The Global Supply Chain Eco-System
PRESENTATION PART 2A

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

PART 2 A

SUPERIMPOSING THE GLOBAL SUPPLY CHAINS
ON THE GLOBAL TRANSPORTATION CORRIDORS

THE LEAN AGILE GLOBAL SUPPLY CHAIN
MANAGING THE CONFLICTS BETWEEN
BEING LEAN UPSTREAM AND AGILE DOWNSTREAM

A topline presentation for C-SUITE Managers

By
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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 Lentaigne 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 (Lentaigne 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.

Acknowledgements

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.

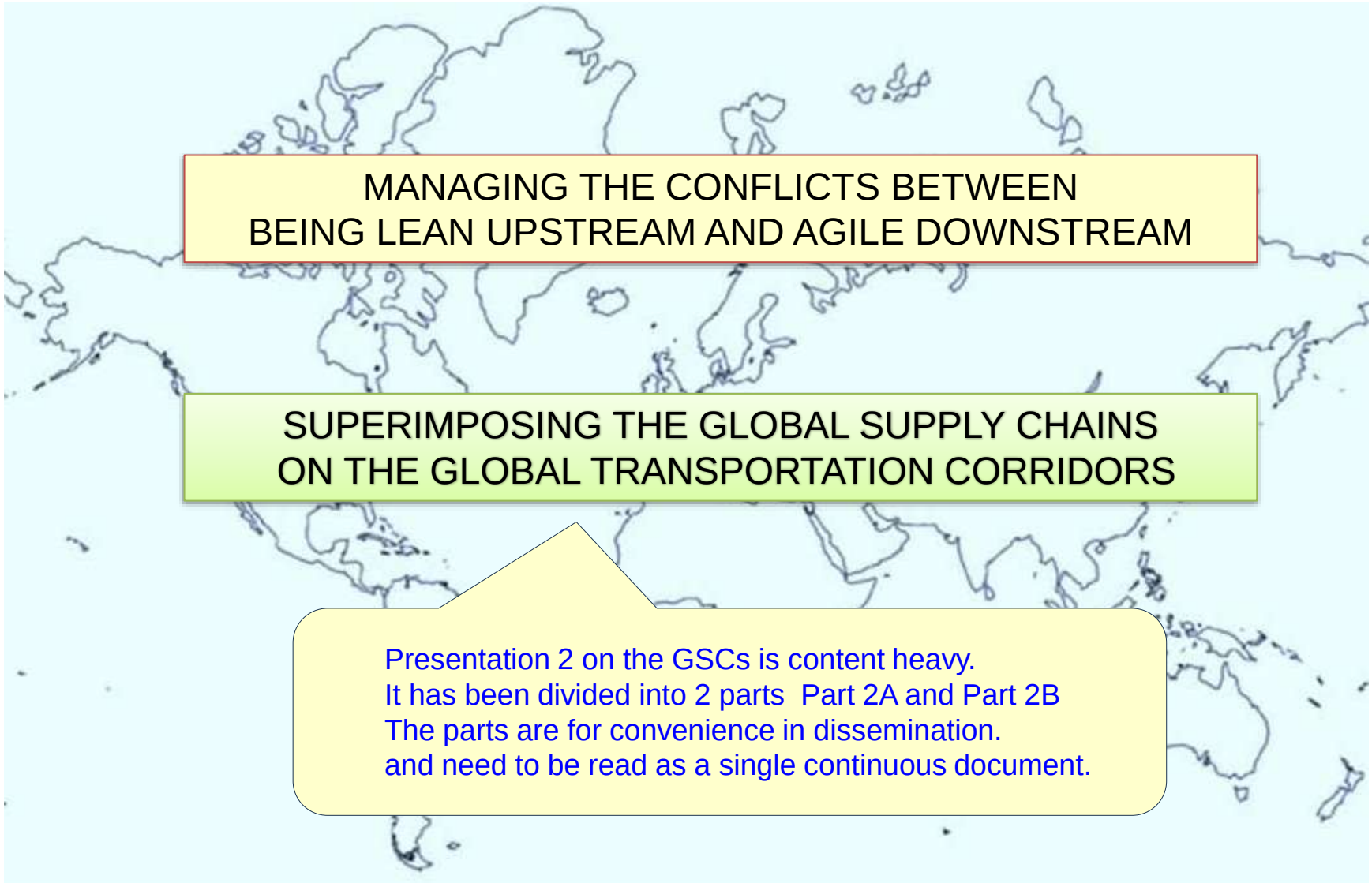
The Author thanks the many senior managers past and present on the C-suite of many of New Zealand's large Sea Ports, Inland Ports, Dry ports and Freight hubs and the principal shippers of the main New Zealand export companies for sharing their practical and hands-on experience in operating and managing 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 of these practitioners in the marketplace.

Abbreviations

ABBREVIATIONS AND TERMINOLOGY.		
Log design	DFA	DESIGN FOR ASSEMBLY
Log design	DFL	DESIGN FOR LOGISTICS
Log design	DFM	DESIGN FOR MANUFACTURING
Log Innovation	I	INCREMENTAL INNOVATION
Log Innovation	R	RADICAL INNOVATION
Log Operations	CM	CONTRACT MANUFACTURER
Log types	DIFOT	DELIVER-IN FULL-ON TIME
Log Operations	MANUF	MANUFACTURING
Log Operations	OBM	ORIGINAL BRAND MANUFACTURER
Log Operations	ODM	ORIGINAL DESIGN MANUFACTURER
Log Operations	OEM	ORIGINAL EQUIPMENT MANUFACTURER
Log Operations	VAR	VALUE ADDED RESELLER
Log Operations	VMI	VENDOR MANAGED INVENTORY
Log Strategy	GSC	GLOBAL SUPPLY CHAINS
Log Strategy	LSC	LOCAL SUPPLY CHAIN
Log Strategy	SVC	STRATEGIC VALUE CHAIN

ABBREVIATIONS AND TERMINOLOGY.		
Log Trade off	CS	CUSTOMER SERVICE
Log Trade off	ERU	EFFICIENT, RESOURCE UTILIZATION
Log Trade off	QoS	QUALITY OF SERVICE
Log Trade off	VOB	VOICE OF THE BUSINESS
Log Trade off	VOC	VOICE OF THE CUSTOMER
Log types	1 PL	FIRST PARTY LOGISTICS
Log types	2 PL	SECOND PARTY LOGISTICS
Log types	3 PL	THIRD BODY LOGISTICS
Log types	4 PL	FOURTH PARTY LOGISTICS
Log types	CRL	CONTINUOUS REPLACEMENT LOGISTICS
Log types	RRL	RAPID REPLACEMENT LOGISTICS
Port Eco Systems	CT	CONTAINER OR BOX
Port Eco Systems	PES	PES PORT ECO SYSTEM
Port Eco Systems	VAFS	VALUE ADDED FACILITIES
Port Eco Systems	VALS	VALUE ADDED LOGISTICS

PRESENTATION PART 2A
THE LEAN AGILE GLOBAL SUPPLY CHAIN



MANAGING THE CONFLICTS BETWEEN
BEING LEAN UPSTREAM AND AGILE DOWNSTREAM

SUPERIMPOSING THE GLOBAL SUPPLY CHAINS
ON THE GLOBAL TRANSPORTATION CORRIDORS

Presentation 2 on the GSCs is content heavy.
It has been divided into 2 parts Part 2A and Part 2B
The parts are for convenience in dissemination.
and need to be read as a single continuous document.

Presentation 2a of 4
The Global Transportation Corridors

Opening Comment.

Note. The presentations may seem a bit crowded and dense. They are designed to be so.

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 presentation 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 the presentations to be a full document and to be readable 'as-is' in pdf without added notes.

This series of four presentations have been compiled pro-bono to demonstrate the broad ideation funnel used by some of the global supply chains of the world, as a way of educating and 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.

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 documents 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 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?"

The conflict on their value chains is addresses in Presentation 3 of this series

The Global North South Divide and the development of the Lean Agile Global Supply Chains (GSCs) of the world

There has always been a global divide from time immemorial that has been unchallenged until the technology revolution of the 1990s

Have nots

Haves

Disrupting changes to how information and technology have changed the status quo has had a profound impact on the entire gamut of human experience

The key disrupters

- The development of personal computation and the internet as an information and knowledge highway enabling instant communication of data and knowledge in real time
- Smart phone technology, digital broadcasting and the creation of social media silos have given voice to the hitherto ignored low value consumers and customers
- The simultaneous deregulation of even protected industry sectors and the opening of national and international borders to globalisation and commerce
- The creation of global behemoths operating across international and ownership boundaries
- The backlash towards globalisation and the Pandemic has also exposed the downside of these influences.

At the start the Global Supply Chains are a subset of special knowledge eco systems across the globe

The spatial advantages of labour

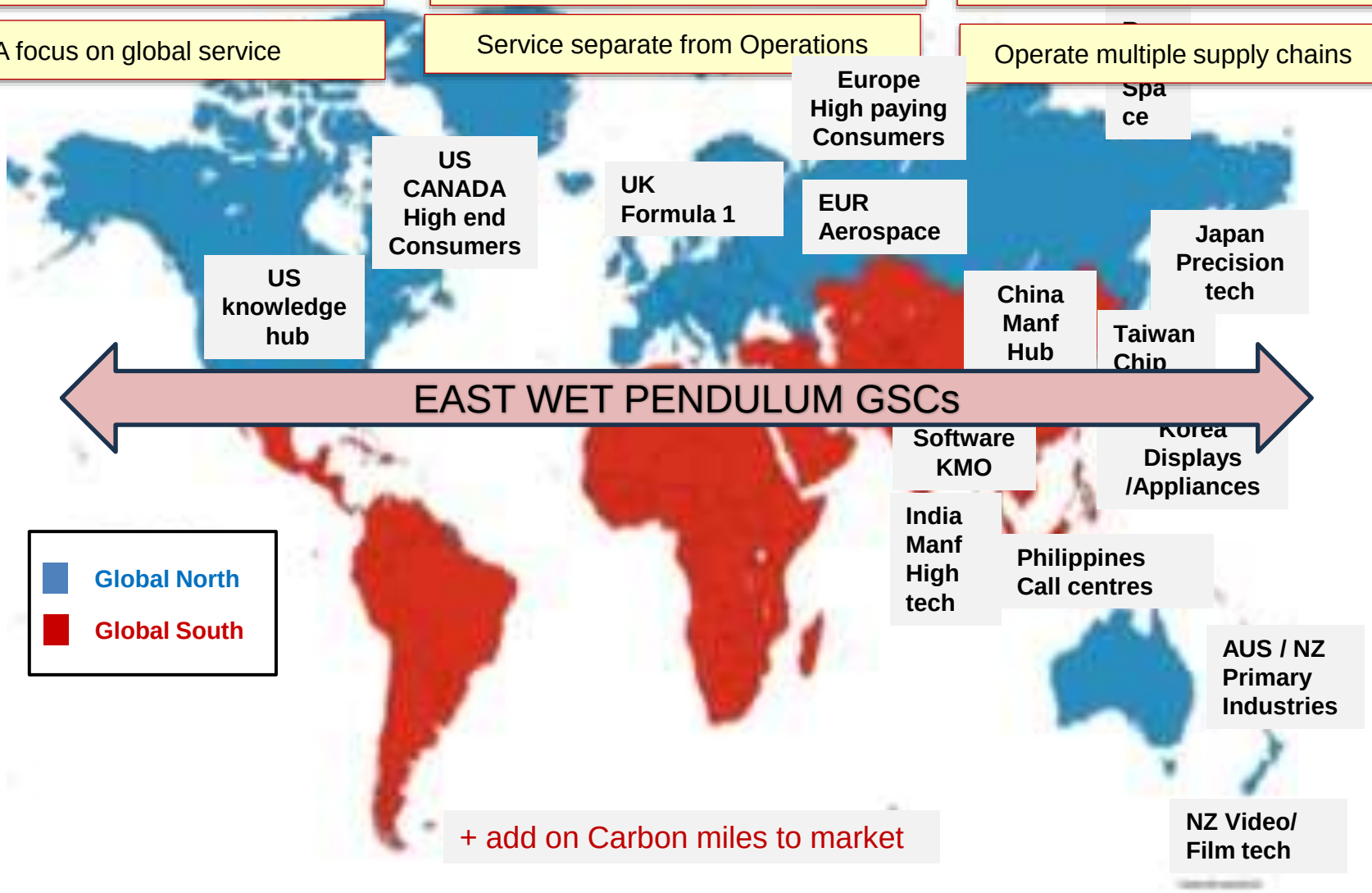
A Trend towards networking

Alliances on the chain

A focus on global service

Service separate from Operations

Operate multiple supply chains



+ add on Carbon miles to market

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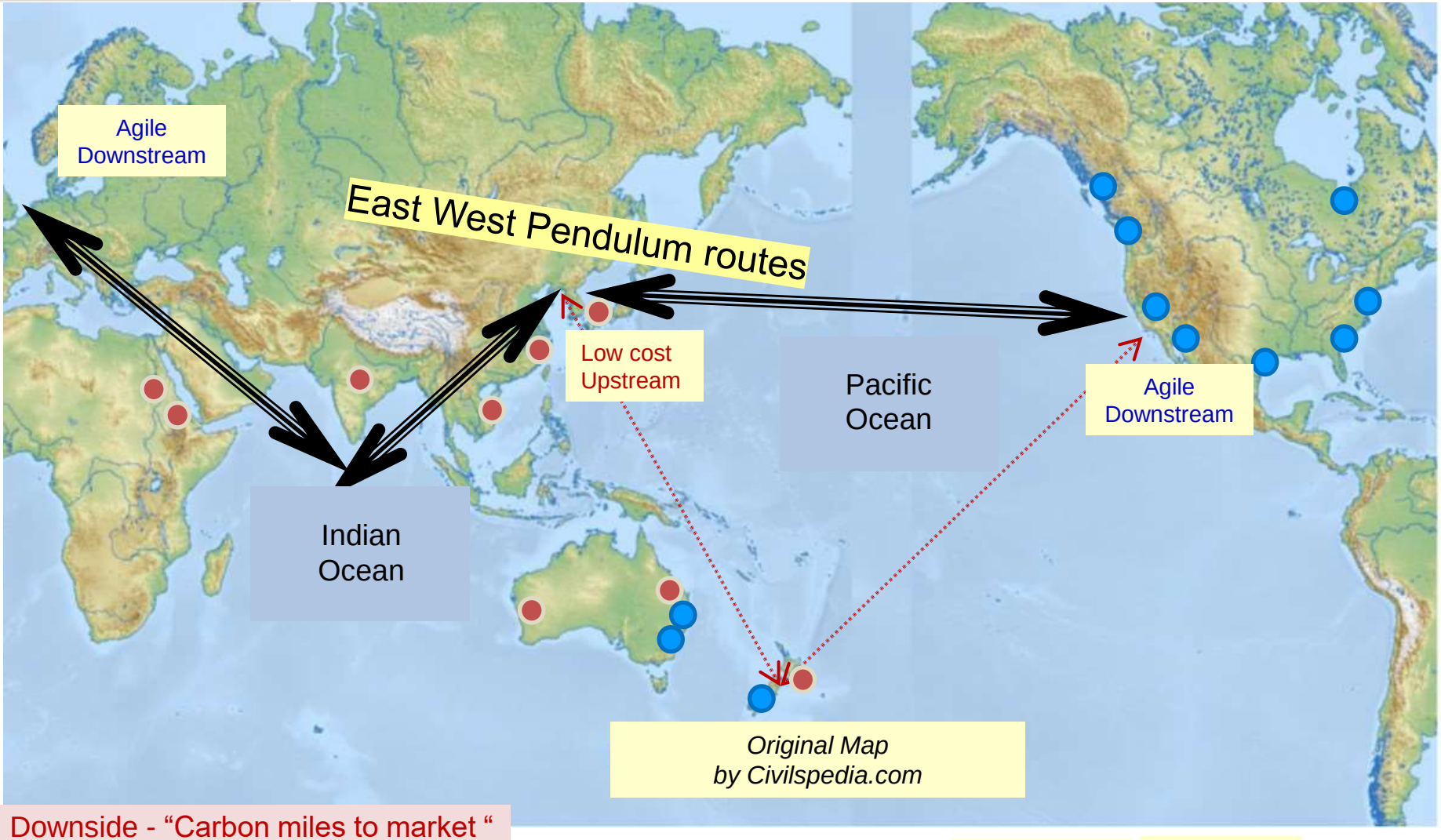
THE BUSINESS BINNACLE
FINDING YOUR TRUE NORTH

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.



Downside - “Carbon miles to market “
Transportation contributes
89% of carbon emission

Manufacturing Economies Producers

Knowledge Economies Consumers

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

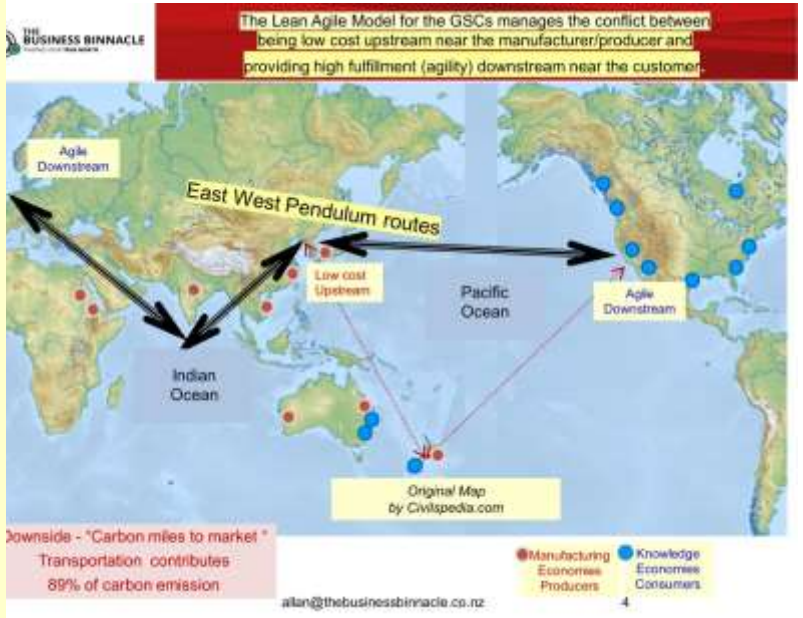
- The PRODUCTION ECONOMIES in Greater Asia who were able to exploit their spatial advantages of labour and expertise. The KNOWLEDGE ECONOMIES were where the design of products were conceived and where the value of these products were captured.

- .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 SVC)

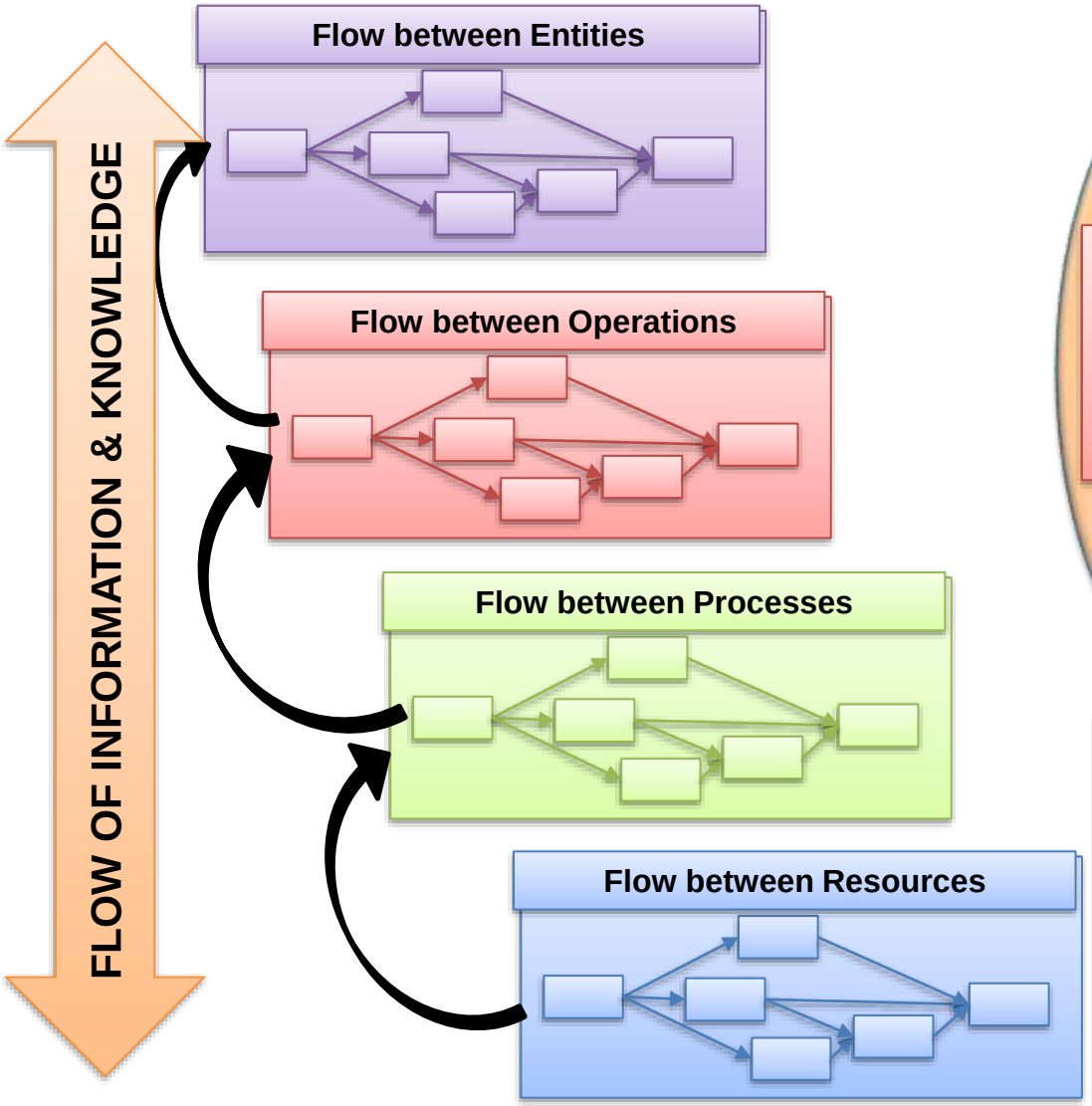


THE SOLUTION

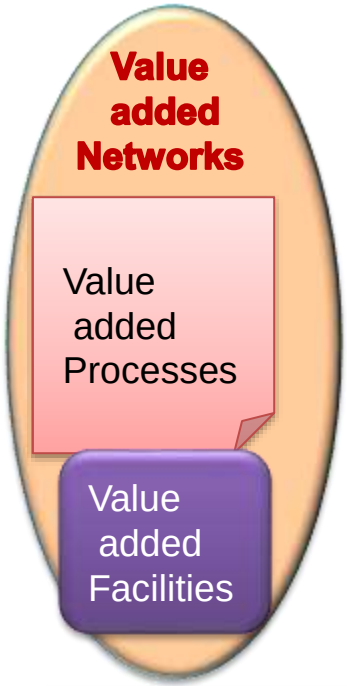
- Be **'LEAN' UPSTREAM** with the lowest cost upstream where the product was sourced and made. Focus on **ECONOMIES of SCALE & SCOPE (Volume to reduce cost)**

- 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 FULFULMENT**.

The Lean-Agile GSCs operate at four levels enabled by Information and Knowledge



Adapted from Slack, Brandon-Jones & Johnston (2022)

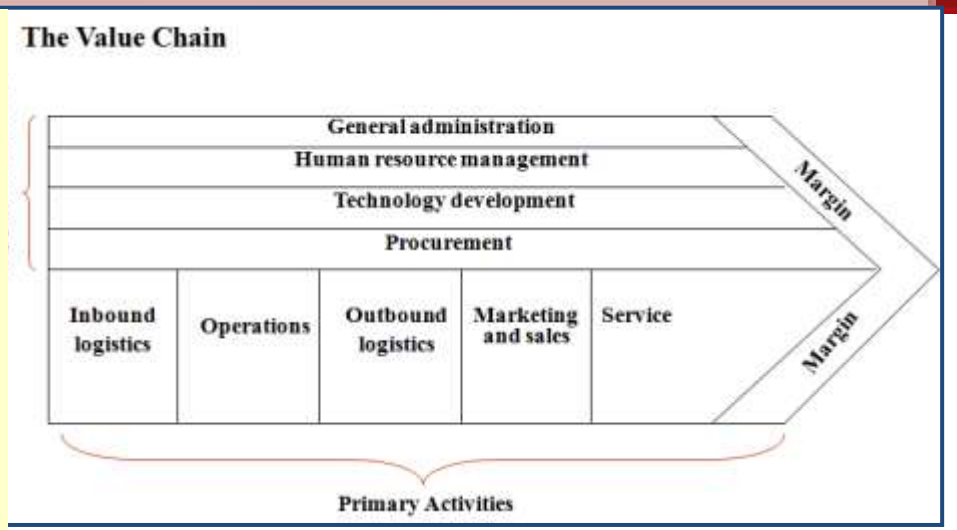


The Lean Agile – GSC construct is driven by

- ❑ Shared Capacity
- ❑ Seamless processes
- ❑ Synergies in Operations
- ❑ Shared expectation of gain based on risk versus return at each node of the supply chain

Porter's original 'Value Chain' (1985)
Primary and Support Activities that create value

- Michael Porter (1985) introduced the concept of the value chain as a 'system' driven by 'subsystems', each with its own inputs, transformation processes and outputs, with 'marketing' and 'customer support' as additional value drivers.
- He identified these as relationships and linkages that determined 'the sources of sustained competitive advantage' that created the value & wealth of the firm.
- Porters Value chain is an activity-based view of the firm. It includes value-added services like marketing, admin & customer service, technology, human resources etc that add value to the physical transformation of the core operations of the firm.
- The Value Chain captures what happens at the value boundaries between the supplier of the firm (Inbound logistics) lying upstream, the Core Operations of the firm and the value lying downstream nearer distribution and retail. Each have their own value-added activities.



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See Presentation 3 for details on GSC- SVC conflict management

- The modern 'strategic value chain' recognises that value positioning begins with the birth of the project with the supplier's supplier and finishes with the distributor's distributor, often many time removed, all the way to the death and disposal of a product/service. **(See Presentation 3 for details).**
- The modern avatar of the value chain recognises the conflict between the value chain and supply chain boundaries of the firm. Supply chains require information, capacity and asset and process sharing to be effective.
- Conversely the sharing of information and knowledge across the supply chain boundaries empowers the strategic value chain of the supply partners upstream or downstream which in turn attract segment invasions and even hostile take overs.

The problem is to address the bigger conflict between ‘the Lean Agile - GSC ’ and ‘the Strategic Value Chain’ (SVC)

King Kong (universal pictures 2005)

Somewhere on the supply chain is usually an **alpha male** who dominates it and often will not easily listen to reason

The Strategic Value Chain is a subset of whoever has the dominant competitive advantage in the market

Left unaddressed the Supply Chain becomes a subset of the Strategic Value Chain unless value along the supply chain is globally optimised.

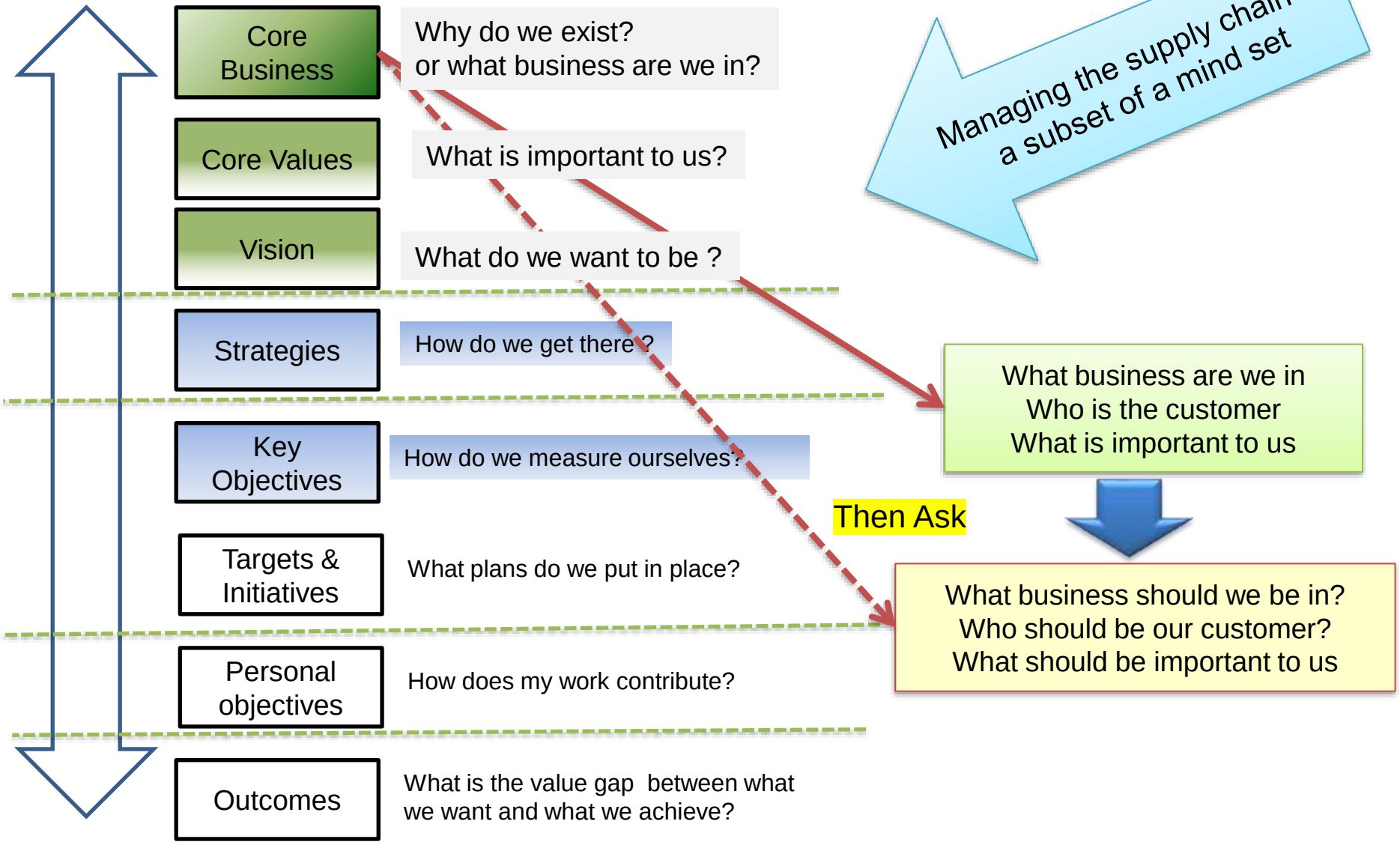
THE KEY TO SUCCESS IS

- ❑ COOPETITION &
- ❑ GLOBAL OPTIMISATION

MANAGE THE CONFLICT ON THE GSC- SVC BOUNDARY

See Presentation 3 for details on GSC- SVC conflict management

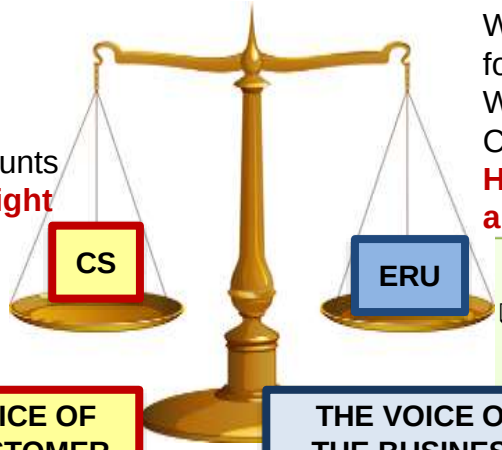
Start with the fundamentals
What business are we in



Manage the trade-off between the 'voice of the customer' & the 'voice of the business'

SERVICE TO THE CUSTOMER ⟷ **Find the Trade Off** ⟷ **EFFICIENT RESOURCE UTILISATION**

Business class
seats
Good meals
Free car park
Economy class
Low fares discounts
How do we Delight the customer
Is it profitable



THE VOICE OF THE CUSTOMER

THE VOICE OF THE BUSINESS

What can we afford to give
What does the competition give for the same price
What extras can we give
Can we sustain this quality set
How do we make a profit and a Return on Investment

Core Business

Core Values

Vision

BANG FOR YOUR BUCK

What is our current emphasis ?
Is the balance tilted towards customer service – If so, is the price paid enough for us
Is the balance tilted towards Efficient Resource Utilisation are our customers happy with the basics we provide

What is our preferred position?
What gives the best bang for buck

The Traditional View

- The traditional view of business has always been a zero-sum game between the company's ability to provide a service and make a profit
- The basic belief is that the higher the service provided, the greater is the cost to the company which in turn eats into profits
- Businesses veer from providing as much service as they can manage, within the price point paid by the customer.
- First class passengers get excellent QoS but pay a steep price. Conversely economy class pay a low price and are given a basic service.
- There is a constant tussle between providing CUSTOMER SERVICE and EFFICIENT RESOURCE UTILISATION of assets to make money
- Where is the trade-off is a constant question
- **TODAY'S CUSTOMERS WANT BOTH**

"How do we make this dance a profitable one for us and yet satisfy "all" our customers ?

Why do they buy

Why do they return

Why do they leave

Who is the competition

1 Who is the customer

2 What is the need

3 Their preferences

The market comparison

4 The value proposition

5

6 Shareholder

Stakeholder

Who is our customer

Who should be the customer

What do they want ?

VALUE PRICE

HIGH SERVICE

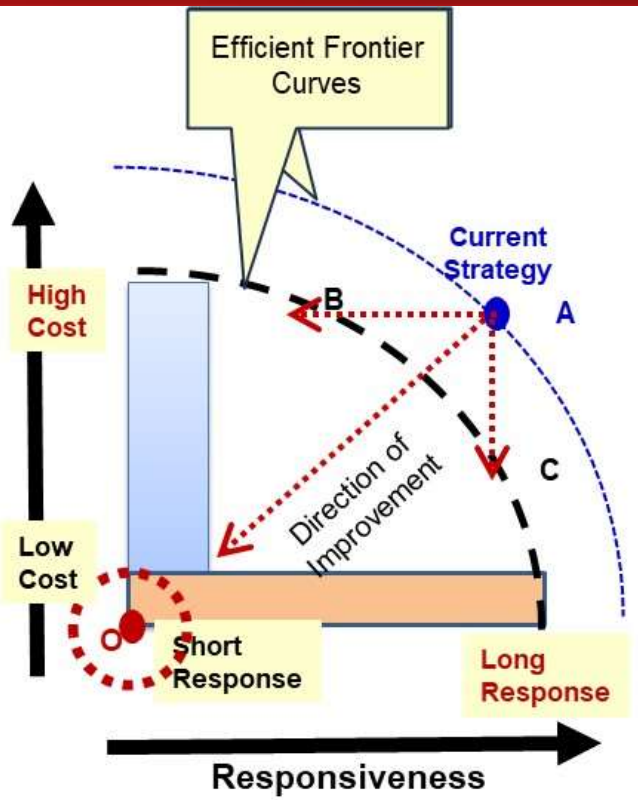
What do they really really want ?

Thanks, but I'm not interested in your problems ….I want it all …read my lips .I'll have the best choice, the best quality, the shortest response time and the lowest price thank you very much Now Go and FIGURE IT OUT OR I'LL FIND SOMEONE ELSE WHO CAN

The Voice of the customer has become more demanding empowered by knowledge in real time

The Modern Supply Chain is the search for "Zero-Zero" Find the Lowest Cost with Highest Quality of Service (QoS)

Yikes ….How do we manage the conflict between
1. Value price & High service level
2. Value price & Frequency of delivery
3. Value price & Fast response (short lead time)



- The traditional view is a trade-off between cost and quality of service (QoS). Business models position themselves on an EFFICIENT FRONTIER CURVE E.G. **Position A** –the current strategy. All firms then strive for constant improvement (**B or C**) Either provide higher QoS for the same price (in this case shorter response time) or Provide the same QoS for a lower price.
- Today the voice of the customer empowered by knowledge demands both i.e. the highest quality for the lowest price. This creates **the search for position Zero-Zero** which is managed at various points in the Supply Chains.
- Modern Supply chains accordingly share Information, work in alliances, that separate basic manufacturing from assembly, using knowledge services in which entities across national and ownership boundaries "**co-operate" and "compete" at the same time in a process called "CO-OPETITION**"
- The emphasis has shifted from single companies operating as separate entities to alliances. Supply chains now compete with other supply chains.
- In this mix up, firms operate at different interfaces on different supply chains even though the supply chains themselves may be in competition with each other
- The emphasis is now on relationship management and managing the conflict between the SUPPY CHAIN and the STRATEGIC VALUE CHAIN

Hmmm….
No Thanks
I want position
Zero-Zero !!
Like I said
Figure it out

…So, who does what and to whom? How do these decisions impact on you ?

Original Design Manufacturer

ODM

CMs add R & D to become ODMs

CM + R & D = ODM

Contract Manufacturer

Contract Manufacturer

Original Equipment Manufacturer

OEM

OEMS that become OBMs

Brand is visible

OEM no brand recognition

OBM

VAR

Value Added Reseller

Builds Brand Equity

Original Brand Manufacturer

Brand Awareness

Brand Loyalty

Hon Hai makes iPhones

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

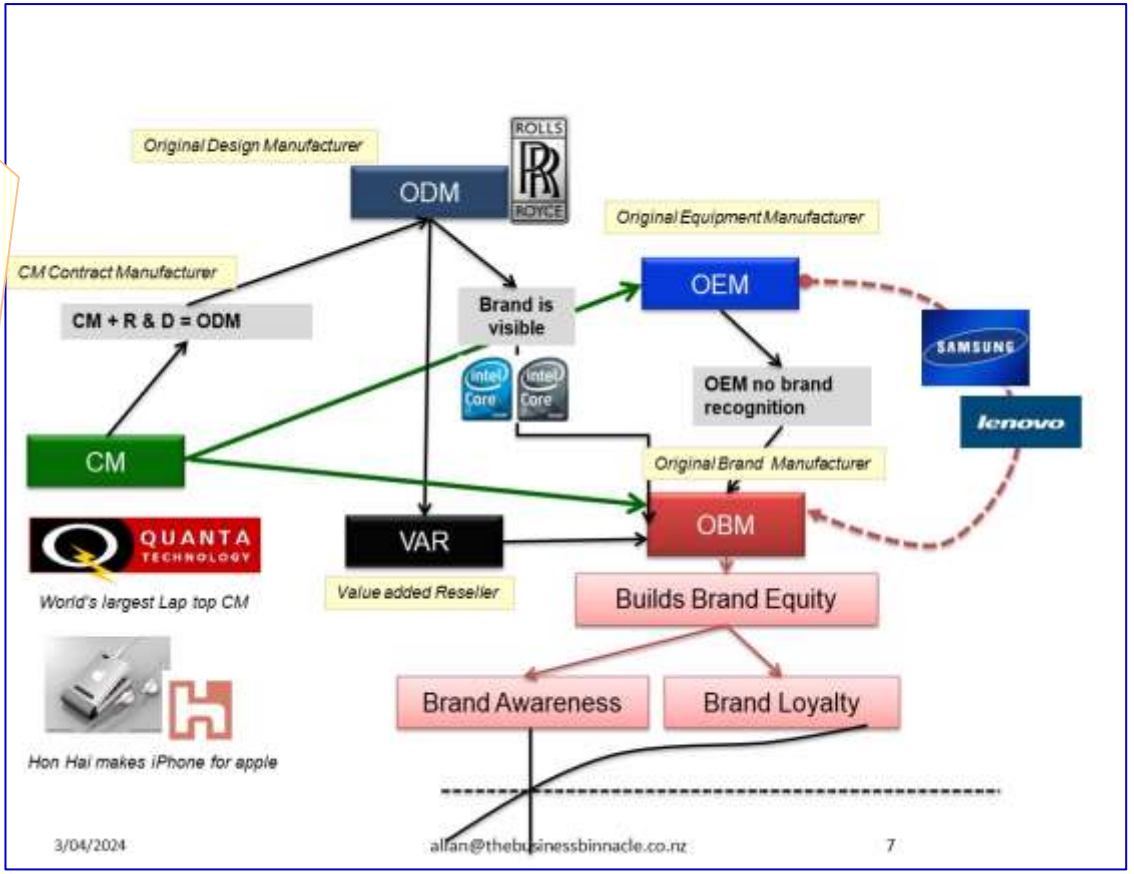
EXPLANATORY NOTE

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 Manf 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.

Companies operate as networks on the GSCs
AIRLINE ALLIANCES Typically Share Capacity & Service

The Skill focus has changed from 'operations management' to >>>>

>>>Relationship management

>>>Time management

>>>Customer management

>>>Knowledge exchange

CO-OPETITION

EXP NOTE

COOPETITION is a process where entities **'cooperate'** and **'compete'** at the same time. Often this will be done in different markets, or with different demographics, or different segments.

Airlines will typically cooperate on some routes and compete on others. Telcos and broadcasters might cooperate on long haul carriage and compete for the last mile or vice versa.

Companies may provide services at the level of the resource or process and compete for the brand at the level of the market.

Wild's Capacity Tree (and adaptation by Rodrigues 2024)
Managing capacity through alliance sharing

THE BUSINESS BINNACLE
FINDING YOUR TRUE NORTH

The Focus is on Customer QoS

Focus is on efficiency & profitability

Customers are forced to wait their turn

Customers may not wait and go elsewhere

Customer Queues

Loss of Trade

2b

Fix Capacity Limit

Fixing capacity ensures no wastage

Holding inventory has a cost. Sharing capacity on the supply chain or "risk pooling" is a better option. E.g. Star Alliance or One World for airline sector

2a

Adjust (Flexible) Capacity

1

Over Capacity

Over capacity always has high QoS but the price point must justify it. Otherwise, it leads to wastage and a stranded asset lying unused.

Capacity expires if unused. An empty airline seat unused has gone forever

Yes

No

Can capacity be adjusted

Manipulate the Demand

3

Can the demand be manipulated? Airlines use dynamic pricing to do this

CS+ RU

Customer Service

Resource Utilisation

Start

The focus is on pleasing the customer. But the price point must justify this QoS

The focus is on making money through the efficient use of resources.

The Capacity Decision Tree
Can capacity be re-distributed on the Supply chain ?

1

The traditional view of the capacity tree has the same trade-off between having **Excess Capacity or Fixing capacity**. Excess capacity pleases the customer, but it has a price E.g. First Class tickets pay a steep price. The risk is waste of capacity.

2

CAPACITY EXPIRES if it is unused. A focus on efficient resource utilisation ensures the firm makes money but the QoS is based on what the customer can be given within a price point. The firm can

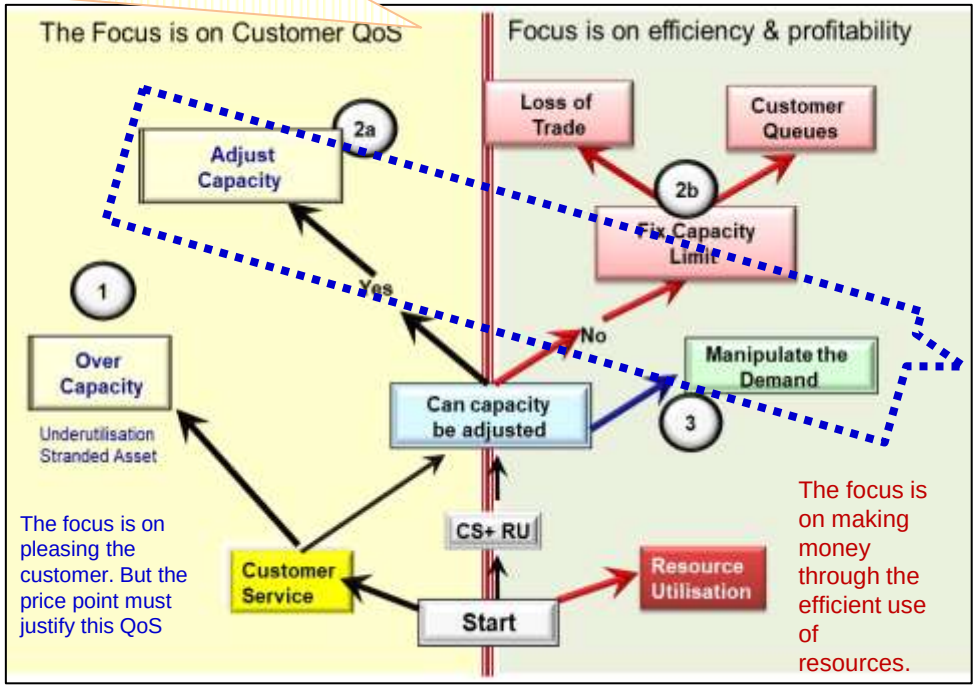
a. Efficiently adjust capacity by sharing capacity in the supply chain. Airlines form alliances (Star Alliance, One World) and share capacity and customers, OR
b. Fix Capacity. Not popular, as it forces customers to wait their turn and Queue. Many customers walk away to a competing service often never to return.

2a

Flexible capacity is undertaken through a shared supply chain.

Airlines take off from the same origin and land at nearly the same time and share their capacity. Customers can book on their Airline but will fly on alliance partners.

Typically, Air NZ and Singapore Air can hold half the capacity of First or business class or share the spill over for heavy booking.



THE LEAN AGILE SUPPLY CHAIN 3

A combination of Flexible capacity and Manipulating the Demand where the firm gets the customer to do what the firm wants.

Dynamic pricing used by airlines with major discounts in NON-PEAK hours encourage customers to travel on flights. They change their behaviour to suit the airline.

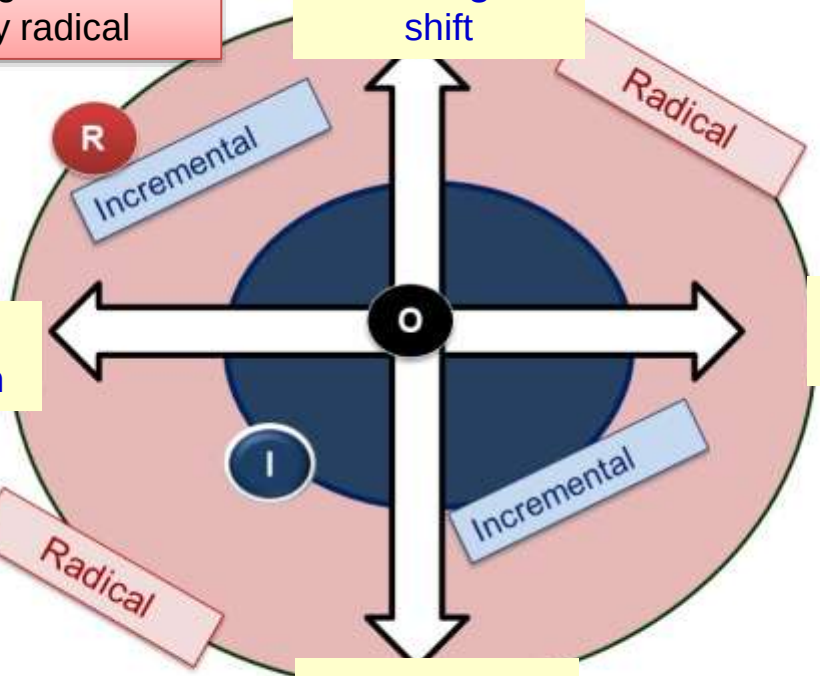
Lean Agile Supply chains harness both Flexible Capacity and Demand Manipulation

Innovation is either ‘Radical’ ‘R’ or ‘Incremental’ (I)
It has four dimensions (4Ps of innovation)

RADICAL INNOVATION Creates a disruptive change in the status quo. It creates dominance and provides super profit , value or wealth that can impact on the dynamics of a marketplace and change an industry.
INCREMENTAL INNOVATION is an improvement in efficiency or effectiveness to create value and increase earnings/value. Incremental innovation usually improves the product/service but rarely disrupts the status quo

A Paradigm Shift is usually radical

Paradigm shift



A radical change in Process Efficiency

Process Innovation

An incremental improvement In process efficiency

A new product or service that has never been seen before \

Product/service Innovation

An incrementally better designed product or service from the ones currently operating

A radical change in Positioning of a company Product or service

Position Innovation

An incrementally improved Positioning of a company or product or service

Adapted from Tidd & Besant (2020)

Adapted by Allan Rodrigues from Tidd & Besant (2020)

Innovation drives the SVC
It can be Radical or Incremental

Williams Gas company fired fibre optic cables on their long-distance gas lines to provide telecommunications and gas to change the Telecom industry

Paradigm shift

OTH Microsoft Windows was radical but now provides incremental improvements in its Windows Operating Systems

Greater Ormond Paediatric surgeons used the FERRARI FORMULA 1 racing pit processes to improve infant mortality in surgery

1st Gen iPhone smart phone changed the market

Process Innovation

Cross docking Radical service method for GSC efficiency

Bausch & Lomb's radical position shift from Ray Bans to laser surgery lenses

Tata Nano produced a radical positioning in price to open up the low-end market for cars

Tata Nano

Position Innovation

To be ‘lean’ upstream and ‘agile’ downstream products have to be radically designed for the rhythm of the GSCs

Design for manufacturing (DFM)

Flexible manufacturing
Delay Manufacturing

Design for Assembly (DFA)

The Allen key approach
Customer is the manufacturer

Design for Logistics (DFL)

Efficient Stowage and transport
Avoid transporting ‘empty air”

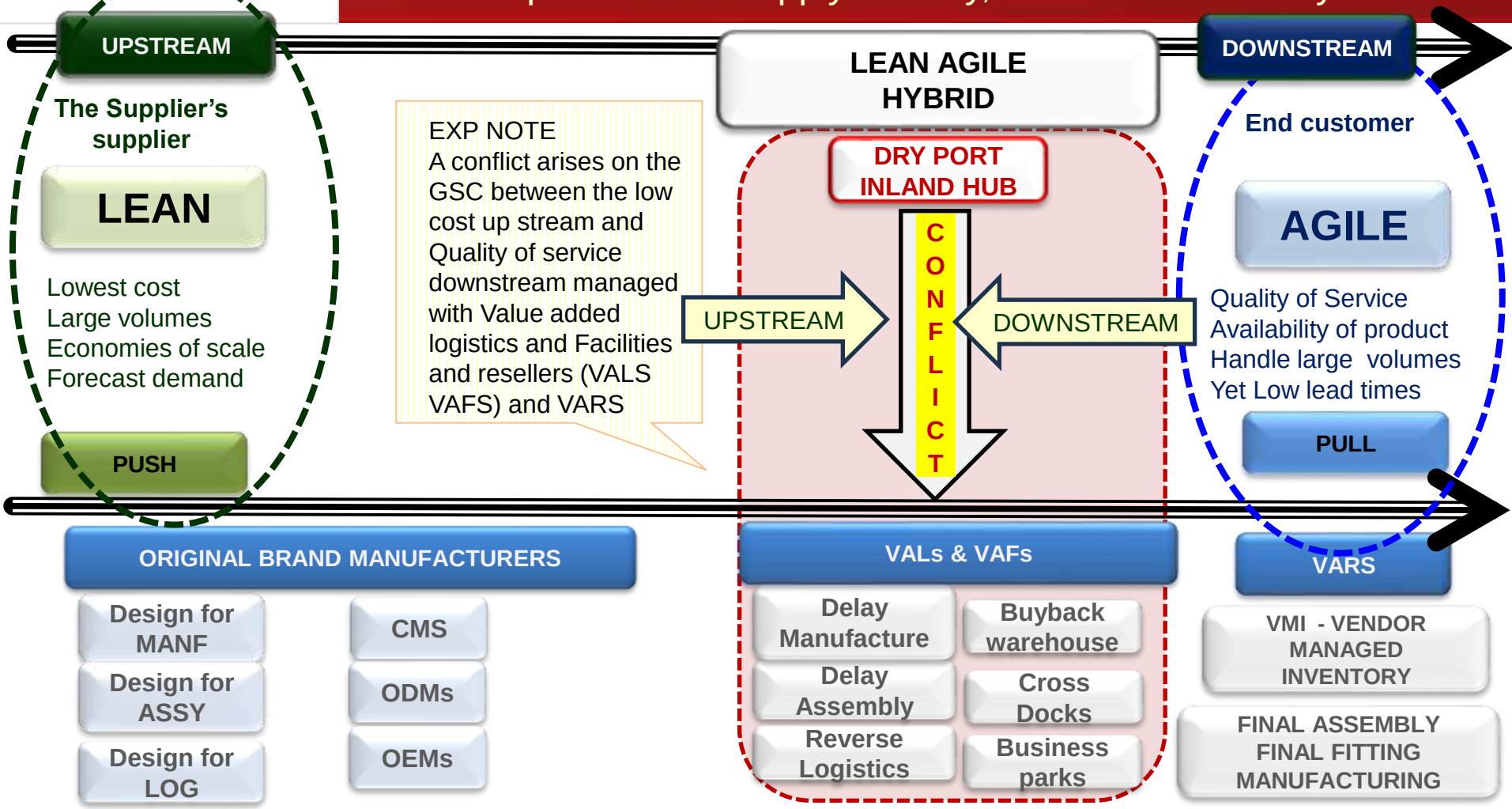
EXPLANATORY NOTE

Global Supply Chains balance out PUSH (large volumes) for scale economies versus PULL (low volumes high QoS. With the GSC innovations Retailers can offer high fulfilment and QoS without holding high inventory. To do this they obtain PULL by offering a large variety of products that are manufactured to order upstream in Greater Asia. The Scale Economies are obtained through transportation and flexible (delay) manufacturing.

Products are designed for transportation in flat packs to fit exactly into a 40 ft. container WITH MINIMAL EMPTY SPACES. Delay Manufacturing, delay fulfilment, last state assembly (Allen key) approach. Delay manufacturing allows pre-prepared raw products to be manufactured on demand near the customer to reduce uncertainty and wastage. Design for Logistics use designs for volume savings in transportation. Square/rectangular containers allow FOR NO AIR GAPS or broken stowage (unlike cylindrical bottles, or tins etc). . Square watermelons in Japan create enormous savings in transportation and refrigerated storage. Even the shelves on IKEA are designed for product sizes that provide for the best transportation and storage economies.

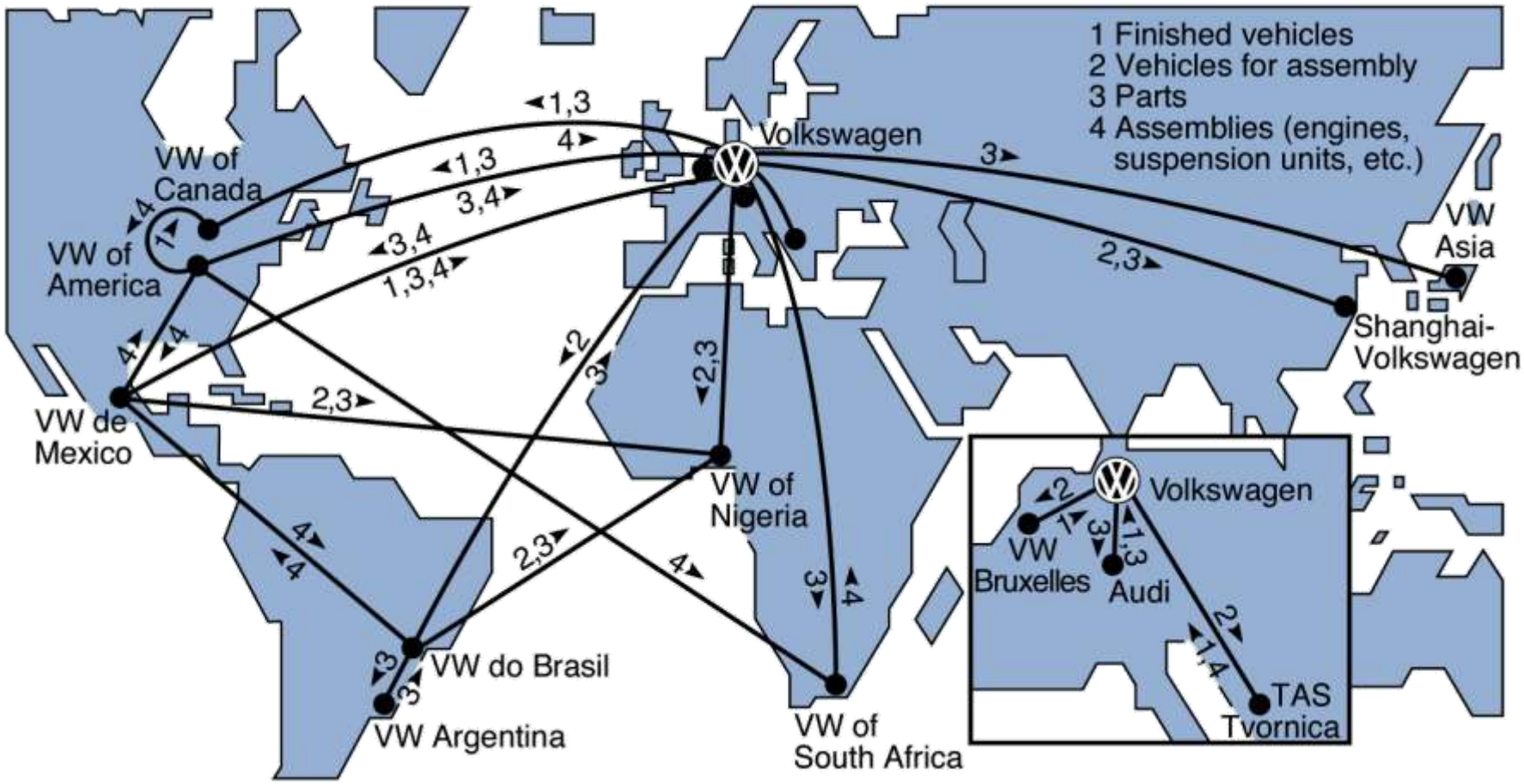
Lean Agile Hybrid Global Supply Chains (GSCs)

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

The VW production and distribution network representing Globalisation at work 2005 to 2015



A network of VW as the OBM, CM's, ODM's, OEM's 3PLs and 4PLS etc

Matching supply with demand
Manage Push Versus Pull - Manage Lean versus Agile

Requires forecasting
Aggregation of stock
Make to stock
High inventory with high cost and wastage

Based on Actual demand
Pull system just in time
Make to order
Minimum inventory
Customers forced to wait
Loss of customer to an agile supplier

PUSH

How much should we produce

Conflict

PULL

How much is the actual demand

Drucker's 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

The Key is to manage Lead Time
Time connects the parts
Use resource Innovation to reduce time to fulfilment

Push or Pull or both on the supply chain

What happens with a push strategy on the GSC

- ✓ Forecast demand creates certainty
- ✓ Focus is on Planning
- ✓ Manf in advance for stock – High inventory
- ✓ Economies of scale
- ✓ Cost is minimised with volume
- ✓ Economies in transportation
- ✓ High Inventory no stock out

What happens with a pull strategy on the GSC

- ✓ Maximise service level
- ✓ Work against Actual orders –No wastage
- ✓ Focus on Fulfilment
- ✓ Manf on receiving an order
- ✓ High individual cost
- ✓ High transport
- ✓ Zero Inventory

CUSTOMERS DO NOT WAIT
BUT THERE IS WASTAGE
UNSOLD INVENTORY
YOU MIGHT STILL RUN OUT

Can we do both?

CUSTOMERS HAVE TO WAIT
LOW CUSTOMER FULFILLMENT
LOSS OF CUSTOMER

Can the different parts of the supply chain have different strategies
Can we Push upstream and Pull downstream

Mapping the supply chain

Every operation must be able
to access resources when needed

- Material
- Labour
- Transportation

Understand the desirability (CS) VS feasibility (ERU) trade off

- CS vs ERU
- Lean vs agile
- Push vs Pull

Make a capacity trade off or manipulate demand

Must have or at least must contribute
To the firms competitive advantage

TIME CONNECTS THE PARTS

The question you must also ask is what is the clock speed of the industry ?

Product Innovation Speed (or technology clock speed)
The speed at which technology or products change in an industry in a way that fundamentally changes how businesses compete

Functional products (low clock speed)

Each has a different supply chain

Innovatory products (High clock speeds)

Dry goods groceries

Car tyres

Fashion

Consumer electronics

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

Lean supply chain

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

Quick response supply chain

Mapping the supply chain strategy is about accessorising your wardrobe

Accessorise between

OPERATION STRATEGY

- Lean
- Agile
- Lean and Agile
- CS or ERU
- Push
- Pull
- Push and Pull
- Capacity trade-off
- Demand Manipulation
- Delay Manufacturing

SUPPLY CHAIN LEAN AGILE TECHNIQUES

VMI
RRL
CRL
GLOBAL OPTIMISATION
CENTRALISED WAREHOUSE
BREAK BULK WAREHOUSE
CONSOLIDATION WAREHOUSE

RISK POOLING
- **Two warehouses**
- **Multiple warehouses**
- **Optimum warehouses**

STANDARDISATION
MODULARITY

INFORMATION SHARING
CO-OPETITION
ELECTRONIC DATA DELIVERY
SATELLITE UPLINKING
RFID TRACKING

1PL, 2PL, 3PL, 4PL LOGISTICS

RULES ON EACH LEG OF THE GSC

1. Decide the operations strategy
2. Decide the Lean Agile technique to be used
3. Innovate to manage the conflict between lean and agile

SIX examples of the 'Lean Agile Global Optimisation GSC'

Adapted by Allan Rodrigues from by Simchi-Levi 2022 & Cachon 2023 et al.

The Supply Chain TimeLine

Suppliers
Upstream
Want high Volume
to reduce
Manuf costs

PUSH STRATEGY

PULL STRATEGY

Retailers
Downstream
Want low inventory
To reduce unsold
stock

There is low uncertainty in sourcing bulk material
The focus is on cost and resource utilisation
Demand aggregation is at the component level

Push-Pull
Boundary

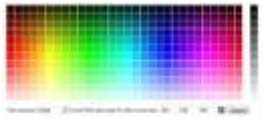
High uncertainty with demand
The focus is on high service level (QoS)
Flexible response to ramp up fulfillment

The Examples used to demonstrate LEAN AGILE GLOBAL OPTIMISATION are a conglomeration of several companies over a number of Industries

Case 1
Delay process

BENNETON

Case 2
Paint industry
Delay Manufacturing
Design for Logistics



Case 3
Cross docking

Case 4
Furniture Industry
Push Pull
Hybrid

Simchi –Levi (2022)
Swimsuit model

Case 5 and 6
Delay Manufacturing
Global Optimisation

O'NEILL Model
by Cachon &
Terwiesch (2023)

Case 7
Supply Chain
Value Chain
De-aggregation
Kiwifruit

CASE 1 Benetton was the first to introduce a delay process to manage uncertainty and reduce wastage

OLD PROCESS

- Spin or Purchase Yarn
- **Dye Yarn**
- Finish Yarn
- Manufacture Garment Parts
- Join Parts

The dye step & finish stage is postponed

Adapted from the original by Simchi-Levi 2012

NEW PROCESS

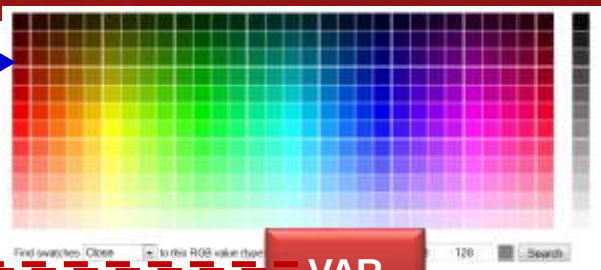
- Spin or Purchase Yarn
- Manufacture Garment Parts
- Join Parts
- **Dye Garment**
- **Finish Garment**

Later far more sophisticated versions began to emerge incorporating a number of innovations on the GSCs to make them both Lean and Agile

CASE 2 Delay manufacturing - Delay fulfilment
Example: A combined descriptor of the Paint industry

Resene
the paint the professionals use

OBM



VAR

CM

100 -200 LITRE DRUMS

Distributor Australia Pacific

1- 50 LITRE DRUMS

Wholesaler NZ

1- 10 LITRE DRUMS

Retailer NZ

128 PRIMARY & 1600 SECONDARY SHADES

PUSH PULL Boundary

CUSTOMER

PUSH UPSTREAM VOLUME ECONOMIES IN TRANSPORTATION BASIC COLOURS

>>>LEAN UPSTREAM AGILE DOWNSTREAM>>

PULL DOWNSTREAM PROVIDES LARGE CHOICE TO CUSTOMER DELAY FINAL MANF

CASE 2 Delay manufacturing - Delay fulfilment
Example: A combined descriptor of the Paint industry

OBM outsources to CM in China who Manufactures the 3 X basic colours + Neutral PUSH SYSTEM

OBM

OBM designs 1600 colour shades PULL SYSTEM

CM

Weekly service rhythm each week China to Australia (30 X day voyage)

VAR

Distributor Australia Pacific

Wholesaler NZ

Retailer NZ

128 PRIMARY & 1600 SECONDARY SHADES

100 -200 LITRE DRUMS

1- 50 LITRE DRUMS

1- 10 LITRE DRUMS

Drums manufactured in rectangular shape to fit a standard pallet. Rectangular drums have no wasted space unlike round drums PUSH SYSTEM ,

PUSH PULL Boundary

CUSTOMER

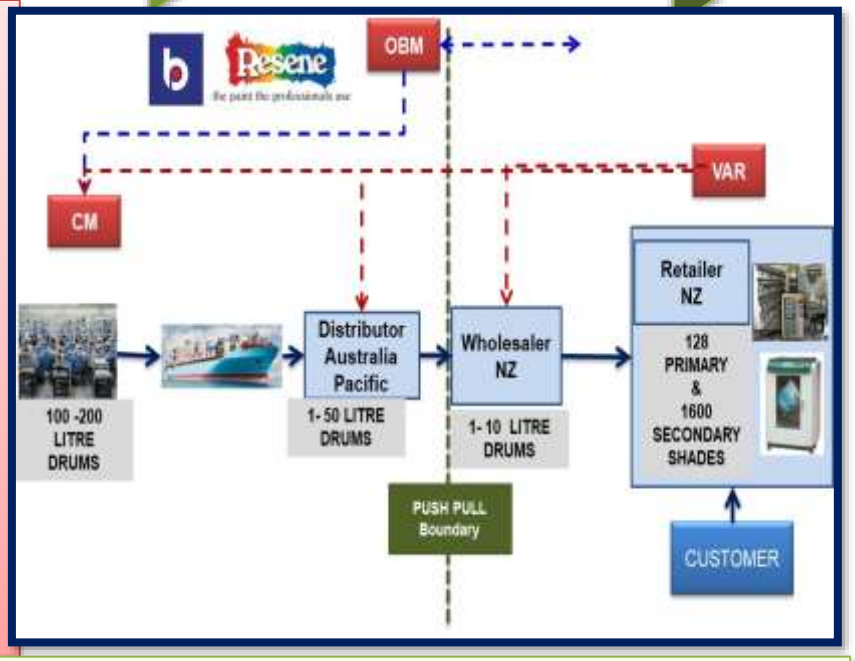
PUSH UPSTREAM VOLUME ECONOMIES IN TRANSPORTATION BASIC COLOURS

PULL DOWNSTREAM PROVIDES LARGE CHOICE TO CUSTOMER DELAY FINAL MANF

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 manuf 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.

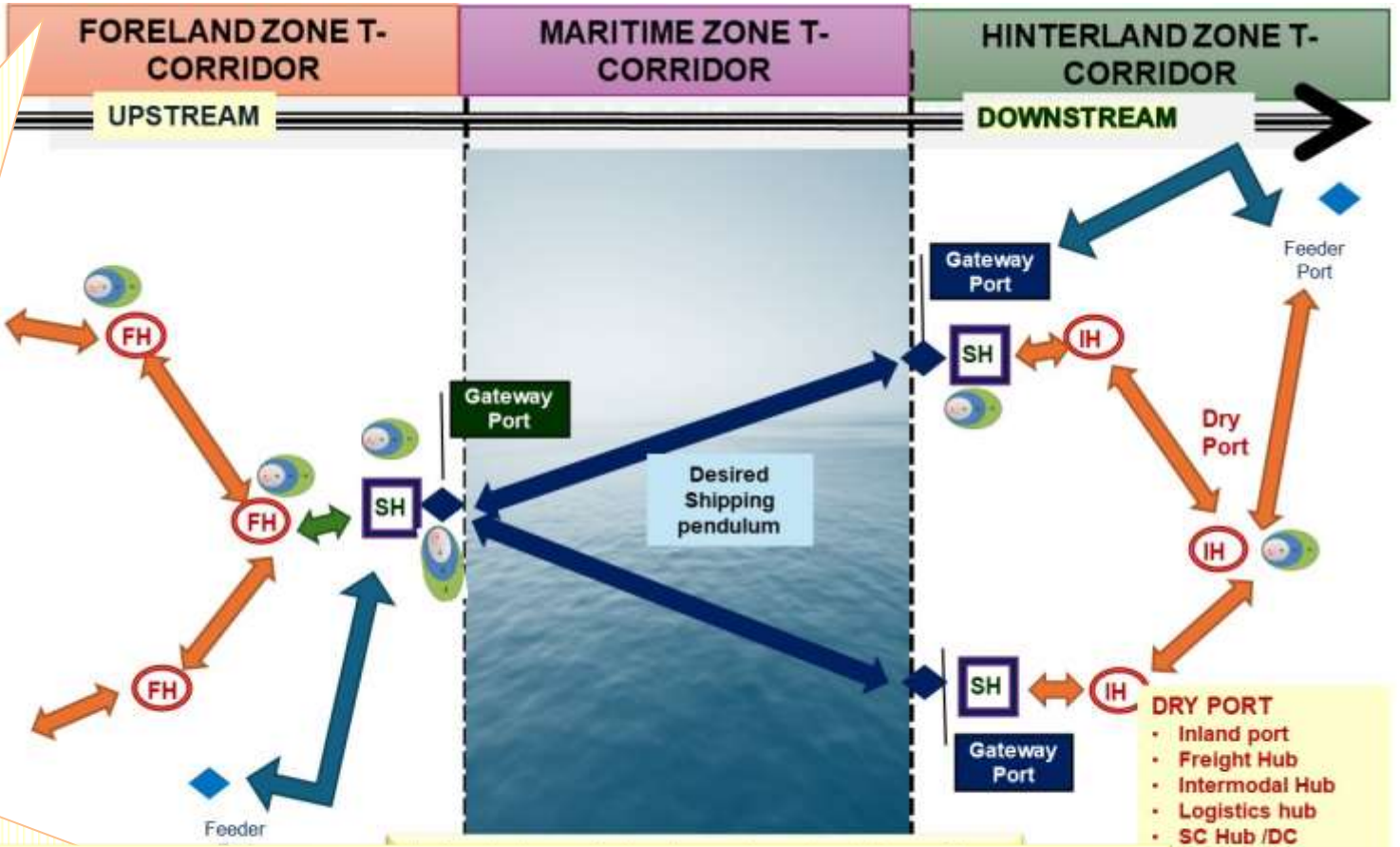


- The DELAY MANF process begins only when the customer enters the store and asks for a selection of the 1600 choices available. The retailer looks up the 'recipe' and mixes the paint. Depending on the quantity, the retailer manufactures the paint shade by mixing the paint in a mixer, on completion it 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.

The GSCs travel on the global transportation corridors from birth of a product to its final delivery, disposal/destruction

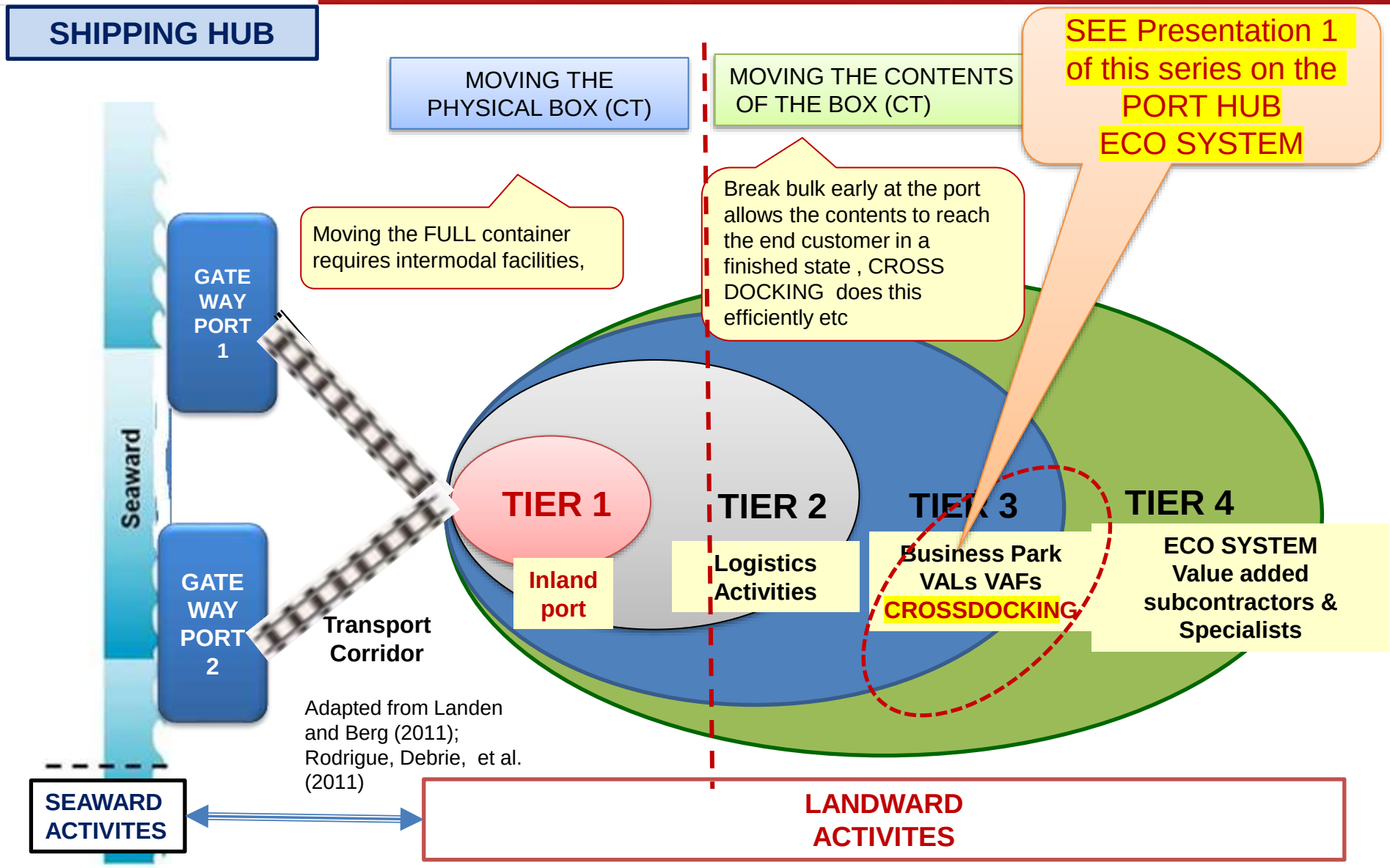
EXPLAN NOTE
The **Foreland** lies upstream away from us. In an import GSC it is where the product is born. It must be low cost, and lean. The eco-systems of the Freight Hubs (FH, Shipping Hubs (SH), Feeder Ports , Dry ports must be aligned to low cost

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



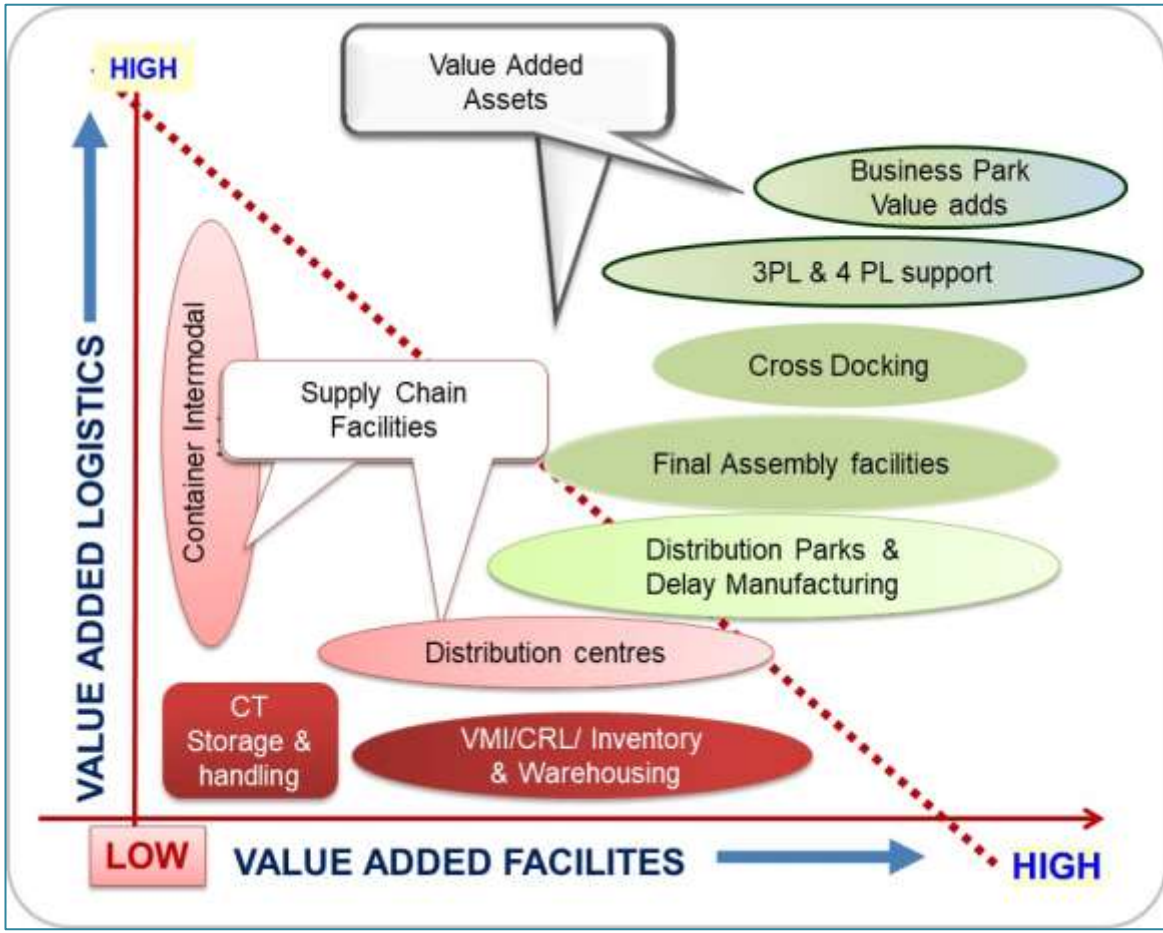
For each hub to be commercially viable it must build an eco-system of Value-Added Facilities (VAFs) that will attract the Value- Added Logistics providers (VALs) with their subcontractors to co-locate
This is the 'Eco System' for any kind of hub

CASE 3: Crossdocking on the transportation corridors
The Foreland Maritime Hinterland Hub connections



Concept of the Port Eco System (PES) and its alignment with the ‘optimisation construct' and rhythm of ‘Global’ and ‘Local ‘ Supply Chain connectivity end to end.

VAFS & VALS
At each hub
On the transport corridors



- **PES = PORT ECO SYSTEM**
- **VMI = Vendor Managed Inventory**
- **CRL = Continuous Replacement Logistics**
- **3PL = Third party logistics**
- **4 PL fourth Party Logistics**

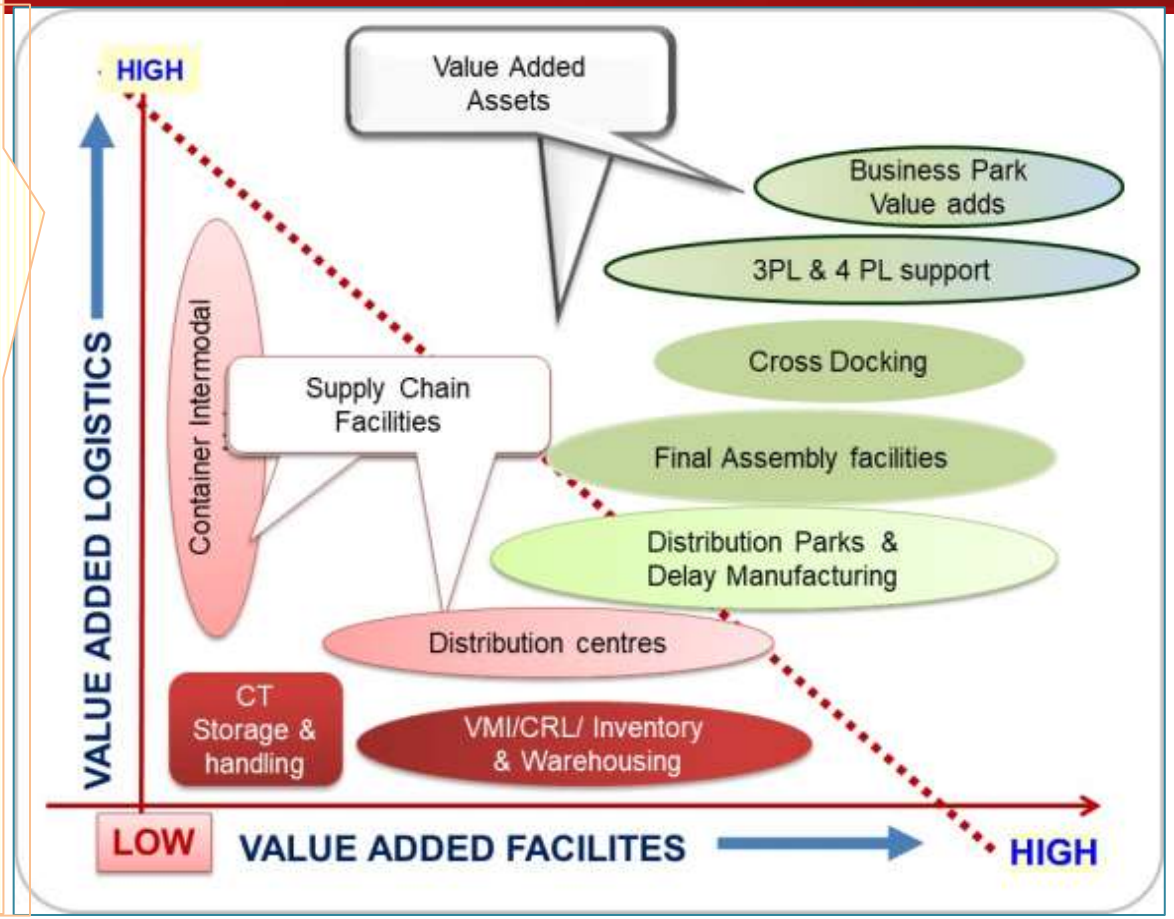
Concept of the Port Hub Eco System (PHES)
Focus on supply velocity, rhythm and cadence

EXPLANATORY NOTE (SEE PRESENTATION 1 FOR DETAILS

A typical PORT HUB ECO SYSTEM (PHES)

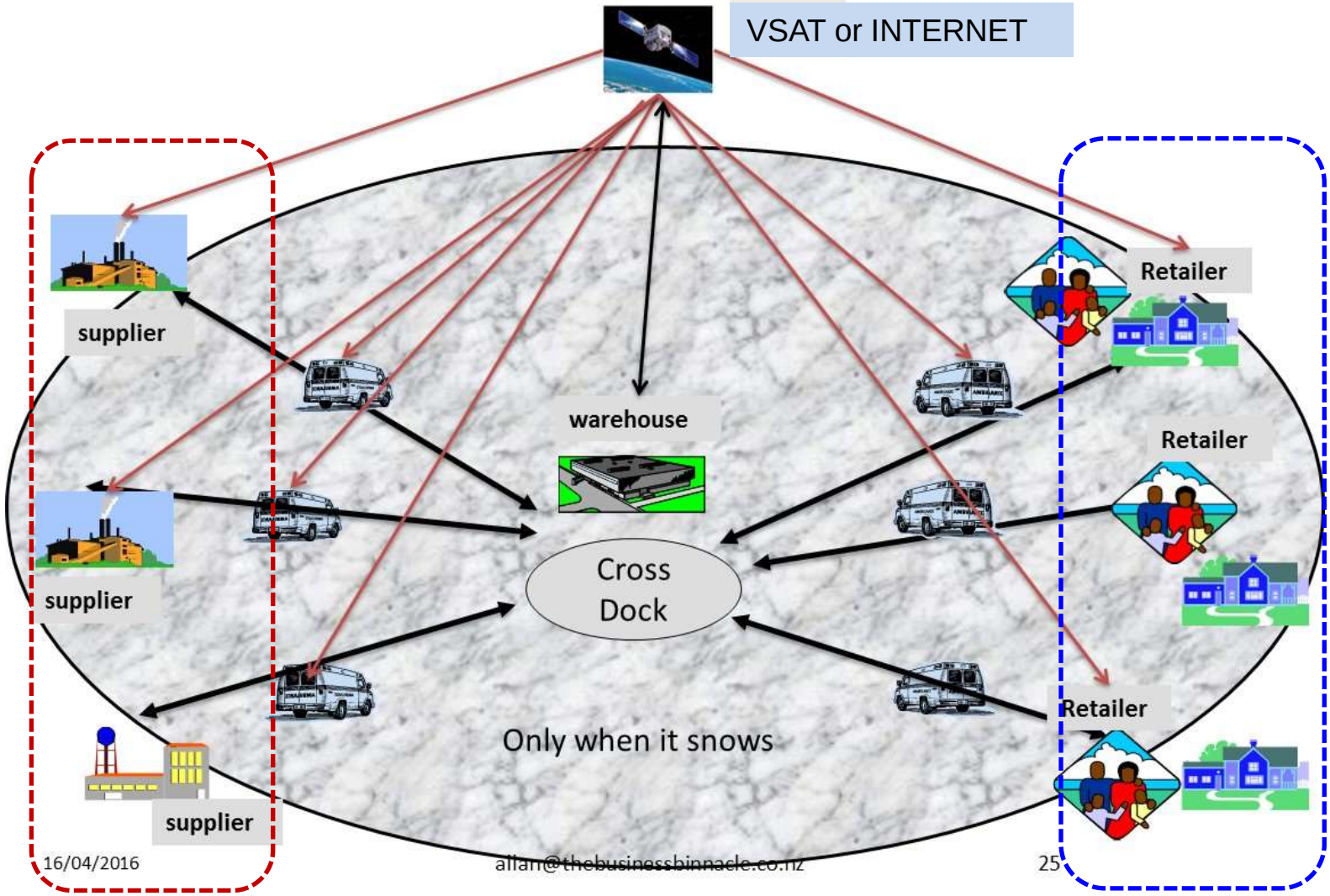
The mistake is to design systems that add value only to the shippers in the hinterland. Instead**, the PES MUST ADD VALUE TO THE RHYTHM, VELOCITY CADENCE OF THE GLOBAL SUPPLY CHAINS END TO END.** Global supply chains build optimisation algorithms that manage delay in manufacturing particularly for high clock speed items.

Each PHES has a combination of Break-bulk value-added logistics for import GSCs that tend to collect around key Value Added facilities. On the reverse export supply chain, they form the aggregation collection point Value Added Logistics. Delay Manufacturing driven by Information dense Algorithms cater to demand uncertainties.



THE HUB ECO SYSTEM THAT IS COMMERCIALLY ATTRACTIVE TO A GSC IS THE ONE WHERE THE PRODUCTION OR DISTRIBUTION SUB-CONTRACTORS CO-LOCATE AROUND THE "HUB".
THE HUB THEN BECOMES A ONE STOP SHOP WITH ALL THE ELEMENTS OF THE DELAY PRODUCTION & CROSS DOCK CONSTRUCTS, IN EASY DRAYAGE DISTANCE FROM THE MAIN GATEWAY PORT

CASE 2 CROSS DOCKING- THE ORIGINAL WALMART MODEL
Aligning the Lean Agile GSC with the Transportation Corridors



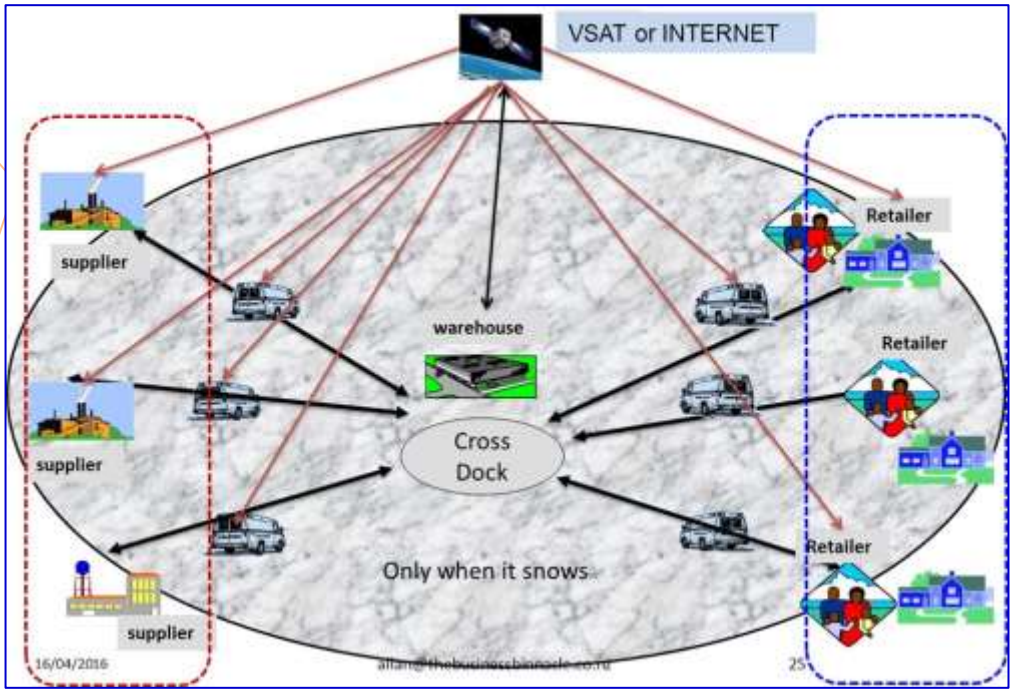
CASE 3 Value Added Logistics - Cross Docking the Wal-Mart model – fixed replenishment cycle 24 hrs

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.

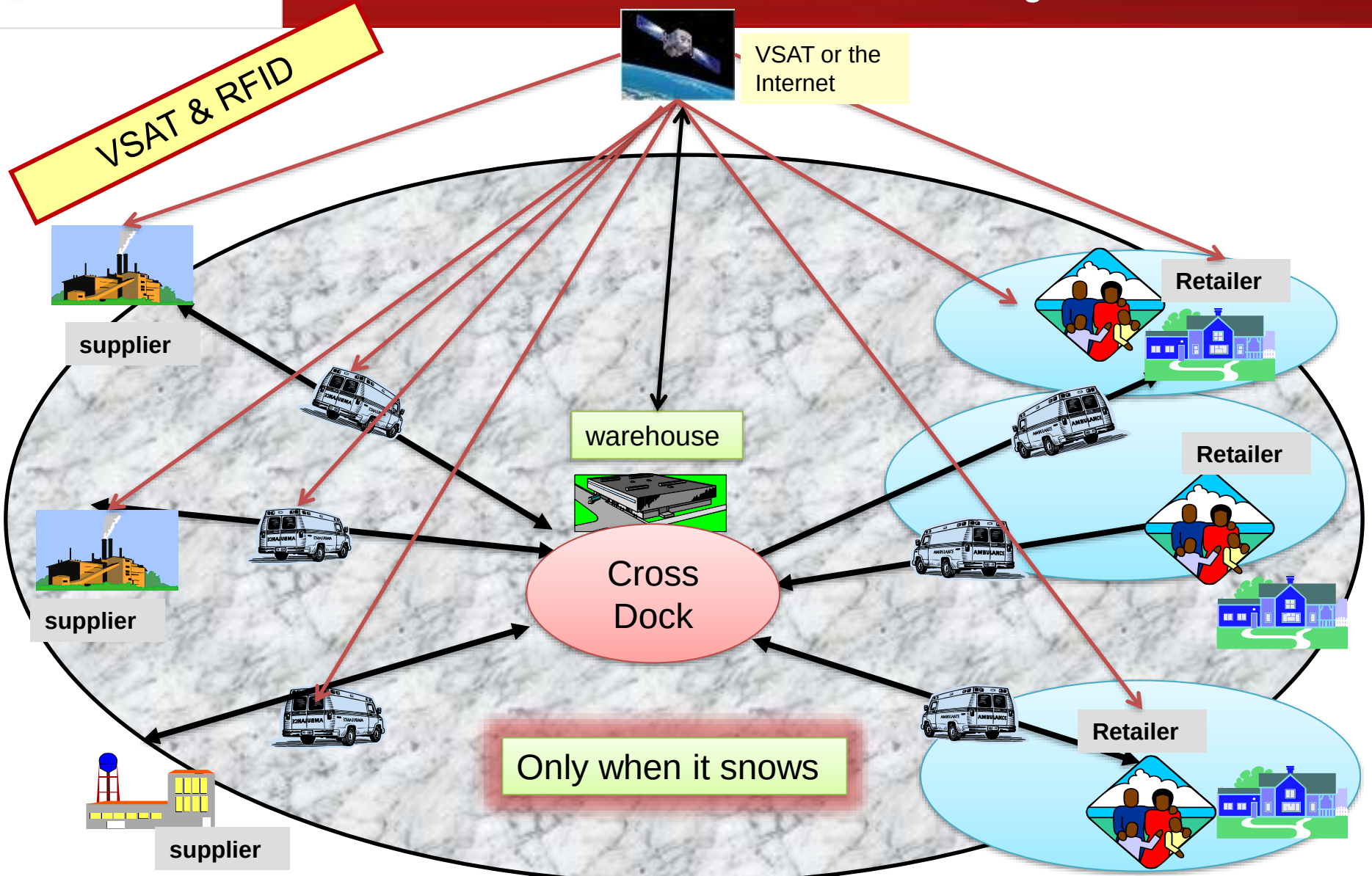
The retail truck has the 24X hr demand from each store. updated continuously. The Supplier sends the 24 X hour demand for each store in the supply truck. All parties are on-line and know the demand in real time. Different suppliers can also operate on the same cycle depending on capacity of the trucks.

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.

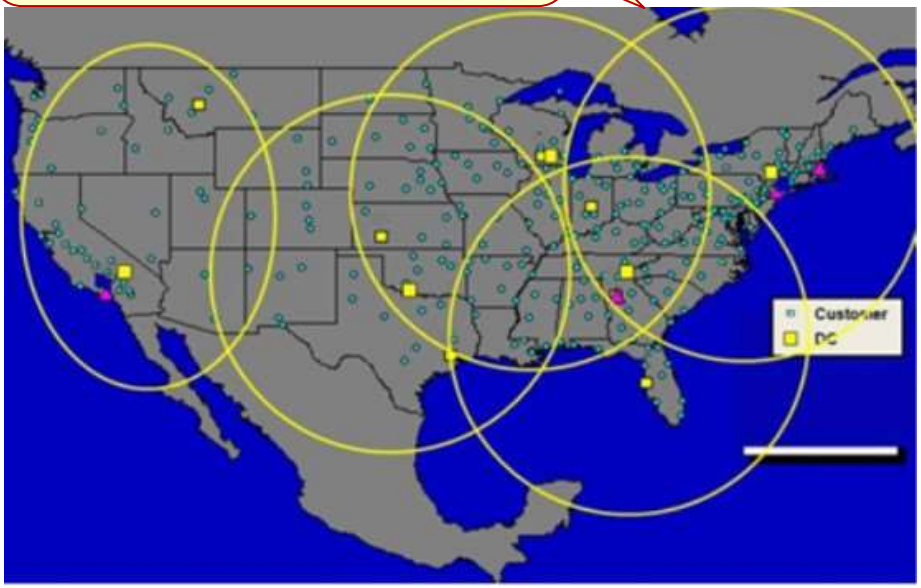
CASE 3 The typical Wal-Mart response to Hurricane Katrina was faster than FEMA on the ground



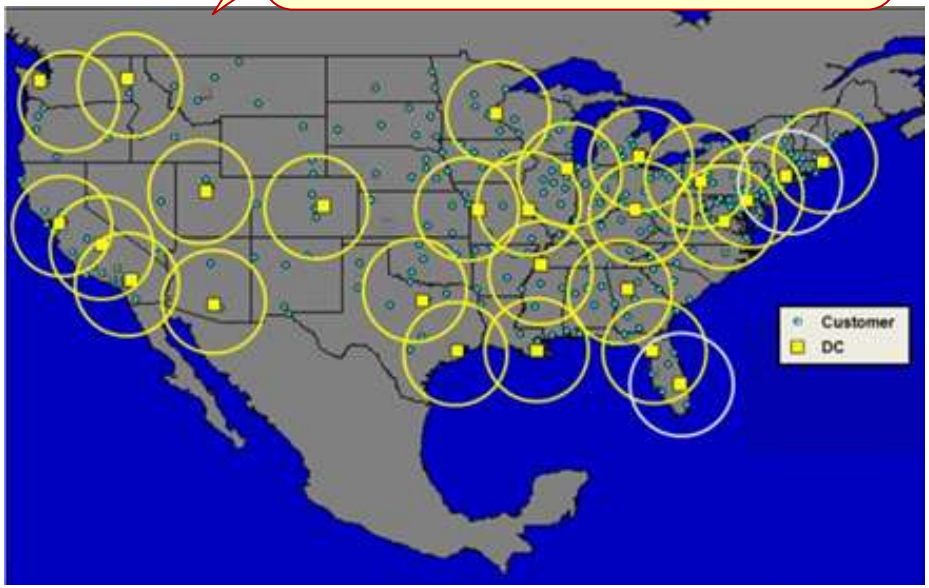
Order response time same day (CS or RU)

Original By Simchi-Levi (2012 : 2022)

Cross Docked interconnected Warehouses
Response time 3 days



Cross Docked interconnected Warehouses
Response time SAME DAY



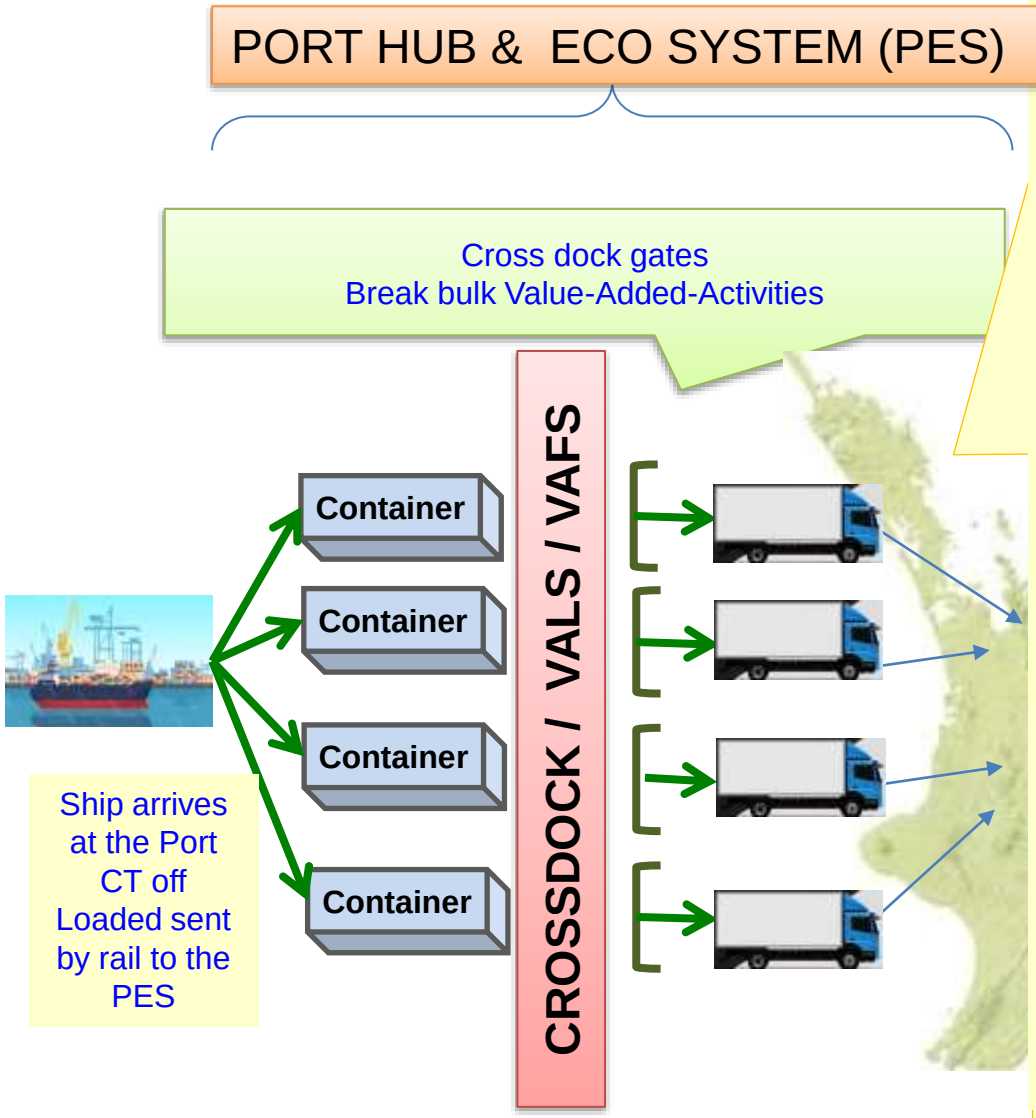
CUSTOMER

DC DISTRIB CENTRE

TIME CONNECTS THE PARTS

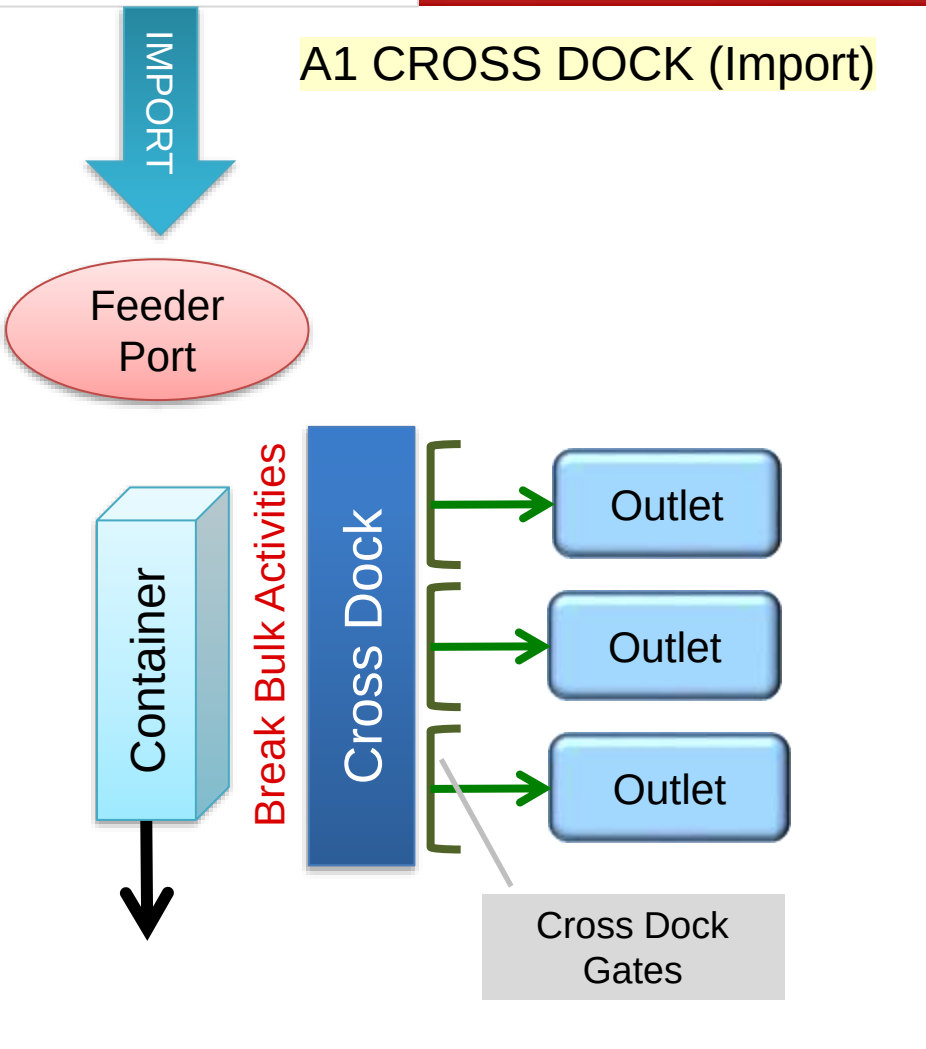
The shorter the time to fulfilment the lesser the uncertainty; Same day service requires the retailer to hold stock for ONE DAY knowing that replenishment is one day away, without any increase in cost.
THIS IS THE ESSENCE OF AGILITY

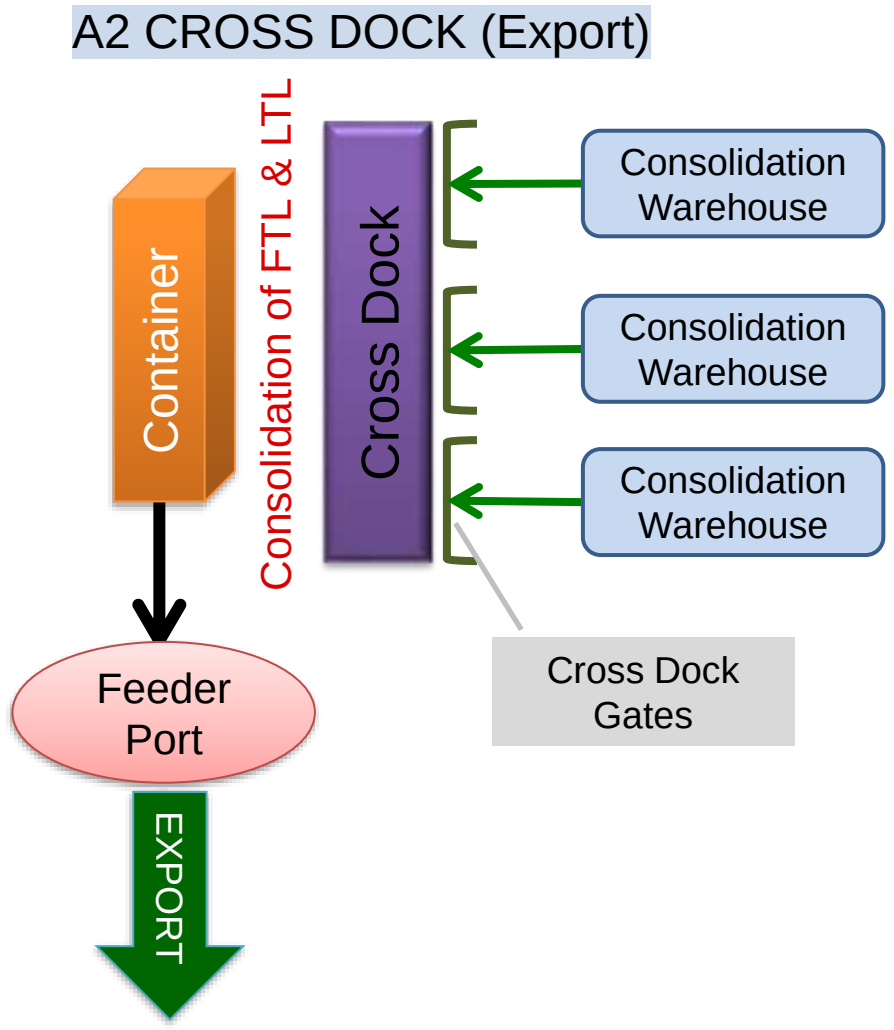
CASE 3 Rhythm and cadence between CT arrival from Port & distribution trucks at the Crossdock gates in the PES



- 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





An overarching algorithm drives the transportation Rhythm and Cadence

End of section 2A

CONTINUE TO SECTION 2 B

SECTION 2B FOLLOWS