

Global Optimisation of the principal Global Supply chains of NZ

To restructure and realign the Global Supply Chain Assets and operations
of the Key shippers, Gateway Ports , Dry Ports, Freight & Inland Hubs
of New Zealand



To be read in conjunction
with Part 1, 2A & 2B & 3

PART 4A

THE LEAN AGILE SUPPLY CHAIN
THE CONTRACT THAT BY PASSES
THE TYRANNY OF “TIME & DISTANCE”

A topline presentation for C-SUITE Managers

By

Allan Rodrigues

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Allan Rodrigues – Profile



Allan Rodrigues retired honourably from the Indian Navy in 1994 after serving 21 years. He is the Sword of Honour of his course and winner of the Lentaigine Medal at the Defence Services Staff College in Wellington India. During his Naval Career he has commanded IN Ships Nipat, Himgiri, and Subhadra. He has also been the 'Commander Work-up and Sea Training' of the Western Fleet and the Second in Command (XO) and Chief Instructor of the Naval Academy INS Mandovi. He was cleared for promotion to Captain but chose to join industry. He migrated to New Zealand in 1995.

In New Zealand, Allan has been a senior manager and C-SUITE 'board level' senior Management Consultant. He specialises in aligning strategy, finance, operations, decision engineering and performance management. Over the last 30 years Allan has been the lead management consultant for several major multi-million dollar projects over a range of industry sectors including the development and analytics for the reform of the sea and inland port & freight hub sector, the alignment of key supply chain hubs and assets across New Zealand to increase supply velocity, value based projects for the TV satellite and broadcasting sector, major electricity utilities, kiwifruit and agronomy, a review of the captive insurance sector, a benchmarking project for a major Australian Bank and technology start-ups under risk. He has designed a 4th generation Balanced Scorecard and an IT Portfolio Management Financial Model. Amongst the major projects he has undertaken is a 'Real Options' valuation of a major section of the national electricity grid in New Zealand, a valuation of the worldwide marketplace for the satellite 'occasional-use' time sensitive carriage of news and sports, strategic alliances and several strategic planning and valuation projects under risk and uncertainty.

Allan's qualifications include an MSc (Defence Studies) University of Madras (Lentaigine Medal) and an MBA (Elective Finance) from Henley Management College and Business School, Oxford on Thames, Oxfordshire U.K. He is a noted industry based adjunct professor who has been invited to both lecture (and guest lecture) at the master's degree level at universities in New Zealand and Australia over a period of twenty years from 2001 to 2021. He has conducted advanced logistics and supply chain governance advisories for senior operations/supply chain managers of the major NZ companies and defence services on behalf of the Centre for Supply Chain Excellence (CSCE) at the University of Auckland. He is currently the MD of The Business Binnacle Ltd (www.thebusinessbinnacle.co.nz) a management consulting practice. He is currently semi-retired from full-on consulting work.

The project was current during the timeline it was compiled and remains so for the most part. Whilst the data in some cases may be outdated, the underlying analytical methodology is current in many cases. Nevertheless, these methodologies need to be periodically peer-reviewed.

Many of the tools used have been obtained and adapted from peer-reviewed sources. The work of Professor(s) Simchi-Levi, (Wharton) on the 'global optimisation' of the GSCs, Theo Notteboom (Maritime Institute, Univ of Antwerp) and Jean Paul Rodrigue (Texas A & M) on port reform and the port eco-systems, Michael Porter (Harvard) on Value Chains and competitive advantage, Kaplan & Norton on strategy mapping and the balanced score card, G. Bennett Stewart, on Economic Value Added (EVA), Ashwath Damodaran on valuations under risk and uncertainty, Dixit and Pindyck on 'Investments under uncertainty', Kulatilaka & Abrams on 'Real Options' feature across all four presentations.

The work of Yves Doz & Gary Hamel on Strategic Alliances, Kenichi Ohmae, Simon Benninga (Wharton) on Finance and Strategy, all master strategists in their own right, feature in the detail in presentations 2 to 4.

The author has also used his own work on the nexus of the value chain and supply chains, the de-aggregation of value chains and the 4G Balanced Score Card to inform this project. All models that have been used or adapted have been referenced. They feature at various places in the presentations.

The Author thanks the many senior managers past and present on the C-suite of many of New Zealand's large Sea Ports, Inland Ports, Dry ports and Freight hubs and the principal shippers of the main New Zealand export companies for sharing their practical and hands-on experience in operating and managing some of the most complex global supply chains in the world. Many of the models developed by the doyens of the Global Supply Chains in academia were adapted for this project using the hands-on knowledge gleaned from these practitioners in the marketplace.

Since this is a work targeted at busy C-SUITE senior managers it was essential to make the logic of the approach visible at first glance. Rather than use APA referencing the author has identified the authors by name and date with specific reference to their work to avoid clouding the issues in short wordage available.

THE C-SUITE PRESENTATION

PART 4

The Global Supply Chain (GSC) The overarching methodology for GLOBAL OPTIMISATION

PART 4A –

- ❑ DETERMINING THE RHYTHM AND CADENCE OF THE GSCs -SVCs
- ❑ MANAGING THE TYRANNY OF TIME AND DISTANCE. MAPPING THE GSC END TO END

PART 4B

- ❑ POST PANDEMIC GSC & TECHNOLOGY AND BIG DATA ON THE GSC
- ❑ TRANSPORTING RESOURCES ON TIME, IN FULL, WHEN NEEDED
- ❑ MANAGING CONGESTION AND CAPACITY INVESTMENT UPGRADES

PART 4C

- ❑ MANAGING STRATEGIC ALLIANCES AND SCORECARDING FOR PERFORMANCE
- ❑ THE SECURITY OVERLAY

- ❑ PART 1 The PORT ECO SYSTEM & Global Transportation Corridors
- ❑ PART 2A & PART 2B: The Lean Agile Global Supply Chain Eco System
- ❑ PART 3 THE GLOBAL SUPPLY CHAIN & STRATEGIC VALUE CHAIN CONFLICT
- ❑ PART 4 In this section as indicated above

The Lean- Agile Global (or Local) Supply Chains (GSCs & LSCs) & their impact on the Global Transportation Corridors

These FOUR presentations capture the Architecture and Construct of the **LEAN AGILE GSCs** in tandem with the efficient management of Sea Ports or Inland Ports or Freight Hubs on the **GLOBAL TRANSPORTATION CORRIDORS**. Whilst they do delve into the asset management and operations processes of Sea and Inland Ports, the focus in this section is on the GSCs and their sea-land transportation rhythm and cadence

All four knowledge packs are densely packed as presentation cum data documents laid out in ways that combine the knowledge, data and findings from several investigative reports and presentations written and delivered over a long arc of several years by the author, with inputs from the port and supply chain analysts on the team. The nexus between the GSCs of the world and the Sea/Inland ports on the transportation corridors that interlink the global supply chains going outward or inward to and from New Zealand, and the conflict with the Strategic Value Chains of the individual GSC members have been drawn out by the author in some detail for the first time.

All four presentations cum data- documents answer the question

“ What do Lean-agile **Global (or Local) Supply and Strategic Value Chains** need from the various nodes and hubs on the world’s transportation corridors, so that they can manage the conflict between cost efficiency on the one hand and high agility (or High Fulfilment) on the other?”

Opening Comment.

Note. The presentations may seem a bit crowded and dense. The colours used are loud to draw attention. They are designed to be so

A NUMBER OF SLIDES FROM THE EARLIER PRESENTATIONS IN THIS SERIES ARE REPEATED FOR EASE OF REFERENCE.

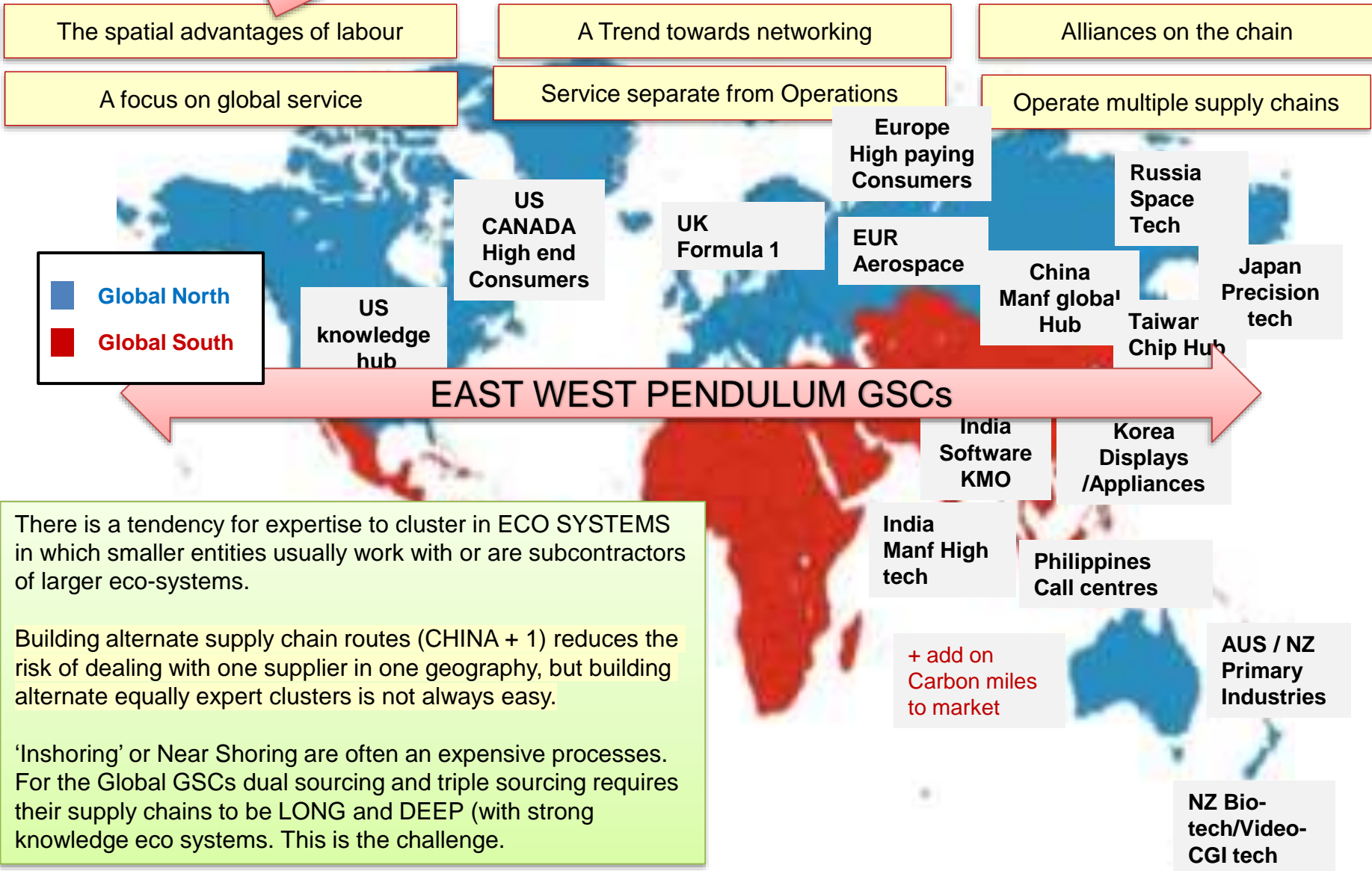
The original project papers including the reports and presentations continue to be commercially sensitive and have been redacted. Rather than rewrite a formal report compiling the various methodologies and findings and for the sake of convenience in dissemination, the original reports and slides created for various forums have been repurposed, but with explanatory notes included for the benefit of lay readers and non-supply chain specialists. The author has designed each of the presentations to be a full document and to be readable 'as-is' in pdf without added notes.

This series of four presentation packs have been compiled pro-bono to demonstrate the broad ideation funnel used by some of the global supply/value chains of the world, as a way of educating/training senior managers on the current work being done at the coal face of many of the modern supply and value chains of the world.

The author advises caution with their use. There is a need for peer review and constant updating. Many globalisation strategies have come under fire post 2016 and the pandemic. Nevertheless, the 'Global Optimisation' innovation developed by the many doyens in the field, are just as easily used locally in a single country, or geography, as well as internationally.

Repeat Slide

At the start the GSCs and SVCs are a subset of **special knowledge eco systems** across the globe
 These specialist attributes create value on the Strategic Value Chain



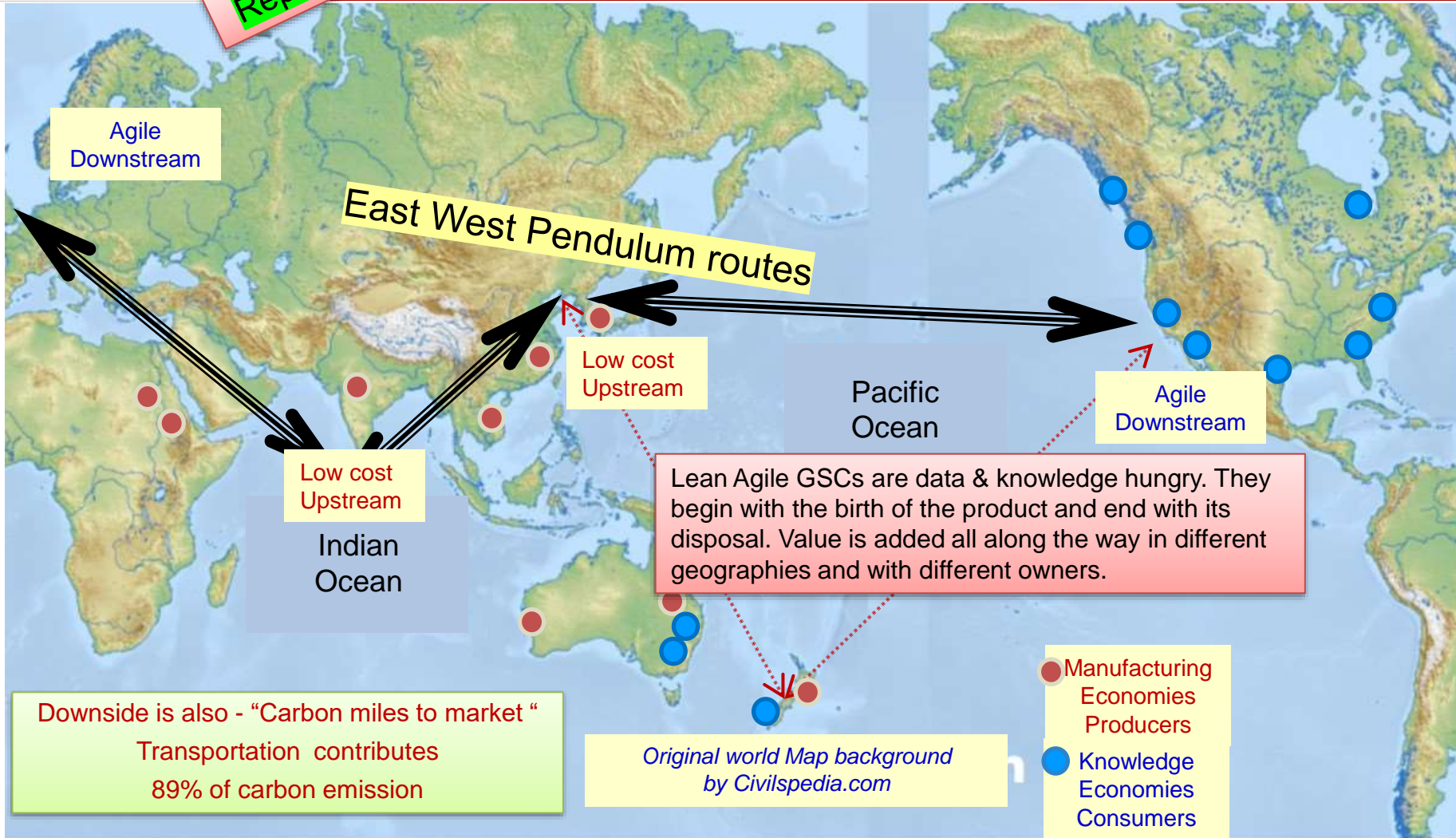
There is a tendency for expertise to cluster in ECO SYSTEMS in which smaller entities usually work with or are subcontractors of larger eco-systems.

Building alternate supply chain routes (CHINA + 1) reduces the risk of dealing with one supplier in one geography, but building alternate equally expert clusters is not always easy.

'Inshoring' or Near Shoring are often an expensive processes. For the Global GSCs dual sourcing and triple sourcing requires their supply chains to be LONG and DEEP (with strong knowledge eco systems. This is the challenge.

Repeat Slide

The Lean Agile Model for the GSCs manages the conflict between being low cost upstream near the manufacturer/producer and providing high fulfillment (agility) downstream near the customer.



The Manufacturing (Manuf) on the GSCs who does what and to whom

EXPLANATORY NOTE

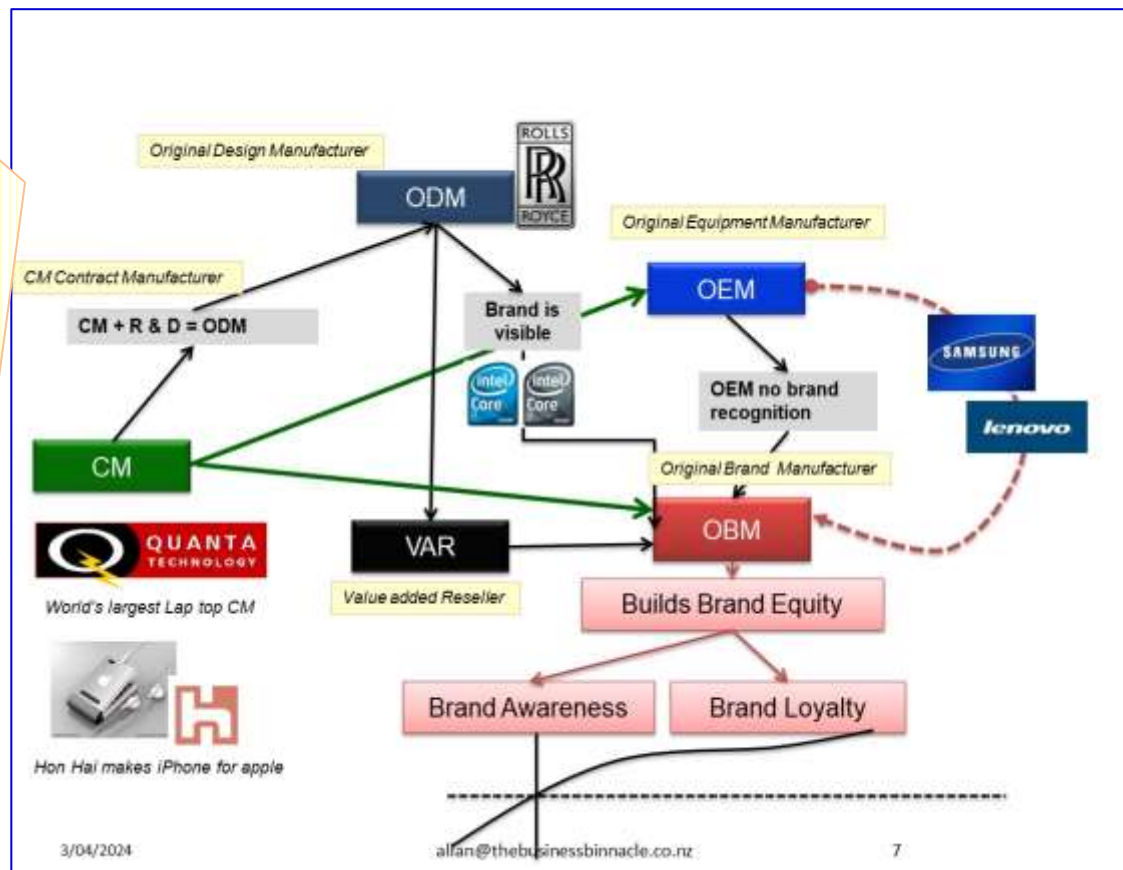
OBM – Original Brand Manuf . They design the product and build awareness and loyalty in the market. They own the brand (Apple, Samsung)

CM – Contract Manuf who specialise in low cost Manuf for the OBMs. They build volume, scale and scope economies to lower costs (Quanta in Taiwan, FOXCONN in China). They focus of efficient production and work for many OBMs

OEM – Original Equipment Manf (some are OBMs as well). They Manf some branded equipment or parts but sometimes act as kitchen brands (no one knows what they do for others). E.g. Parts Manf companies.

ODM Original Design Manf are OEMS who insist that their brands are displayed on the final product. E.g. **INTEL** chips on laptops and **Rolls Royce** engines on Aircraft. Their brands sell the final product.

ODMs do their own R & D.



VARs Value Added Resellers. They are distributors, wholesalers or retailers who perform the final Manuf or assembly.. In delay Manuf models they put together the product.

VARs sometimes locate inside PORT ECO systems, Business Parks and Distribution Parks and act as part of the crossdocking processes at Satellite, Inland or Dry Ports.

from birth of a product to its final delivery or disposal/destruction THE GATEWAY PORT ECO SYSTEM PERSPECTIVE

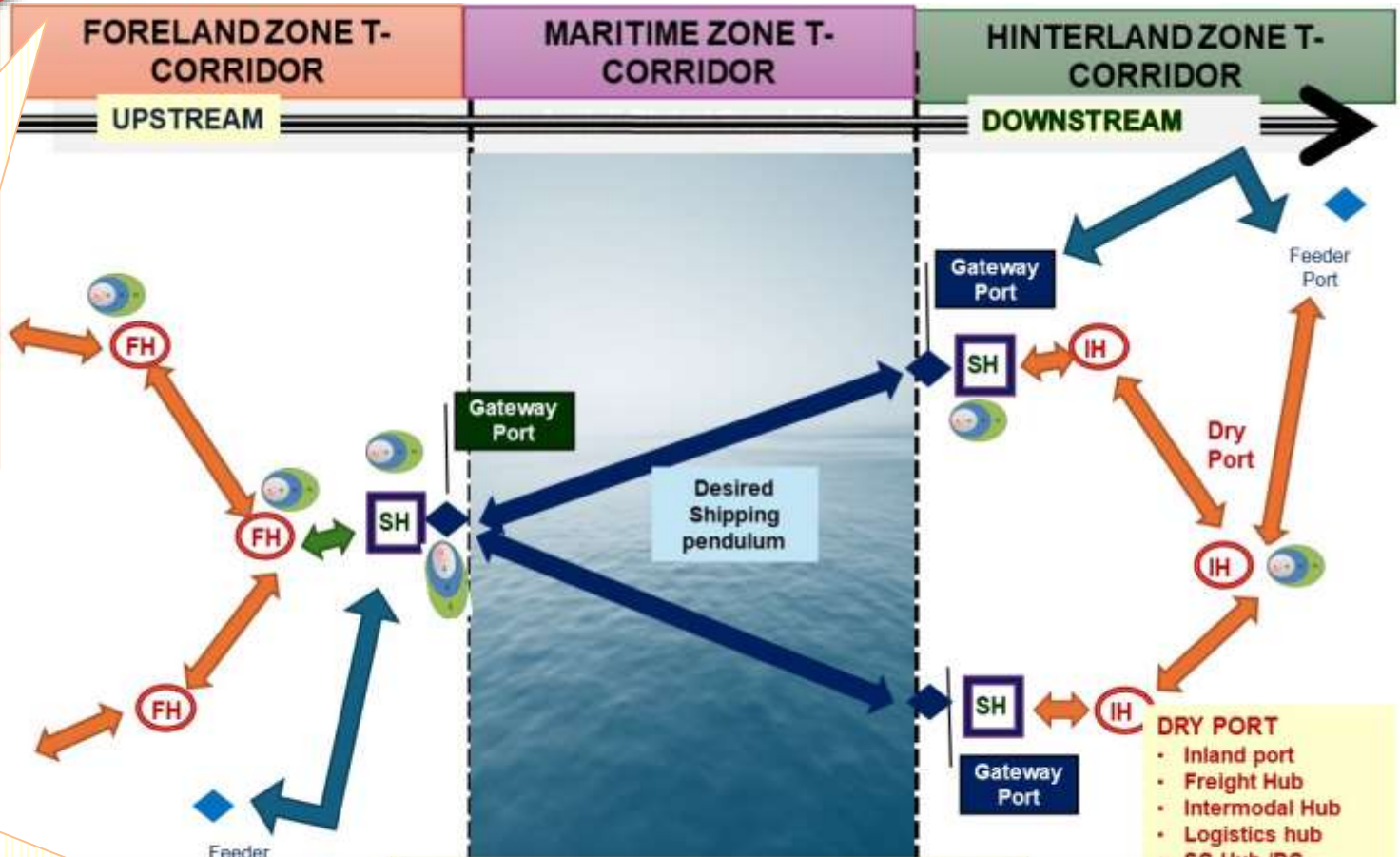
Repeat Slide

EXPLAN NOTE

The **Foreland** lies upstream away from the customer. In import GSC it is where the product is born. It must be low cost, and lean. The eco-systems of the **Freight Hubs (FH)**, **Shipping Hubs (SH)**, **Feeder Ports**, **Dry ports** must be aligned to low cost

EXP NOTE

In Import GSCs The **Hinterland** lies downstream nearer the customer. The **FH**, **IP (inland Port)**, **DP (dry port)** etc must be designed to be agile to deal with uncertain demand without increasing cost or inventory and yet able to ramp up fulfilment when required.



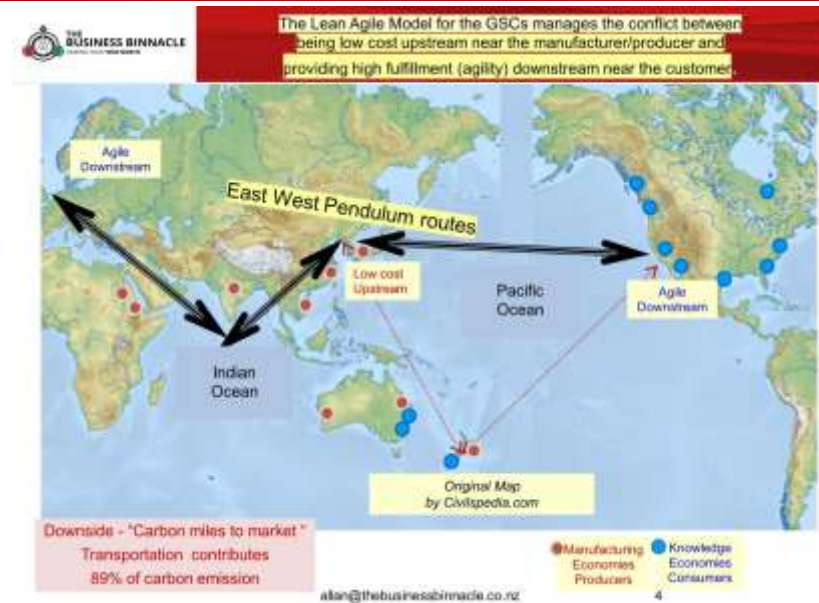
For each hub to be commercially viable it must build an eco-system of Value-Added Facilities (VAFs) that will attract the Value-Added Logistics providers (VALs) with their subcontractors to co-locate. This is the 'Eco System' for any kind of hub

DRY PORT

- Inland port
- Freight Hub
- Intermodal Hub
- Logistics hub
- SC Hub /DC
- Distri Park
- Business Park
- Freight Village

The Lean Agile Global Supply Chain - Low cost upstream Agile – 'Delivery In Full' & On Time (DIFOT) downstream

- ❑ The convergence marketplace of technology and globalised commerce coupled with the spatial advantages of labour and specialised eco-systems have created two types of economies worldwide
- ❑ The PRODUCTION ECONOMIES in Greater Asia who were able to exploit their spatial advantages of labour and expertise. The KNOWLEDGE ECONOMIES were where the design of products were conceived and where the value of these products were captured.
- ❑ The GSCs were then designed around the optimal ways of achieving two hitherto impossible feats. Provide products and services at the lowest cost and at the highest fulfilment levels by mitigating the impact of 'TIME' and 'Distance' as a key limiting resource.
- ❑ Mitigating time in turn mitigated the risk and uncertainty in demand (the shorter the time the lesser the uncertainty). It allowed the GSCs to be both the lowest cost and yet provide the highest quality and 'near fulfilment' of all demand.
- ❑ The mantra that drove this radical thinking was **DIFOT (DELIVER IN FULL ON TIME)** at **the lowest cost and at the highest quality of service**. made possible by with the marriage of information, its dissemination in real time, demand manipulation and the radical manipulation of capacity sharing through **COOPETITION** (cooperating and competing at different part of the supply chain simultaneously).
- ❑ In turn it created the conflict between the Supply Chain and the strategic value chain . Firms that managed the conflict survived. Those that did not perished. **SEE PRESENTATION 3 FOR THE STRATEGIC VALUE CHAINS (SVC).**

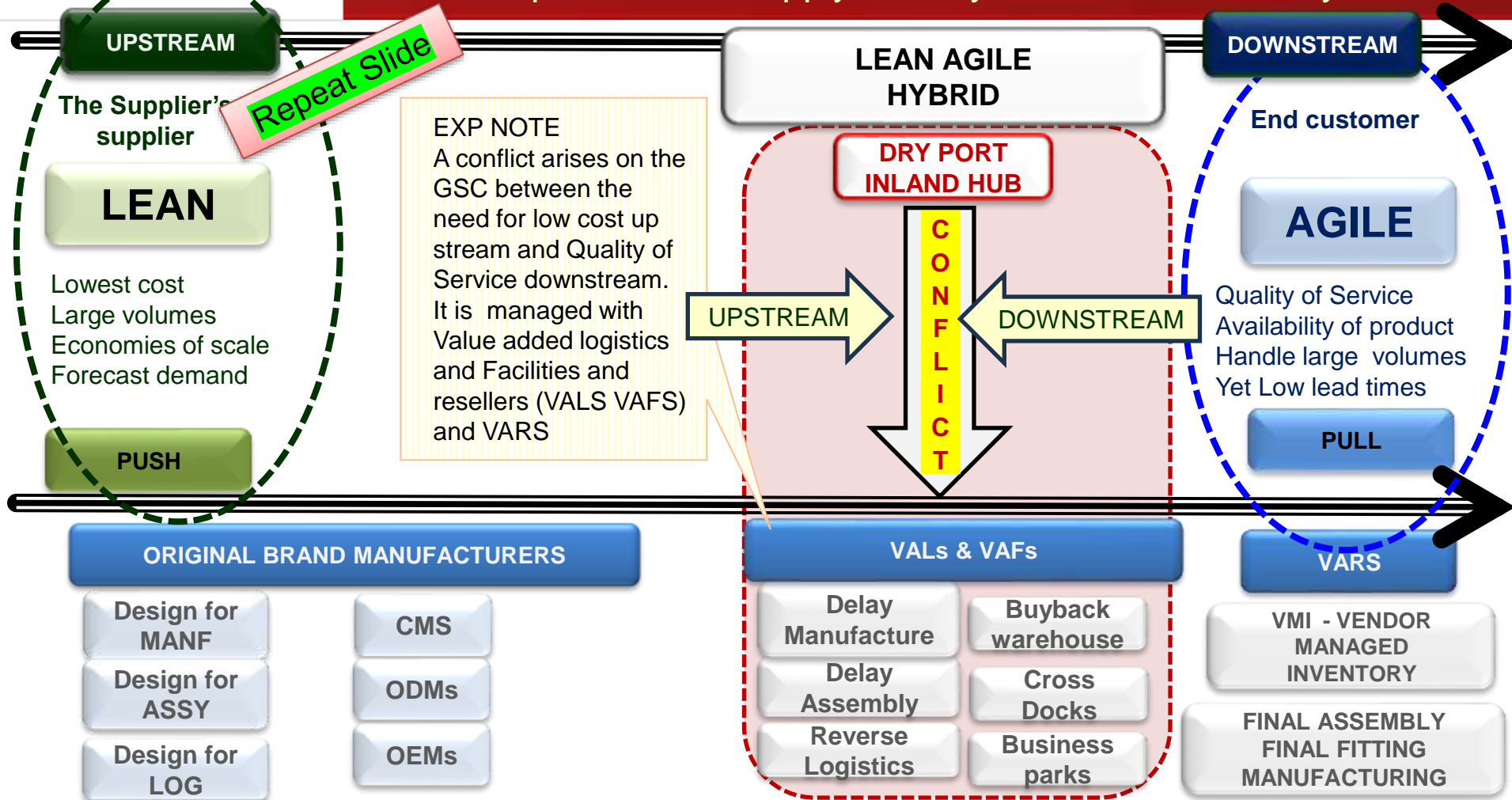


THE SOLUTION

- ❑ Be **'LEAN' UPSTREAM** with the lowest cost upstream where the product was sourced and made. Focus on **ECONOMIES of SCALE & SCOPE (Volume to reduce cost)**
- ❑ Be **AGILE DOWNSTREAM. DIFOT**. Hold as much inventory as required with a systemised ability to scale up or down at no cost and in the shortest time.
- ❑ **MANAGE THE CONFLICT BETWEEN LOW COST & HIGH FULFILLMENT.**

Lean Agile Hybrid Global Supply Chains (GSCs)

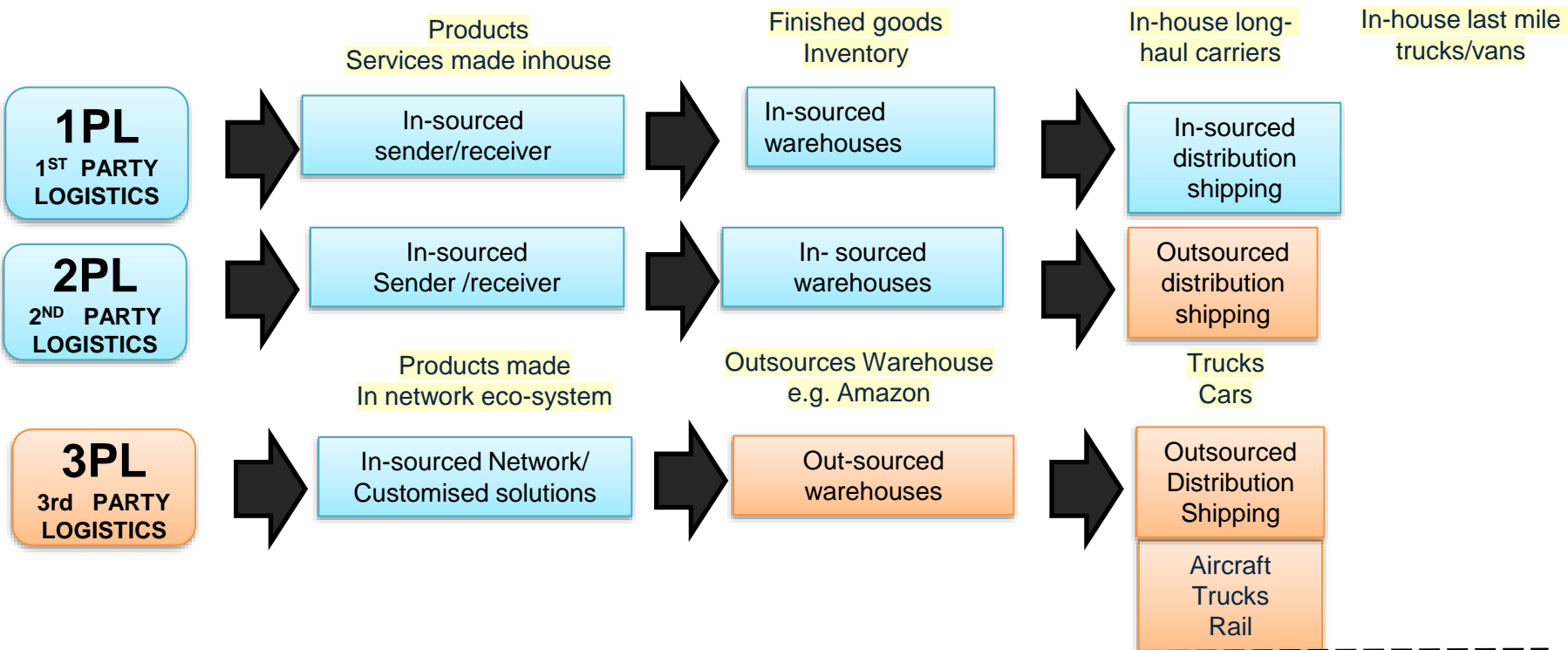
Global optimisation- Supply velocity, demand uncertainty conflict



THE GSCs will HUB at those Port Eco Systems and Inland Port/Freight hub eco-systems that will give them the best VALS and VAFs conveniently connected and located

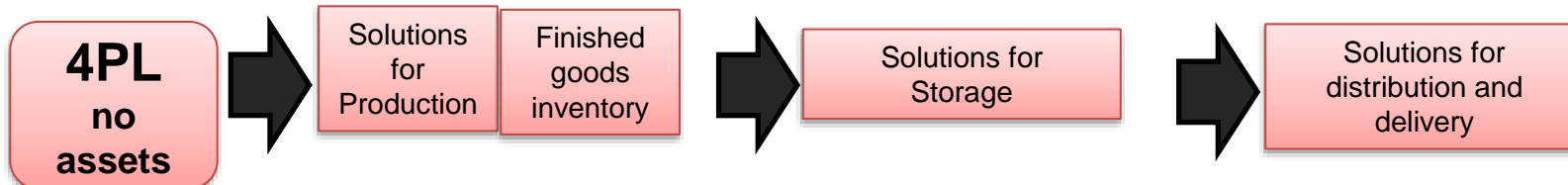
Lean Agile GSCs

The outsourcing value-added logistics providers



4PL is a consultancy not a provider

Except for the design of the product the 4PL manages everything else, from production to last mile delivery



Start with the Clock Speed of the Product

What is its lifecycle

Functional products (have low-clock speed)

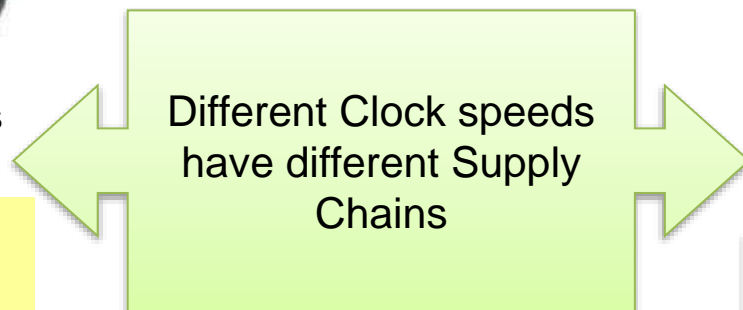


Dry groceries
A can of beans



Car tyres

Slow innovation clock speed
Longer lifecycle
More accurate forecasting needed
Less variety
Low profit margins



Innovatory products (High clock speeds)



Fashion



Consumer electronics

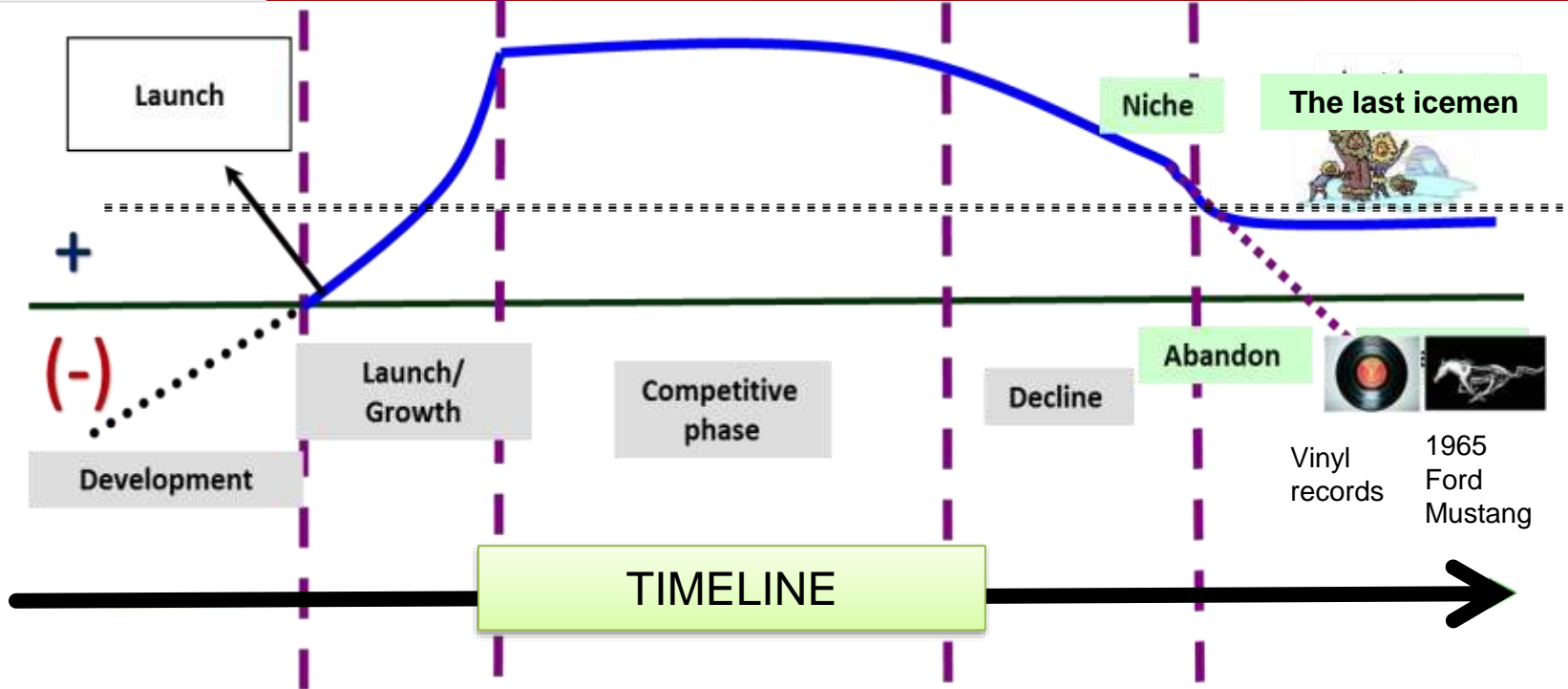
Fast technology/ innovation speed
High product variety
Short life cycle/obsolescence
Uncertain forecasts
High margins

LEAN supply chain

Quick response (AGILE)
supply chain

The traditional life-cycle curve of a product or service

Clock speeds determine the lifecycle duration



<<STRATEGIC STRETCH>>

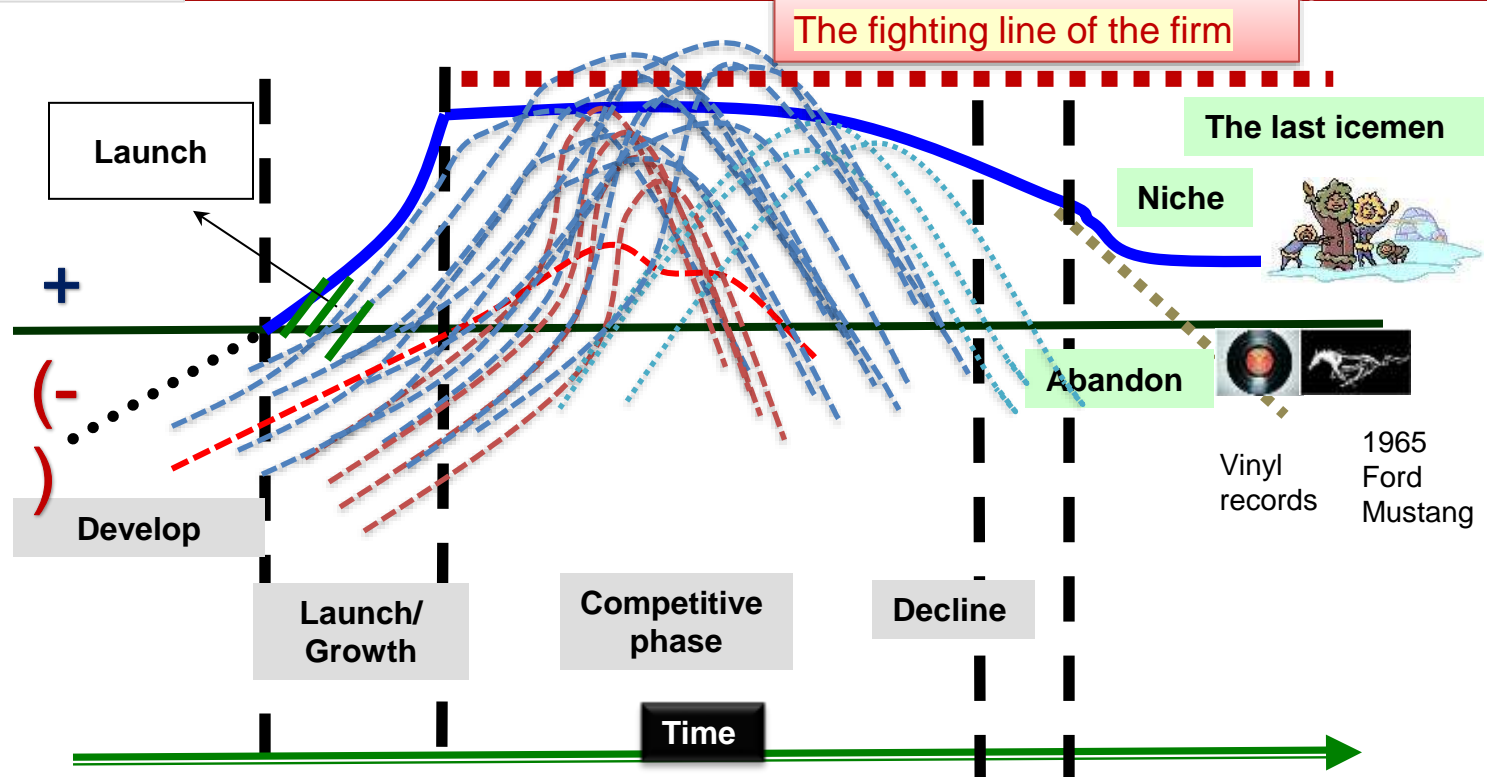
Strategic stretch happens when a company follows the ambitious strategic intent of disregarding its lack of resources and raises risky capital to fund innovation and the development of new products/services. It involves high risk but creates a hockey stick growth curve

<<<STRATEGIC FIT>>>

Strategic fit is the Resource based View of the firm. It expresses the degree to which an organization matches its resources and capabilities with the opportunities it sees. Strategic Fit requires a safe pair of hands to manage the life cycle after maturity

Adapted by Allan Rodrigues for use on the Lifecycle curve from the original descriptors of strategy as stretch by Hamel and Prahalad (HBR1993) and Levitt's (1965) Lifecycle Curve

The marketplace does not stand idly during the lifecycle Market organisations fight constantly to innovate



<<STRATEGIC STRETCH>>

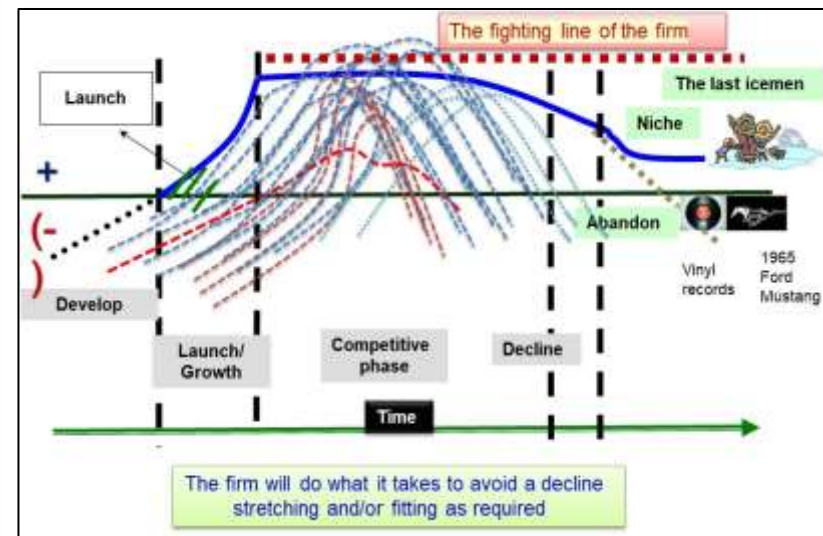
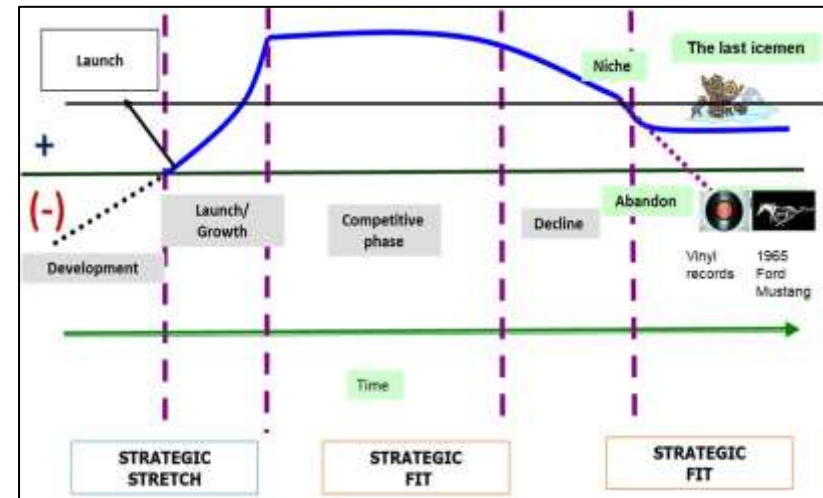
<<<STRATEGIC FIT>>>

The firm will do what it takes to avoid a decline
By strategically 'stretching and/or fitting' as required

Adapted by Allan Rodrigues for use on the Lifecycle curve from the original descriptors of strategy as stretch by Hamel and Prahalad (HBR1993)

The logic that drives lifecycle curves on the GSCs

- ❑ In the traditional lifecycle curve a product grows from an idea (usually a radical innovation). It begins with cash negative as investments are made to develop the product. As the product becomes popular it goes through a hockey stick growth curve until it breaks even and begins to provide a high cash return. The firm needs 'strategically stretch' raise and raise cash at high risk. Managers need to be adventurous.
- ❑ Eventually the product attracts competition particularly after the patents have run out. A number of me-too products appear that flatten growth. With multiple suppliers the product matures. Eventually the product dies as newer products appear in the market. The few customers remaining are called the last icemen. Collectors of Vinyl records are an example.
- ❑ The car manufacturers were the first to introduce the concept of the fighting line. Products were branded e.g. the Toyota Prius Companies began to then incrementally innovate to produce a new period every fixed period (e.g. 3 years) and develop brand loyalty amongst its customers. The logic was that a customer would stay with the brand and buy newer versions of the car. The strategy worked for both home or business customers by locking them in, making it easier to raise finance for incremental innovations.
- ❑ Since the innovation was constantly ongoing, it created 'perpetual value' or perpetual cash flows paid by legions of loyal customers creating the concept of the fighting line. (The minimum cash flow line on which a company would fight and defend). It would then overlay radical innovation to produce new products to create growth spurts and perhaps raise the fighting line.
- ❑ This is the base line which the GSC and the SVC operate on. The ability to fight and defend ones fighting line dictates the value of the company.



Matching supply with demand

- ☐ Forecasting
- ☐ Aggregation
- ☐ Make to stock
- ☐ High inventory
- ☐ Increase in production numbers reduces manufacturing cost

PUSH SYSTEM

How much should we produce



Conflict

- ☐ Based on Actual demand
- ☐ Pull system is made to order
- ☐ Minimum inventory
- ☐ Retailer does not carry high inventory
- ☐ There is reduced risk of unsold stock

PULL SYSTEM

How much is the actual demand

The three principles of all forecasting techniques:

- ☐ The Forecast is always wrong
- ☐ The longer the forecast horizon the worse is the forecast
- ☐ Aggregate forecasts are more accurate

MAPPING CUSTOMERS IN ZONES
MAKES THE SUPPLY CHAIN VISIBLE



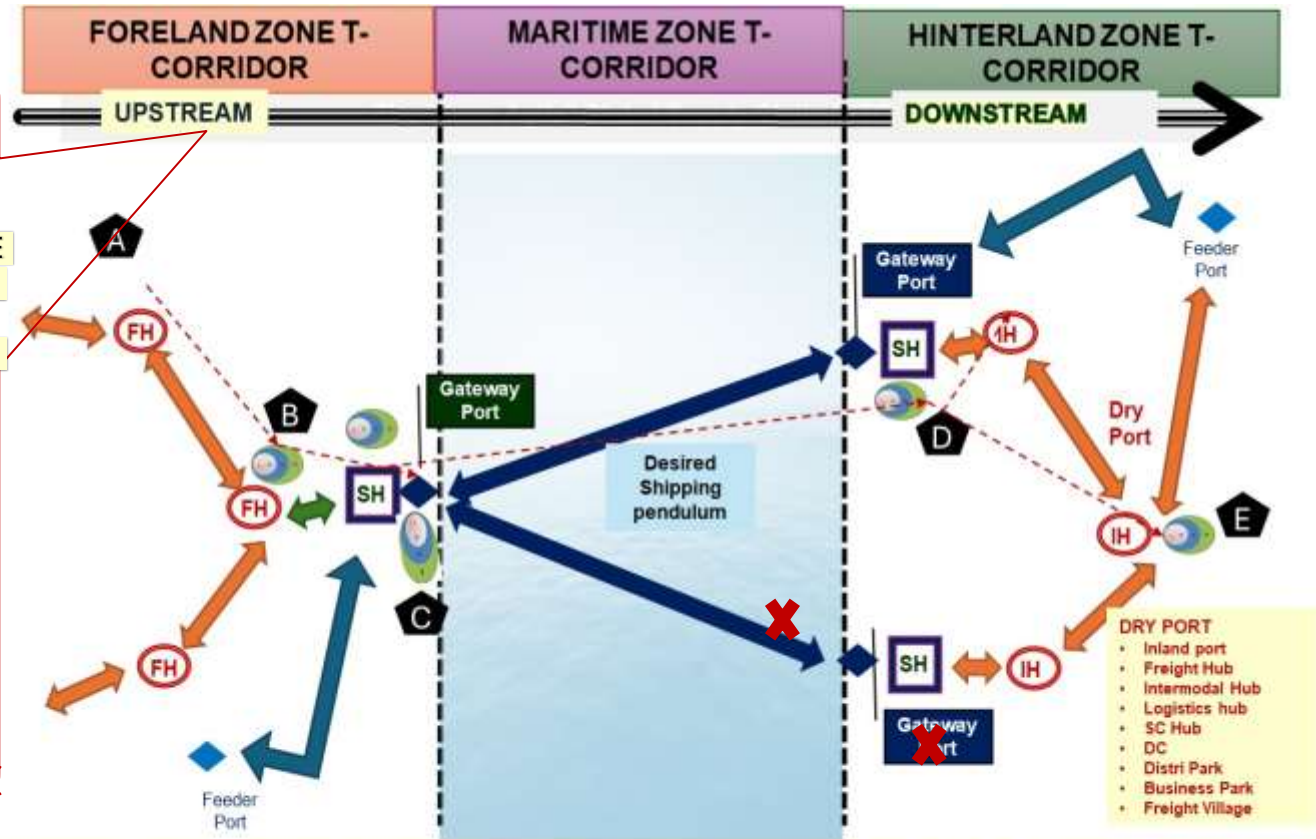
Superimpose the GSC on the transport corridors Manage the conflict between Cost and Fulfillment

The GLOBAL SUPPLY CHAINS RUN ON A RHYTHM WHERE TIME CONNECTS THE PARTS.

EG A WEEKLY PENDULUM SERVICE WOULD REQUIRE THE SUPPLY VELOCITY TO ENSURE THAT THERE IS AN AGREED WAITING TIME AT THE CHOSEN GATEWAY PORTS AT EITHER END

THE VALS AND VAFS AT EACH NODE UNDERSTAND THE RHYTHM

CROSS DOCKING IS SYNCHRONISED
(See PRESENTATION 2)



Upstream requires a 'lean' supply chain and lean Eco-systems at the hubs.

Downstream 'Agility' does not mean fast speed only. It is also the ability to ramp up fulfilment at no extra cost.

Value adds in the Hub eco systems use innovation in the supply chain processes to make this happen.

Creating the Lean Agile GSC

Mapping the Supply Value Chain

UPSTREAM

DOWNSTREAM



MAP THE GSC UPSTREAM STARTING WITH THE CUSTOMER

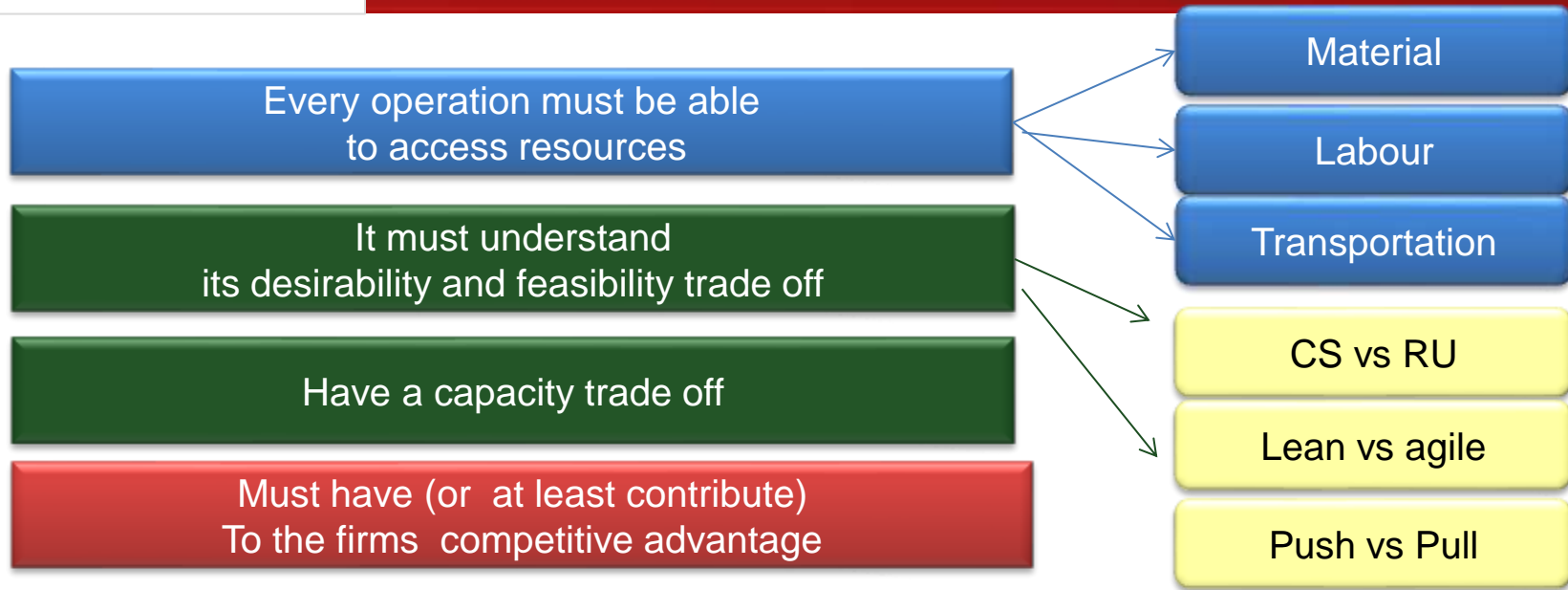
DESIGN & PRODUCTION

1st CUSTOMER

FINAL DISPOSAL

DESIGN THE GSC FOR FULFILLMENT (IN FULL – ON TIME –TO SPEC) = DIFOT

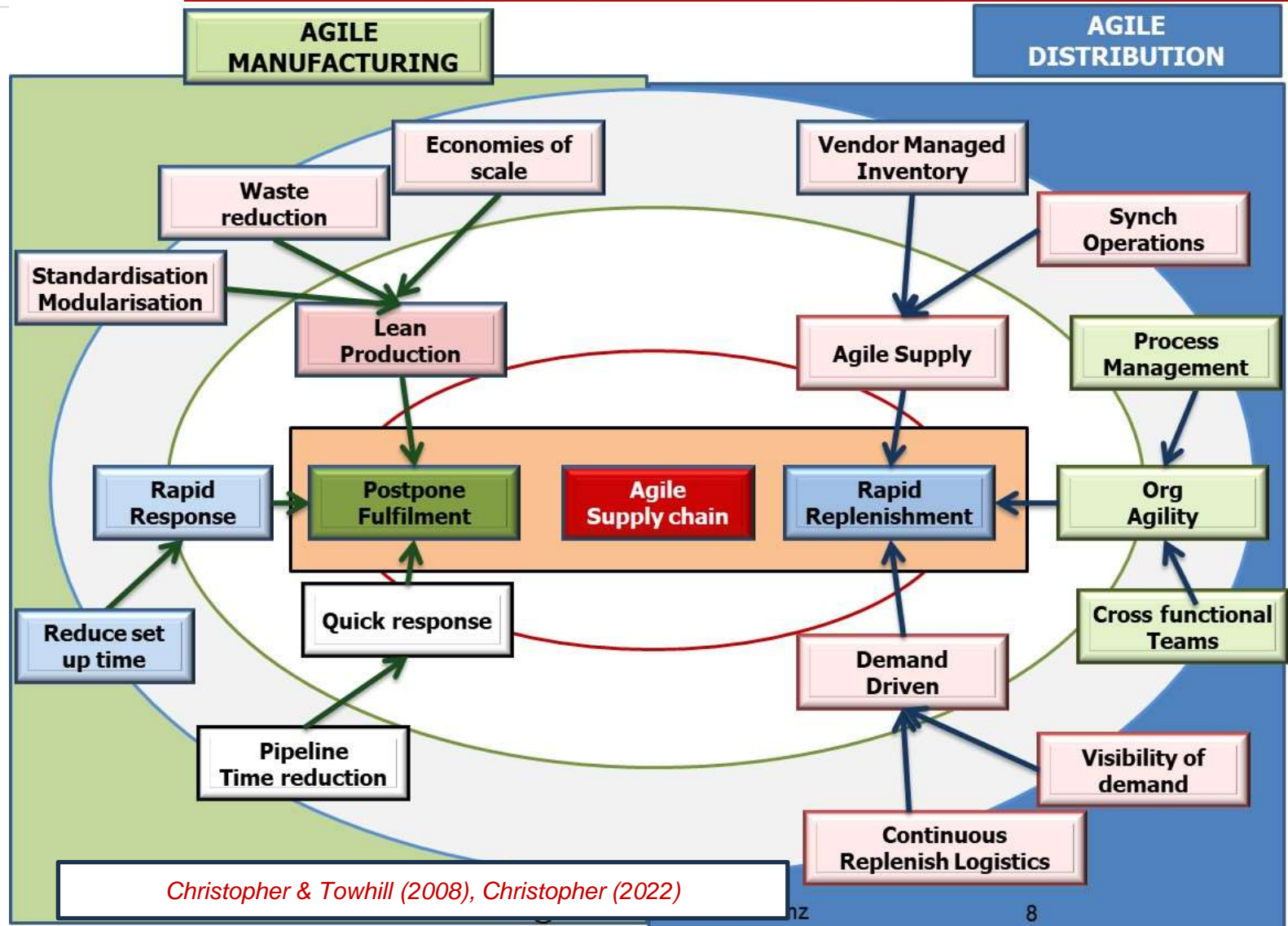
Mapping the supply chain



TIME CONNECTS THE PARTS



The roadmap to the LEAN AGILE GSC



Begin downstream at customer end

Fulfillment drives the Global Supply Chain

Collect data
A supply chain is information hungry

Create Customer Zones

1. Aggregate zones using a grid network or other clustering technique for those in close proximity
2. Replace all customers within a single cluster by a single customer located at the center of the cluster

- ☐ Customers are clustered into customer zones, Or,
- ☐ Customers are clustered by service levels (classed A, B, C etc)
- ☐ Customers may be classified by frequency of delivery
- ☐ Customers aggregated by distribution pattern

1. List products
2. Group products
3. Customer location
4. Demand by location
5. Order patterns, frequency, size, season
6. Est Order processing costs
7. Est Warehousing costs
8. Est Transportation cost & Freight rates
9. Customer service goals

Zone	A	B	C	D
1				
2				
3				

Create Product Groups

1. Products are picked up at the same source and destined to the same customers. Logistics characteristics like weight and volume drive the grouping
2. Product type product models or style differing only in the type of packaging are another way of grouping products.

Adapted from Simchi- Levi et al. (2012:2022)

Designing the network

AGGREGATION & RISK POOLING

Aggregate customers in close proximity together.
The result will be a large number of customer zones)

Aggregate items into a reasonable number of product groups

- **Distribution pattern** (same source to the same customer)
- **Or by weight or by volume** (use same vol or same weight to get the best transport deal)

Each zone must have the same or near equal demand

Aggregation reduces the original number of zones to a manageable number (e.g. 18000 to 800)



ESTIMATING TRANSPORTATION COSTS

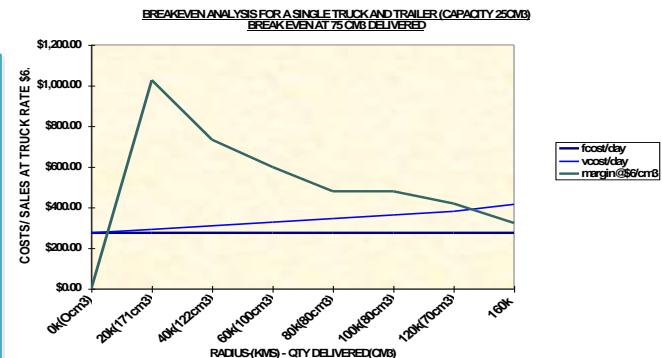
Rates are linear with distance not volume – work out the distance versus volume trade off

For internal distribution work out breakeven trips. For external distribution workout the transportation rate . Work out container loads and part container loads

Use great circle distances for long distances (spherical trig logic)

Note: roads don't take the great circle route

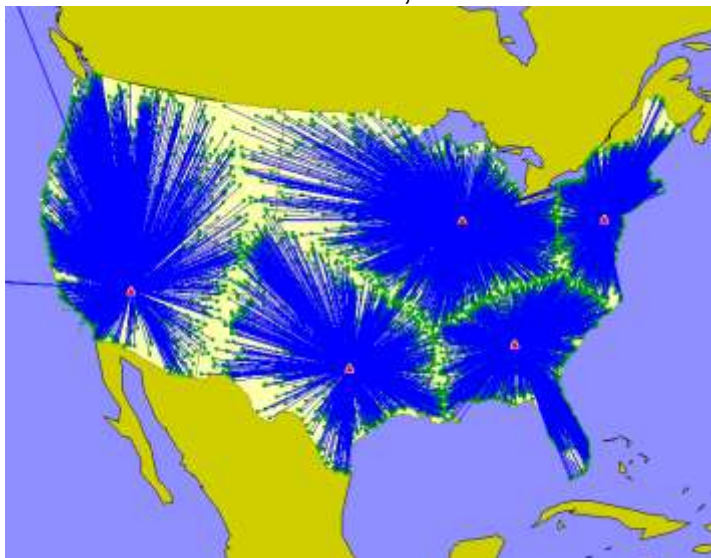
Reduce the Product groups to a manageable number
(e.g. 46 product groups --->>> 4 or 5)



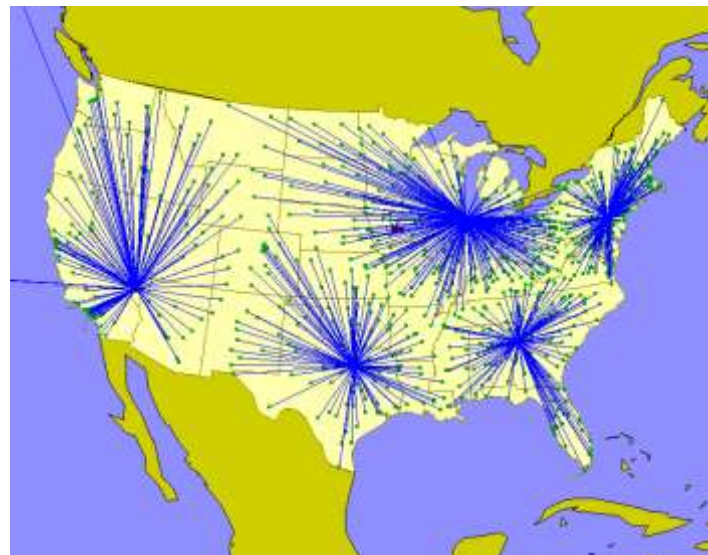
(Simchi-Levi et al (2008 to 2022))

Customer aggregation displays the solutions compare scenarios

Total Cost:\$5,796,000
Total Customers: 18,000



Total Cost:\$5,793,000
Total Customers: 800



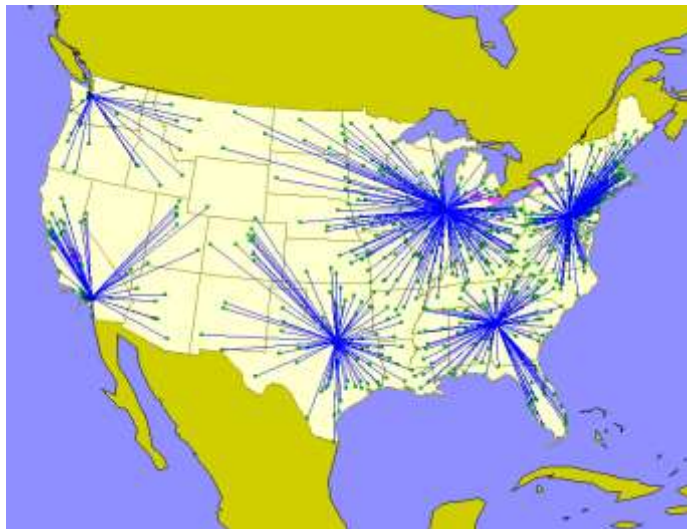
Simchi Levi et al (2008:2022) in their seminal work on designing the modern supply chain demonstrate how aggregating demand by customer zones allows risks to be pooled. In this example the customer zones are reduced from 18,000 to 800 with barely a 0.05% difference in costs.

Reducing uncertainty is critical. Aggregation of customers also allows each customer zone to be assessed for revenues and cost efficiencies. There is always a trade-off. The greater the number of customer zones the greater is the spread in scenarios and uncertainties. Reduced customer zones without reducing the cost parameters make the zones manageable.

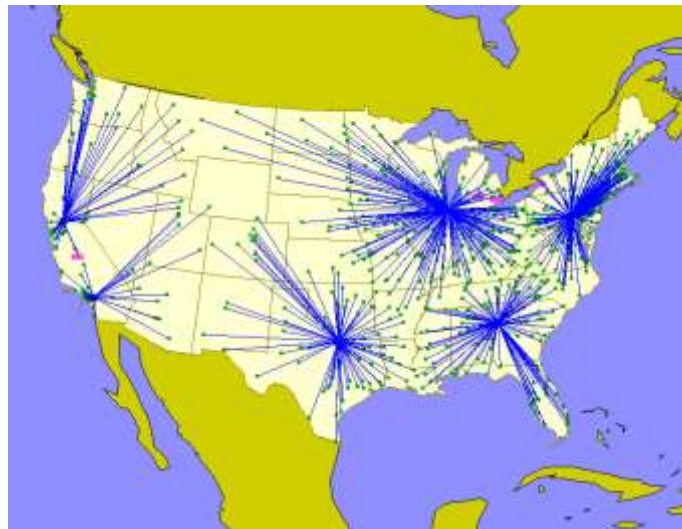
Adapted from Simchi- Levi et al (2008/2022) Designing and managing the supply chain

Product aggregation

Total Cost:\$104,564,000
Total Products: 46



Total Cost:\$104,599,000
Total Products: 4



Likewise, Simchi Levi et al (2008:2022) demonstrate how aggregating suppliers and their products allows risk to be pooled by products. The key is to intelligently reduce the product groups in a way that the reduced number of product groups have similar transportation or warehousing costs. Products that are picked up at the same source and/or destined to the same customers, logistics characteristics like weight and volume drive the grouping. Often product types or models or style differ only in the type of packaging or in temperature management.

Once again reducing uncertainty is critical. Aggregation of products also allows each product group to be assessed for revenues and cost efficiencies. There are always trade-offs. The greater the number of product groups the greater the spread in scenarios and uncertainties. Reducing product groups without reducing the cost parameters for transport or warehousing make the groups manageable. **MORE IMPORTANTLY IT ALLOWS ALL PARTIES TO BENCH MARK HOW EACH PRODUCT GROUP PERFORMS AGAINST ANOTHER.**

Adapted from Simchi- Levi et al (2008/2022) Designing and managing the supply chain

The Hinterland Hub Eco-System Inside Out

Adapted from Landen and Berg (2011); Rodrigue, Debie, et al. (2011)

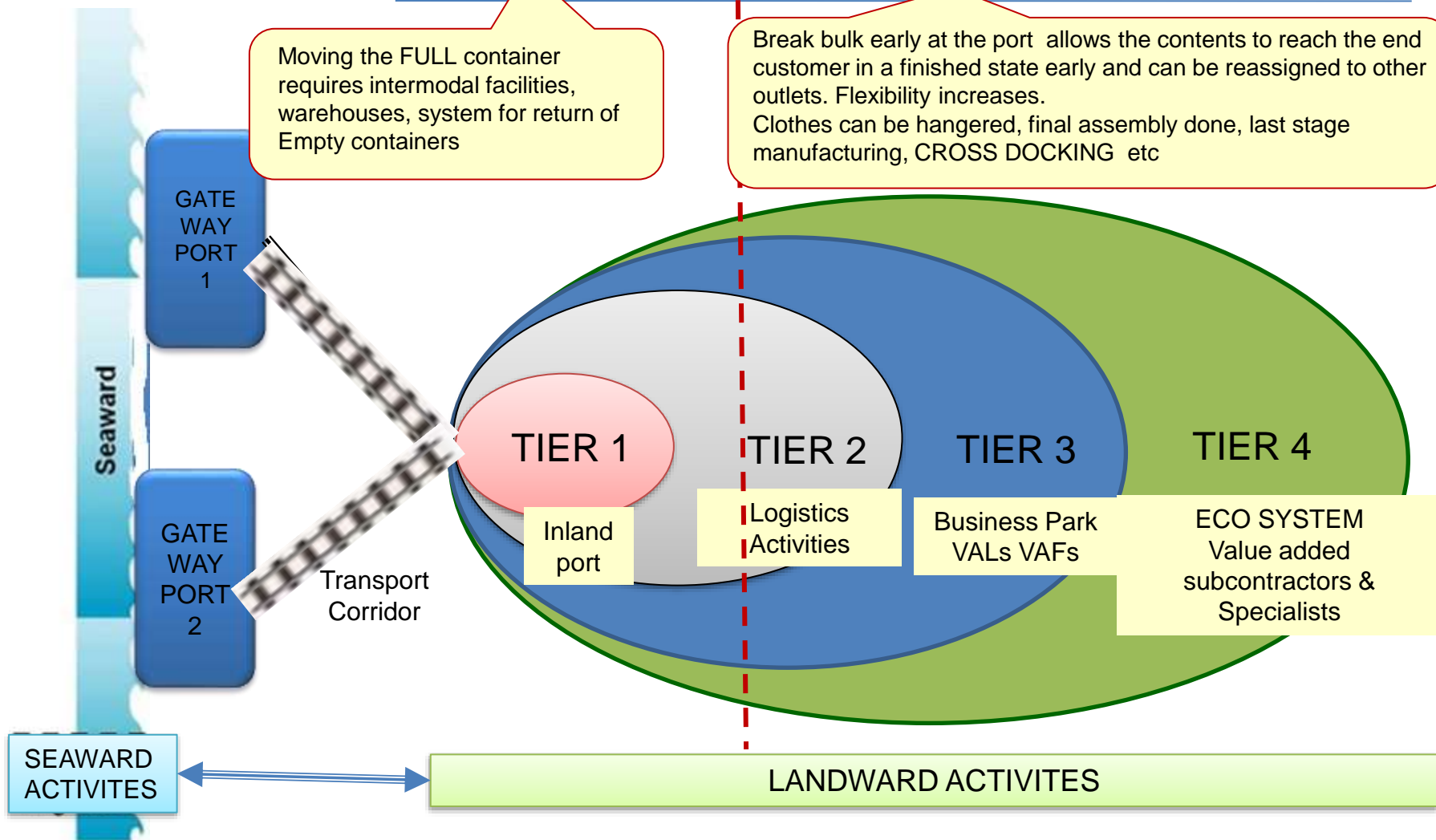
SHIPPING HUB

MOVING THE BOX

MOVING THE CONTENTS OF THE BOX

Moving the FULL container requires intermodal facilities, warehouses, system for return of Empty containers

Break bulk early at the port allows the contents to reach the end customer in a finished state early and can be reassigned to other outlets. Flexibility increases.
Clothes can be hangered, final assembly done, last stage manufacturing, CROSS DOCKING etc

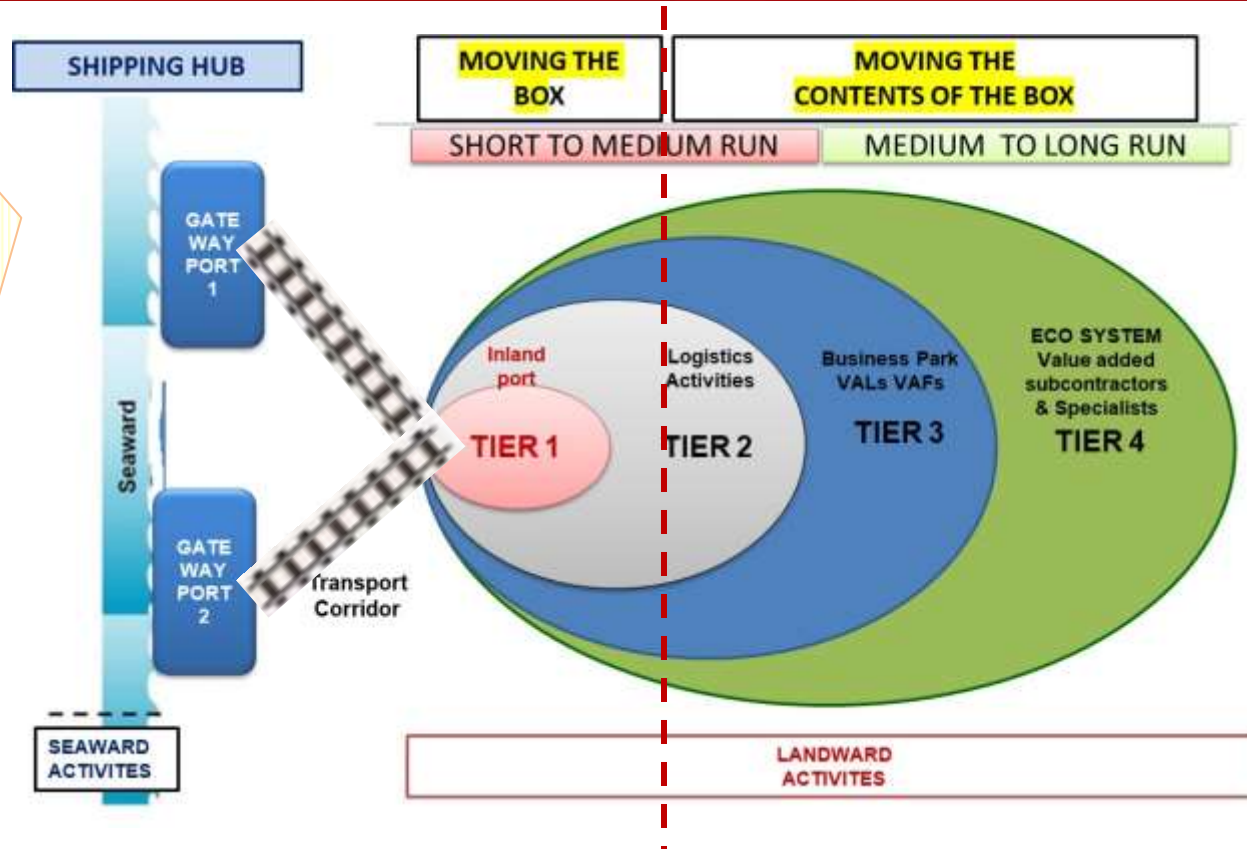


The rhythm between the Sea Port eco system as a gateway between the maritime and hinterland corridor

EXPLANATORY NOTE BOX = CONTAINER or CT

MOVING **THE BOX** or container activities (TIER 1) requires a satellite/inland port a short distance away connected by a dedicated rail line to avoid trucks congesting traffic near the port.
The boxes are delivered to and from the Satellite Port.

MOVING THE **CONTENTS** OF THE BOX requires a break bulk facility. The items are removed at an intermodal facility and transported by trucks to the next destination a warehouse or a retail outlet

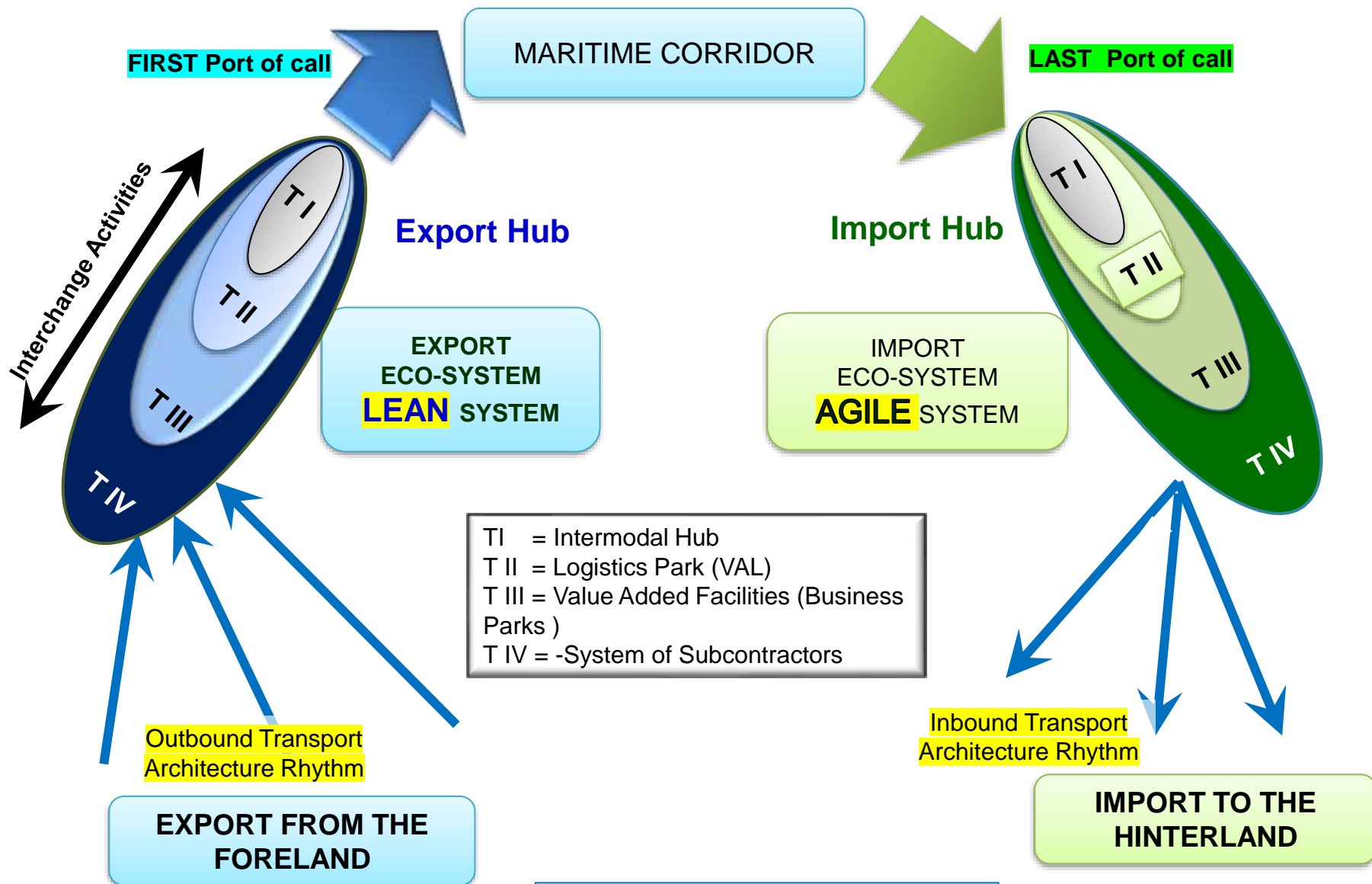


The PORT ECO SYSTEM forms when the VAFs at the freight, Inland, satellite or Sea Ports VAFs are in synch with the RHYTHM of the Global Supply Chains routes that move from the Foreland (upstream producers) to the hinterland (end customers downstream).

If the VAFS are valuable to the shippers, then the VALs (Value added Logistics) providers will co-locate. Each Sea port may have its own VAFS/VALS or share it with a third party

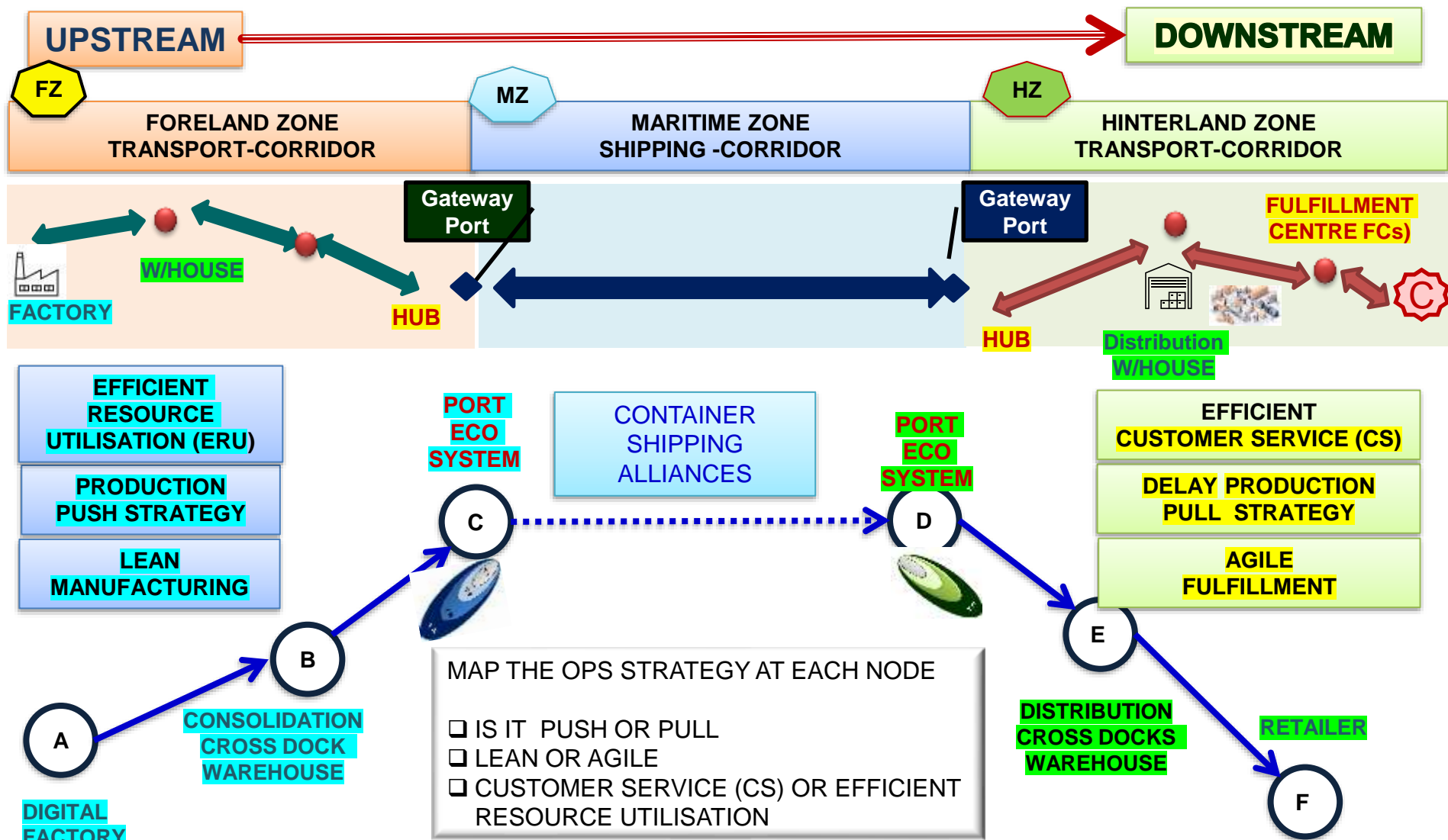
THE PORT BECOMES AN ECO SYSTEM WHEN THE VALS and their Subcontractors locate around the port.

The export import eco-system at the Export and Import Gateway hubs

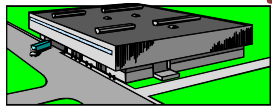
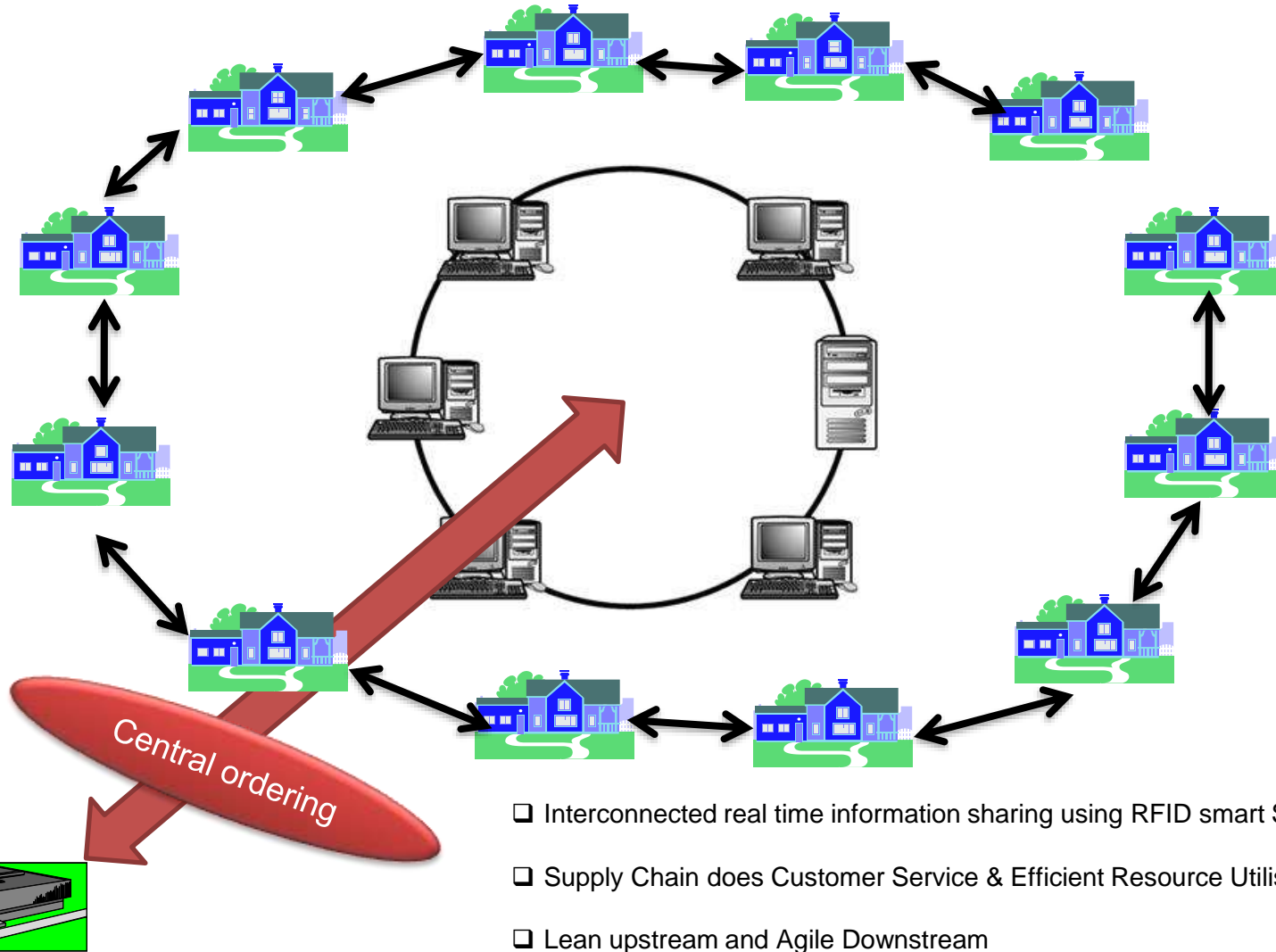


Mapping ON EACH LEG

Trade off PUSH-PULL- LEAN AGILE – CS VS ERU



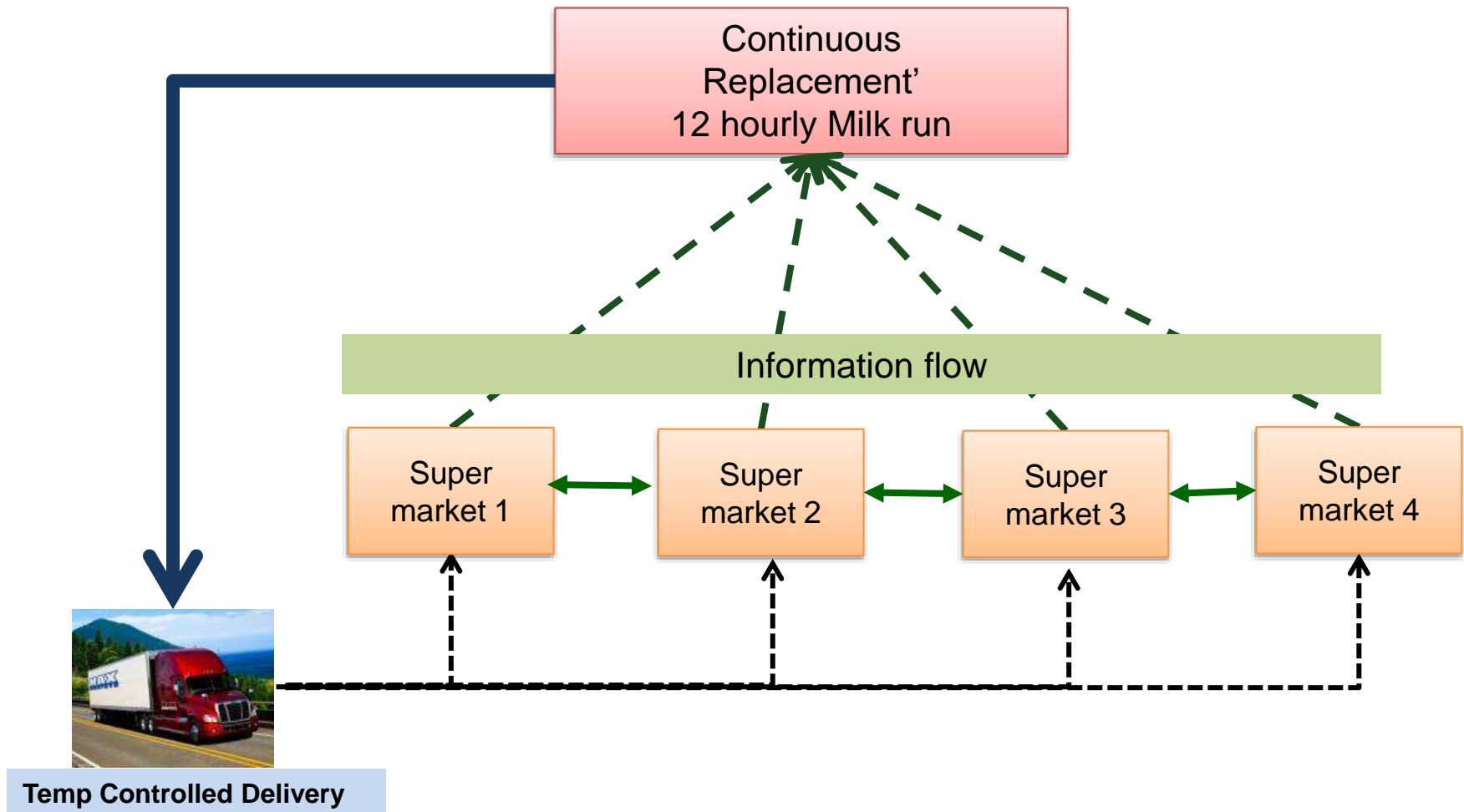
The central retail risk pool risk spread reduces safety stock



Central warehouse

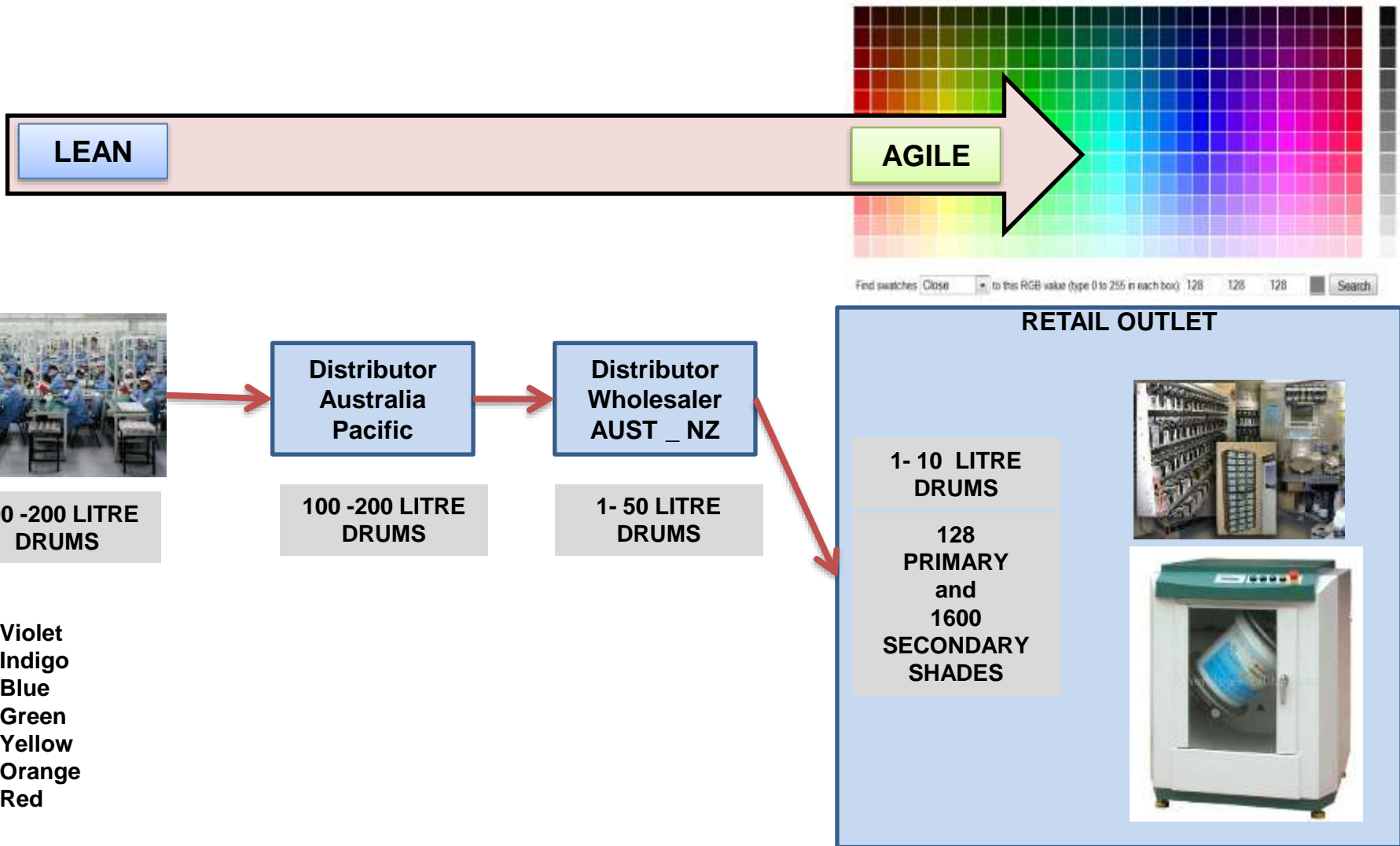
Continuous replenishment logistics

Pipeline reduction



Or through delayed manufacturing

Example: house-painting industry



CASE 2 Delay manufacturing - Delay fulfilment

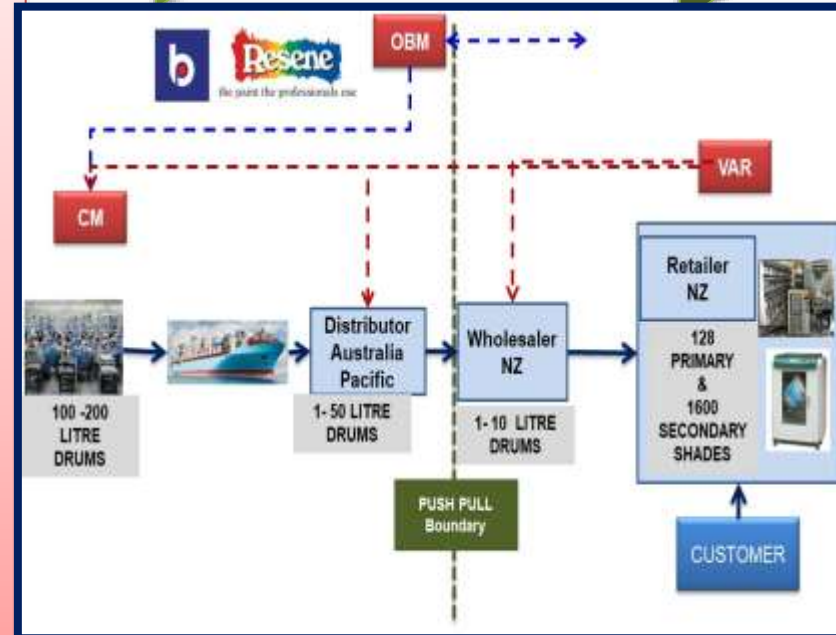
Example: A combined descriptor of the Paint industry

PUSH

PUSH PULL

PULL

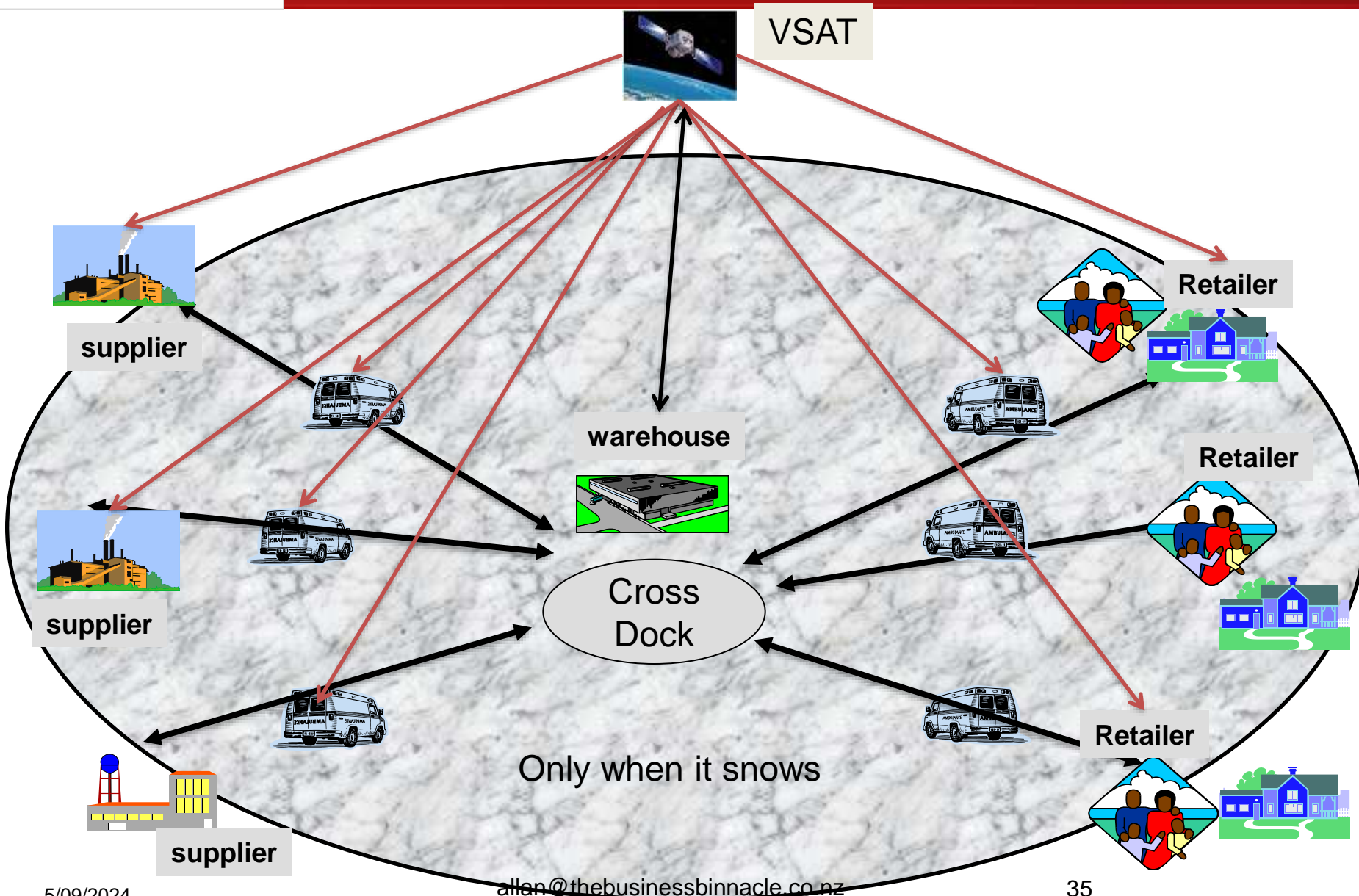
- ❑ The OBM (Original Brand Manufacturer) takes extensive feedback and designs about 128 colours around which it creates nearly 1600 shades. This is wide choice in a PULL system that would be impossible to manufacture efficiently.
- ❑ OBM then commissions a CM (Contract Manf) to manufacture to an estimated demand the **three basic colours (RED, YELLOW BLUE) + NEUTRAL**. The drums are rectangular and designed to fit a standard pallet (1.2 x 1.0) that in turn will fit perfectly into a 40 ft CT. This is the perfect PUSH system. (Cylindrical drums introduce empty space between drums). Using Basic colours create economies of scale in Manf and Shipping.
- ❑ The 100 -200 litre drums are sent to the distributor in Australia to a Break Bulk warehouse where they will be broken up into smaller drums of 10 to 50 litres for the retail market in AUS and NZ. These drums are also rectangular. They then go to the wholesaler in NZ where they are broken into 1 – 10 litre drums.



- ❑ The DELAY MANF process begins only when the customer enters the store and asks for a selection of the 1600 choices available. The retailer looks up the 'recipe' and mixes the paint. Depending on the quantity, the retailer manufactures the paint shade by mixing the paint in a mixer, on completion it is then decanted into a drum of 1 to 10 litres, the label with the shade is printed and stuck on and the paint drum sealed. **THE FINAL STAGE RETAILER IS THE MANUFACTURER.**
- ❑ **The clock speed of the product is very high.** Typically, customers can be given a small test can of 100 ml and told to try it and see how it looks. **They can come back and ask for any number of changes to be made to the recipe** before making the final choice. This is the perfect PULL system. It allows the manufacturing process to be delayed until the customer enters the store.
- ❑ **Wastage is reduced.** For paint shades that are not selling the relative quantities of the primary colours RED, YELLOW, BLUE and NEUTRAL will be consumed differently. This effectively allows the OBM to order the CM to increase production of certain colours or reduce production of other colours. Estimates are accurate. Shades that are not popular can be discarded.

Cross Docking

An aggregate of the typical methods used



CASE 3 Value Added Logistics - Cross Docking the Wal-Mart model – fixed replenishment cycle 24 hrs

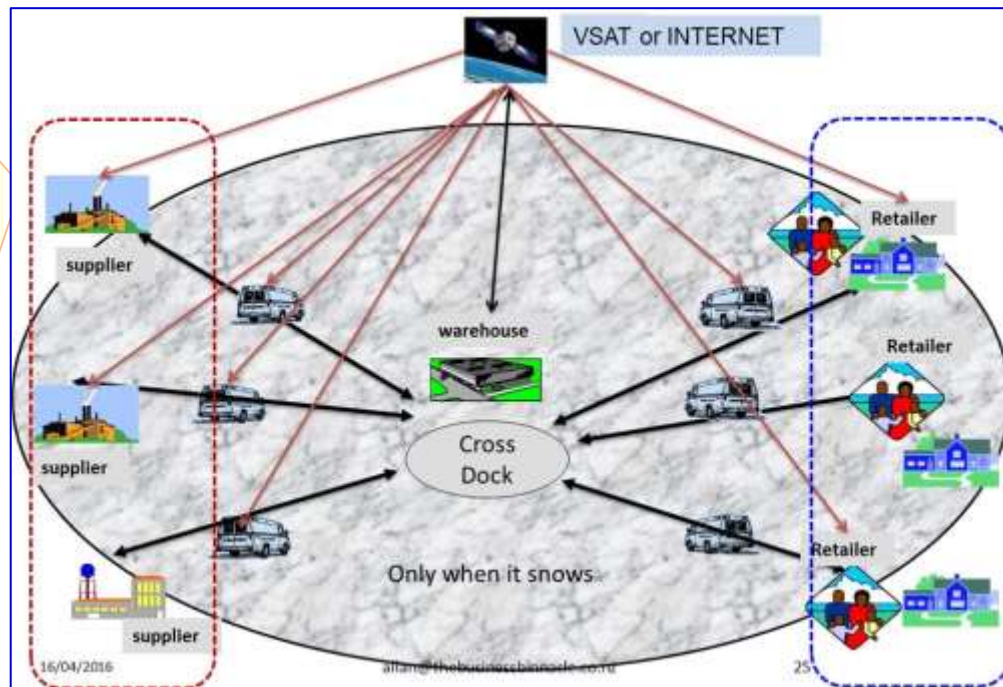
EXP NOTE

A typical Warehouse sits at the centre of a Supply rhythm. **The mantra is “only when it snows”.** The entire supply chain end to end including the delivery vehicles know the up-to-date demand needed at each retail store.

Supply trucks from the Manuf Producers (or another forwarding warehouse) arrive at precisely the same time as the retail trucks.

The retail truck has the 24X hr demand from each store, updated continuously. The Supplier sends the 24 X hour demand for each store in the supply truck. **All parties are on-line and know the demand in real time.** Different suppliers can also operate on the same cycle depending on capacity of the trucks.

The goods are exchanged on the tarmac in front of the warehouse. The warehouse is used only if it snows. IF THE RHYTHM IS CORRECT THEN THE WAREHOUSE IS EMPTY. Nothing is extra or short.



Each store knows that supply is exactly 24 hours away. Rather than stocking for many days, each store stocks inventory only for 24 hours. The rhythm can be made shorter to 12 hours and even 8 hours.

Retailers can now hold stock for a larger variety of brands but with only a small number of SKUs. Increasing choice for customers. The GSC is AGILE and can be ramped up at 24 hours' notice for increased or SUDDEN DEMAND.

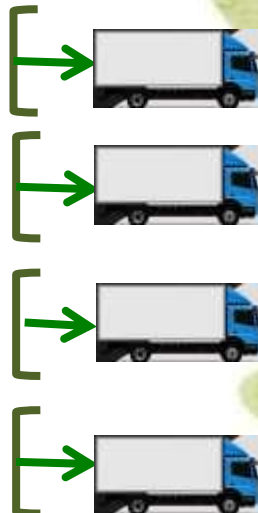
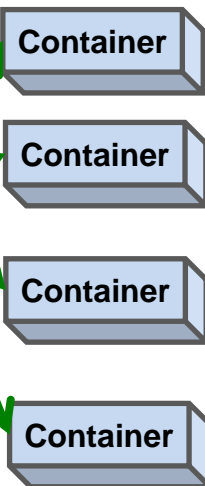
E.g. A store holds 20 varieties of jeans with only a few hours stock (or SKUs) knowing replenishment is a few hours away. Ergo greater selection to its customers for the lowest price.

CASE 3 Rhythm and cadence between CT arrival from Port & distribution trucks at the Crossdock gates in the PES

PORT HUB & ECO SYSTEM (PES)

Cross dock gates
Break bulk Value-Added-Activities

CROSSDOCK / VALS / VAFS



Ship arrives at the Port
CT off Loaded sent by rail to the PES

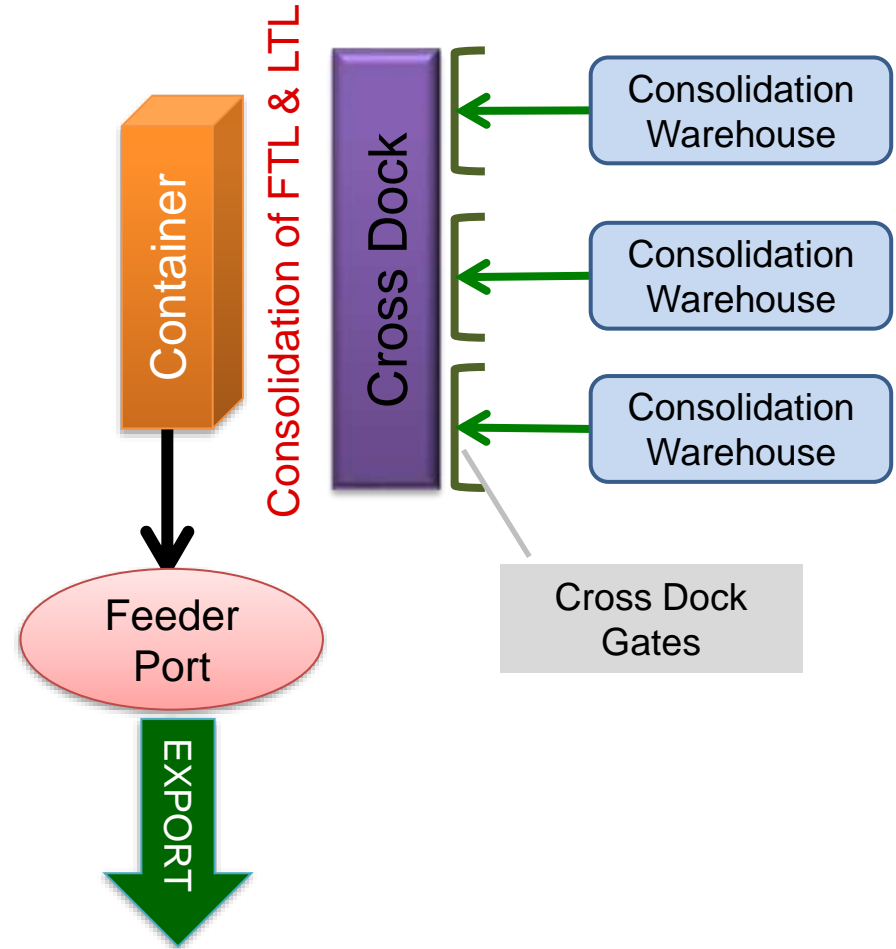
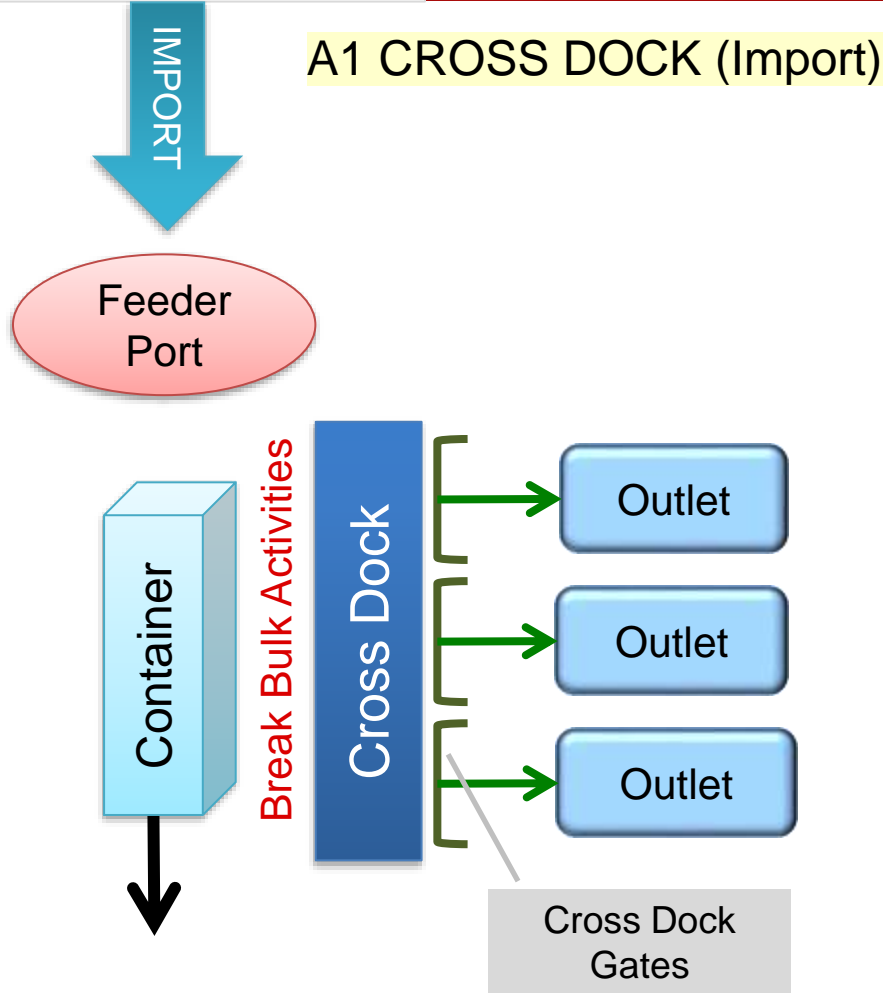
- ❑ Import CT arrive at Gateway Port on a regular schedule e.g. weekly shipping service. Items offloaded are sent by rail to Inland Hub. CT broken open, at VALS and VAFS where Assembly or Delay Manuf activities, break bulk is done e.g., clothes are stitched and hangered etc.
- ❑ Delivery vehicles arrive at a specified time e.g. 8 hours later items are offloaded and sent direct to the retail warehouse or retail store. All parties from the producers in the foreland to the Shipping companies, the hinterland shippers and end customers know the exact SKUs in each CT and on each truck.
- ❑ All retailers know replenishment is e.g. 7 days away. In this case Demand forecast is for a week.
- ❑ The longer the lead time the less reliable the forecast of demand. The shorter the lead time the lesser the uncertainty. Port eco systems work if there is a rhythm and cadence created from information being shared in real time across several geographical and ownership boundaries.
- ❑ Sophisticated systems run daily and 12 hourly replenishment systems that link the entire global supply chain. The CT are off loaded in batch-cycles to synch with the hinterland supply chain and the ship service is linked to the batch cycles.
- ❑ The most sophisticated model is run by the WALMART EXPRESS with Pendulum Ship routes from the Producers to End Customer

CASE 3 Cross Docking at the satellite/logistics hubs

The Transportation Rhythm and cadence

A1 CROSS DOCK (Import)

A2 CROSS DOCK (Export)



An overarching algorithm drives the transportation Rhythm and Cadence

Using Lean - Agile Manufacturing and Crossdocking end to end Last Mile distribution to increase Agility and Fulfillment

- ❑ Simchi Levi et al (2008:2012) were the first to recognise it was possible to use the **Cadence and Rhythm of coordinated GSCs** to increase the number of Distribution Centres (DCs) to increase fulfillment.
- ❑ The shorter the time to fulfillment the lesser is the market uncertainty of demand, reducing the safety stock needed. WALMART used Cross docking to enable Retailers to lower safety stock (keep stock for a single day) and therefore offer greater variety and brands knowing that restocking was a day away. Retailers now offer even shorter times.
- ❑ AMAZON restructured their entire business from a retail business to an end-to-end logistics business offering multi-channel fulfilment.
- ❑ AMAZON GLOBAL LOGISTICS runs an end-to-end 4PL service over entire GSCs. The service includes all-inclusive pricing, cross border documentation, Amazon Warehouses for Consolidation/Distribution and Last mile Multi channel Fulfillment.

ORDER RESPONSE TIME ONE WEEK



ORDER RESPONSE TIME 3 DAYS



ORDER RESPONSE TIME 1 DAY



ORDER RESPONSE TIME SAME DAY



- ❑ Technology drives the engine. Sellers store their products in FBA centres (fulfillment by Amazon) that use AI and Machine learning algorithms, and high end picking and RFID tech.
- ❑ The last mile has shifted away from using traditional Postal Services to using AMAZON FLEX (Uber for delivery) and the use of DELIVERY SERVICE PARTNERS who buy 100 vans and lease them to drivers who are paid by the hour. AMAZON plans the routes, labels the packages and tracks the drivers to keep control of the process.