



Strategic Design Global Supply Chain

For executives planning a global supply chain this Paper describes an integrated framework—based on the tools of scenario planning, robust optimisation with real options and organisation design

*Jay Horton, Founder and Managing Director
Strategis Partners*

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Executive Summary

Firms aiming to globalise their supply chain can benefit from new frameworks and capabilities to enhance planning processes.

This paper addresses four interrelated questions. Firstly, what are the special challenges in global supply chains? Secondly, how to anticipate the future global business environment? Thirdly, what are the strategic factors that drive success? Fourthly, how should the global supply chain be organised?

It explains how these questions can be addressed using the ESO framework—Environment, Strategy and Organisation. This framework is based on constructing scenarios on the future business environment, designing the organisational model to manage the hazards, and understanding the strategic rationale on how to win. By achieving an alignment between the business environment and the strategic and organisational choices, the odds of success can be improved.

By applying the framework described in this Paper, companies can benefit in the following ways: It will enhance the company's ability to anticipate shifts in supply and demand, and enable the development of robust supply chain strategy in a changing global economy. It can facilitate more effective project implementation, reduced costs and delays, leading to maximisation of value for shareholders and customers.

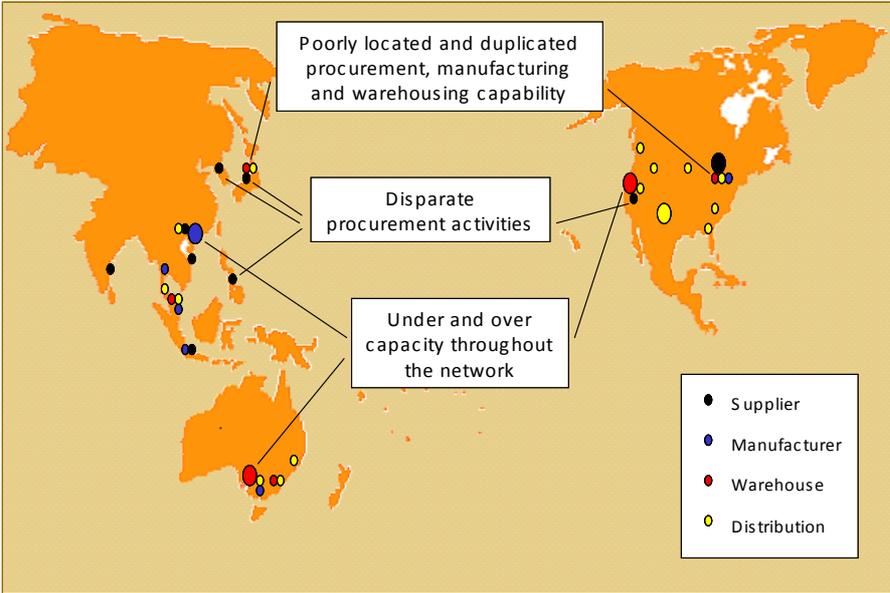
What are the Key challenges in global supply chains?

Global supply chain strategy involves many choices on network design and operation to lift performance. Additionally there are different “rules of the game” to learn; and the “home bias” can undermine effective decision making on cross-border initiatives. Unavoidably the risks and uncertainties are higher. Let’s look at these in turn.

Many choices in network design to improve performance

A key challenge is to identify structural improvements needed to reduced costs and lift service quality. Inefficiencies almost always exist within the existing supply chain as illustrated in Exhibit 1: poorly located facilities in the face of growing markets, lengthy supply links, and capacity imbalances.

Exhibit 1 – The inefficiencies in global supply chains



However companies face a massive array of strategic and tactical choices in designing their future global supply chain; for example how and where to process, manufacture, package, load, transport and distribute retail and industrial goods. The opportunities to reduce costs in the supply chain by eliminating duplication and inefficiency can run into savings of tens or hundreds of millions of dollars annually.

Other choices are to with how facilities can best serve changing markets and customer channels. What assets to divest? What assets to acquire? Where and when to locate facilities to meet growth? Where to source inputs? Which transport options to ship raw materials and products?

These decisions have many interdependencies. There are literally thousands or even millions of ways of interconnecting suppliers, production and warehousing facilities, and consumer markets.

Global supply chains involve a different set of “rules of the game”

The rules of the game are the cultural, legal and regulatory constraints that shape supply chain interactions. Cultural differences include the level of hierarchy accepted in business differs from country to country, and the importance of the individual versus the group in business situations.

Guanxi or interpersonal relationships is one of the major dynamics of Chinese society. A pervasive part of the Chinese business world for the last few centuries, it binds literally millions of Chinese firms into a social and business web.

Any business in this society, including local firms and foreign investors and marketers, inevitably faces guanxi dynamics. In China's new, fast-paced business environment, guanxi has been more entrenched than ever, heavily influencing Chinese social behaviour and business practice.

Failure to recognise these different rules can cost foreign firms dearly, so foreign entrants need to learn new “rules of the game” in host countries to overcome the liability of their non-native status.

The “home bias” undermines good decision making

In 2006, Kodak's chief executive called for a less “western-centric” approach to doing business in Asia after the US imaging company misread how quickly Chinese consumers would embrace digital technology.

Initially, Kodak had forecast continued growth in sales of traditional film canisters in markets such as China and India. The US Company had hoped this would cushion the impact of losing this highly-profitable business when customers switched more rapidly to digital cameras in Europe and the US. But consumers in China quickly adopted digital photography. In June 2005, Kodak accelerated plans to phase out its traditional film business – in part due to having underestimated the rapid decline of film in China.

Today Kodak is re-framing its world-view, acknowledging that its biggest consumer markets are increasingly a long way from the home base.

The risks and uncertainties are higher

By their very nature, global supply chain projects are innovative; that is:

Risky. There is a risk of failure, but also prospects for big pay-offs

Uncertain. Many contingencies are difficult to foresee

Long-term. There are often numerous stages of development

Knowledge intensive, both local and global. The effort and insights of specific individuals is crucial

Idiosyncratic. The comparability of specific international projects with other projects is low.

Designing the strategy

The ESO framework—Environmental scanning, Strategy and Organisation—for crafting global supply chain strategy is shown in Exhibit 2. It is based on constructing a range of future business scenarios, designing the organisational model to manage the hazards, and understanding the strategic rationale on how to win. By achieving an alignment between the business environment and the strategic and organisational choices, the odds of success can be improved.

The following sections explore in detail how this process works.

Exhibit 2 – Drivers of global supply chain performance



Imagining the future global supply chain environment using scenario planning

Creating a robust and adaptive strategy starts with scenario planning

Scenarios explore alternative pictures of the future that can weave together changes in technologies, markets, politics, social values and other elements in the form of a “storyline”. Scenarios do not predict what the global business environment will look like in ten or twenty years time, but they do offer a robust a framework for supply chain strategy.

The natural inclination of managers is to work from what is known. Scenarios force managers to look at what is not very well-known, and what cannot be controlled. Importantly, they help planners think about the larger picture. They aim to stretch thinking and question assumptions. In so doing they help managers overcome decision making biases, open up new frames of reference, and so lead to more robust strategies.

Scenario planning helps in strategy development in three ways

Firstly, scenarios provide a framework and process for thinking about change, uncertainty and opportunity that lies in the global market. It’s an “outside in” approach of understanding the future environment. It’s possible to challenge conventional wisdom constructively, and enable executives to consider a variety of possible futures.

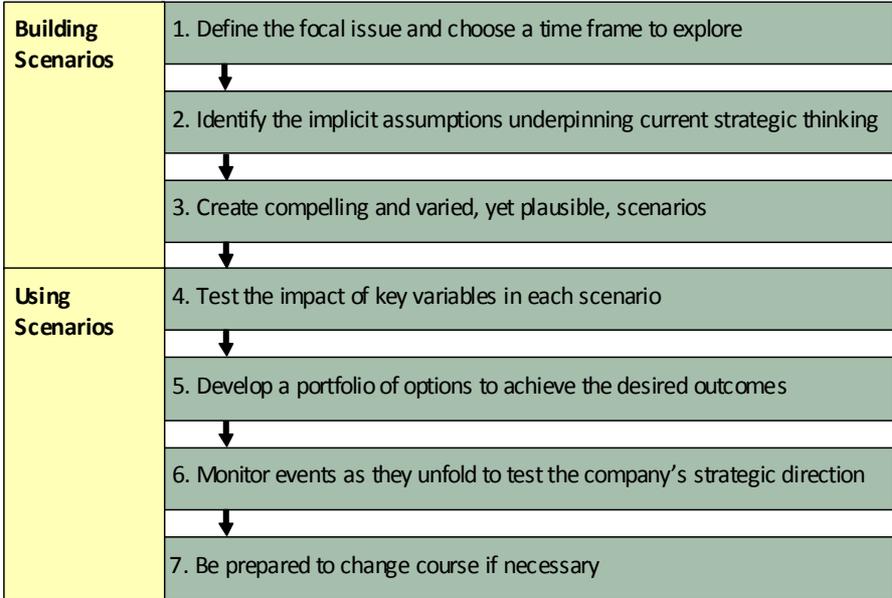
Secondly, by educating decision makers about the different ways in which the global market might unfold, it can help them to better prepare their supply chain to respond and adapt. In an uncertain world, supply chain strategy is really about creating options and opening up new choices.

Thirdly since future success cannot be predicted with certainty, scenarios help the company adjust course in the light of events. The better the scenarios, the less frequent these surprises will be and the more successful the strategy.

The process of building and using scenarios

Exhibit 3 shows there are two main phases in scenario planning: building scenarios and using scenarios, starting with a specific decision set or issue that the organisation will need to think hard about.

Exhibit 3 – The process of building and using scenarios



There is little doubt that a company’s “shared mental models”— the implicit assumptions and thought processes that key decision makers use to make sense of the world—are strongly influenced by the cultural traditions which are forged in the home market.

The Kodak example described earlier illustrates that cognitive bias—systematic errors in the way decision makers process information—can wreak havoc on international success. In Kodak’s case what was needed was a judicious, deliberate re-framing of the company’s view of the world “outside.” The scenario process aims to do this.

The key step is to understand the key drivers of change, and then determine which of those are predictable and which are uncertain. The uncertainties which are most influential are used as the basis of the scenarios. Next time is spent exploring the implications of those scenarios.

Building scenarios

The key step in building the scenarios is to identify the key drivers of change that might shape the future. For example, important drivers of long-term change in global supply chains include those shown in following Table 1. These cover social, technological, economic and financial, environmental, political and regulatory drivers of change.

Table 1 – Examples of Drivers of Change in Global Supply Chains

Category	Some Drivers of Change
Social	Shifts in social values and environmental values Work-life balance concerns Global population growth and population ageing Rising inequality
Technological	Getting globally dispersed teams working together Demand for “clean” technologies Growth in recycling Increasing pace of technological change Increasing importance of innovation New energy sources
Economic and Financial	More sophisticated customer requirements Rise of outsourcing and use of strategic alliances Growth in emerging economies, in particular China and India The emerging global workforce and new competitors Oil and energy prices
Environmental	Climate change “Exxon Valdez-Three Mile Island-Chernobyl” events; Pandemics Growing pressures on the natural environment
Political and Regulatory	Country political risk Tightening environmental requirements Security of property rights Product recalls

Using the scenarios

Once scenarios have been crafted, the most crucial step begins: developing and testing the company's strategic supply chain options against the scenarios, addressing the following questions. What should the company be doing under each scenario? What actions are common to all scenarios—the “no regrets” strategy? What actions work under one scenario, but are very risky under another scenario? What is the essence of the underlying formula for the venture's success, given the range of scenarios?

Strategic factors driving success in global supply chains

Formulating the global supply chain strategy has several components:

Definition of the goals, and how success is measured. This might be shareholder value maximisation, or it might be something more complex involving the interests of different stakeholders. Even when shareholder value is the ultimate objective, sub-goals might be expressed in terms of building in flexibility, adaptability and resilience.

Definition of the scope. This includes a specification of the supply chain that the firm requires, what products and services it will offer, what customers and market segments it will serve, what activities it will undertake, where it will do these things, and what technology it will use. Most importantly, the scope of the strategy determines what supply chain activities the firm is *not* going to pursue.

Specification of the firm's competitive advantage. This is an indication of how the supply chain will contribute to the company's competitive advantage.

For example, supply chains are moving towards closer and tighter networking, in response to customer preferences for better quality, improved service and end-to-end traceability. In food supply chains for example, developing, signalling and monitoring quality across the chain has become a central issue.

Strategic rationale. An explicit analysis of why the firm's competitive advantage will actually be realised.

Designing the portfolio of initiatives

At the core of the strategy is the development of a “portfolio of initiatives” They can include:

- Investments in a supply chain network that is robust against the range of scenarios. Decisions also include the acquisition or exercise of real options such as options to scale up faster in response to better than expected conditions
- New capabilities which are needed, and existing capabilities which need updating
- Initiatives to increase speed of adjustment and flexibility
- Changes in the nature of the dialogue between key stakeholders – customers, suppliers, investors, policy makers and regulators
- Formation of new supply chain partnerships.

Case study – real options in HP’s global supply chain

In the 1990s, HP customised inkjet printers for foreign markets at the factory, then shipped them in finished form to warehouses. Customizing at the factory is cheaper than customizing in the field. But HP kept guessing wrong on demand and ending up with, say, too many printers configured for French customers but not enough for Germans.

Executives realised that it would be smarter to ship partially assembled printers and then customise them at the warehouse, once it had firm orders. True, local customisation costs more. But even though production costs rose, HP saved \$3 million a month by more effectively matching supply to demand. In effect the price HP paid for the option to delay configuration choices until the optimal time.

Developing and testing initiatives using global optimisation

Optimisation is the way to design the global supply chain from the ground up, to build competitive advantage into the structure of the network. With optimisation the economics of the facility location options – factories, regional processing and distribution centres, market-based warehouses – can be modelled together with the material and product flows. Exhibit 4 shows a schematic of a supply chain model which can be modelled using optimisation tools such as linear programming. All choices can be analysed systematically to identify the best supply chain decisions, clarifying the risks and opportunities of alternative strategies.

Exhibit 4 – Many choices for interconnecting supply and demand

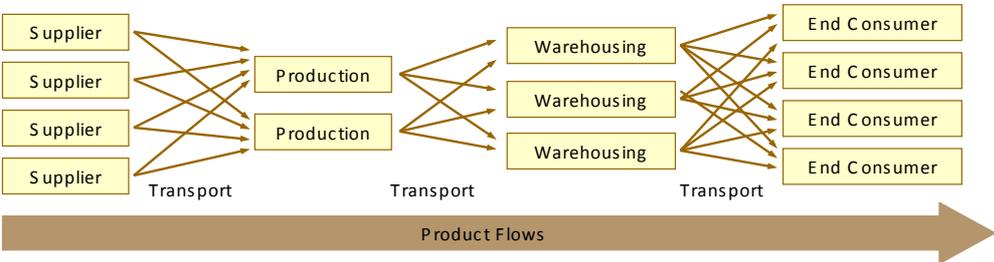
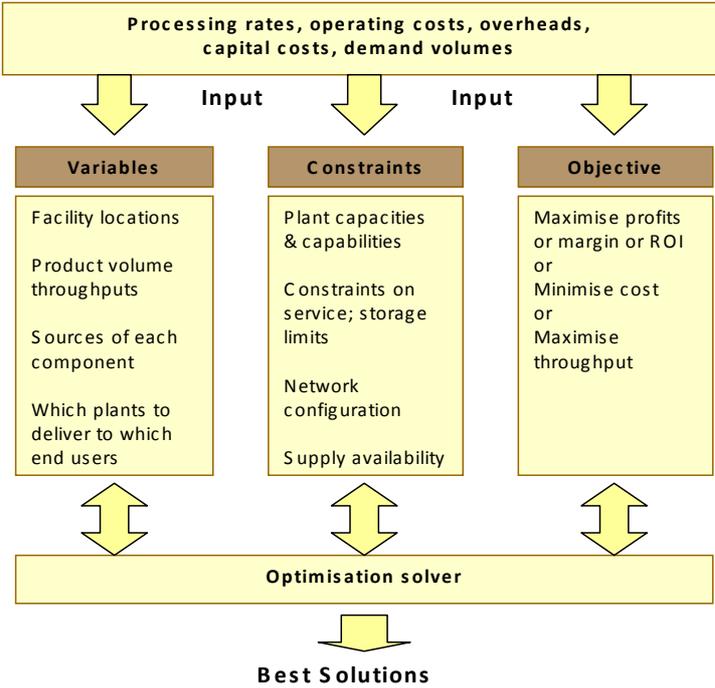


Exhibit 5 shows the modelling process of supply chain optimisation. Decision options are included as variables, the “operating rules” of the business are entered as constraints, the objective is defined, and an optimisation solver is used to find the best decisions.

Exhibit 5 – How does the supply chain optimisation model work?



Optimisation delivers key answers on capital investment, facilities reconfiguration and rationalisation, and new modes of operation. Fast “what if ...?” analyses of important business decisions increases the confidence of management.

Case study in supply chain optimisation

In Indonesia, Coca Cola Amatil had a capacity problem: How to meet increasing sales volumes in the fast growing Indonesian market? When to expand infrastructure to meet demand?

With a network of over a dozen production and distribution facilities serving over 100 million consumers across the Indonesian archipelago, an integrated value chain view was needed. Many islands, cities and towns meant that there were many possible ways to proceed, shown in Exhibit 6.

Exhibit 6 – Production facilities across Indonesia



One or two large plants would cut plant costs through scale economies, but these gains could be swamped by extra transport costs. To resolve the many choices available a large-scale multi-time period optimisation model of Coke’s Indonesian supply chain was developed to analyze the network configuration options. The objective was to optimise the tradeoffs between production, distribution and warehousing capital and operating costs – to determine the optimum balance between facility capital expenditure and variable production and distribution costs.

The supply chain decision model was able to show management how to lift shareholder value and meet the growth in the market – by finding the best supply options, plant locations, production volumes, distribution patterns. The result was a saving of tens of millions of dollars, and a roadmap for how the supply chain needed to be upgraded.

Mastering the logic of supply chain organisation

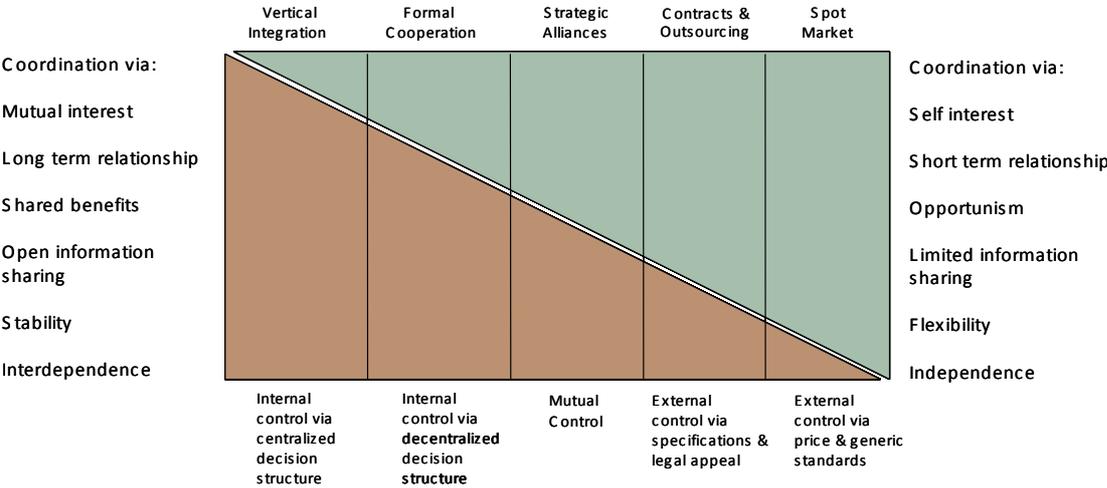
In globalising the supply chain, the nature of the hazards faced in the foreign market should drive the design of the organisation model.

Transaction costs are higher in a global supply chain

A global supply chain face higher costs compared with establishing and running a supply chain which has a domestic focus. Firstly, there is the time and effort expended on cross-border partner / supplier development, relationship building with foreign parties, and the extensive negotiation and contracting costs. Secondly, once an agreement has been reached, monitoring and enforcement costs come into play.

A variety of models are available or organizing supply chain services (Exhibit 7), each with different means of coordination and control.

Exhibit 7 – The models for organizing supply chain services



Choosing between the models of organisation

The choice of models range from a fully integrated organisation, through to arms-length, short-term transactions. For the vertically integrated organisation, coordination of the supply chain and its assets is controlled centrally and unilaterally.

Between the two poles of vertical integration and spot markets are hybrid models of organisation. The “formal cooperation” and “strategic alliance” models in Exhibit 7 include organisational forms such as joint ventures or joint ownership. The distinguishing feature is the presence of a formal organisation that has an identity distinct from the two owners, and that is designed to be their joint agent in business dealings.

The next step along the Exhibit 7 continuum, “contracting and outsourcing” is based upon legally enforceable contracts involving establishment of specific and detailed conditions of exchange.

The last form in Exhibit 7 involves arms-length, short-term transactions—where the good or service is generic and identities of buyers / sellers are immaterial to the transaction.

Whereas Western firms tend to rely largely on market and hierarchical organisational arrangements in dealing with their suppliers, Japanese firms rely mainly on hybrid forms of governance to manage the high degree of co-specialisation that exists between firms.

Some Japanese automakers pay for consultants to work with suppliers to improve production methods. For example, after Honda chose Donnelly Corporation as its sole supplier of mirrors for its U.S.-manufactured cars, Honda sent engineers over the two Donnelly plants, scrutinizing the operations for kinks in the flow. Honda hopes Donnelly will reduce costs about 2% a year, with the two companies splitting the savings.

Conclusion

For executives directing global supply chain strategy, the frameworks described in this Paper are valuable aids to build resilience into cross-border supply chain initiatives. Within the management team, they can foster openness to new ideas and different perspectives, and can help reshape core planning assumptions before they become outdated or just plain wrong. Key success factors are uncovered, leading to an enhanced ability to succeed with your company's global supply chain strategy.



About the Author

Jay Horton, Founder and Managing Director of Strategis Partners, is a leading adviser to Companies and Governments in Asia and Australia on strategic management issues, including scenario planning, capital investment decision making and real options analysis, and corporate strategy.

During his twenty year management consulting career, he has worked with clients in Australia, Canada, China, Japan, Hong Kong, New Zealand and South East Asia.

Jay has played a number of leadership roles, including as a Partner of PricewaterhouseCoopers, McKinsey & Company, and Managing Director of management consultancy ORG Pty Ltd.

Jay is a regular guest lecturer at the Australian School of Management, the Sydney University School of Business & Economics, Australian School of Business at the University NSW, and the Macquarie Graduate School of Management.

Jay's qualifications include Master of Arts from Sydney University, Master of Economics from Australian National University, a Bachelor of Engineering - Electrical from James Cook University, and Fellow of the Australian Institute of Company Directors.

Contact us

Sydney:

Level 57, MLC Centre
19-29 Martin Place
Sydney, NSW 2000
Phone: +612 9238 6886

info@strategispartners.com.au

www.strategispartners.com.au