

9 The influence of customer buying behaviour on product flow patterns between trading countries, and the implications for regulatory policy

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9.1. Introduction

This paper is designed to provide a more granular perspective than the traditional aggregate view that economists take of supply chains. In particular, I want to add a behavioural dimension, and introduce a more dynamic methodology, capable of addressing the increasingly volatile operating environments that are likely to pervade future trading conditions within and between countries, whether developed or developing.

The objective of this paper is to develop a toolbox of creative methodologies that will add insight to what we already know about supply chains and point the way towards improved navigation of the cross-border movement of trade flows.

From the outset, let us deal with some of the terminology issues. In my view, there is no difference between the terms supply chain and value chain, because supply chains done well equals value chains.

Regarding the term networks, these develop from local to regional to global, with correspondingly increasing complexity. The important thing to realize is that you should attack this growing complexity from the outside in, not from inside out as per conventional practice. Of course, the ultimate solution selected will be a combination of both.

Fundamentally, people, their respective behaviours, and the decisions they make in particular circumstances propel products and services along supply chains, so

it is vital that human behaviour is factored into all future value chain designs. This is non-negotiable if the objective is to achieve a finer alignment between buyers and sellers and a necessary precondition if we are to take operational and financial performance to the required next level. Understanding human behaviour is the elephant in the room but, unfortunately, too many executives are in denial about its pivotal influence, presumably because they do not know how to factor it into the performance equation.

And people are spread out along supply chains, in the form of customers, intermediaries, staff and management inside suppliers and the enterprise itself. The optimal result is obtained when all parties (including outside influences such as government) along specific supply chains, approach a degree of “alignment” in the way they think and act.

Thus, looking at the operation of supply chains through the narrow prism of economics is not sufficient. Human behaviour must be factored in, just as the eminent economist, Robert J. Shiller, Professor of Economics at Yale University commented in the aftermath of the 2008 global financial crisis. He was acknowledging the human effect on the economy. See Shiller (2009).

Indeed, simply observing macro-flows of goods and services across or within country borders, hides the important detail beneath, and blunts the search for more predictive supply chain business models. In such situations, the emphasis is on reactivity, but there is a limit to reactive designs because of the premium cost attached to this *modus operandi*.

If we are going to work from the outside-in, we need a meaningful way of grouping customers into economically viable segments and then reverse engineering back into the enterprise from there. Most, if not all, conventional methods of segmentation used by the marketing discipline are flawed when used for the purpose of supply chain design. The only method that will adequately inform supply chain design is behavioural segmentation, grouping customers, consumers and users with similar buying values (and corresponding behaviours) according to the product and service category under consideration.

Through our empirical work in companies drawn from many industries, and across numerous geographies in the period 1989–2012, we have found discernible patterns in the way customers project their demand for products and services. These conclusions are summarized as follows. See Gattorna (2010).

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1. Customers always exhibit a small but finite number of dominant buying behaviours for any given product or service category, usually no more than three, but four at most (to give an 80 per cent fit to the market).
2. The preferred dominant behaviours exhibited by customers can change temporarily under the pressure of changing (operating) conditions such as lifestyle changes, government regulatory action, or the product life cycle itself. But behaviours usually return to the preferred position when conditions return to “normal”.
3. Where there is a permanent change observed, it is usually associated with a change in the customer’s own internal decision-making group.
4. Finally, it is not unusual to observe more than one kind of buying behaviour inside a large corporate customer, where different groups are involved in buying different product or service categories.

These observations explain two phenomena:

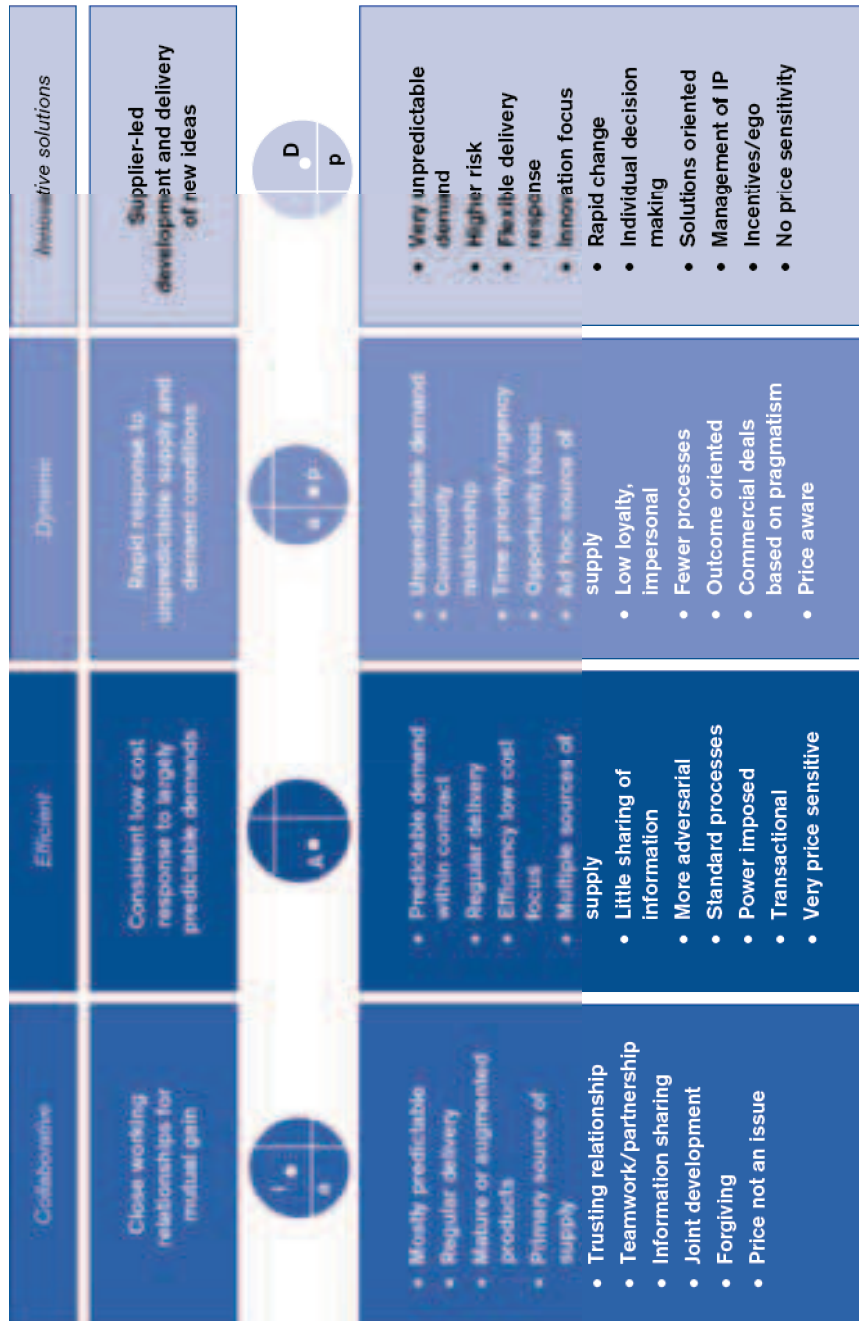
1. That customers can exhibit more than one buying behaviour, under varying conditions, and hence more than a single supply chain configuration is required to cope with this plurality; and,
2. That such changes can be brought about for many reasons, including government regulatory actions – this is the connection between supply chain designs based on customer behaviour, and the impact of different government policies (such as tariffs, customs duties, wages, and development incentives) which can either help or hinder product and service flows.

We can now say with some confidence, that the most common buying behaviours and behavioural segments observed in the marketplace are the following four types:

Collaborative, transactional, dynamic and innovative solutions, the characteristics of each of these is described in the Figure 9.1 below.

What is also very significant is that as we look at how customers buy certain products and services in different countries across the world, the only thing that changes is the mix of the originally-identified buying behaviours. We put this down to the influence of national cultures superimposed on individual or business unit buyers, see Gattorna (2010).

FIGURE 9.1: The four most commonly observed dominant buying behaviors



Source: Adapted from Table 1.3.1 in Gattorna (2003), p. 32; see also Gattorna (2006), p. 41.

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This is a particularly important finding because it means that we can set up the same supply chain configurations around the globe, and they will be just as relevant from one country to another. Of course, the prevailing government regulations and competitive activity could influence things in specific locations, but it is unlikely any fundamentally new segments will suddenly emerge out of nowhere. This is good news for multinational companies as they design their regional and global value chain networks. It is also good news for the future work of the WTO.

At the enterprise level, in reviewing regional and global markets, there are really only two appropriate methods open to companies to surface the underlying demand patterns. These are:

1. Using a shortened version of the well-known conjoint analysis market research technique, where a sample of customers are interviewed (qualitatively and quantitatively) face-to-face and by telephone. A draft “straw man” segmentation is prepared as a result, and this is then validated with further direct contact with customers in the field; and,
2. Of perhaps more relevance in the case of aggregate flows of product important in trade flows between countries is the demand variability analysis otherwise known as the co-efficient of variation. The methodology is as follows:
 - a) Profile the total demand, by-customer or source, by-year for say two to four years to understand overall patterns. Demand should be broken down by major product categories,
 - b) Then calculate the co-efficient of variation (CoV) by customer or product category in a few sensible time buckets, such as monthly or quarterly, over the selected period. This will give a perspective on the relative variability of different customer's demand,
 - c) The CoV is a method of comparing the variability of different data sets. It is calculated by dividing the standard deviation by the mean, expressed as a percentage. By setting some business rules, it is possible to distinguish between volume flows with lower variability (base load or lean), compared with volume flows which has a higher variability (agile).

For example, we conducted this type of analysis on the demand (and export) of thermal coal from the Hunter Valley region of New South Wales, Australia, in

the four-year period, 2003–06. Congestion was occurring at the loading Port of Newcastle, and at one stage there were 75 Cape size ore carriers in a queue out to sea, waiting to be loaded. The business rules we applied to the demand side were as follows:

1. Any one customer included in the analysis had to take at least 1 metric ton (MT) in any of the given years; and,
2. The CoV for each customer was calculated, and any customer with a CoV equal to or less than 50 per cent by month, or less than 33 per cent by quarter would be considered base-load demand, with all the implications for a lean style of supply chain configuration,
3. Anything above these numbers would be regarded as volatile, with all the implications for an agile style of supply chain configuration.

Based on our analysis in 2007, for a total demand of 100 MT per year along the coal chain and embarking port, 60 per cent of the volume was found to be base-load, and 40 per cent to be volatile, requiring two entirely different supply chain configurations or pathways, lean and agile, working in tandem, but managed separately. But if the two demand patterns are mixed together, no analysis is possible, and things degenerate into guesswork and opinion. This is very relevant to the way we look at trade flows between countries as the same problem applies.

9.2. Resolving rising complexity

The term “supply chain” was first coined by Keith Oliver at Booz Allen¹ in 1982. I have long been uncomfortable with this term but have chosen instead to continually redefine its scope over time, rather than introduce new terminology, which in turn just adds to the semantic confusion.

Indeed, the more accurate term these days would be value networks, as argued in my book, *Dynamic Supply Chains*, see Gattorna (2010). And networks they are, spreading from local to domestic national trading environments, becoming regional as more countries are involved in strategic sourcing and/or distribution strategy, and ultimately, global. The complexity of these “networks-of-networks” increases exponentially as the geographic scope widens, and the number of links (both transport and electronic transactions) and nodes (facilities of all types and activities within) increases.

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During the last two decades we have seen an explosion in the size and complexity of value networks as companies embraced global sourcing, offshoring of production and jobs, and dispersed manufacturing. In some cases these trends have already been reversed or are in the process of changing as conditions have changed. Indeed the reallocation of global manufacturing will become more pronounced over the next five years, especially as companies face decisions about where to add future capacity. The best companies will undertake a “product-by-product analysis of their global supply networks” taking multiple factors into account, both directly related to production cost, and others of a more indirect nature, such as cross-border inefficiencies, see Sirkin et al., (2011).

As the economics of production change because of escalating labour costs and availability (as is now the case in China), the impact of carbon footprint, and the corresponding thrust towards a more sustainable world, these value networks are again being reshaped. And this evolutionary process will continue indefinitely, spurred on by the new “Age of Digitization” that we are just entering. See Friedrich et al., (2012) and El-Darwiche et al., (2012). This digitization will facilitate different pathways for the physical product and corresponding financials and make revenue recognition for tax purposes more difficult. The same can also be said for the true country of origin on the label, as there are likely to be several involved as the product progresses towards its final form.

One thing we can say with certainty is that the increased degree of complexity posed by extensive global value networks opened up through multi-country trading activities will never be resolved by conventional means such as bilateral agreements and centrally devised and administered regulations. We need to borrow ideas from Ashby’s Law of Requisite Variety, (Ashby, 1954; 1956) and seek out fundamentally new and sophisticated solutions to this growing problem. In short, we need completely new business models to make any sort of impression on the inexorable rise in complexity.

To paraphrase, Ashby says that as systems become more complex through increased variety, then the complexity-reduction devices we deploy must necessarily become correspondingly more sophisticated to match this complexity. In effect, to manage complexity in supply chains – and supply chains are after all living organic systems – we have to absorb variety, otherwise the whole system is likely to become brittle, unstable and prone to collapse, perhaps catastrophically, see Gattorna (2010).

Unfortunately, the modern obsession with enterprise resource planning (transactional) systems has in part unwittingly contributed to the increased complexity too.

Paradoxically, company executives, thinking that more standardization of processes and underlying systems would reduce the complexity they face, have in fact made things worse as the new [more rigid] systems installed have further reduced the degree of natural “alignment” with customers, and in so doing led to more exceptions, increased cost-to-serve, and more (rather than less) complexity. This is a good example of what happens when attempting to fix a problem from the inside out.

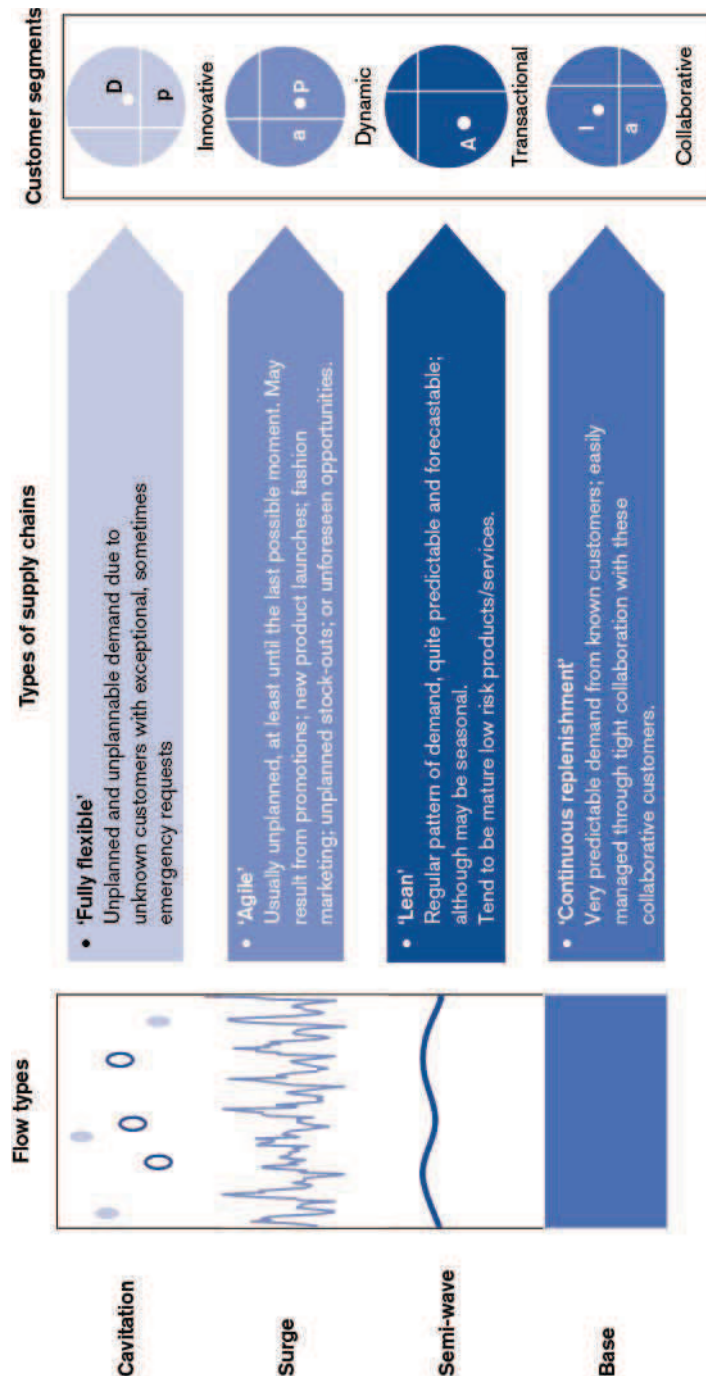
At the country level, complexity has arisen simply because of the rate of growth that has occurred in the process swamping existing capabilities. China is a good example of this. India is another example that is in an even worse situation because of its poor infrastructure. At least China has made giant advances in this particular area. Yet both countries lag in finding solutions to smooth the flow of trade through their inbound and outbound supply chains as evidenced by their low standing in the *Ease of Doing Business Index* referred to later in this paper. See Lawrence et al., (2012).

Fortunately, we now have at our disposal network optimization modelling techniques that have the potential to cut through complexity and allow us to in effect find the lowest cost pathways through nominated networks, from the supply base to customers, anywhere in the world. These mixed integer mathematical models have been available for the last few decades, but it has taken the hardware on which they run time to catch up and achieve the required higher processing speeds. The best models currently available are designed by Solvoyo (Boston) and Llamasoft (Ann Arbor).

In addition, instead of running the models against some arbitrary objective function, we can link them to the behavioural segmentation mentioned above and in the process find out what the possible pathways and corresponding cost-to-serve are for any given product-market combinations, under particular operating conditions, including government taxes or incentives, tariffs and carbon footprint. Indeed, there is practically no scenario that we cannot model these days, and the result is a whole new level of more informed decision-making by executives and government officials.

These new Decision Support Systems (DSS) are likely to provide a bright new avenue for exploring government policy options in the future, especially where constraints are placed on trading flows across borders. The core concern is to be in a position to make more informed decisions, and for confirmation of this you only have to look around the world at the winning sporting teams who benefit by making better, faster and more timely decisions than their opponents in the heat of competition.

FIGURE 9.2: Flow types and matching supply chain configurations



Source: Gattorna (2010), p. 53.

Based on my work and that of colleagues inside multinational companies, I expect that we will find ways of fast-tracking certain product flows, by embedding agile processes along certain preferred pathways, albeit at a premium cost, and for the residual, less volatile flows, I expect it will be possible to design lean pathways that carry flows on a more regular, predictable basis, at lowest delivered cost.

The key is to separate the two flow-types and treat them completely differently. Once this is achieved, overall costs will fall, as will complexity, and more certainty in trade relationships will return. The trick is to eliminate both the over and under-servicing and reallocate resources to achieve a finer-grained alignment between the supply base and the corresponding target customer base.

The main supply chain flows we are interested in are depicted in Figure 9.2, and in particular the combined steady-state flow made up of lean and continuous replenishment components, which are largely predictable and have low variability.

9.3. Infomediary capability²

There is one other enhancement to the network optimization modelling approach suggested above, and that is to form an infomediary in key industries to pool and aggregate data in order to better manage trade flows. Specifically, the term refers to an organization designed to allow information to be gathered from multiple parties and used productively while protecting the confidentiality of other contributors. Prashant Yadav of MIT and the University of Michigan have already used this approach in attempting to improve the forecasting of essential medications in developing countries. See Levine et al., (2008).

Yadav conceived the idea of a global health infomediary, which collects information from funding agencies, procurement agents, national buyers and other parties who have a wealth of information available but do not necessarily share it.

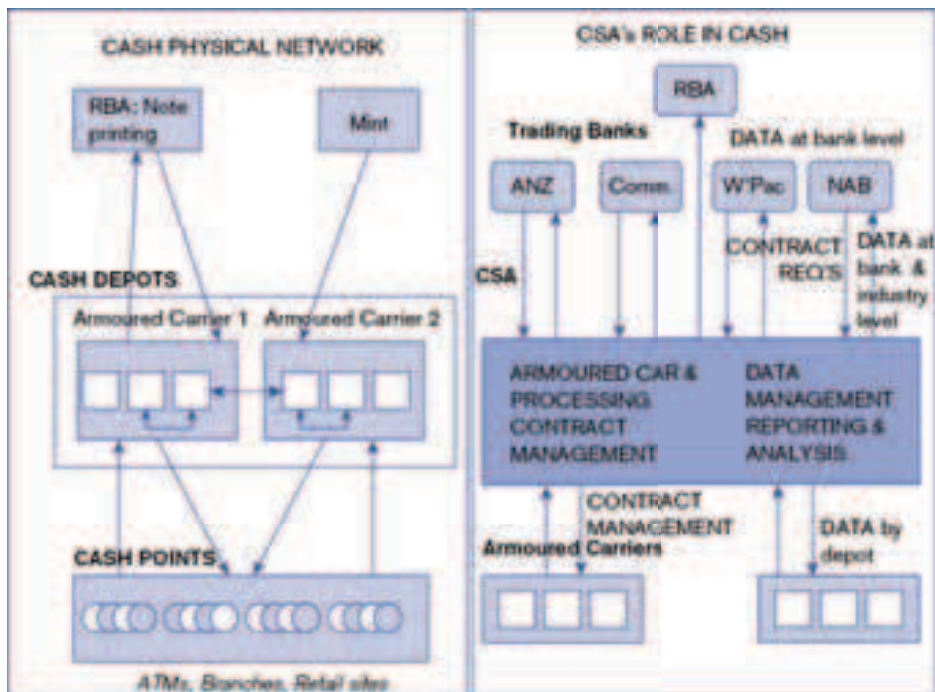
My colleague, Deborah Ellis, and I found a similar business model working in Australia at Cash Services Australia (CSA). This company is jointly owned by Australia's four biggest banks. It gathers information on the individual and joint cash requirements of these banks (both inbound and outbound), and uses this information to direct pick up and delivery of cash from and to strategic locations, spreading the physical task across several armoured car companies.³ See Gattorna (2010) and Figure 9.3 of this chapter.

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At the enterprise level, the equivalent is the control tower, which companies such as Unilever are building to more tightly manage the flow of their products to markets using asset-heavy third party logistics providers (3PLs) to undertake all the physical movements. The forerunner of this application was the Fourth Party Logistics (4PL) model, developed originally by Andersen Consulting (now Accenture). See Gattorna (1998).

Another potential case is Port Waratah Coal Service (PWCS), which is the operator of the Hunter Valley Coal Chain, referred to earlier, 150 km north of Sydney. Over 100 MT of thermal coal per annum is exported to 75 global customers from this region, which involves 17 coal producers, 27 load points and 39 mines, three rail track owners, two rolling stock operators, one port authority and one terminal operator. As you can imagine, the mix of conflicting objectives and priorities among these disparate parties makes it very difficult to achieve a smooth flow of product

FIGURE 9.3: The new business model at Cash Services Australia



Source: Gattorna (2010), p. 369.

along the shared infrastructure and ship-loaders at the port. It is in fact a microcosm of what happens in inter-country trade flows. For PWCS, we have suggested an “infomediary” style of arrangement to ensure improved collaboration and efficiency.⁴ See also Gattorna (2010).

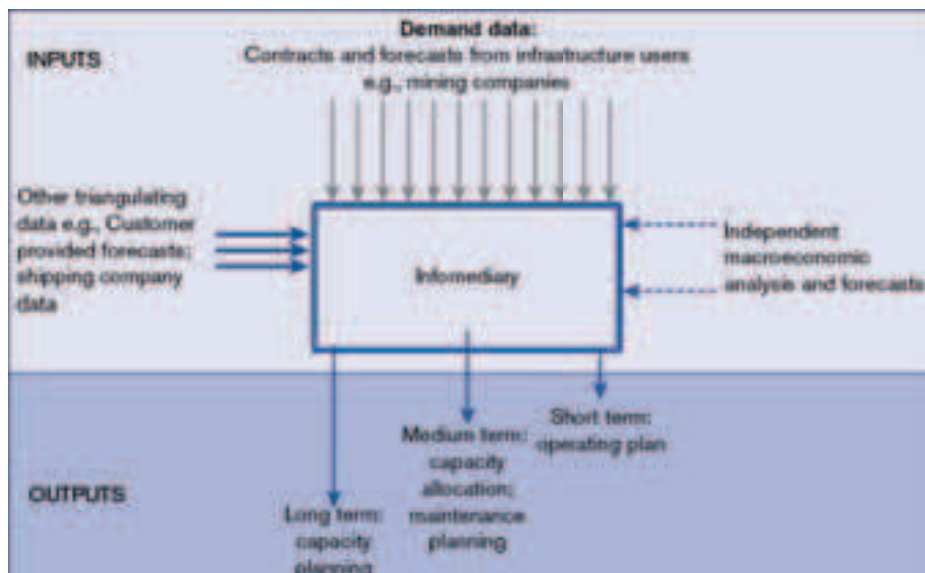
The broad principles embedded in an “infomediary” are depicted in Figure 9.4.

The point of suggesting this type of info-sharing vehicle is that it would not be difficult to replicate the arrangement for major product-industry categories in producing countries. This would have the effect of improving demand forecasts and smoothing cross-border product flows along key supply chains to export customers.

9.4. Introducing an over-arching fully-integrated end-to-end supply chain business model

Part of the problem that we face is that today there does not exist a unifying business concept to describe the B2B or B2C phenomena that links suppliers, enterprises,

FIGURE 9.4: The new business model is needed to manage demand and capacity in multi-user supply chains



Source: Gattorna (2010), p. 373.

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customers and users, either within or between countries. And what we do have is very fragmented, generally along functional lines.

Functional specialism still rules supreme, and the only problem with that is that customers are inevitably buying at 90 degrees (horizontal) to the way we manage our enterprises and public authorities (vertical). This has been an enduring problem faced by supply chain designers over the last few decades as e-commerce has overtaken us and it has highlighted the deficiencies in the conventional method of managing our companies and government authorities.

Somewhat fortuitously in 1989, several co-researchers and I began the task of re-conceptualizing how logistics systems worked in a corporate context, and this eventually “morphed” into how the broader concept of enterprise supply chains functioned in the firm. We started with the working hypothesis that if we could better align a company’s internal culture and leadership style with its marketplace through appropriate operational strategies, this would inexorably lead to improved, more sustainable operational and financial performance, and so it emerged. Figure 9.5 depicts the original concept.

FIGURE 9.5: Elements of the ‘dynamic alignment’ framework



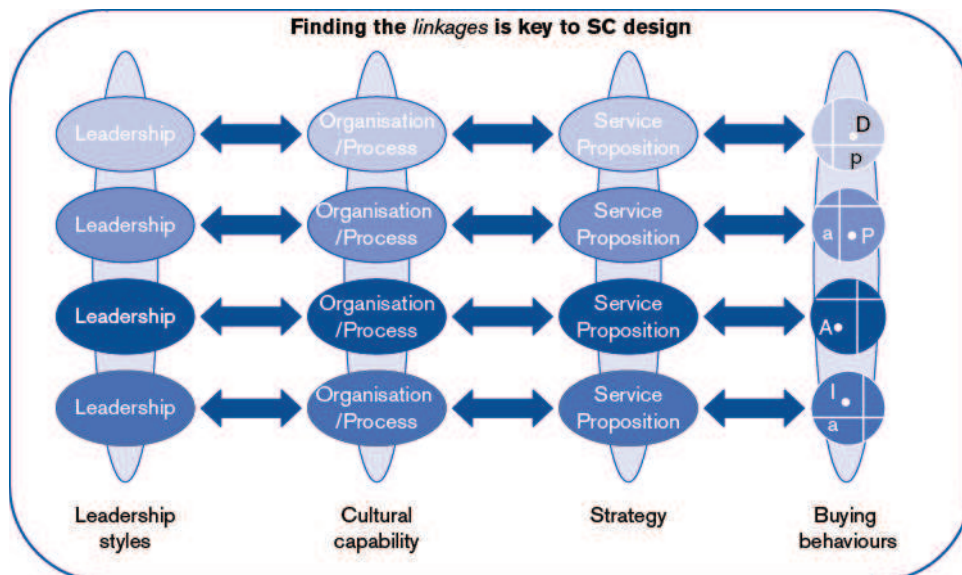
Source: Adapted from Figure 1.2 in Gattorna (2003), p. xiii; also Gattorna (1998), p. 5; and Gattorna (2006), p. 16.

We initially focused on ways to understand and reinterpret the marketplace as discussed earlier, and this proved to be a masterstroke, as we ultimately discovered underlying demand patterns in product-markets as diverse as dairy ingredients, thermal coal and electronic high tech (EHT).

What it told us is that contrary to conventional wisdom, humans are more similar than dissimilar, and that we could always identify three to four dominant buying behaviours (or behavioural segments as described earlier in this paper), out of a possible 16, that explained over 80 per cent of the demand in a given product-market situation. This was the breakthrough that we had been looking for, because it immediately informed us just how many supply chain configurations we needed to replace the previous outmoded notion of a “one size fits all” supply chain. We have continued our work for the last two decades, applying this thinking to many new and diverse product and service industries, and the evidence has continued to mount in support our original thesis.

On this basis we are able to reorient the above conceptual diagram (Figure 9.5) to represent the horizontal product and information flows found in enterprise supply chains as depicted in Figure 9.6 below. These show the four supply chain types that

FIGURE 9.6: Multiple supply chain alignment on the customer side



Source: Adapted from Figure 4.3.2 in Gattorna (2003), p. 459; see also Gattorna (2006) Figure 2.1, p. 40.

we very commonly see flowing through organizations, in parallel, all with their own particular operating characteristics and supporting capabilities.

9.5. Potential policy implications

It is clear that among the biggest challenges facing trading countries are the border processes, specifically, import and export clearance. Import is typically more of an issue unless there is some manufacturing value-add involved, in which case import taxes and duties are offset or refunded through the subsequent re-export activity.

China is a good example of the latter. It has in place special export zones (SEZs) where goods can be brought in under a bonded system, and then transferred to approved manufacturing locations, and later re-exported. If however, the goods are instead consumed locally, declaration follows and appropriate taxes are paid.

Nevertheless, there is a lot of reconciliation and bureaucracy involved as goods move through the various touch points, and this attracts costs and delays in what should otherwise be an ideal trade facilitation process.

India is a good example where the process does not work well at all. Agreements are made at senior levels of government but are not implemented on the ground. Worse still, some agreements are reversed on a retroactive basis, so uncertainty reigns among importers and exporters alike. Just recently, new free trade warehouse zones (FTWZs) have been established by Arshiya International in Mumbai and New Delhi, with more to come in other locations such as Kolkata, Chennai and Mangalore, all connected by rail corridors serviced by privately-owned rolling stock. This new model will greatly improve the movement of products around India. But there is still a long way to go.

So, it is clear that there are still issues related to trade practices at borders, even though high-level frameworks may be in place. Consistent implementation on a day-to-day basis of import and export clearances remains flawed, so fixing this situation is a priority.

If, using some of the techniques already described, we are able to understand the various types of flow patterns present, we can find a better way to manage them, as with continuous replenishment and lean flows which are largely predictable, then they could be managed at export and import points on a post-clearance basis. Instead

of more government regulation, a government can appoint an auditor to review the transactions retroactively and ensure the correct taxes are paid. Something similar is already done with personal taxes in some countries, where people self-assess and pay their taxes, and these transactions are audited later to check for compliance. In the same way, companies could be asked to self-assess their customs duties, and these would be subject to possible audit at any time. The efficiency of the transaction would increase significantly, and this could become the basis of a new trade facilitation model in which all parties would benefit.

Likewise, for the more volatile/agile component of cross-border flows, although in these cases government agencies would perhaps look more closely at the flows because they represent a risk of revenue leakage to participating governments.

Another possible model is that now in operation with US Customs. After 9/11, all sea-borne containers entering the United States have to be inspected by customs, and this naturally slows commerce down. The US Customs and Border Protection (CBP) agency has introduced the Container Security Initiative (CSI) at foreign ports to pre-screen containers before they are placed on vessels bound for the US. The three core elements of CSI are described below and in the corresponding web link.⁵

- Identify high-risk containers. CBP uses automated targeting tools to identify containers that pose a potential risk for terrorism, based on advance information and strategic intelligence
- Pre-screen and evaluate containers before they are shipped. Containers are screened as early in the supply chain as possible, generally at port of departure
- Use technology to pre-screen high-risk containers to ensure that the screening can be done rapidly without slowing down the movement of trade. This technology includes large-scale X-ray and gamma ray machines and radiation detection devices

The CSI program is now operational at ports in North America, Europe, Asia, Africa and the Middle East, and in Latin and Central America. Indeed, CBP's 58 operational CSI ports now pre-screen over 80 per cent of all maritime cargo imported into the United States.

A similar program is being piloted for air cargo by the US Customs and Border Protection agency; this is known as the Air Cargo Advance Screening programme, and is still in a voluntary stage at the time of writing.

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Both programmes are designed to ensure that containers shipped from foreign ports will not need further inspection on arrival in the US port of destination. US Customs officers are implanted in foreign ports to ensure compliance to strict procedures. The overall result is a significant reduction in lead times between origin and destination.

In summary, border clearance for too long has involved minute checking and scrutiny of goods at time of arrival, which has had the effect of inhibiting flows and causing costly delays to both shippers and customers. If we adopt a completely new supply-chain-based global trade flow approach, many of the costs and inefficiencies will disappear overnight. Some of the above-mentioned ideas, and others, are consistent with the direction of many governments that are now actively seeking to reduce regulation and improve the ease of doing business for corporations engaged in their respective countries. Indeed, an index has been created by the World Bank and is regularly published. The index uses several parameters including the trade across borders, the number of documents, cost and time necessary to export and import. Research by the World Bank has found that the effect of reducing regulations on economic growth is strongly positive.⁶

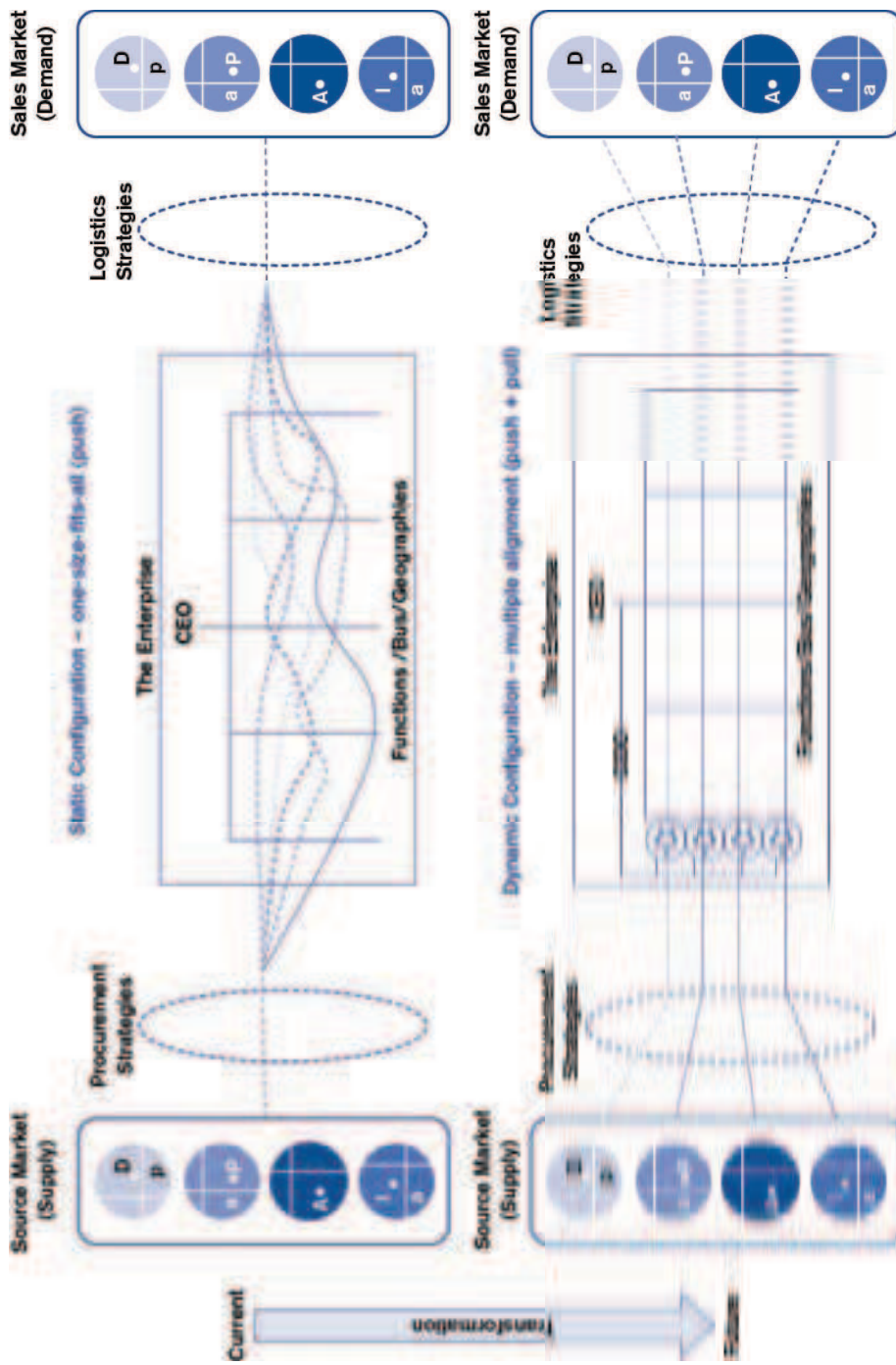
It is significant that the 2012 rankings show Singapore as No. 1, Hong Kong, China No. 2, New Zealand No. 3, US No. 4, Australia No. 15, China No. 91 and India No. 132. Clearly, the latter two countries have a lot of work to do. The equivalent index produced by the World Economic Forum confirms Singapore in the No. 1 spot, and Hong Kong, China No. 2, but the next best Asian country is Australia at No. 17. China is No. 56 and India No. 100, and both countries seem to be slipping in the rankings. See Lawrence et al., (2012).

In summary, we are moving from a static supply chain design that did not previously explicitly include the procurement function, to a more dynamic supply chain design that incorporates the supply side, and is constituted as several different types of supply chain configuration – all focusing on different buying and selling behaviours. The result is a genuine end-to-end integrative supply chain model as depicted in Figure 9.7.

The top half of Figure 9.7 indicates the *status quo* in many companies, where logistics strategies at the demand end, and procurement strategies at the supply end are refined down to a single combination of perceived best practices and relentlessly pursued.

The bottom half of the diagram is where we want to go, where different behavioural segments are recognized in both the demand and supply markets, and discrete supply

FIGURE 9.7: From static to dynamic configurations



Source: Gattorna (2012) (previously unpublished).

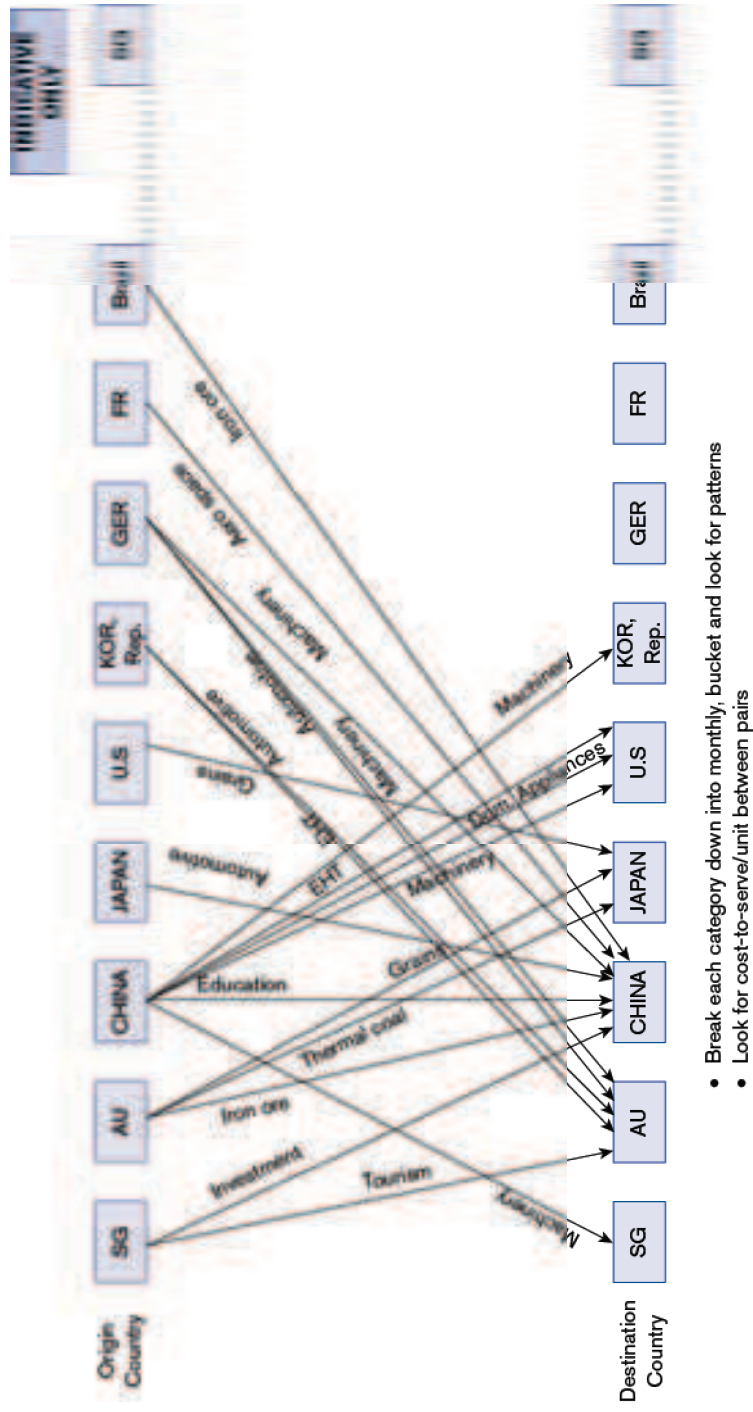
chain configurations are designed to run horizontally through the otherwise vertical organization, managed by separate clusters or teams of managers drawn from the vertical functions.

9.6. Bringing it all together in a research design

Given the various insights discussed above, it is now time to bring all the pieces together and devise a possible supplementary methodology to map and manage major trade flows between countries for a specific number of mainstream product categories. The answers from these analyses will provide pointers to appropriate policy formulation discussions with national governments. Refer to Figure 9.8 below when reading the proposed methodology:

1. Select a number of countries from whose perspective we will view trade flows: Australia, Brazil, China, France, Japan, India, Republic of Korea, Germany, Singapore and the United States.
2. Select several mainstream product categories, both in-bound and outbound from the countries nominated in 1. above: e.g., coal, apparel, EHT, automobiles, medical equipment, grains, iron ore, machinery, financial services and tourism.
3. Build a network model of the selected flows in and out of the nominated countries, and place ABC costs on all the feasible links and facilities (including labour).
4. Test a range of scenarios in each network, incorporating constraints such as capacity at certain points; different lead-times; government customs duties and tariffs; government subsidies/incentives; account for any bilateral trade agreements in existence; where certain functions are carried out along specific supply chains; impact of production/logistics clusters; carbon footprint and sustainability; and other similar considerations. Then test the same scenarios without these constraints present, and note the difference in lead-times and cost.
5. The aim is to understand what the cost/unit is along various supply chain network pathways, under varying conditions and to seek the optimal solution for the total network under review.
6. At the same time these flows of products can be analysed using coefficient of variation (CoV) techniques to reveal if there are any layers of identifiably different volatility and if so, how this impacts on the cost of each network flow under review.

FIGURE 9.8: Bilateral import/export trade flows (by key major product/service category)



Source: Gattorna (2012) (previously unpublished).

7. The outcomes of this research will likely reveal preferred pathways for certain product-origin-destination combinations, and using sensitivity analyses, how these are impacted by different regulatory conditions imposed by respective governments. It is suggested that the best and worst countries on the Employment Trends Index (ETI) Index are compared and contrasted.
8. Finally, taking all the above analyses into account, new business models can be devised that rely less on external regulation, and more on self-regulation combined with compliance audits.

9.7. Recommended policy changes

As a result of the above analyses, it will be possible to develop and recommend a new range of policies that the WTO can initiate among the top 20 trading countries, in the first instance and beyond as these policies are phased-in and are seen to work in a positive way to support more efficient trade flows between trading countries.

1. Recommend self-assessment or fast-track import procedures involving customs duties for those destination country-product category combinations where the flows are consistently predictable, year-by-year, eg. thermal coal from Australia to Japan; the taxes from these flows should also be quite consistent.
2. Recommend customs focus more on the “irregular” imports to ensure revenue is not lost. However, these will often involve short lead times, so additional personnel manning may be necessary to avoid delays; both 1. and 2. Will be subject to compliance audits.
3. Recommend a range of productivity initiatives to destination countries which are low-rated countries on the “ease of doing business” index, eg., China and India.
4. Recommend ways to increase and expand the United States CSI initiative beyond the 58 global ports currently participating. In particular, a similar initiative could be started between pairs of non-US ports around the world. The aim should be to smooth the passage of containers to 80 per cent of trading nations.
5. Recommend to major trading countries such as India and Brazil, and to certain African countries, exactly what priorities in terms of infrastructure investment would have the most positive impact on their respective economies.

6. Recommend to the top 20 pairs of origin-destination trading nations to introduce a common method of measuring and taxing carbon footprint that they are individually and jointly responsible for.
7. Recommend to the laggards in the top 20 trading countries, tax reform that will speed up trade-flows across their borders and within (across state borders).
8. Recommend that the WTO undertake research at the company level aimed at influencing multinational companies to change their internal organization designs to better facilitate the horizontal flow of goods and services along the supply chains that they are part of. This recommendation is based on the contention that change must take place inside trading companies as well as countries if many of the ideas outlined in this paper are to be realized on the ground. The mantra is: “there will be no change unless there is pressure for change”, and the WTO has the means to apply such pressure.

9.8. A final word

In the end, because we now live in such an inter-connected world, the best solution to freeing up complex supply chain and trading networks around the world will likely involve a mix of new and modified regulations plus a range of completely new and innovative non-regulatory initiatives. Getting that balance right is the challenge that lies ahead for the WTO. The lessons to learn from the content of this paper are that we must break down the aggregate numbers involved in trade flows, and better understand why they are and what they are. After all, it is the decisions of personnel along enterprise supply chains that in aggregate underpin these numbers.

A finer alignment with customers and other influential stakeholders will drive productivity improvements at every point. In addition, tax revenue collection will also be more targeted and therefore more efficient, and lead times more competitive for shippers – a win-win for all parties involved in global, regional and national supply chains.

Endnotes

1 Keith Oliver, Booz & Company. He first used the term in public in an interview with Arnold Kransdorff of the Financial Times, 4 June, 1982.

2 The term ‘Infomediary’ was first coined by John Hagel and Marc Singer in their book, *NetWorth*, Harvard Business School Press, 1999.

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- 3 For more detailed information of this unique case, refer to Gattorna (2010).
- 4 Further details available in Gattorna (2010).
- 5 http://www.cbp.gov/xp/cgov/trade/cargo_security/csi/csiinbrief.xml
- 6 'Doing Business report series- World Bank Group'. Available at: www.doingbusiness.org/documents/growthpaper_03_17.pdf.

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