and roadside bombs.

- Modern transportation and changes in demographics have further provided potential enemies a global reach.

- These have created the so-called "super-powered individual" that have the ideological motivation and also the material means to inflict significant harm to any nation.
Risks In Delivery Service Mechanisms
Risks In Delivery Service Technologies

- Delay or unavailability of either inbound and outbound transportation to move goods due to carrier breakdown or weather problems
- Failure of information and communication infrastructure due to line, computer hardware or software failures or virus attacks, leading to the inability to coordinate operations and execute transactions
Clustering & Concentration

- Global pressures in some industries encouraged the search for efficiency through larger scale and a high degree of concentration as in for e.g. super-aero planes and gigantic dam projects, Giant firms such as DHL, Flextronics etc. mergers and acquisitions, and geographical concentration (e.g. low cost manufacturing in China, IT clusters in India, Auto or pharma Industrial clusters).

- Damage due to an accident is higher for a concentration rather than for separate owners in several locations (bird flu effect on China in early years of this decade).
Cyber Security: Biggest Risk of Connectivity

- Computer systems are subjected to electronic attacks originating from sources that are usually unidentified.
- The terrorist and counterfeit networks are also globally connected and indeed they follow the HR practices of recruitment, training of people and also systematic planning processes for implementing their objectives.
Somali Pirate Operations

- Pirates have expanded over the years 2006-10
- Many of the world’s most powerful navies are involved: US, EU, India, Malaysia, Indonesia and South Africa.
- The Japanese and South Koreans send warships to protect ships carrying cars.
- It is still cheaper & convenient to pay higher insurance fees and take risk being attacked by pirates than to incur the extra cost of diverting vessels around the Cape of Good Hope.
Supply chains are designed to deliver the maximum intended value by mitigating high probability operational risks. In the event of a low probability high impact systemic failure, a supply chain not only fails to deliver its intended value but may also result in losses.

N. Viswanadham
High Consequence-Low Probability Disruptions

1997
UPS Labor Strike
Quebec Ice Storm
Taiwan Earthquake

1998
Toyota Brake Plant Fire
GM Labor Strike
Ford-Firestone Tire Recall

1999
Philips Plant Fire
Sept. 11 Terrorist Attacks
West Coast Ports Lockout

2000
Iraq War
Blackouts US - Europe

2001
FMD UK
Ok. tornado - GM

2002
Scandals: Enron, Andersen, Worldcom
SARS

2003
Philips Plant Fire

2004
London Attacks

2005
Madrid Attack
Katrina

Ref: Adapted from Dr. Debra Elkins, General Motors
Cyber Security
Cyber Risks

- Disruptions to supply chain flows caused by IT defects or damage
- Cyber attack
  - Exposure to malicious actors through remote exploitation of IT weaknesses
  - Exposure to malicious actors through the installation of corrupted or counterfeit IT
Recent Cyber attacks

- Hacktivist groups targeted businesses in recent cyber attacks by hacking, and defacing websites of businesses or government entities for purposes of political or policy protest.
- Hacktivist also conduct distributed denial of service (DDoS) attacks. Making a machine or network resource such as banks, credit card payment gateways, etc, connected to Internet unavailable to its intended users.
- **Stuxnet** is a computer worm discovered in June 2010 attack of nuclear facilities.
- Stuxnet spreads indiscriminately via Microsoft Windows and spies on and subverts Siemens supervisory control and data acquisition (SCADA) systems, an industrial software and equipment that are configured to control and monitor specific industrial processes including the PLC.
- Stuxnet infects PLCs by subverting the Step-7 software application that is used to reprogram these devices.

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Credit crunch affects trade finance and hence trade volumes.
- Prices for letters of credit increased in 2008 and 2009 & trade-related loans were charged higher interest rates
- Preference to source from domestic suppliers during downturns because of trust or financing problems & greater protectionist policies

Global supply chains that reacted “just in time” to the collapse in demand resulting in synchronized fall in trade volumes from all countries.
- A sharper decline of firms’ inventories
- Greater protectionist policies
- A larger decline in trade of goods, which make up 70% of world trade

N. Viswanadham
Network industries of critical infrastructures – electricity, transport or communications- have the features of connectedness, large size, and loose governance structures. These systems of systems are subject to systemic risks.

Connectedness makes individuals and organizations accessible over distance.

- On the positive side, victims of disasters are easier to reach, and emergency rescues can be organized more efficiently using Satellites and Wireless based monitoring and warning systems.
- On the negative side, connectedness multiplies the channels through which accidents, diseases or malevolent actions can propagate. Natural disasters at one side of the planet can have substantial economic and financial impacts at the other. Epidemics spread more rapidly due to the international travel and trade and tourism.