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The physical internet

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Like information on the internet, goods are moving around the world with ever greater efficiency. But Paul Markillie spots dangers lurking in modern supply chains

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LOUISVILLE, Kentucky, 2am. Roaring thrust-reversers rapidly slow the giant MD-11 jet as it touches down on the runway before turning to taxi towards a sprawling floodlit building. Seconds after it has pulled up at the ramp, large doors on the fuselage swing open and people scurry around with equipment. But they are not about to unload hundreds of passengers: instead, the aircraft carries stacks of air-freight containers stuffed with parcels and documents. Soon they will be emptied to join the 300,000 packages that are sorted every hour at the UPS Worldport.

Every package is automatically photographed, measured and weighed and has the information on its super-barcode analysed by computers to determine its trajectory along some of the 17,000 conveyor belts. This requires awesome computing power: more data are processed here every 30 minutes than in an entire day of trading on the New York Stock Exchange. Eventually the packages slide down a chute to be placed into a bag or an air-freight container. And before dawn they are off again to complete their journey in another aircraft or in one of a fleet of waiting trucks.

A few hundred miles to the south-west, in Memphis, Tennessee, more landing lights line up across the night sky. This is FedEx's global hub, and for the next few hours an aircraft will land here every 90 seconds. Every one of them has the company logo painted on its tail. Tractors towing containers and cargo pallets dash everywhere. Documents are automatically sorted in a maze of machines. In one giant building, known as the "matrix", packages zoom around on 300 miles of conveyor belts. Before dawn,

all these packages too will have departed again.

As the night continues to travel west, similar scenes unfold at airports in Manila, Taipei, Hong Kong, Mumbai, Guangzhou, Dubai, Cologne, Paris and Anchorage. The goods moving through these air-cargo hubs range from items bought on eBay to vehicle parts, fresh flowers, books, computers, transplant tissue—just about anything imaginable. Even live whales have been “FedExed”. And when the night reaches America again, the landing lights once more appear in the sky over Louisville and Memphis.

21st-century clippers

Frederick Smith, FedEx's chief executive, compares his company's jets to clippers, the sailing ships that once carried cargoes on the trade winds. Mr Smith pioneered the air-express business in the early 1970s by delivering a few hundred parcels overnight to a handful of American cities using Falcon aircraft the size of an executive jet. At Memphis airport, the parcels were sorted on a table. Many of his contemporaries thought he was mad: who would pay to send packages by air? He almost went bust. But now FedEx has ordered a fleet of double-deck Airbus A380s to help cope with demand. Rival UPS has also placed orders for the huge new Airbus. Neither company wants any seats inside, just space for lots of cargo. If they were passenger airlines, UPS and FedEx would now rank among the world's biggest carriers.

In an effort to rebrand itself, UPS is painting the phrase “Synchronising the World of Commerce” on its 270-plus aircraft and 90,000-plus vehicles, including its distinctive dark brown delivery trucks. It may not exactly trip off the tongue, but it is an apt description of a business that has grown far beyond simply delivering things. Nowadays firms ranging from trucking companies to freight forwarders, shipping lines, air-cargo carriers and post offices are more likely to use the word “logistics” to describe what they do.

Logistics is a military term. As generals know, wars can be won or lost by it even before they are fought. Now companies are having to become more involved in planning their own logistics. Under relentless pressure to reduce costs and increase sales around the world, firms are outsourcing operations to subcontractors who can do them better and more cheaply, and moving more of their production and services to lower-cost countries.

Globalisation requires greatly increased co-ordination of transport by road, rail, sea, air and now also by an entirely new route to market: the internet. This makes logistics vastly more complex. The job of ensuring that all these things work together is known as supply-chain management. Thomas Freese, an American consultant in this business, explains: “Supply-chain management is an evolution of logistics. Logistics tends to be tactical, supply-chain management is strategic.”

Supply chains are becoming not only longer but also more enveloping. Supply-chain management these days can include anything from buying raw materials to managing suppliers, warehousing, operating transport fleets, taking orders, collecting payments, repairing products and even answering the telephone at call-centres. Companies are also outsourcing supply-chain services.

Yet supply-chain management is not just about wringing costs out of a business. It can also be used to increase revenue and boost profits without necessarily lowering costs. Indeed, some companies have re-engineered their supply chains to gain a huge competitive advantage. What has put Wal-Mart ahead of Sears in retailing, Dell in front of Hewlett-Packard in the personal-computer business and Zara ahead of Marks & Spencer in fashion? The market leaders all have supply chains that are more responsive to customer demand, according to Yossi Sheffi, director of the Massachusetts Institute of Technology's Centre for Transportation and Logistics.

Things like transport, purchasing and warehousing used to be considered merely part of the cost of doing business, and were often managed as separate entities. Now they are coming together as a strategic item on the chief executive's agenda. There is a reason for this. “Supply-chain leaders are very aware of how a company runs because they have to deal with all the different components of the operation,” says Rick Blasgen, who used to work for a big American food group and now runs the Council of Supply Chain Management Professionals.

But as this survey will show, supply chains harbour dangers too, and managing risk is becoming a pressing issue. A number of alarm bells have started ringing. Most firms have been organising their logistics to make themselves leaner. Many now carry little or no inventory to save money. Indeed, sometimes their entire inventory consists of what is moving from the factory directly to the consumer in the back of a truck or an aeroplane. If something goes wrong—and it often does—business will quickly grind to a halt.

Experts worry that some companies do not fully understand the risks of operating very lean international supply chains—or that they choose to ignore them because their rivals are forcing the pace, purchasing critical components from a single supplier to increase their buying power. In fact, some firms do not know who is supplying their suppliers—or even where some of their lower-tier suppliers are based.

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