



**Take Back Manufacturing**  
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## **“ LEAN Sustainable Supply.....the Next Industrial Revolution”**

*The next Industrial Revolution will be the perfect storm of:-*

- *LEAN business thinking ..Revisited,*
- *The emergence of Industry 4.0*
- and*
- *Adoption of significantly more Sustainable Supply Chains.*

**Nigel Southway**



**Take Back Manufacturing**  
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**Nigel Southway**

**[www.nigelsouthway.com](http://www.nigelsouthway.com)**



**Sheridan**

**50 years of Manufacturing Experience,**

**Engineer, Manager, Consultant, Business Owner.**

**Change Agent / Educator / Coach / Advisor LEAN business improvement**

**AUTHOR: CYCLE TIME MANAGEMENT...**

**Consult / Direct many organizations on Global Supply Chain Initiatives**

**Past Chair of Society Manufacturing Engineers.**

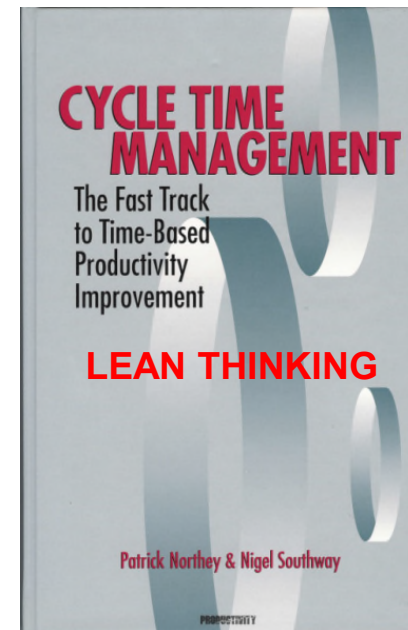
**Advocate for Take Back Manufacturing**

**Global Sustainable Supply Chain Consultant / Educator.**

**Lecturer post-graduate Advanced Manufacturing Management program.**

**Co-founder of Additive Metal Manufacturing Inc**

**Assisting Industry 4.0 technology companies**



# GLOBALIZED



# MANUFACTURING

# Moved Off-shore.....

For low cost labor rates

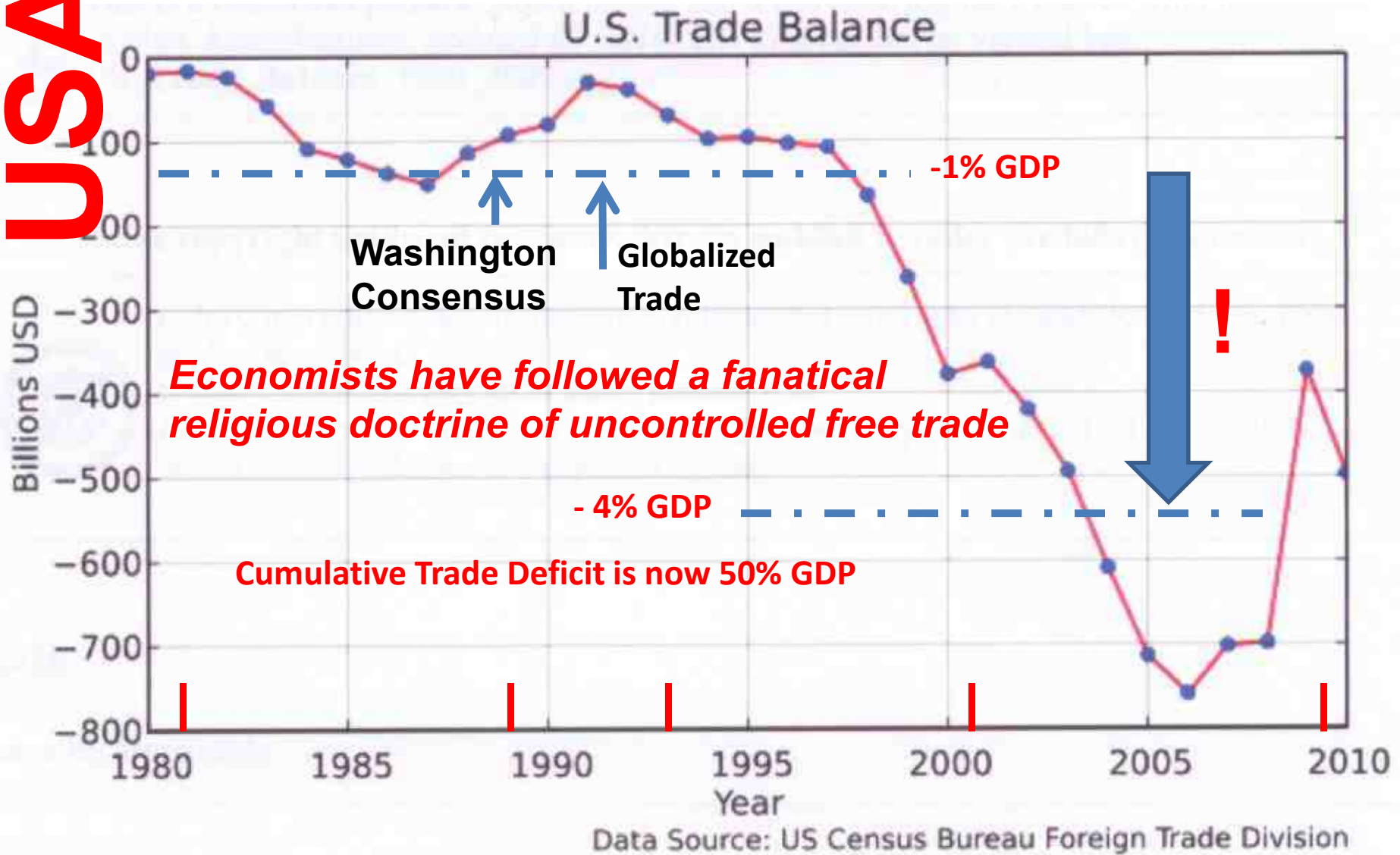


**Un-controlled trade..... “herd behavior”**

***30% + Reduction in Manufacturing Intensity (2000 to 2017)***



USA

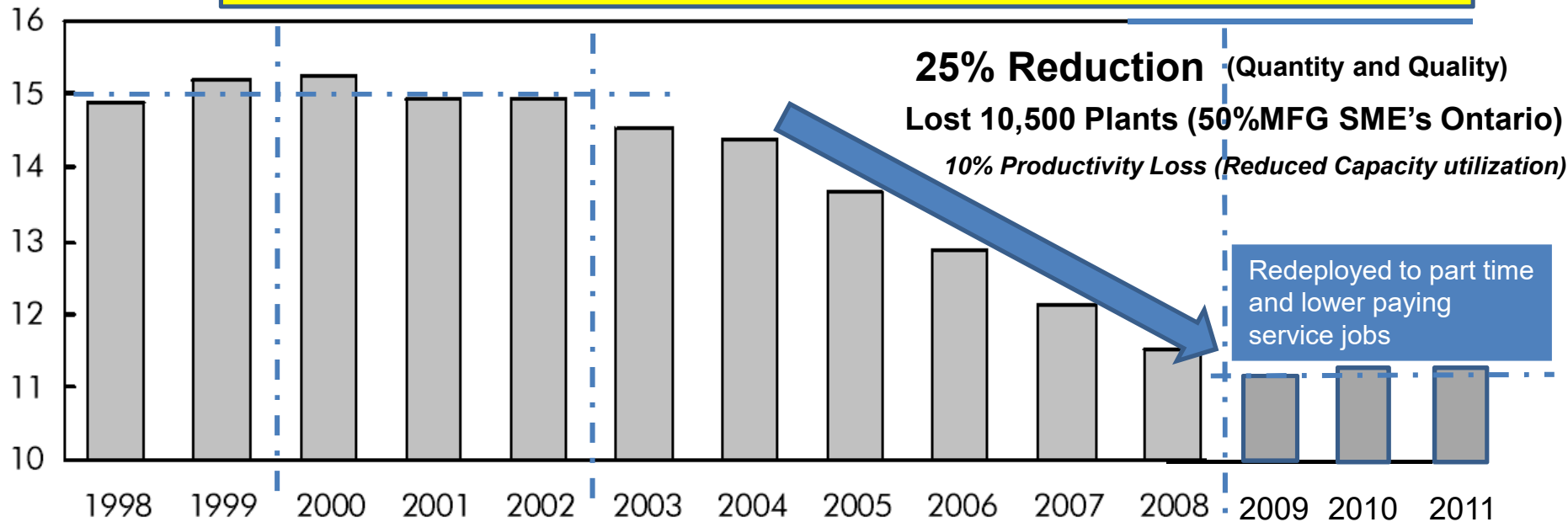


(US GDP 2010=14000B)

## Manufacturing's share of employment has fallen sharply since the turn of the century

Share (%)

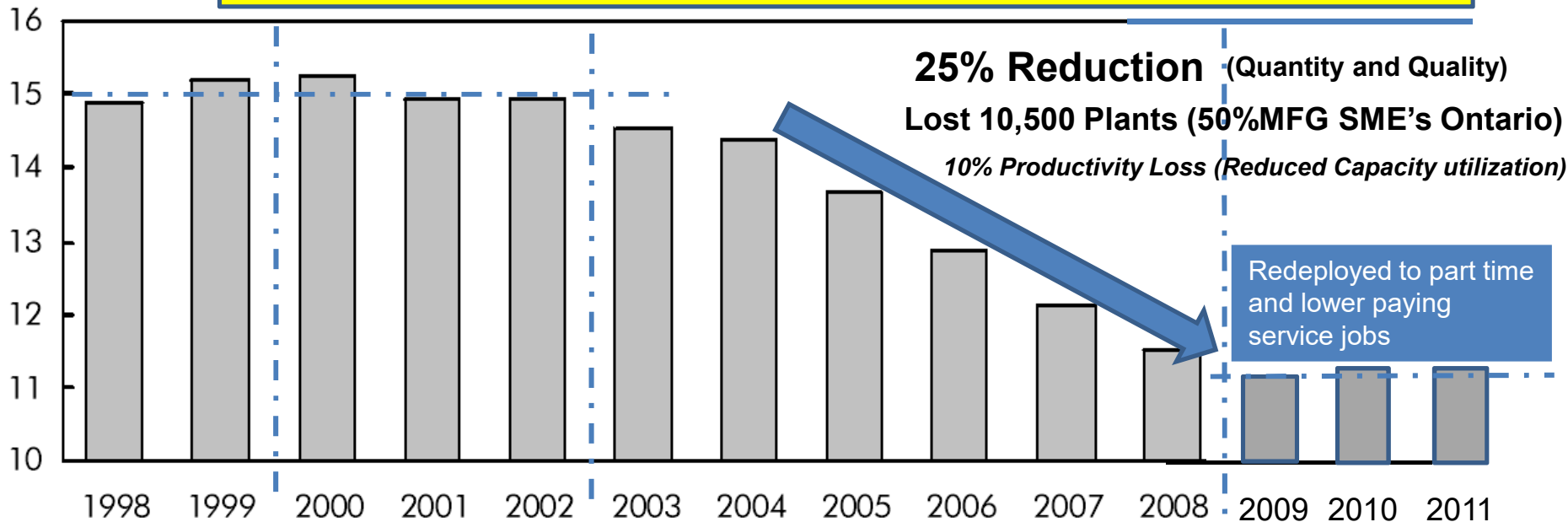
**More than 500,000 jobs lost in 6 year period (300,000 Ontario)**



**Manufacturing's share of employment has fallen sharply since the turn of the century**

Share (%)

**More than 500,000 jobs lost in 6 year period (300,000 Ontario)**



Source: Statistics Canada

**Due to this....**

**We have a skill shortage!!!  
(NOT a labor shortage)**

## Youth Un & Under-Employment

**1,000,000 Young Canadians  
Now un or under employed!!**

**Youth Unemployment Rate 13%  
Youth Participation Rate 51%**

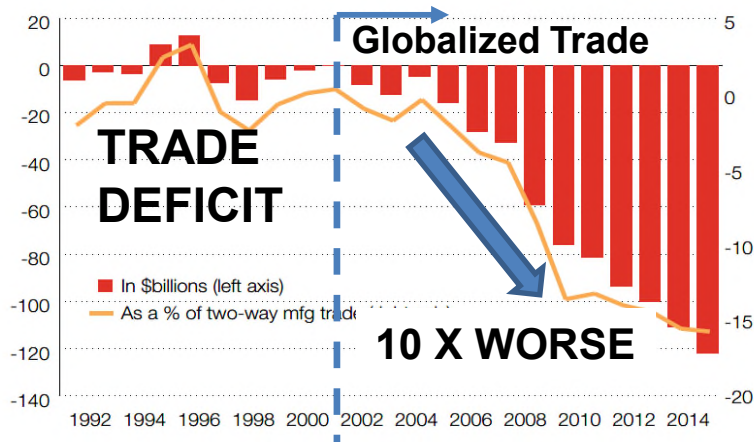


# How are **WE** doing?

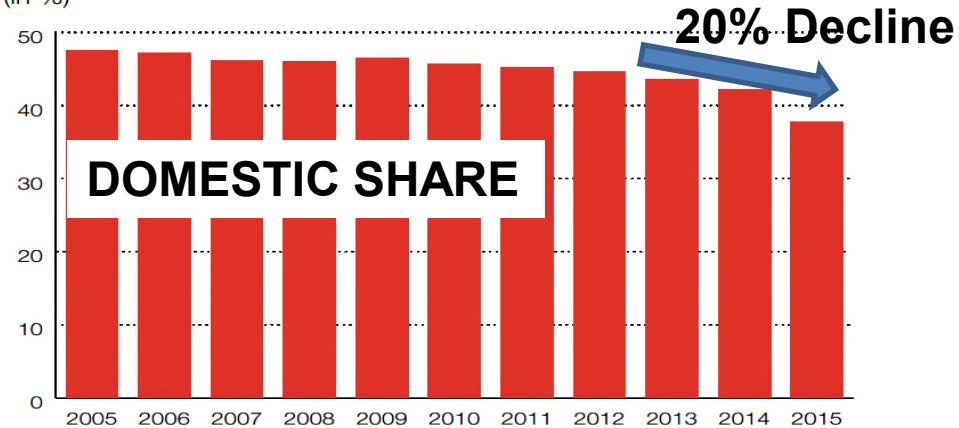
## MANUFACTURING



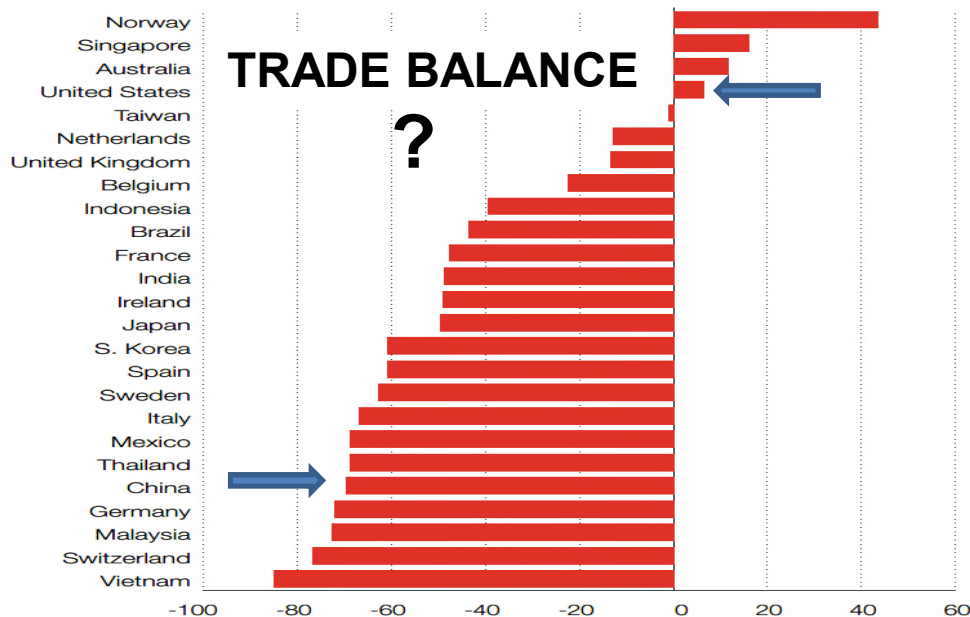
CANADA'S BALLOONING TRADE DEFICIT IN MANUFACTURING



CANADIAN MANUFACTURERS' SHARE OF THE DOMESTIC MARKET (in %)

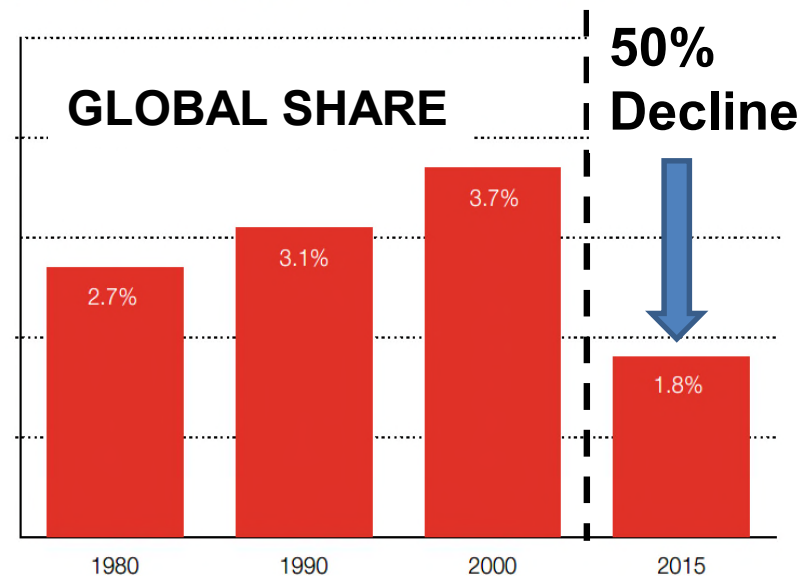


CANADA'S MANUFACTURING TRADE BALANCE BY COUNTRY (as a % of two-way trade in manufacturing)



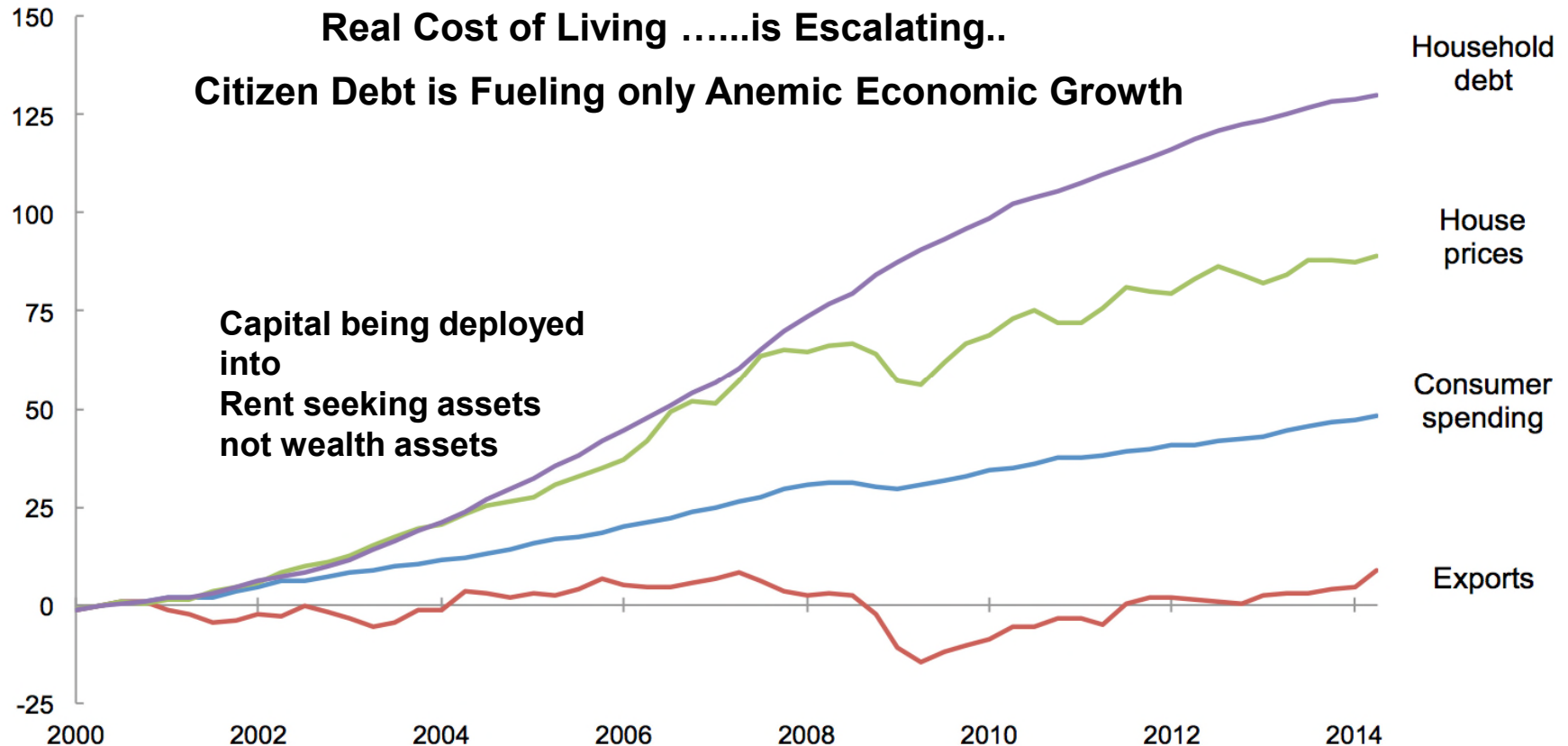
CANADIAN MANUFACTURERS ARE LOSING GLOBAL MARKET SHARE

(Canada's share of global manufacturing exports, in %)



# Canadian Prosperity Measures show significant decline...

Cumulative real growth since 2000, selected Canadian variables, %

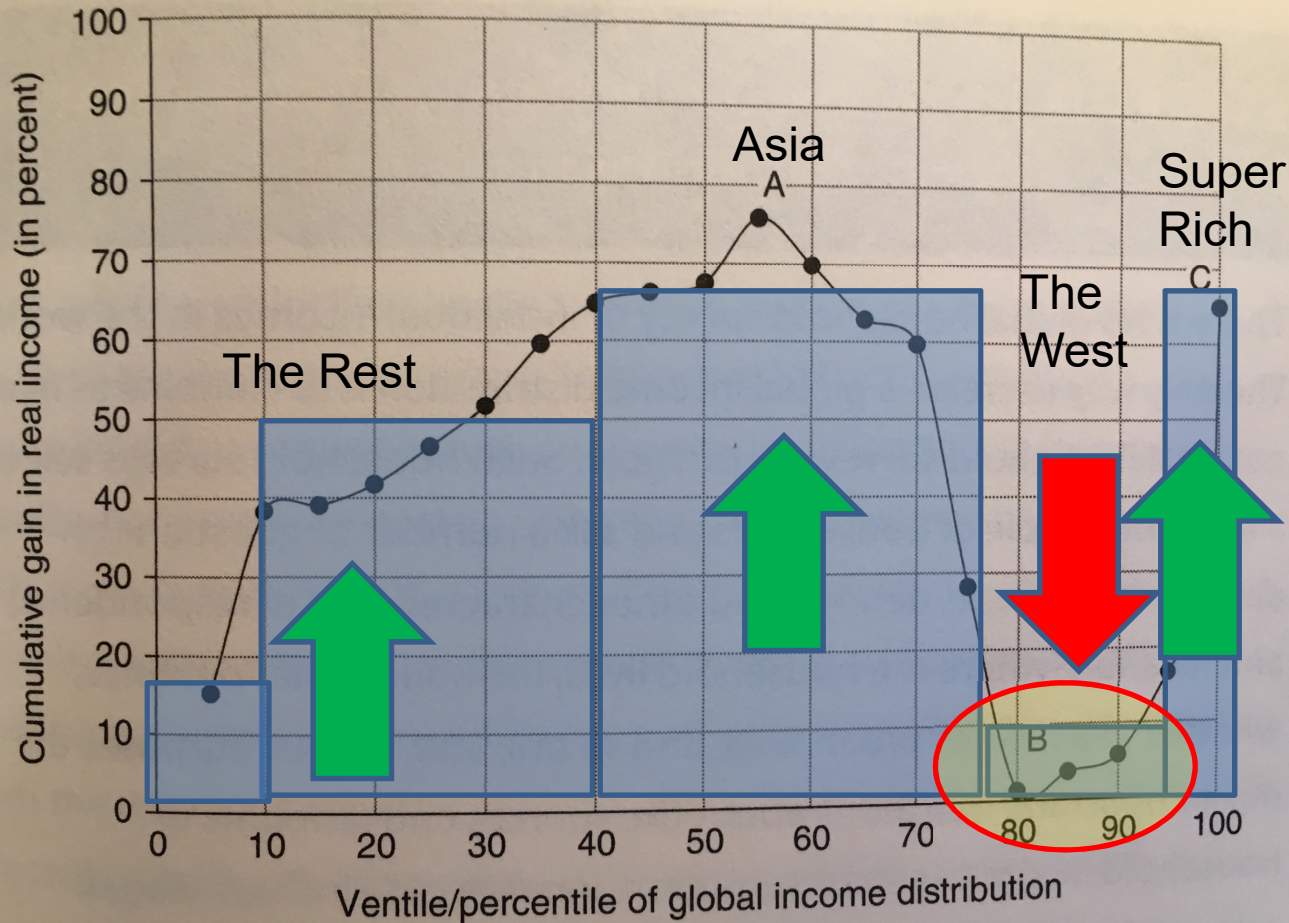


Household debt and house prices deflated by price index for household final consumption expenditure

Sources: FMR Co, Haver Analytics, Statistics Canada, Bank of Canada, Teranet/NB

# The Western Nations are Net Losers..

## Huge Wealth Transfer



# Globalization is NOT working



# Many Factors will change Trade structures

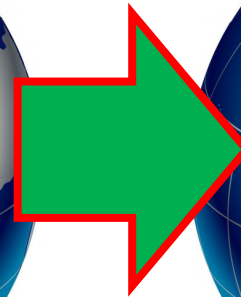
**Currently**



# Many Factors will change Trade structures

## Prediction!!!!

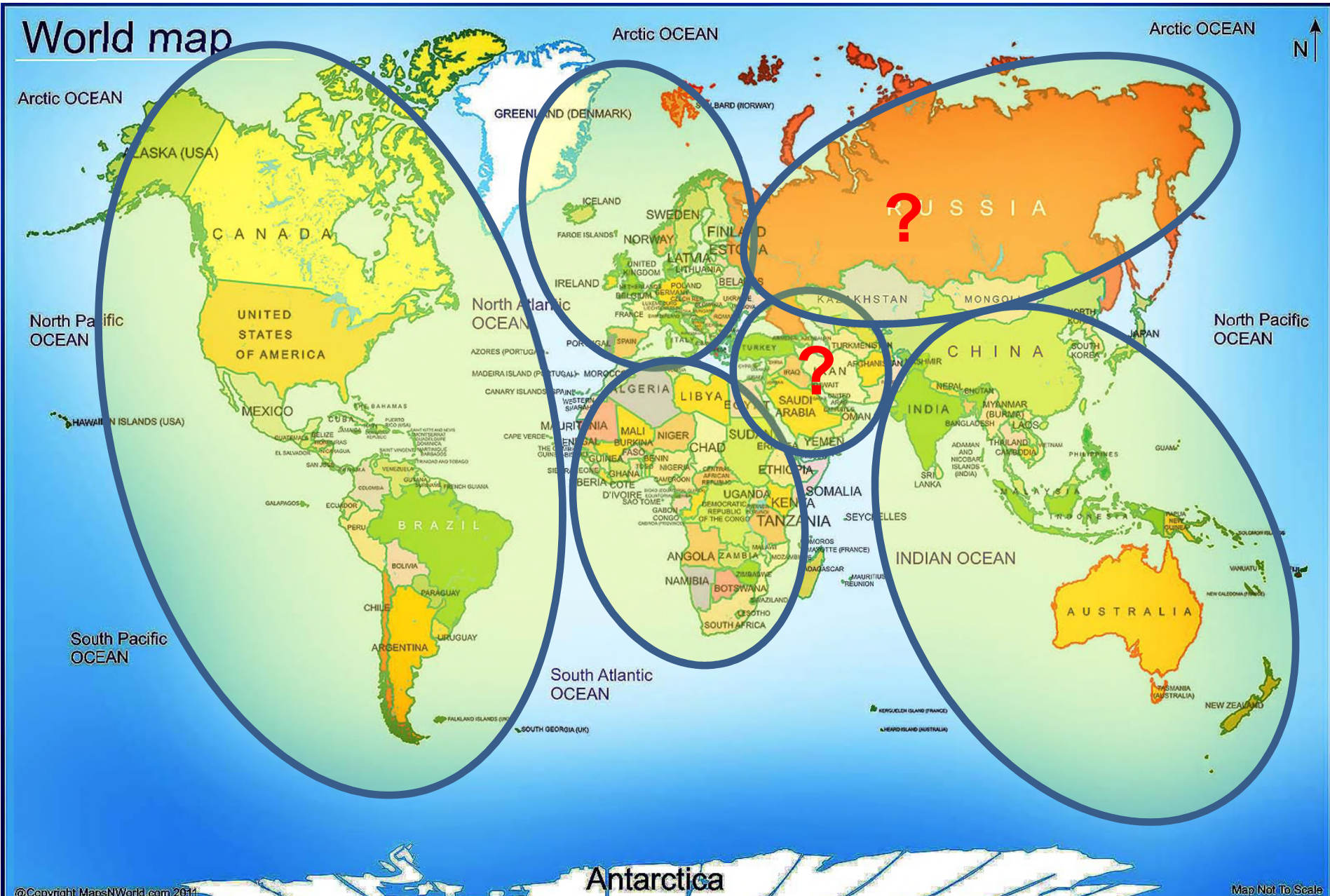
**Currently**



**Future**



# Far Future....Regionalized Trade Blocs



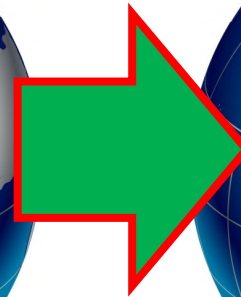
# Many Factors will change Trade structures

## Prediction!!!!

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**Future**



# Many Factors will change Trade structures

## GOVERNMENT INITIATIVES

Political Will / Citizen Pressure

Re-balance sourcing Import/Export

Government budget /Tariff / tax Re-balance



Age of Over Supply ...via over globalization

Globalized Trade Wealth Loss

Ecological Sustainability Issues

Complex Supply Chain Costs

Interest Rate Normalization

Oil / transport price increases

IP protection issues

Close proximity to customer

Ease of doing business

Emerging Economy Price Inflation



## BUSINESS INITIATIVES

LEAN Business practices.. *Revisited*

Disruptive Technology Advantage

Re-evaluate Supply Chain/s (Sustainability)



**Our Inability to Understand  
And Take Action!!!**

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The Globalization Purist!

Liberalized  
Global Trade

Regional  
Trade  
Bloc

Re-shoring!  
Local Re-Capitalization!  
Local Re- Infrastructuring  
Local Re- Training!

Our Inability to Understand  
And Take Action!!!



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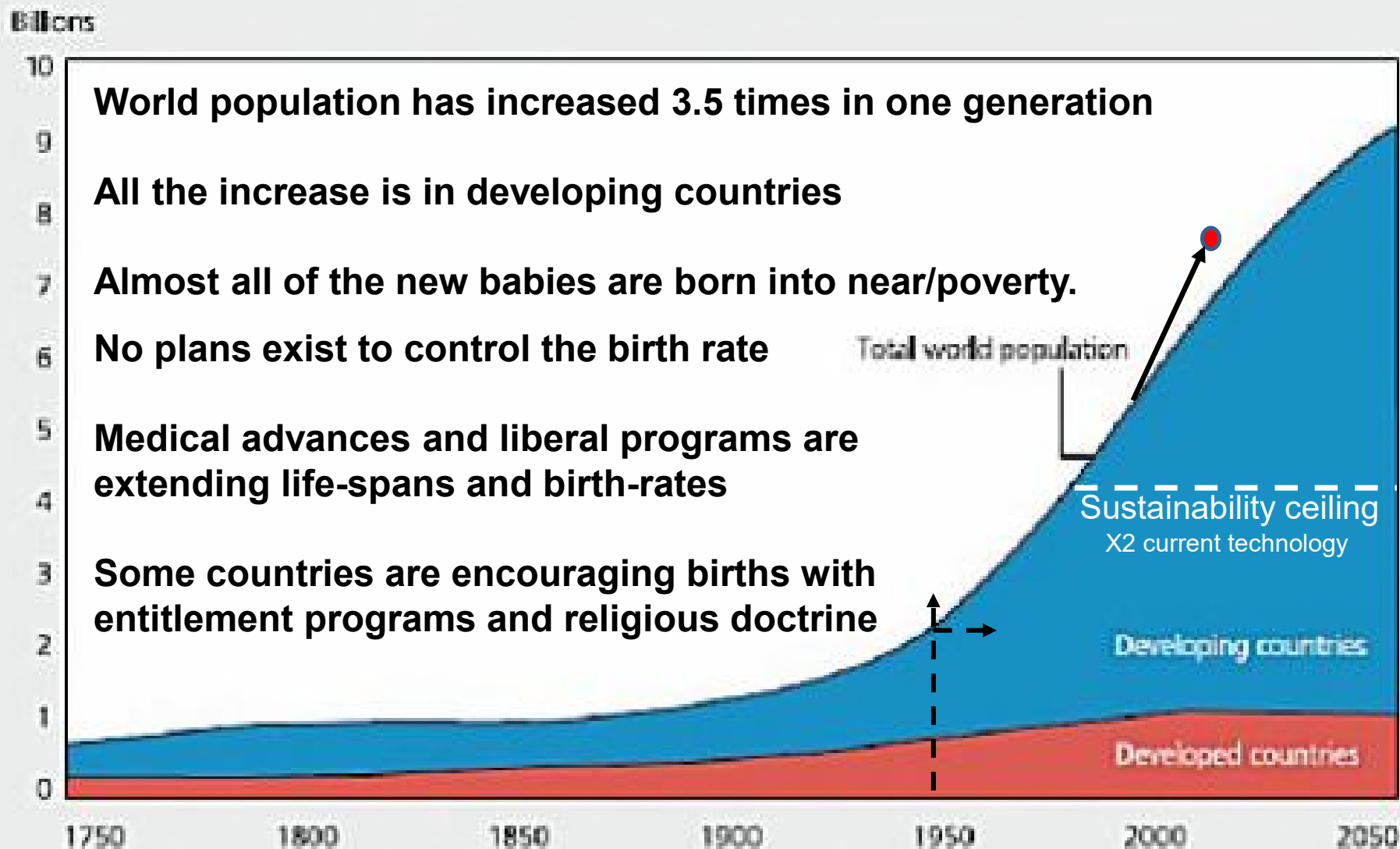
# **Age of Over-Supply**

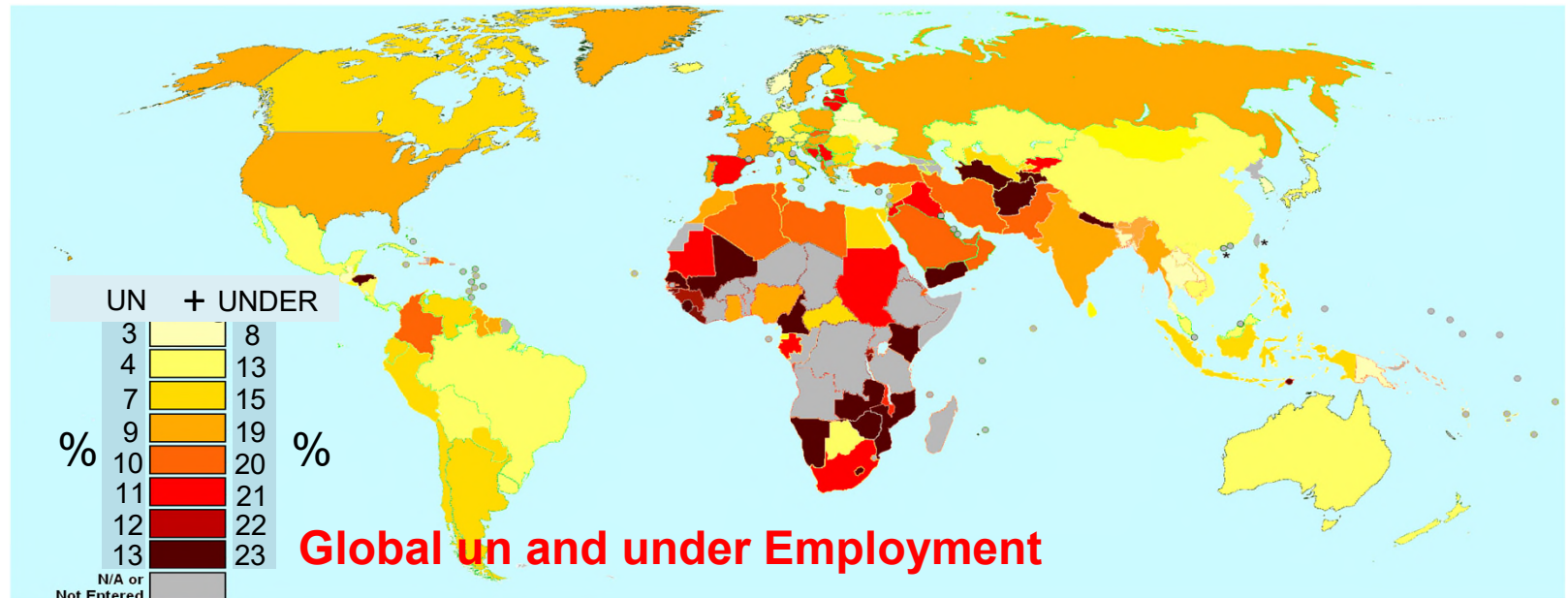
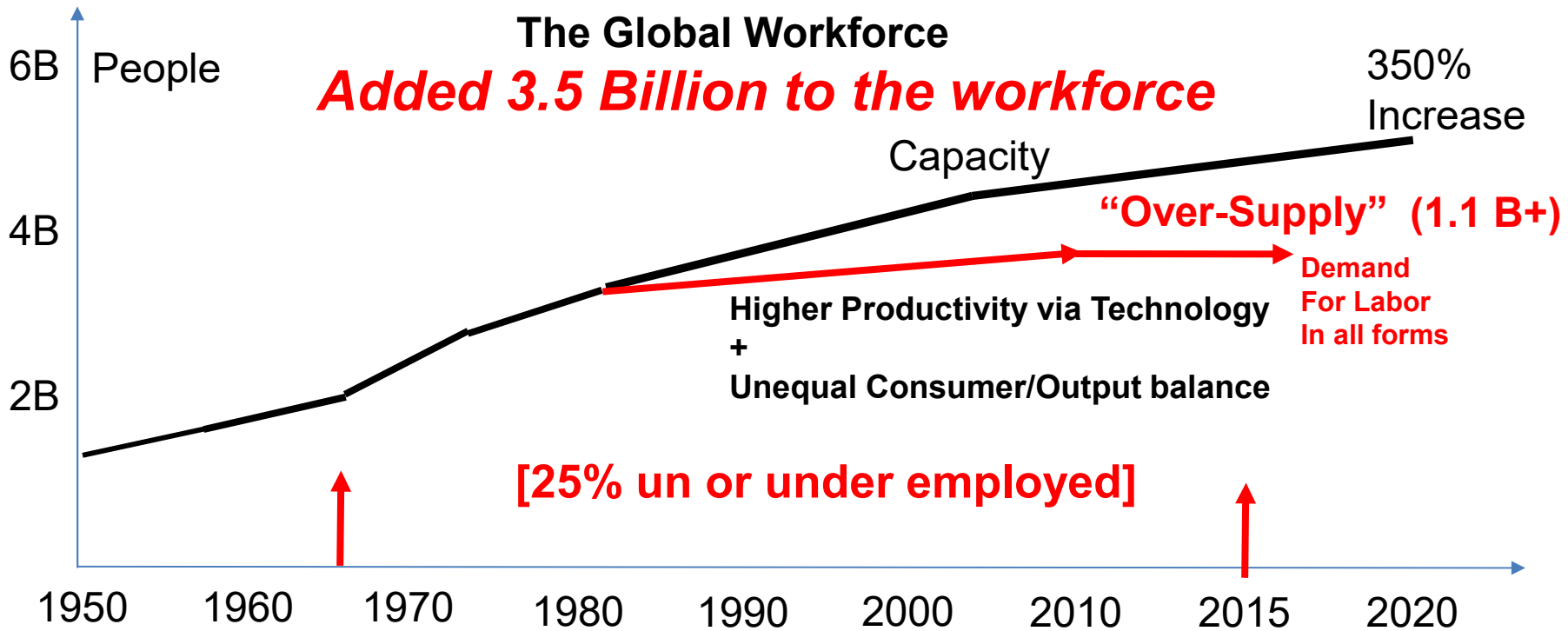
# Over Population



**Figure 3.1**

**World population, 1750–2050**







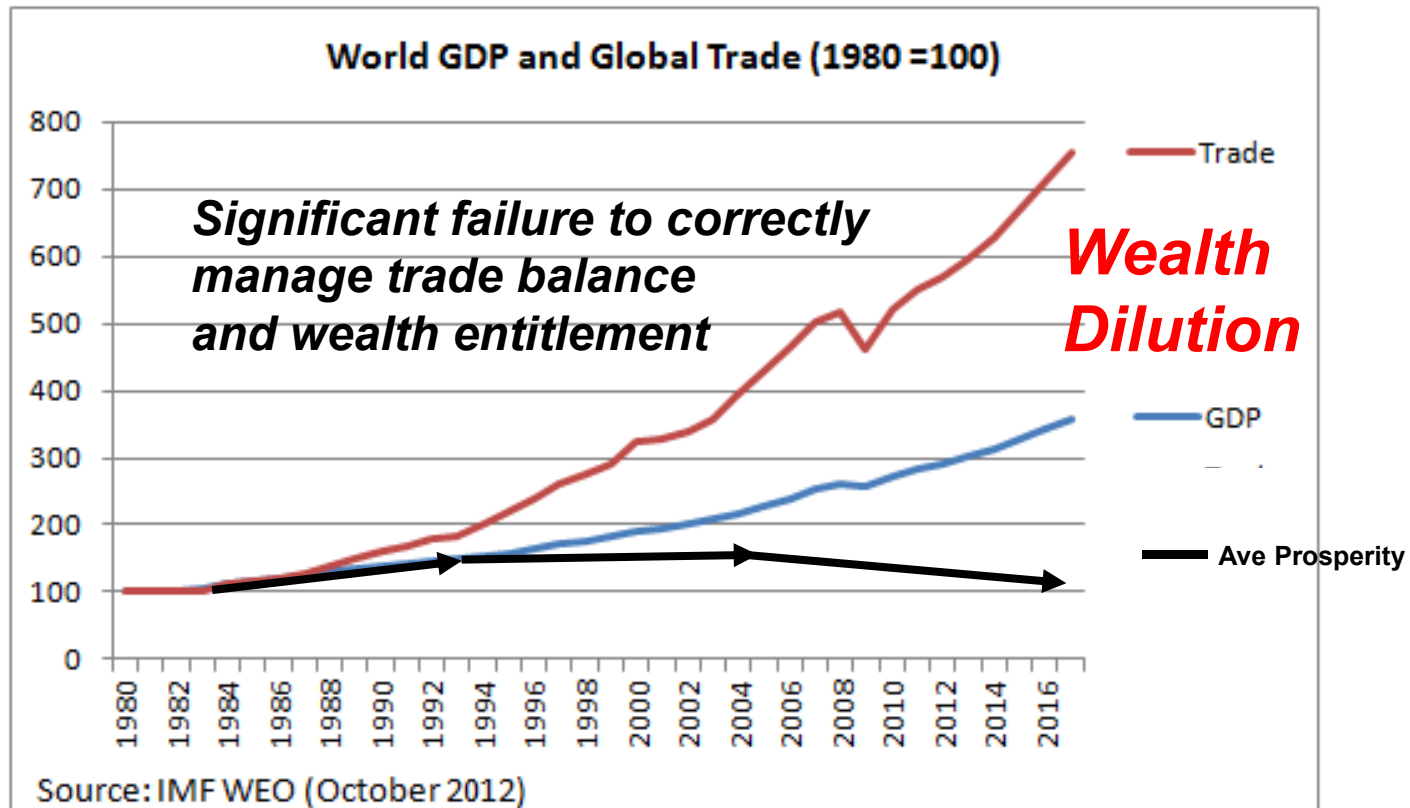
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# **Globalized Trade Wealth Loss**

# Globalized Trade has outpaced Wealth Creation



## Winners

- Emerging Economies
- Bankers
- Traders
- Global Corporations
- Global Capitalists

## Losers

- Mature Economies
- National governments
- Mature Economy Middle class
- Citizen level investors
- Youth early in careers
- The Planet!

# Globalized Trade has outpaced Wealth Creation

## *Trade is an inefficient method to generate wealth!*



## More Global trade deals will just NOT help!

### Winners

- Emerging Economies
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# So what's next?

A new critical mass of Awareness/Dialogue/Debate .....  
To force action taking .....

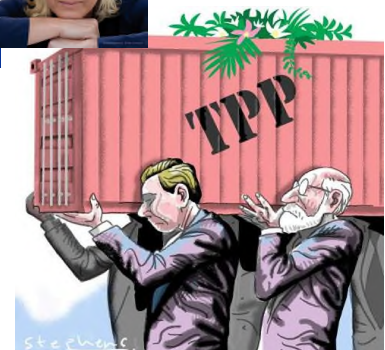
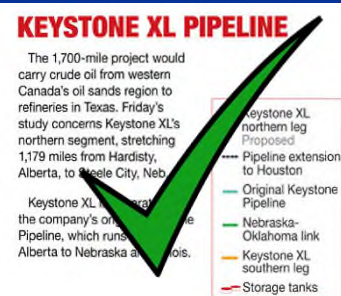
*A glimmer of hope !*

**Fresh Political Will**  
***THE GAME CHANGERS!***



**Balanced Trade Matters**

**No!.. To the Paris accord**



# Many Factors will change Trade structures

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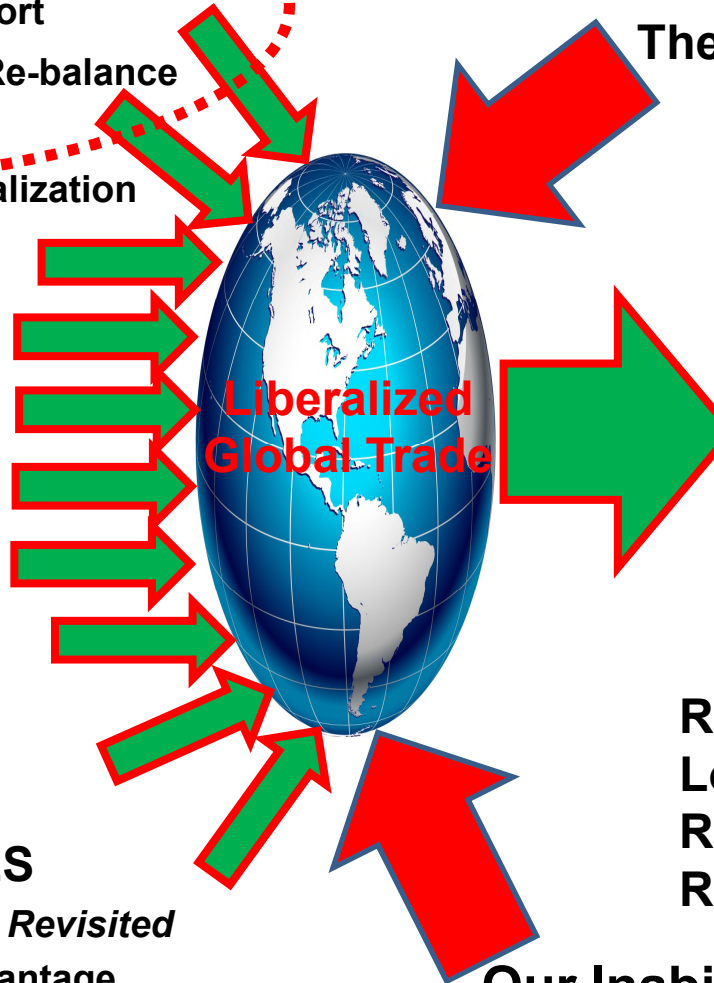


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LEAN Business practices.. *Revisited*

Disruptive Technology Advantage

Re-evaluate Supply Chain/s (Sustainability)



**The Globalization Purist!**

**Regional  
Trade  
Blocs**

**Re-shoring!  
Local Re-Capitalization!  
Re- Infrastructuring  
Re- Training!**

**Our Inability to Understand  
And Take Action!!!**

# Questions?

# Many Factors will change Trade structures

## GOVERNMENT INITIATIVES

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# **LEAN Business practices.. *Revisited***

*After all these years.....*

*LEAN is STILL the prime business improvement concept.....*

*In the future.....*

*LEAN will be revisited by business with a broader focus and a RETHINK!!!.....*

*To allow localized business close to customers to compete*

*To include Sustainability thinking into business processes and practices.*

# LEAN

# LEAN

## Get the LEAN Religion



# LEAN

**Not about.....  
... just looking good**



# LEAN



**Not so much about ...**

**.....reducing cost**

# LEAN



**More about Improving  
Business Performance!**

**LEAN Requires.....**

**VISION**

**Baseline to Entitlement**

***This is STILL a struggle for many of us!!***



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# **Global LEAN**

# GLOBALIZED



# MANUFACTURING

**TBM Positional Paper on the Waste in a Global Supply Chain**

# GLOBALIZED



# MANUFACTURING

TBM Positional Paper on the Waste in a Global Supply Chain

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# GLOBALIZED



# MANUFACTURING

TBM Positional Paper on the Waste in a Global Supply Chain

# Waste of VERY Expensive Bunker Fuel



## Much Non-Value-Adding Inventory

# Waste of VERY Expensive Bunker Fuel



## VERY LARGE CARBON FOOTPRINT

**This low grade bunker fuel is used by the worlds 90,000 cargo ships**

***A single large container ship emits pollutants equivalent to 50 million cars.***

**Total container ship pollution is 6 times that of the TOTAL cars in world  
2,000 times the amount of sulfur compared to diesel automobiles.**

**Container ships account for 90% of global trade by volume.**

**Our Economies will be jeopardized by this global warming enabler**

# INSANITY



A close-up photograph of a man's face, showing a wide-eyed, open-mouthed expression of shock or horror. The background is dark and out of focus, suggesting foliage.

# INSANITY

We are sharing Global waste...NOT Prosperity

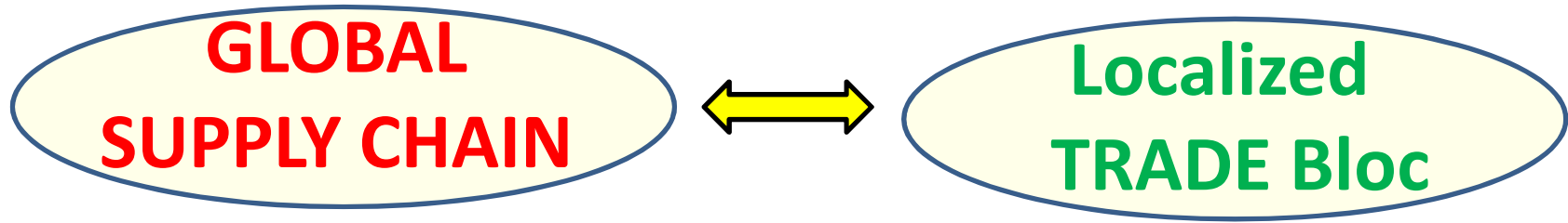
# GLOBALIZED



# MANUFACTURING

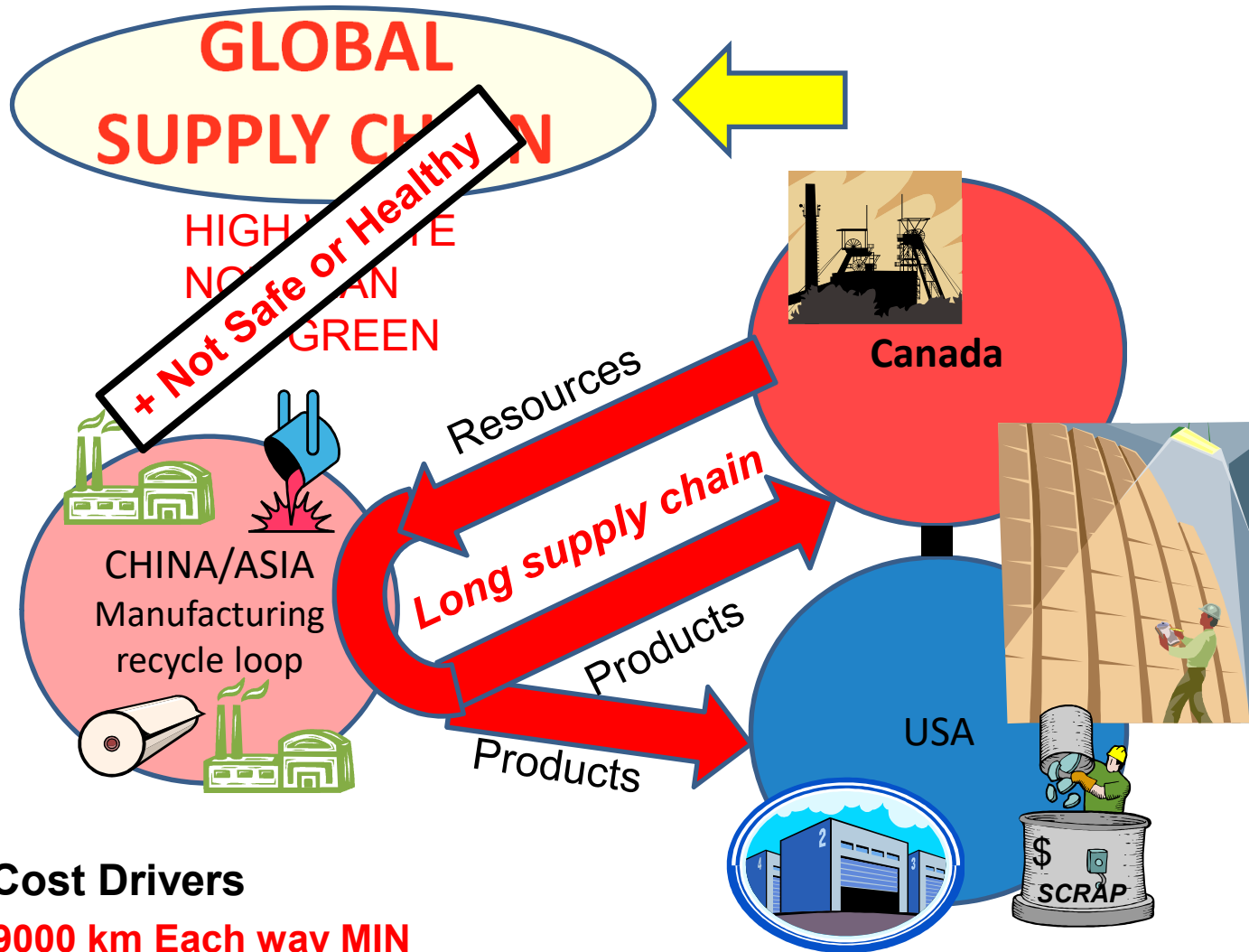
TBM Positional Paper on the Waste in a Global Supply Chain

# LEAN Review of Trading Models



# LEAN Review of Trading Models

# NOW



## Process

Dig Resources  
Ship resources  
Dock resources  
Use Resources  
Ship products  
Dock products  
Ship  
Store  
ship  
Sell

## Cost Drivers

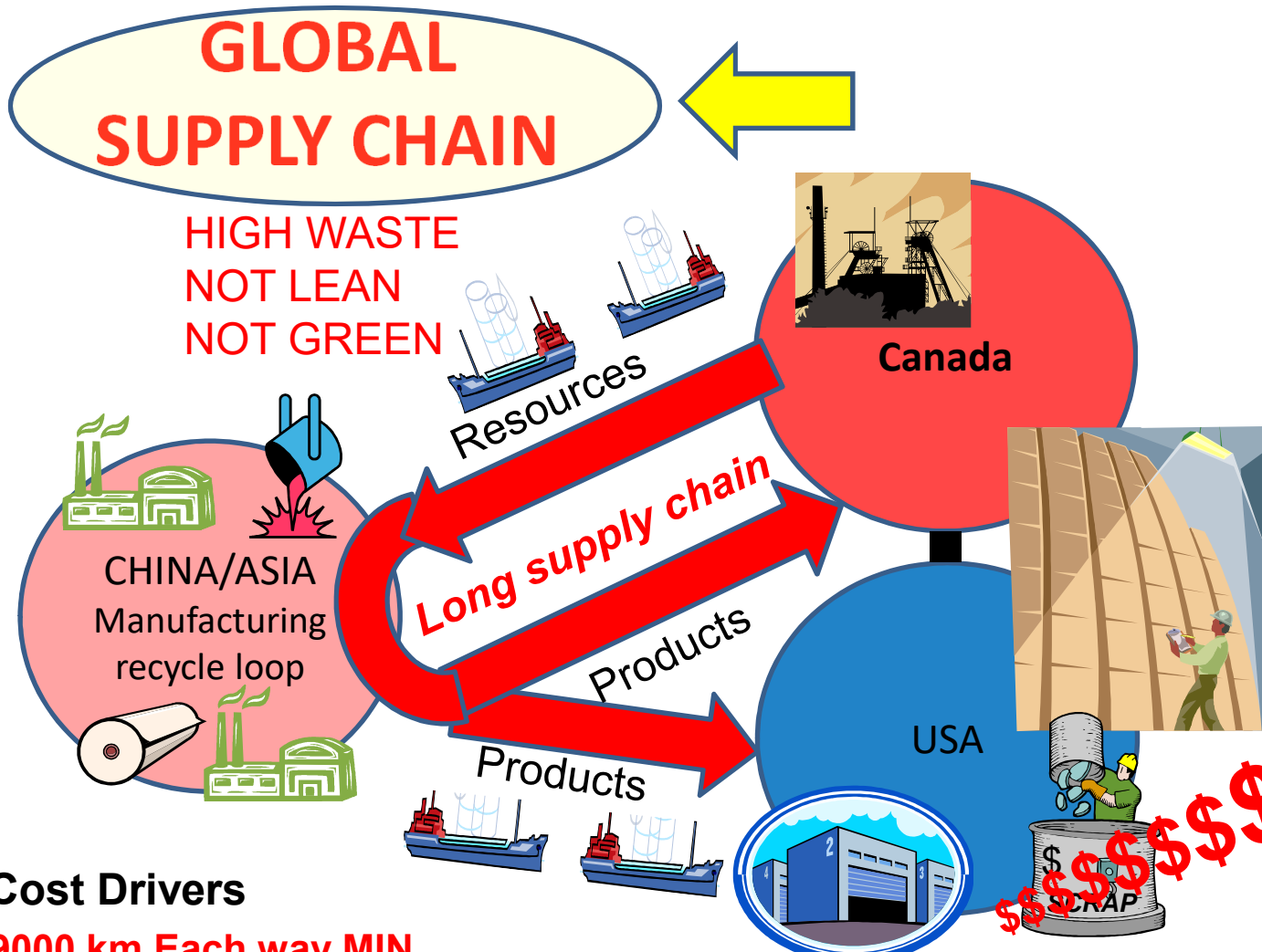
9000 km Each way MIN  
6 weeks Transit Inventory MIN  
\$100/M cube to transport MIN  
Many Transactions / Handling.....  
Much Waste of Natural Resource's

# LEAN Review of Trading Models

# NOW

## Process

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HIGH WASTE  
NOT LEAN  
NOT GREEN

## Cost Drivers

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Much Waste of Natural Resource's

***When Interest rates are “normalized”  
we will have a “High cost of Inventory trap”***

**The  
Economist**

# CHINA ... Low Cost Country ?

The end of cheap China

## What do soaring Chinese wages mean for global manufacturing?

Mar 10th 2012 | *HONG KONG AND SHENZHEN* | from the print edition

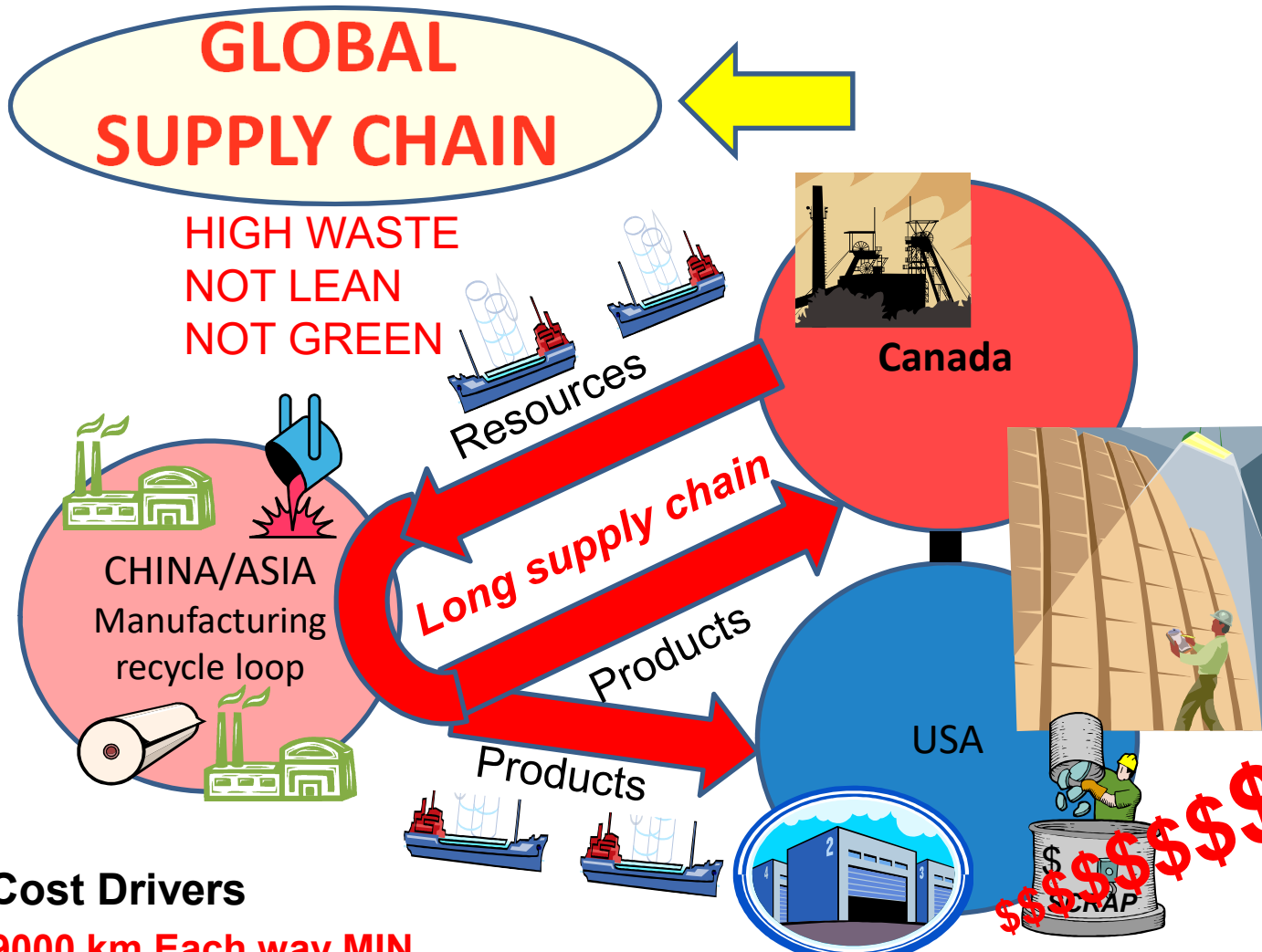


# LEAN Review of Trading Models

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HIGH WASTE  
NOT LEAN  
NOT GREEN

Resources

Long supply chain

Products

Products

## Cost Drivers

9000 km Each way MIN  
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***When Interest rates are “normalized”  
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# LEAN Review of Trading Models

NOW

GLOBAL  
SUPPLY CHAIN

HIGH WASTE  
NOT LEAN  
NOT GREEN

Resources

CHINA/ASIA  
Manufacturing  
recycle loc

USA

Ship  
Store  
ship  
Sell

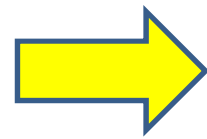
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When Interest rates are "normalized"  
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dry MIN  
transport MIN  
ons / Handling.....  
of Natural Resource's

# LEAN Review of Trading Models

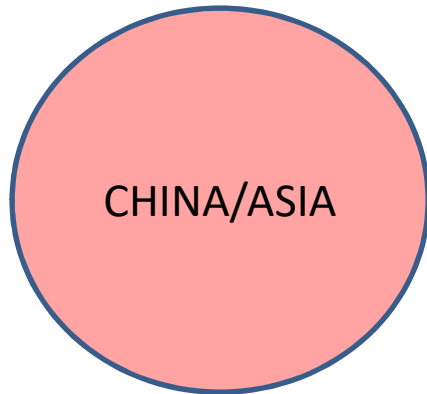
# FUTURE



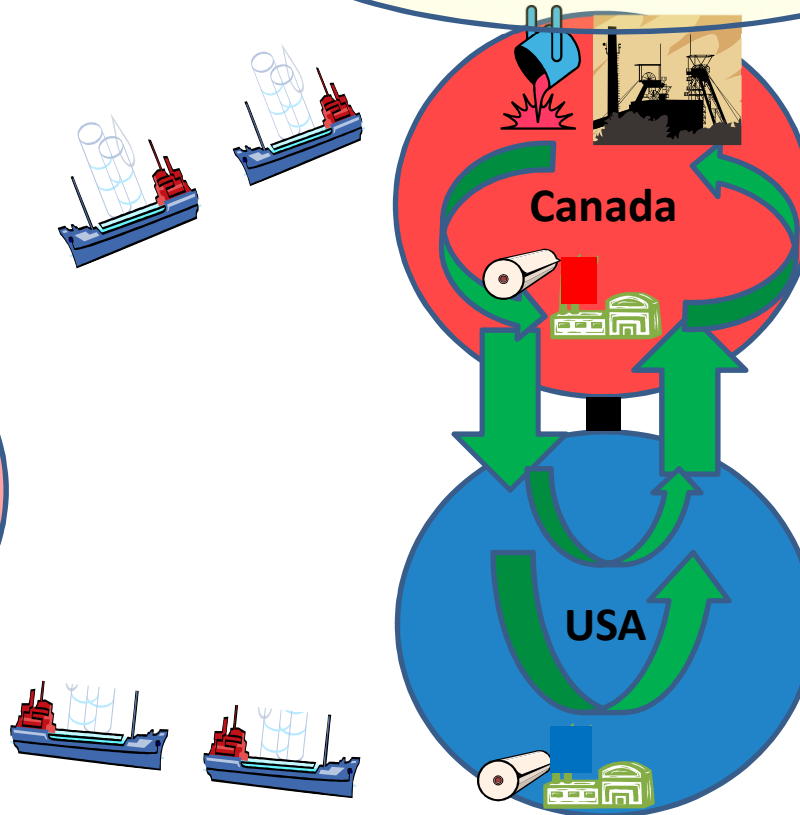
Localized  
**TRADE Bloc**

Process

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CHINA/ASIA



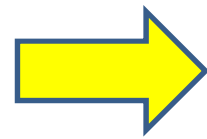
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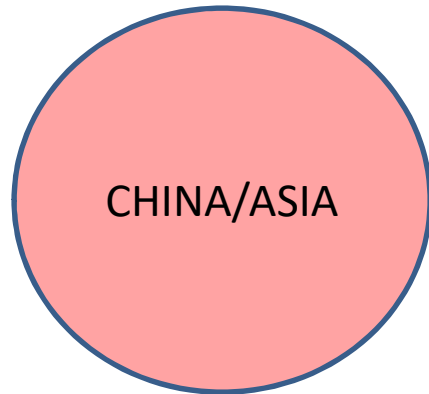
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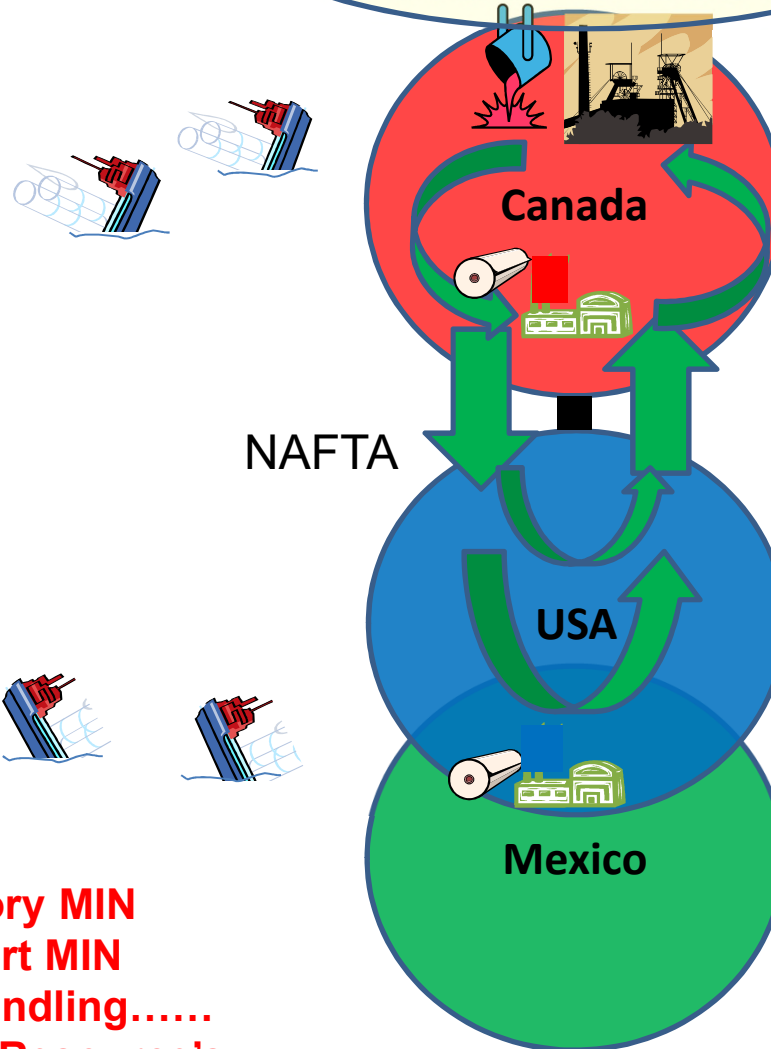
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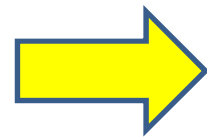
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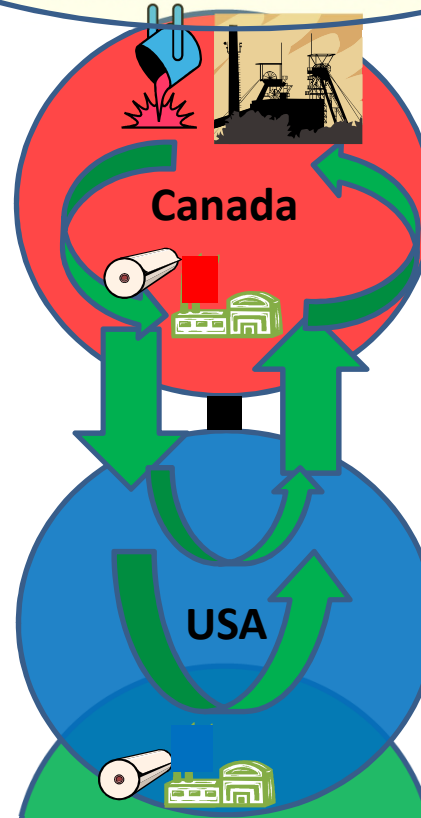


# LEAN Review of Trading Models

# FUTURE



Localized  
**TRADE Bloc**



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~~Ship resources~~  
~~Dock resources~~  
Use Resources  
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~~Ship~~  
~~Store~~  
Ship  
Sell

*Short Supply Chains*

*FAST RESPONSE  
to customers*

## Cost Drivers

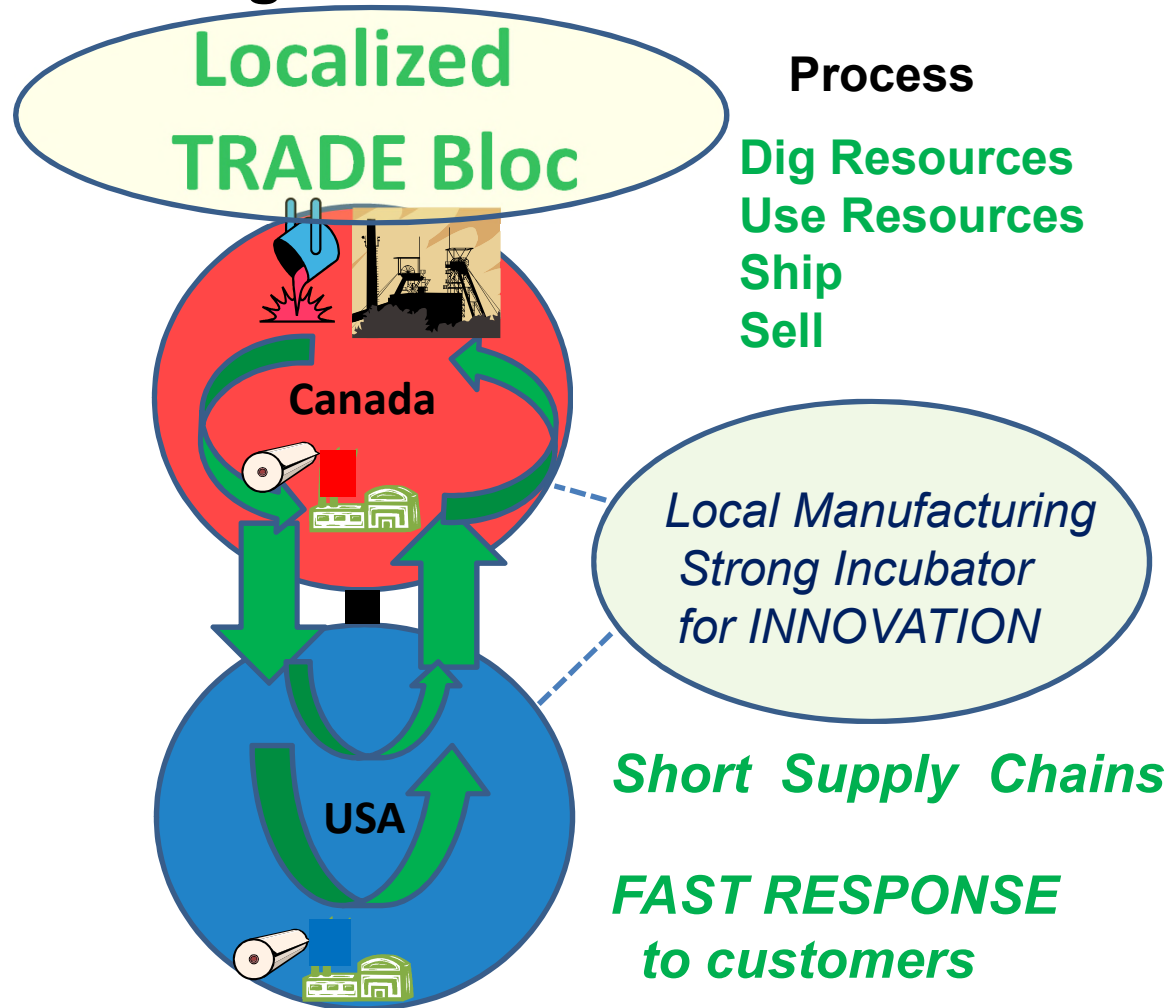
9000 km Each way MIN  
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Much Waste of Natural Resource's



1000 km Each way MAX 11%  
1 week Transit Inventory Max 16%  
\$10/M cube to transport Max 10%  
Few Transactions 10%  
*Minimal Inventory/Interest rate exposure*

# LEAN Review of Trading Models

## FUTURE



1000 km Each way MAX

1 week Transit Inventory Max

\$10/M cube to transport Max

Few Transactions

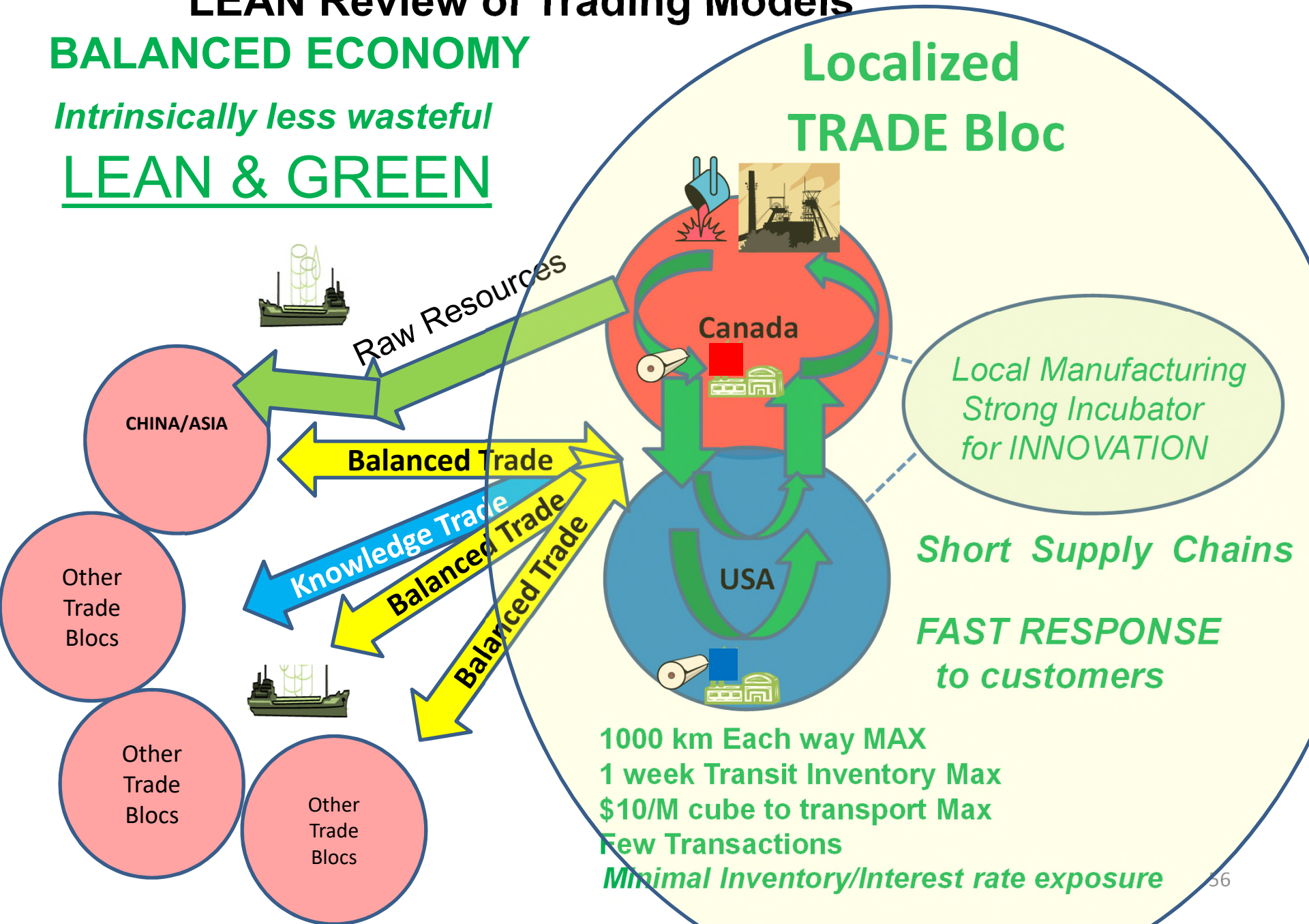
*Minimal Inventory/Interest rate exposure*

# LEAN Review of Trading Models

## BALANCED ECONOMY

*Intrinsically less wasteful*

## LEAN & GREEN

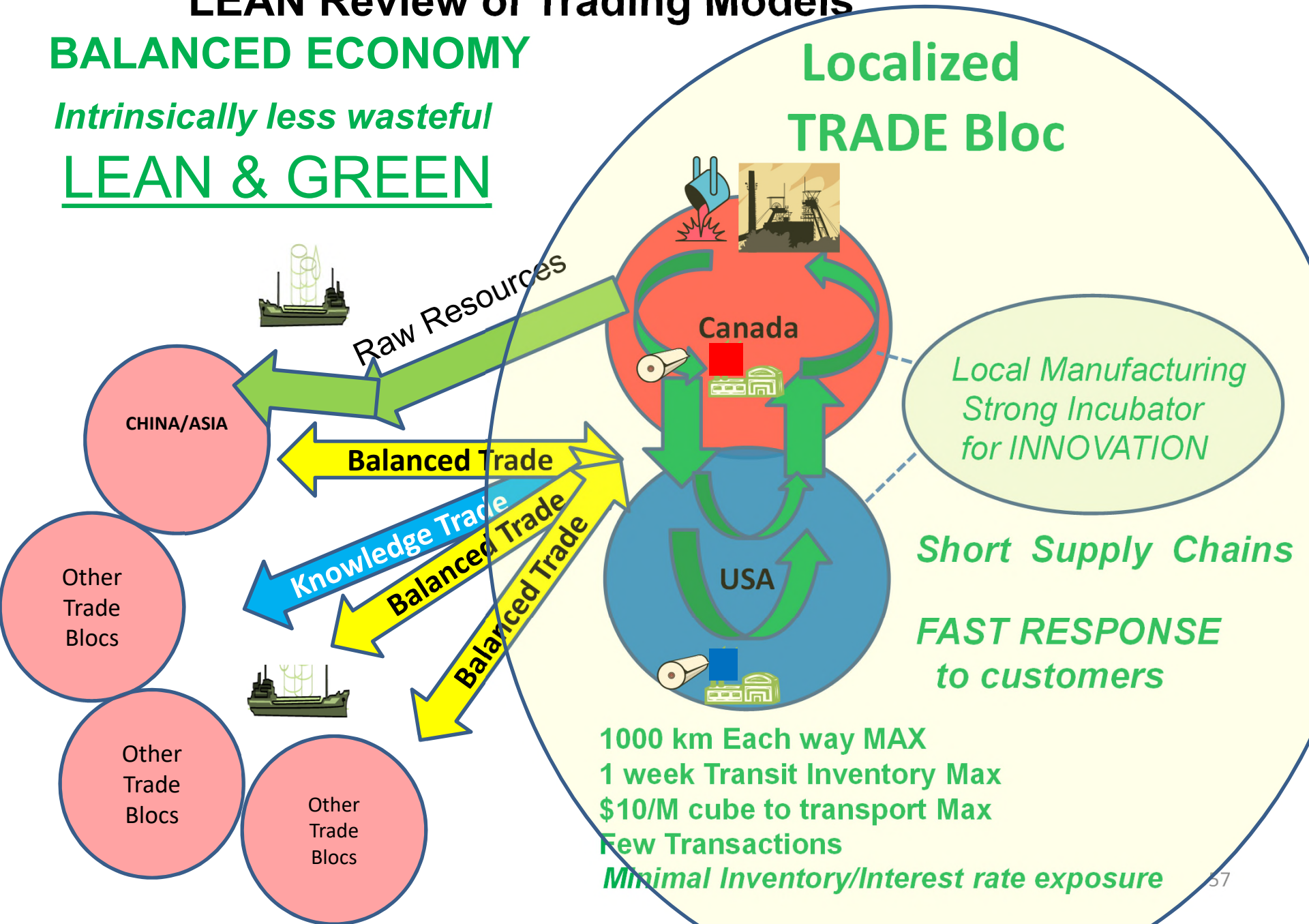


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## LEAN & GREEN

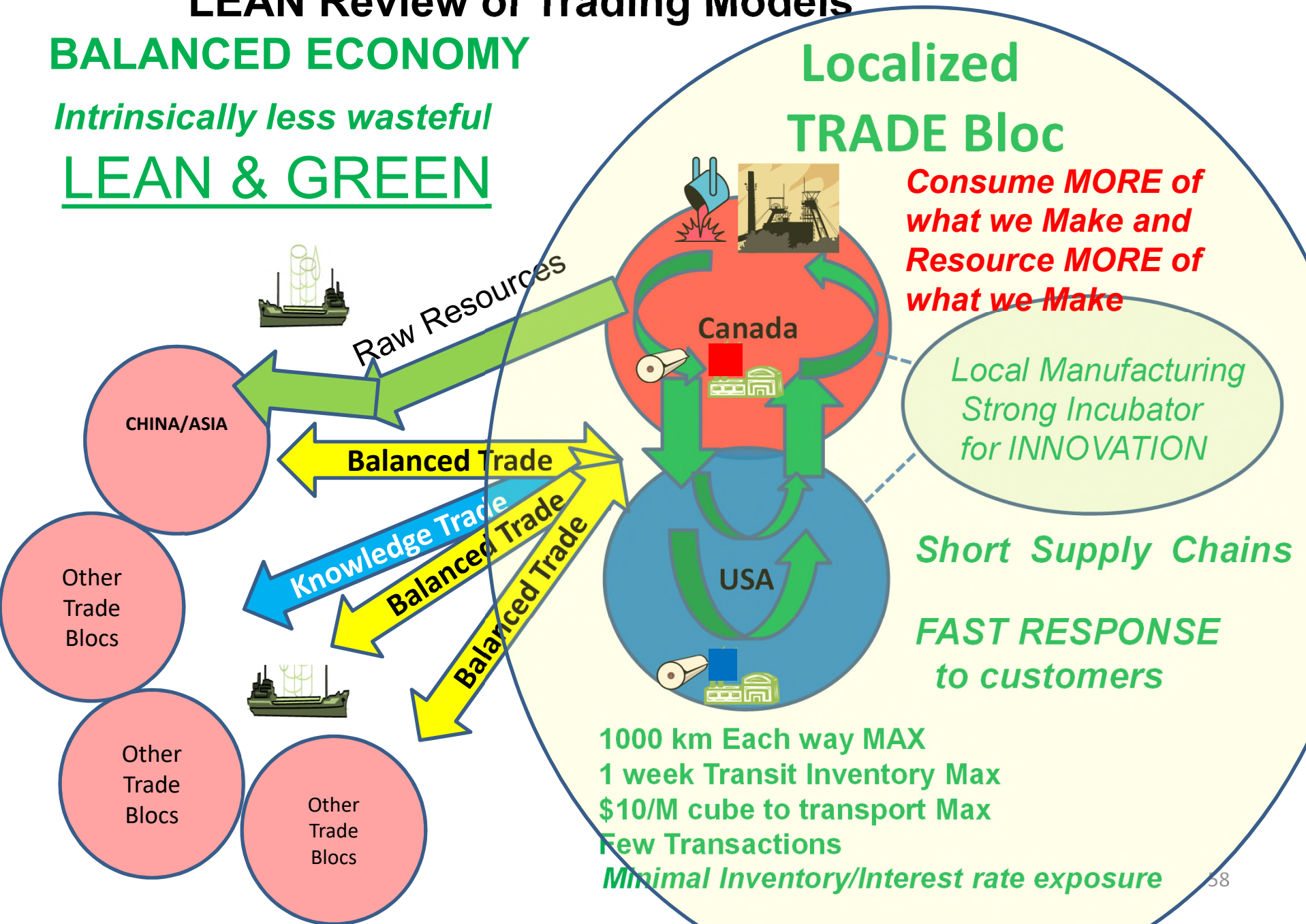


# LEAN Review of Trading Models

## BALANCED ECONOMY

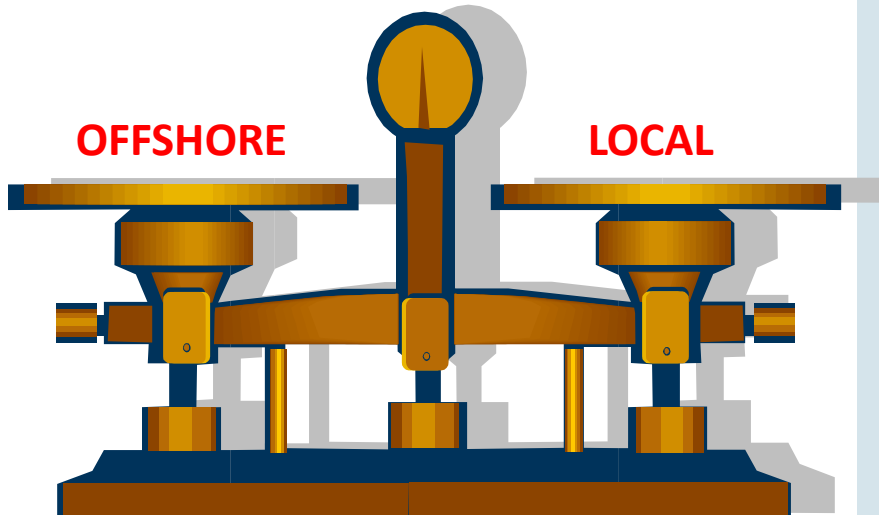
*Intrinsically less wasteful*

## LEAN & GREEN



# Validated Cost Trade-off Models ... LOCAL versus Off-shore

## BALANCED SOURCING



## Boston Consulting Group (BCG).....

*Reached **BALANCED LANDED COST PARITY** in most sectors*

The **REAL** Costs to Manufacture OFF-SHORE will be projected to rise.

Due to: Exchange, tariffs, Labor wage inflation, Product Quality Cost escalation  
Transportation costs, Customer location Inventory costs, Ease of doing business,  
Plus...Many Other hidden drivers....

# Validated Cost Trade-off Models ... LOCAL versus Off-shore

## BALANCED SOURCING

OFFSHORE

LOCAL

ADVANTAGE LOCALIZED MANUFACTURING

40% + Corporations are now Reshoring to North America (NAFTA)

Manufacturing Outsourcing Cost Index  
% of US cost



## Boston Consulting Group (BCG).....

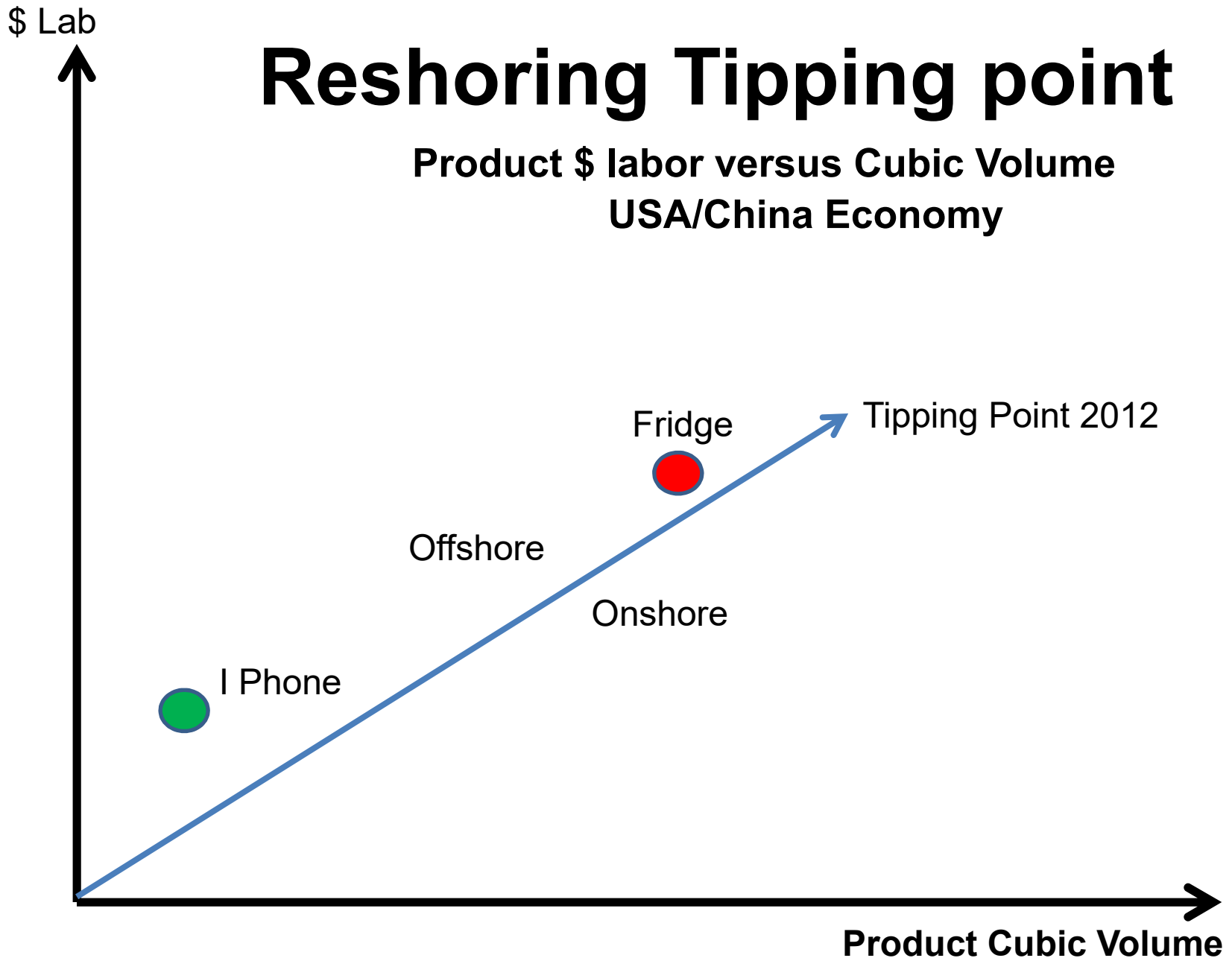
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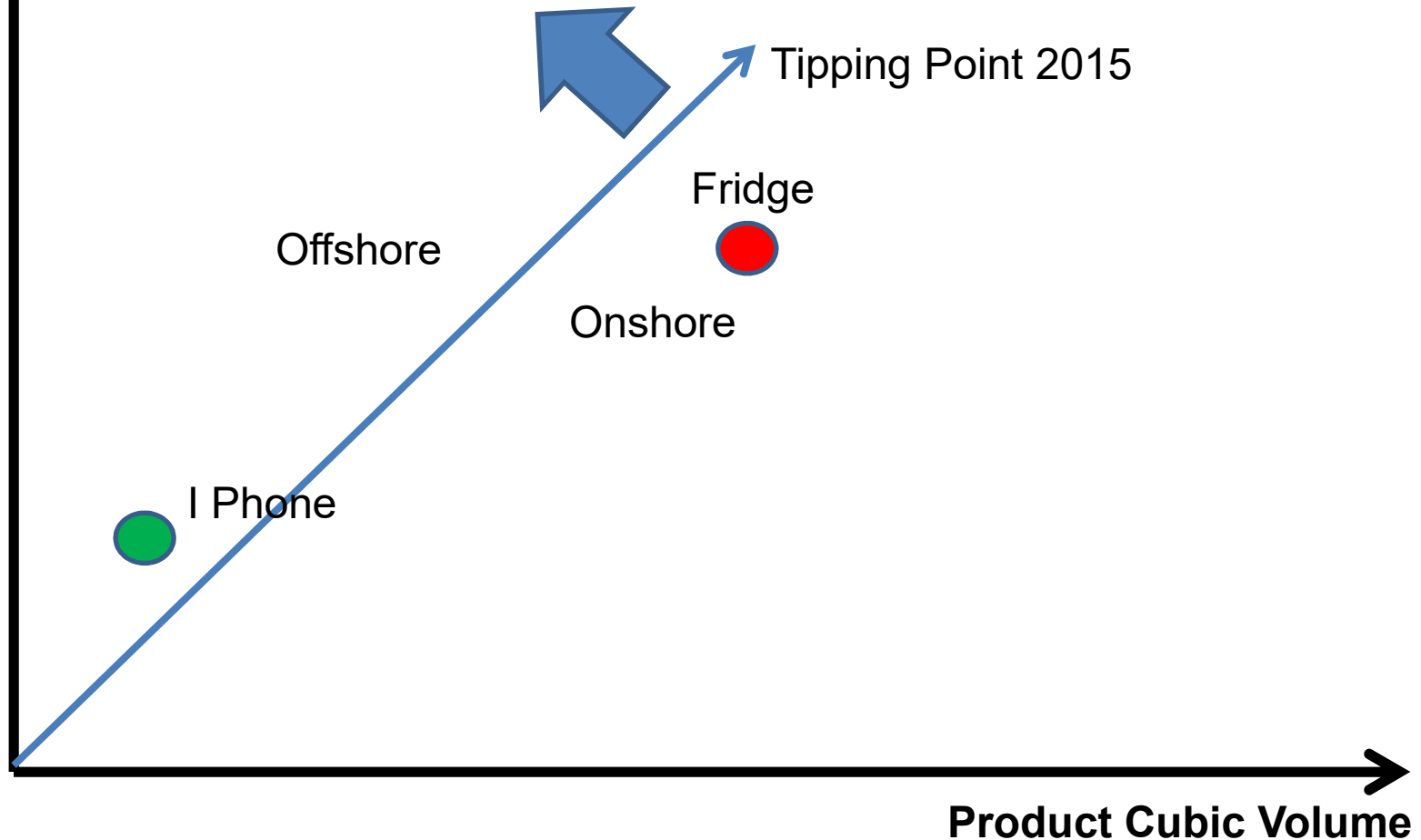
Product \$ labor versus Cubic Volume  
USA/China Economy



\$ Lab

# Reshoring Tipping point

Product \$ labor versus Cubic Volume  
USA/China Economy



# GLOBALIZED



# MANUFACTURING

# GLOBALIZED



**Long Supply Chains  
Are  
Far Less Sustainable**

# MANUFACTURING

*We Question its future Sustainability*

# GLOBALIZED

**UNSUSTAINABLE**

# MANUFACTURING

*We Question its future Sustainability*



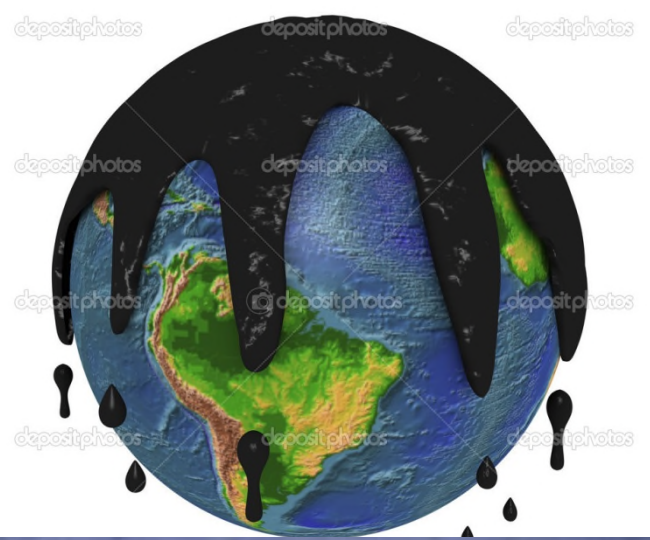
**Take Back Manufacturing**

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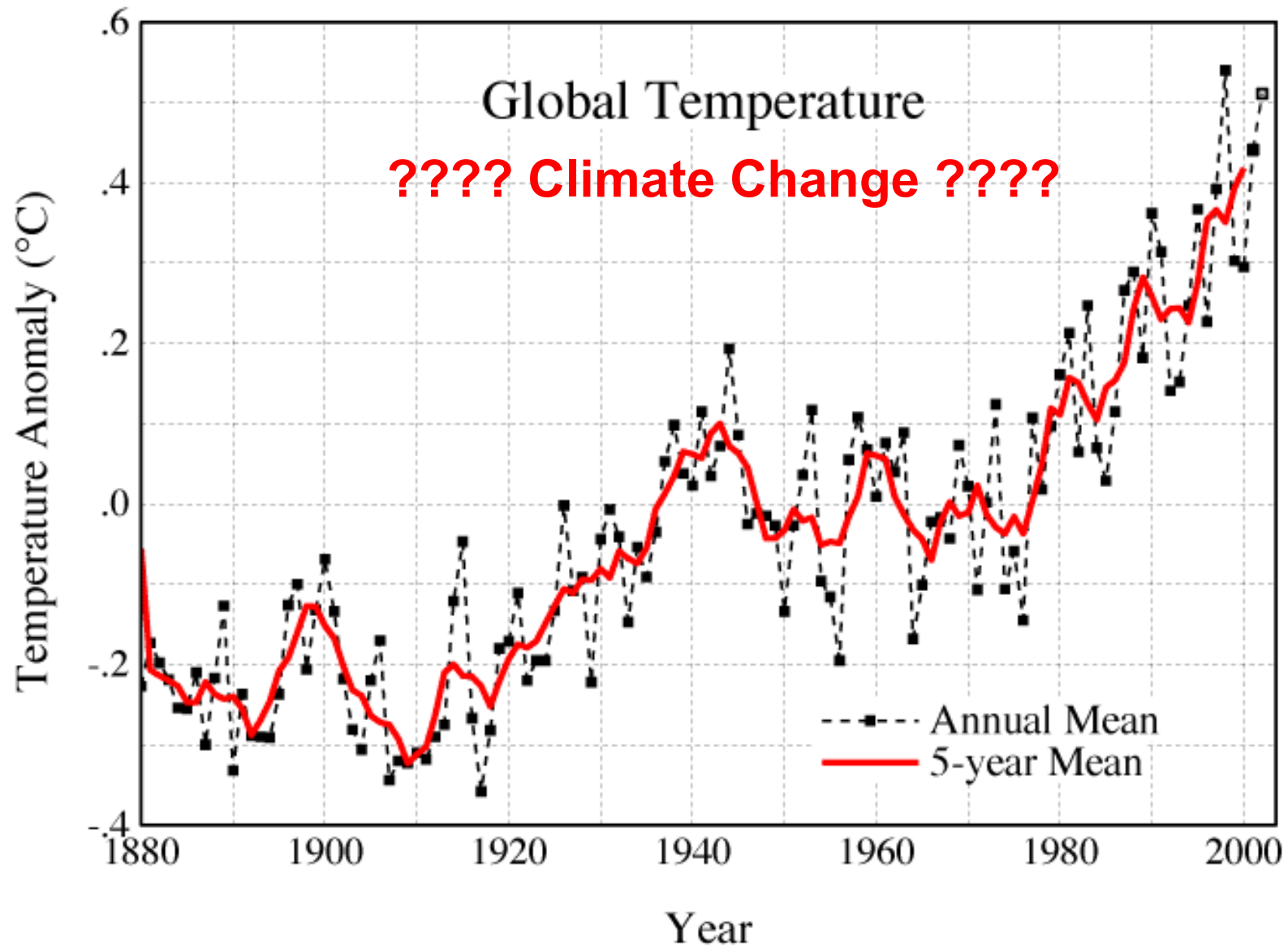
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# **Environmental LEAN**

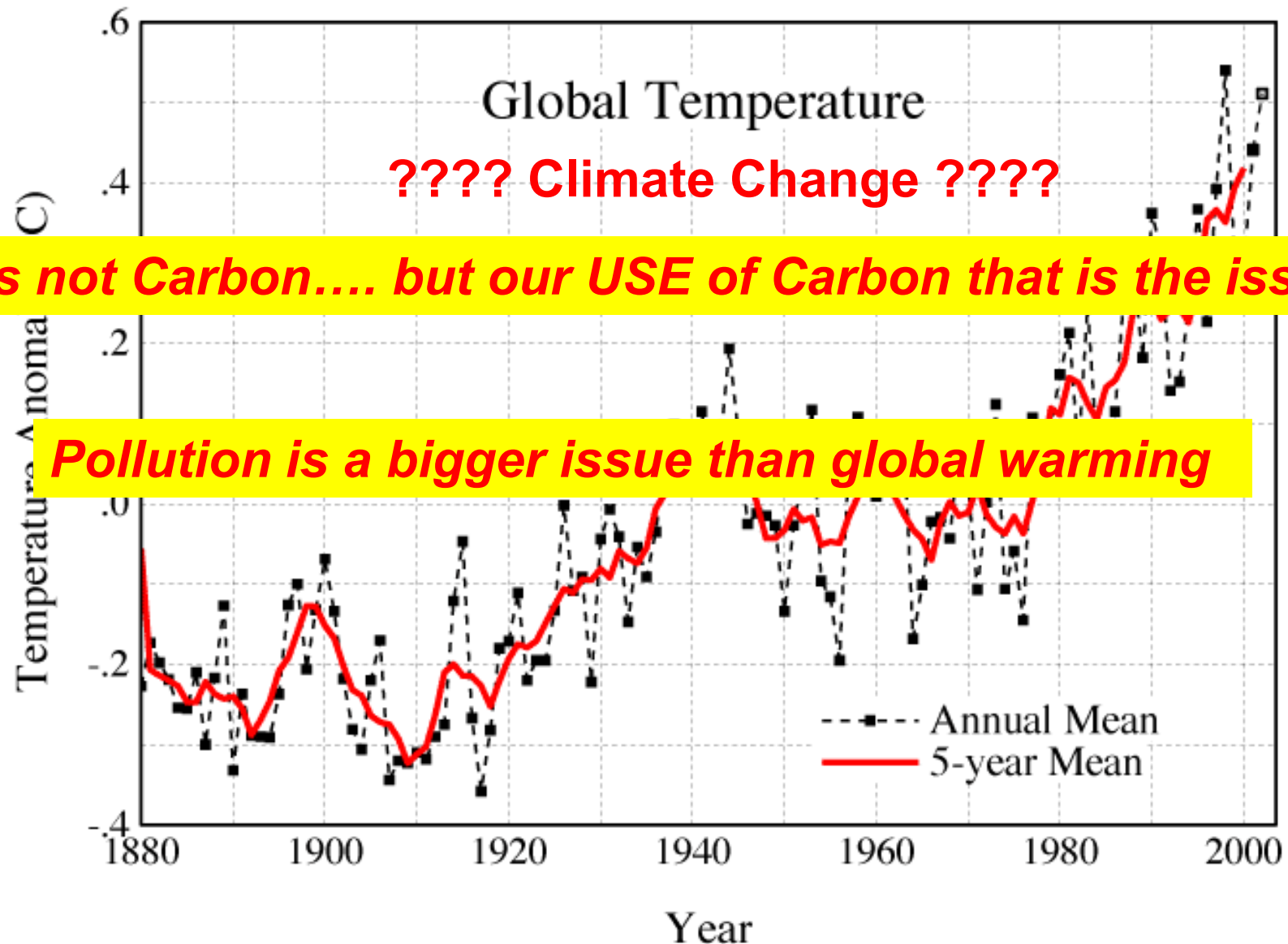
## **Ecological Sustainability Issues**



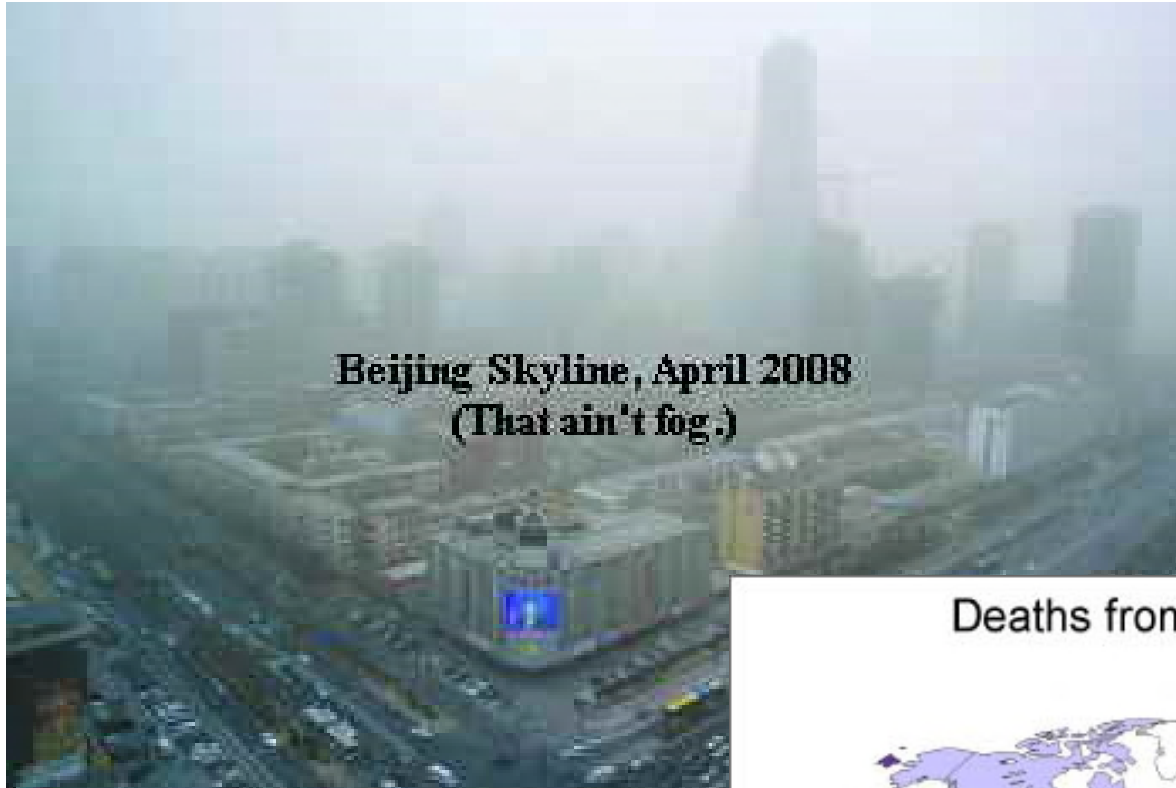
# Global Warming



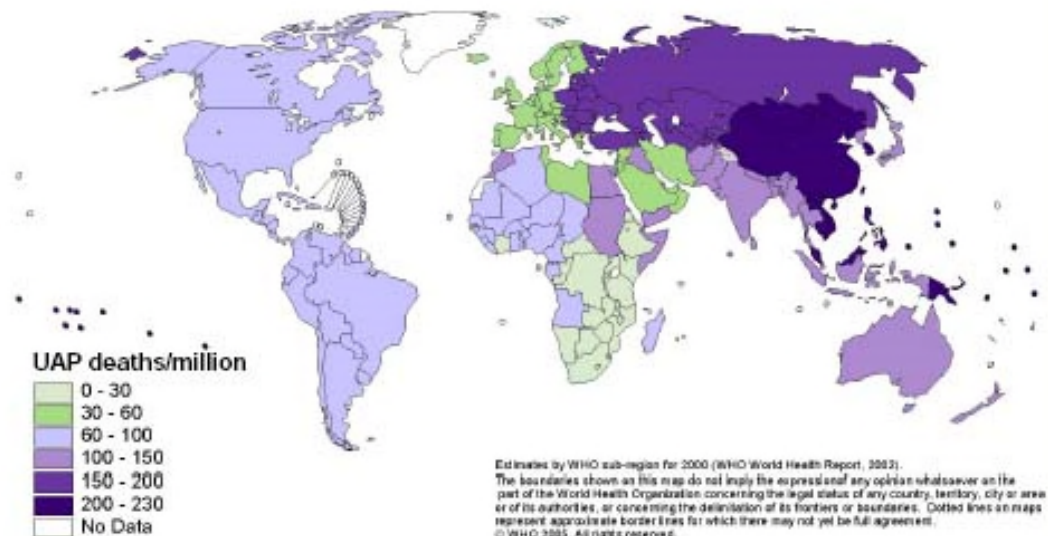
# Global Warming



# Air Pollution



Deaths from urban air pollution



# WASTE



# Water....

## A “Thirsty” Resource!!

**A Car** takes 39,090 gallons of water to make Plus 2,000 gallons for the Tires

**Pair of Jeans** takes around 1,800 gallons of water to grow enough cotton to produce just one pair.

**Cotton T-Shirt...** 400 gallons of water to grow the cotton required for an ordinary cotton shirt.

**Single Board of Lumber** takes 5.4 gallons of water to grow enough wood for one lumber board.

**Barrel of Beer...**(32 gallons of booze), takes 1,500 gallons of water.

**To-Go Latte...**takes 53 gallons to make every latte, grow coffee, sugar, plastic lid, the sleeve and the cup itself. . .

### **Individual Bottled Water**

This irony shouldn't be lost on anyone: it takes 1.85 gallons of water to manufacture the plastic for the 500ml bottle of water.

# Water....

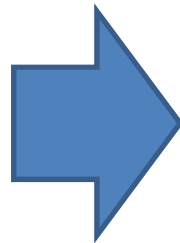
## A “Thirsty” Resource!!



### **Individual Bottled Water**

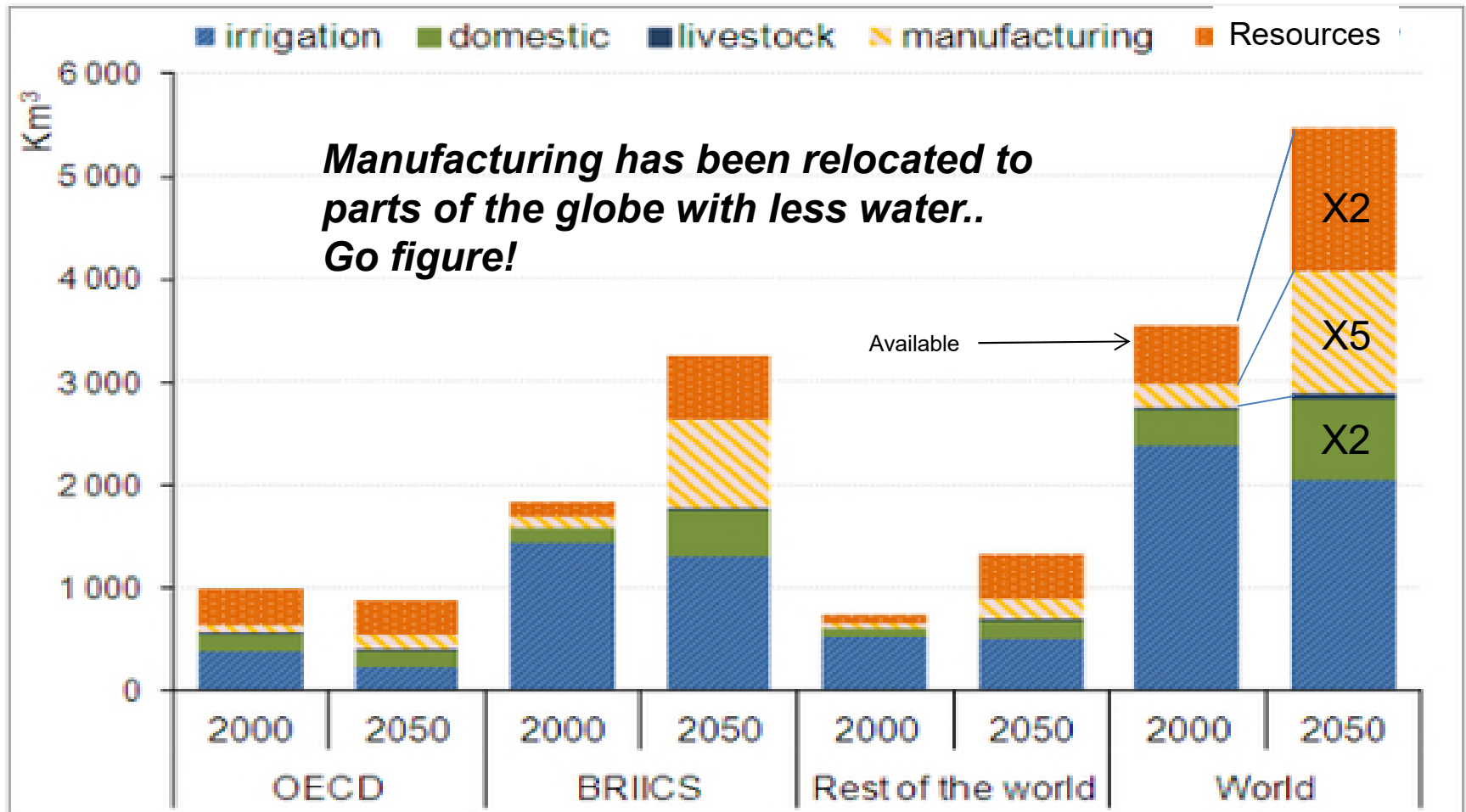
This irony shouldn't be lost on anyone:

It takes 1.85 gallons (7000ml) of water to manufacture the plastic for the 500ml bottle of water. (14:1)



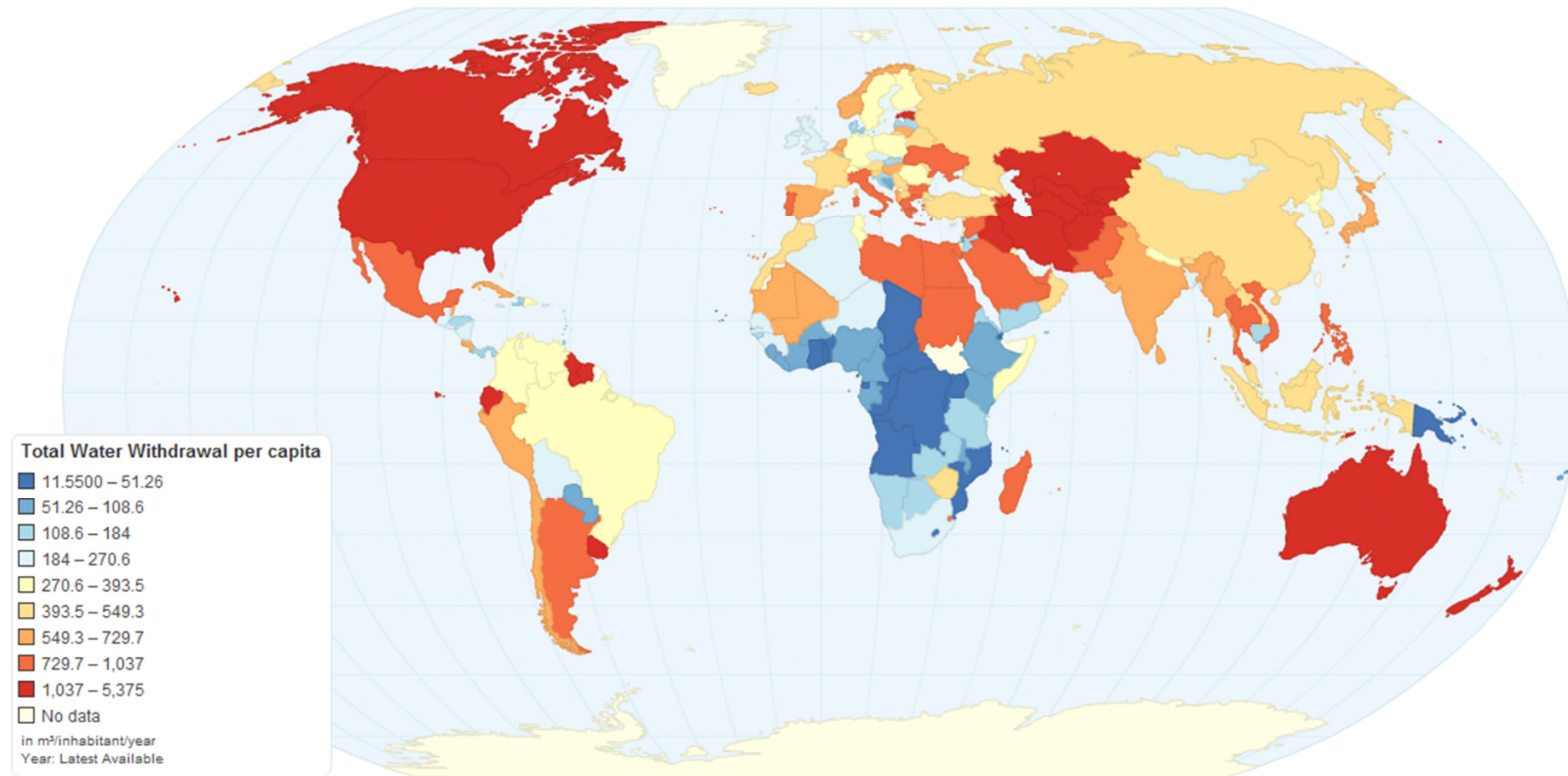
# Global water demand

## Global water demand: Baseline scenario, 2000 and 2050



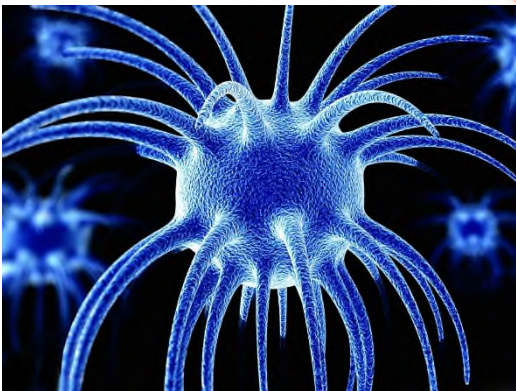
Source: OECD

## Total Water Use per capita by Country



**North Americans Water Consumption**  
1.5 Olympic swimming pools per year per person  
24,000 pints of beer a week per person  
13.5 showers a day per person

The Planet Earth has a relatively new virus



# The Planet Earth has a relatively new virus

- This **Destructive virus** is multiplying at an exponential rate
- Infiltrates all ecosystems and habitats
- Destroys forests and attacks all forms of life
- Increases pollution levels in rivers and oceans
- Has a negative impact on the air quality
- May be responsible for adverse weather changes
- The virus is “mutating” to further enhance the danger

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Its called ...**Man!**

*It likes to live now .....and pay later!*

*Hopefully it will mutate into a benign state before it destroys the whole planet!*

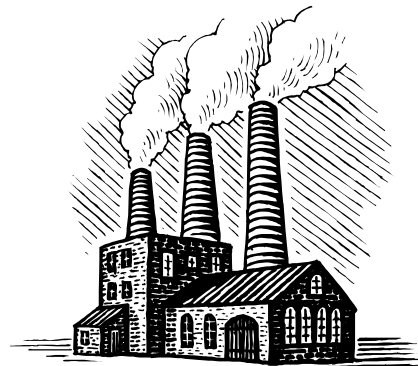
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# Questions?



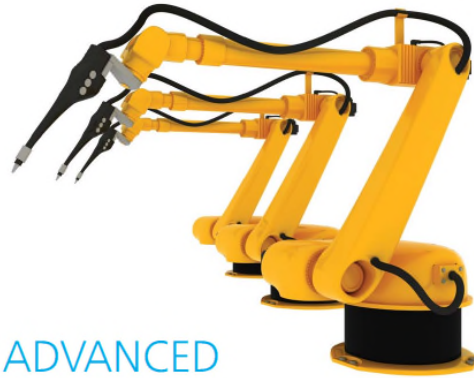
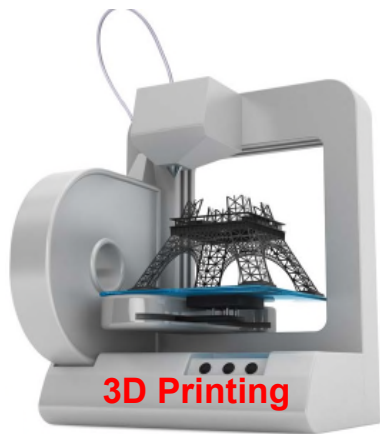
**Take Back Manufacturing**

**WWW.SME-TBM.ORG**

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# **Age of Technological Disruption**

**LEAN & GREEN ....& *AUTOMATED***



## ***The 5 Advanced Technologies Driving Disruptive Innovation***

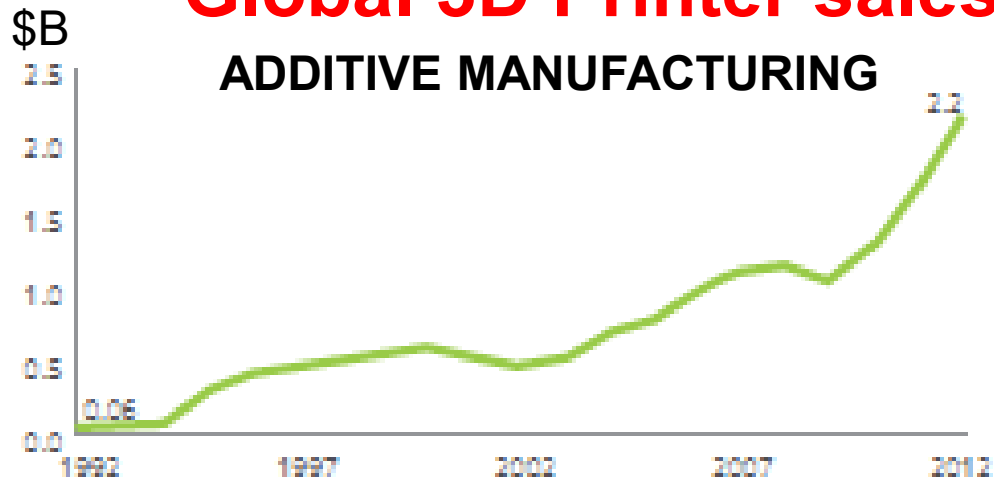


***Moving us toward another ( 4<sup>th</sup> ) Industrial Revolution***

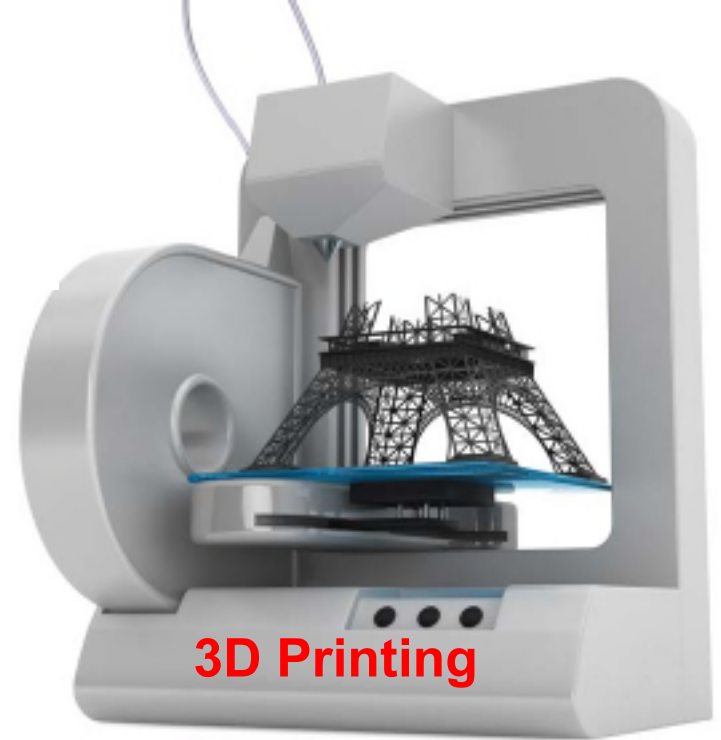


# ADVANCED MANUFACTURING

## Global 3D Printer sales ADDITIVE MANUFACTURING



*Disruptive technologies such as Additive 3D printing in both Plastic and Metal can provide many industries with both Rapid prototyping and hi performance tooling strategies to re-life traditional industries and breed new industries.*



Plastics

**Metal** (Tooling solutions)

Composites

Food

Bones

Organs

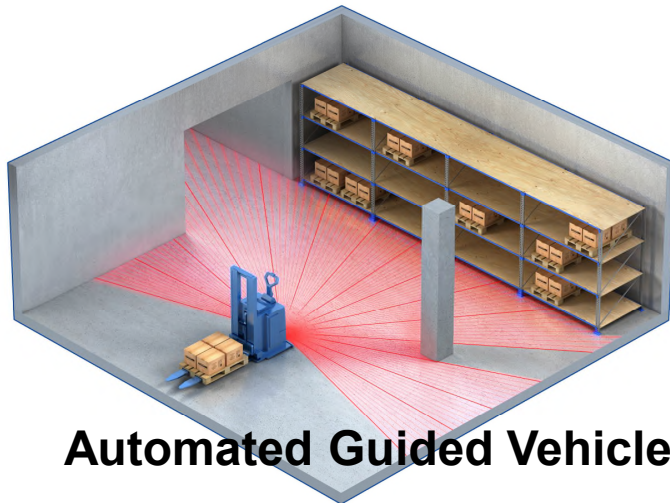
?

**WWW.Additivemet.com**



## ADVANCED ROBOTICS

Robots started to change the industrialized world more than a half century ago. Since then, they've transformed how businesses manufacture goods large and small, and replaced the need for human labour in a vast range of applications, from fulfilling warehouse orders to maintaining nuclear reactors.<sup>15</sup>

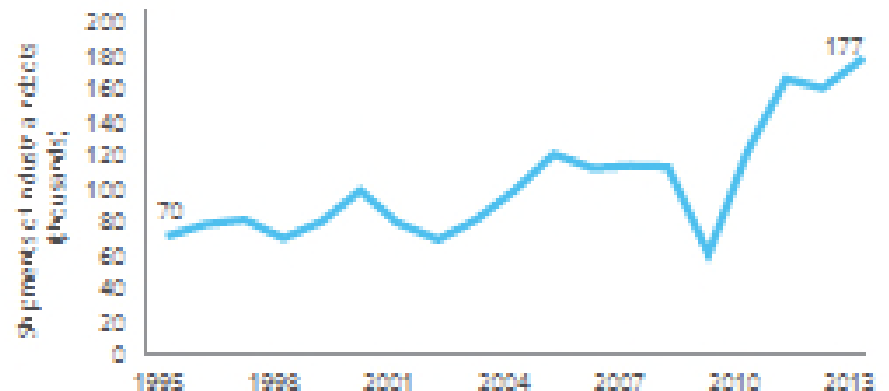


**Automated Guided Vehicles**

***Advanced Manufacturing Technology process machinery and “SMART” Sensor Technology is included in this loose term “Advanced Robotics”***

***“Some distraction due to Low Cost Country labor utilization”***

Estimated worldwide annual shipments of industrial robots from 1995 to 2013<sup>16</sup>

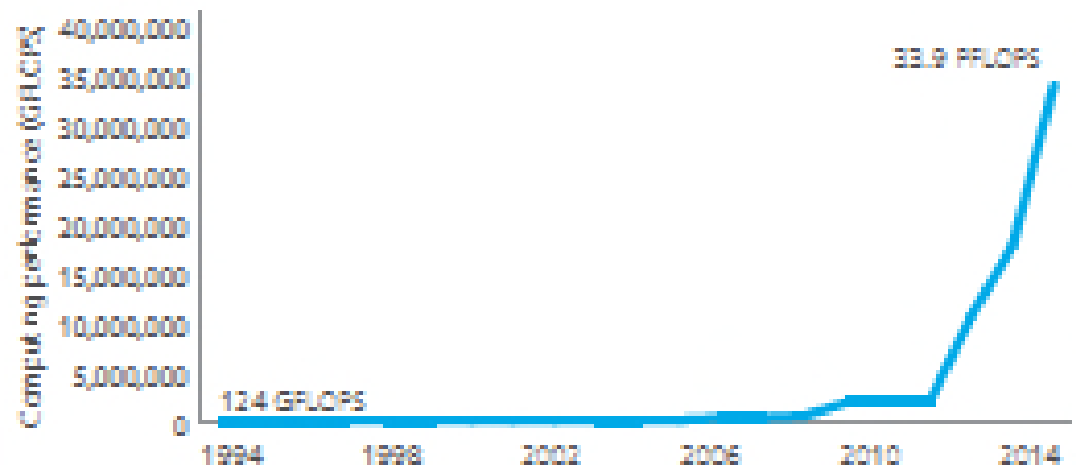




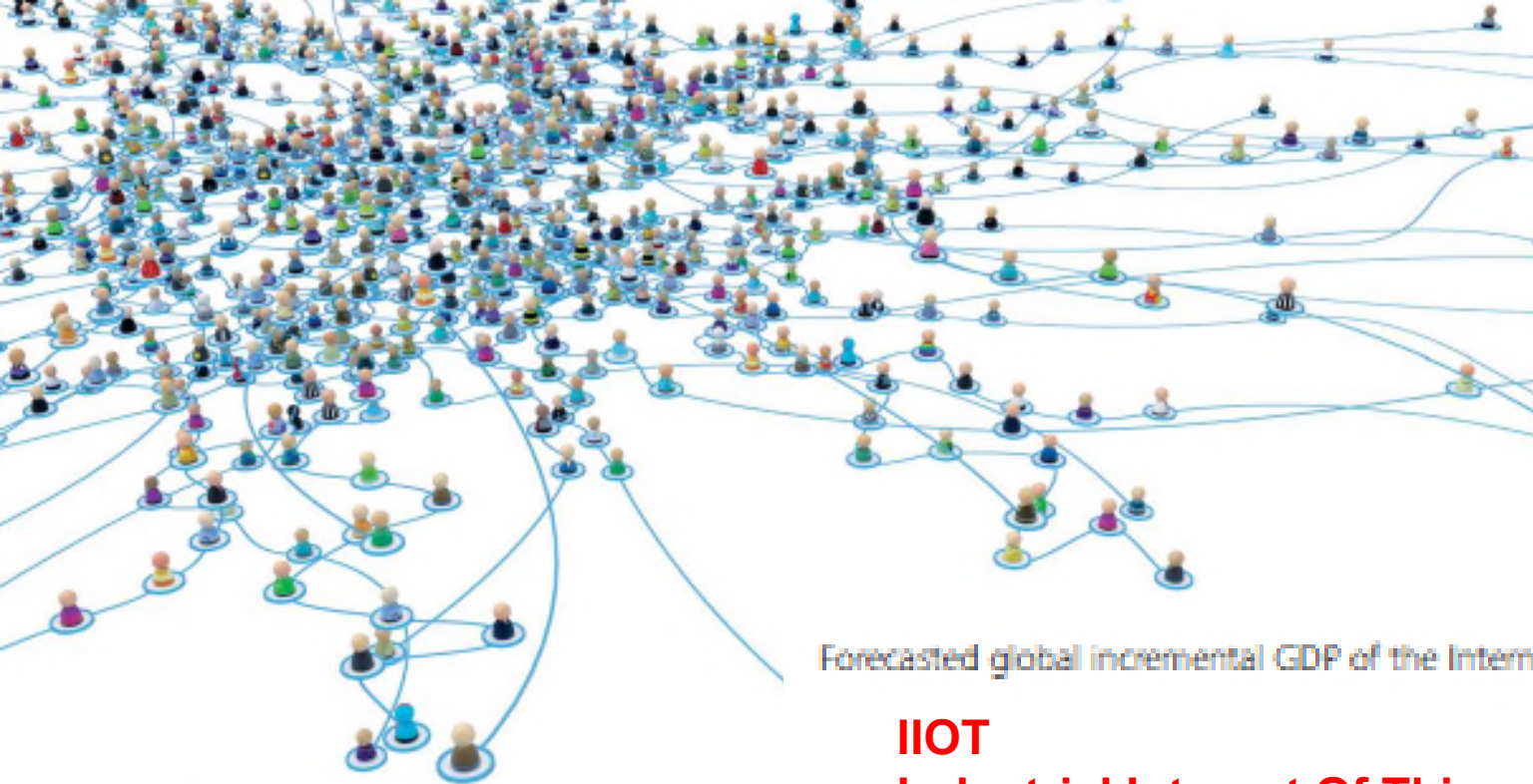
# ARTIFICIAL INTELLIGENCE

## Big Data

Computing power of the most powerful supercomputer<sup>47</sup>

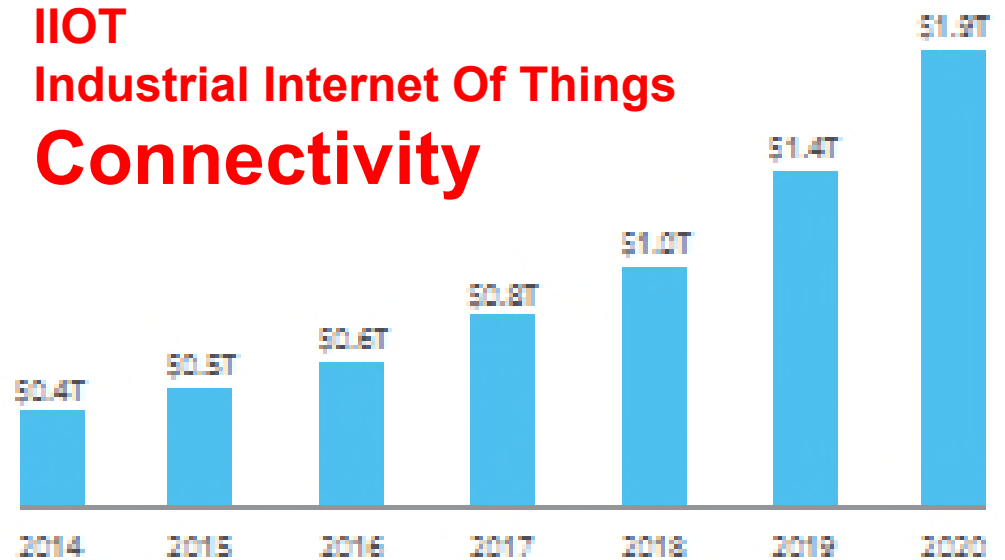


Thanks to 20 years of dramatic improvements in computer processing power (measured in floating-point operations per second, or FLOPS), machines process much more information far faster than ever before



Forecasted global incremental GDP of the Internet of Things<sup>42</sup>

## **IIOT** **Industrial Internet Of Things** **Connectivity**



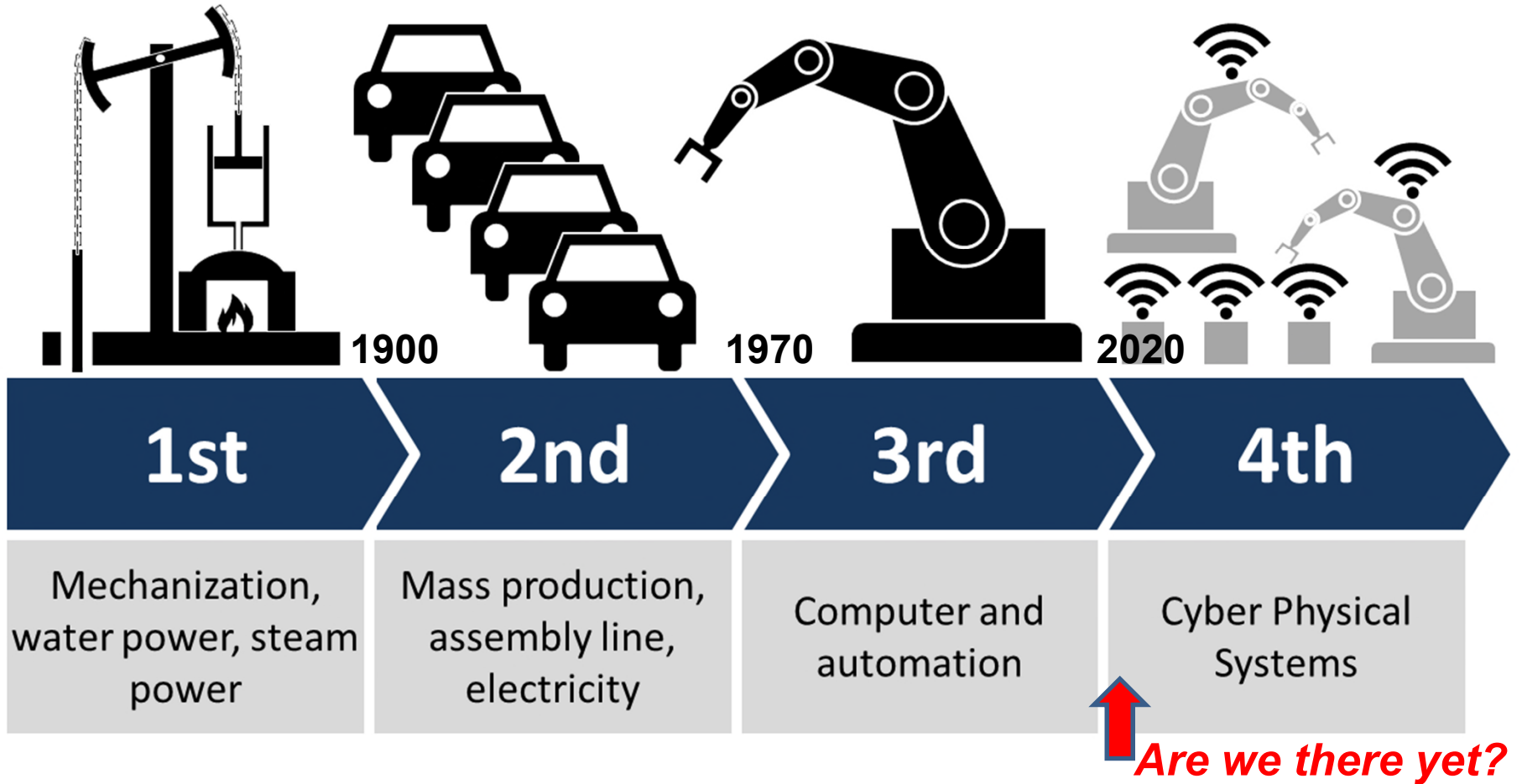


## COLLABORATIVE CONNECTED PLATFORMS

The Internet has revolutionized how we communicate and interact with each other. Today, we take for granted our ability to connect with people and participate in activities thousands of kilometers away. Increased connectivity and Internet capacity have made crowdsourcing, crowdfunding and cloud computing possible, giving people and organizations alike access to skills, knowledge, funds and resources in ways that were never before possible.<sup>59</sup>

**Globalization  
of Ideas....  
NOT  
materials!**

# Industry 4.0...The Next Industrial Revolution/Opportunity



# Cyber-Physical Systems...

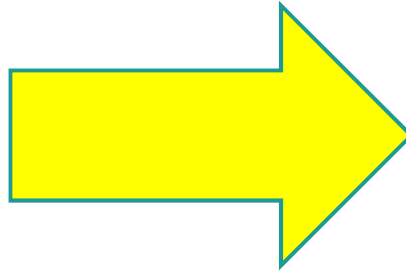
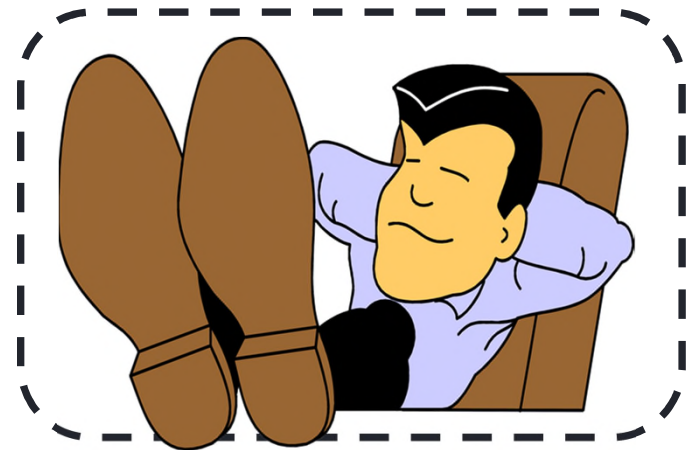
[ Cyber-Physical: Connecting computers to processes without human intervention ]

***“Computers working for us .... NOT us for the computer”***

BEFORE



AFTER



Processes



Human Intervention



Computers



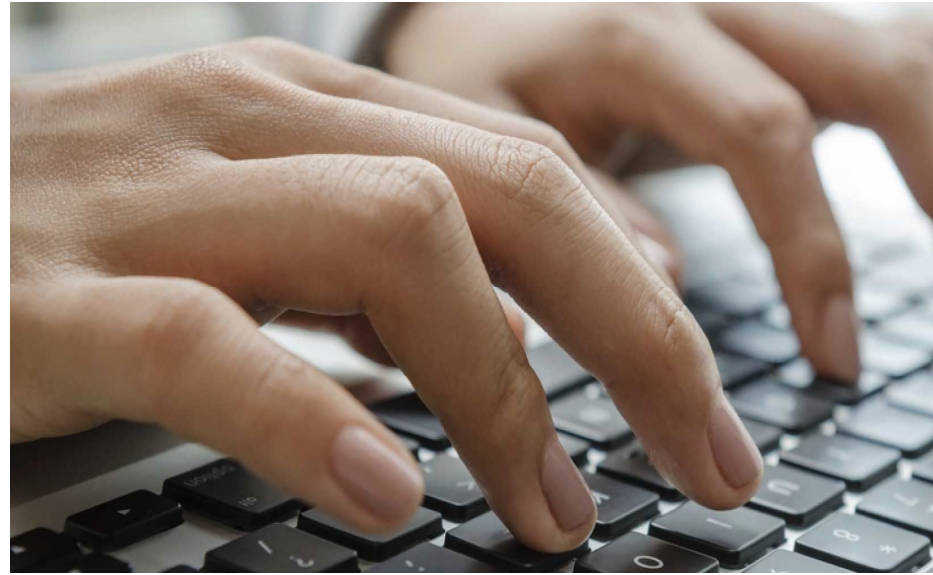
Processes



Computers

# Pre Cyber Physical

**Manual Effort (High cost) Errors (Inaccurate data) Not real-time (Outdated)**



# Cyber Physical Quiz

A



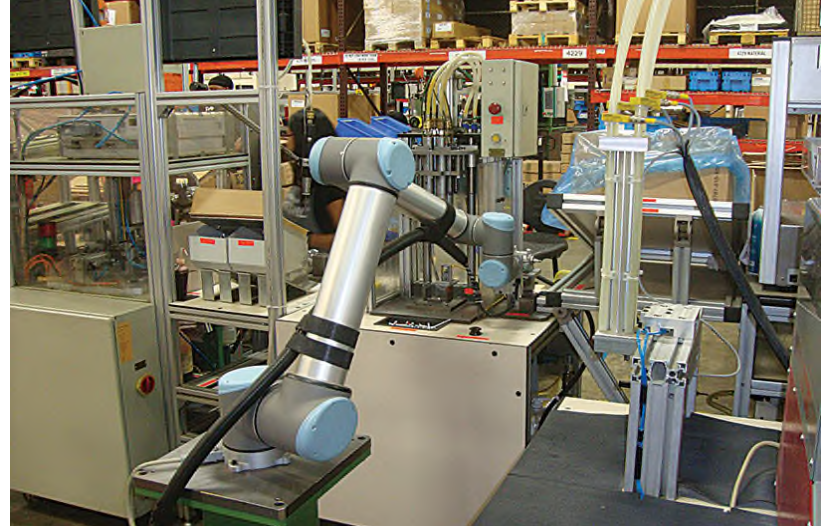
B



C



D



# ***SMART Cyber Physical Connectivity using WPSN®***



Manufacturing



Logistics



Mining



Aerospace



Health care



Agriculture



Nuclear



Freight



Construction

***Will be deployed across most business sectors.***

# ***SMART Cyber Physical Connectivity using WPSN®***



Manufacturing



Logistics



Mining



Aerospace



Health care



Agriculture



Nuclear



Freight



Construction

***Will be deployed across most business sectors.***

Asset  
Management

Inventory  
Management

Transaction  
Elimination

Process  
Control

Global  
Positioning

Advanced  
Sensor  
Integration

Safety  
Systems

***Will solve many operating issues and eliminate significant waste***

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Global  
Positioning

Advanced  
Sensor  
Integration

Safety  
Systems

**Will solve many operating issues and eliminate significant waste**



Transaction Free



LEAN



Visual



Smart



Connected

Confidential

**Will Move us toward INDUSTRY 4.0 and the Business of the FUTURE**

**Now...we can connect processes to  
computers without human  
intervention?**



# **CYBER-PHYSICAL TECHNOLOGIES**

**GEN 1 Radio Frequency Identification (RFID)**

**GEN 2 Wireless Sensor Networks (WSN)**

**GEN 3 Real-time Location Systems (RTLS)**

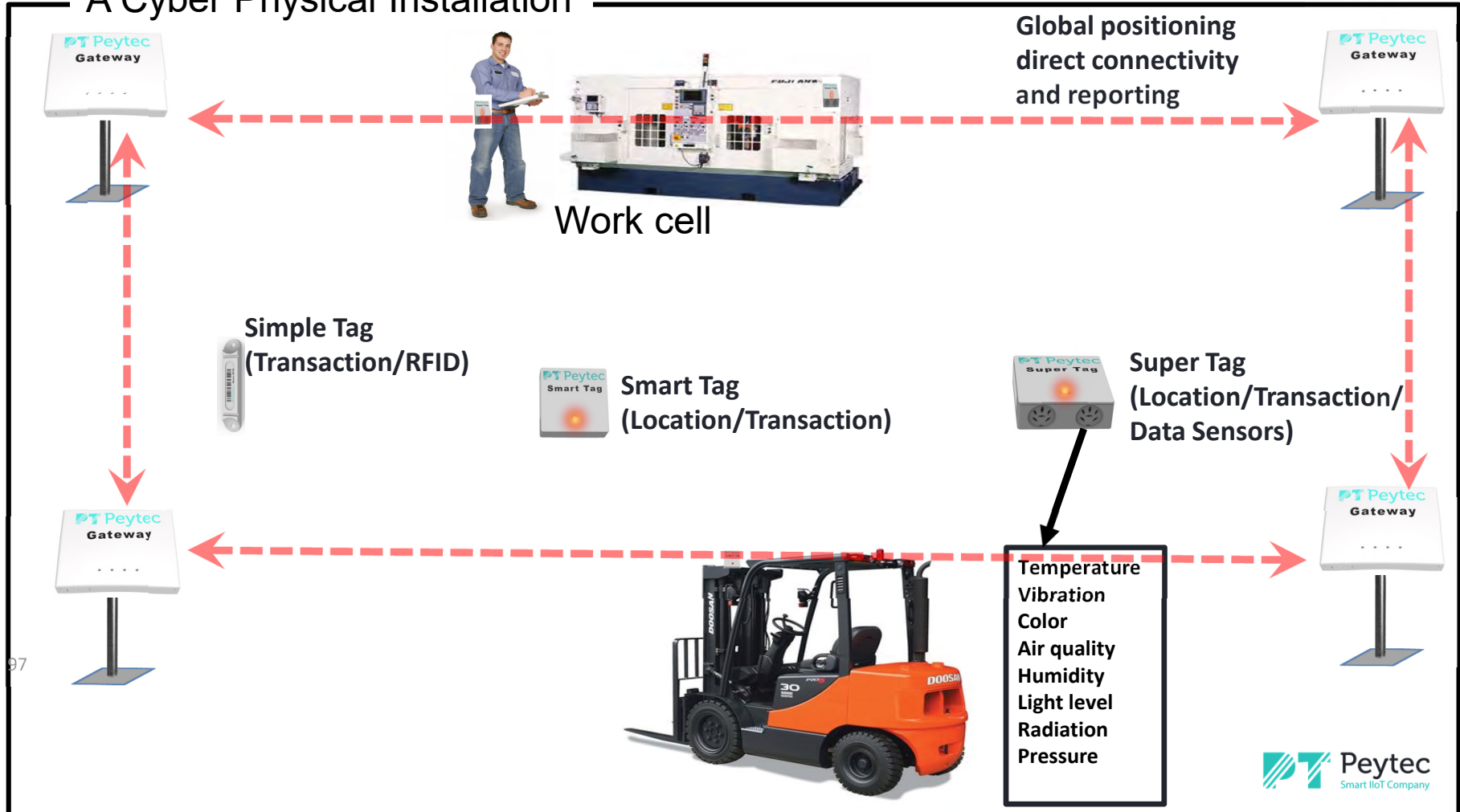
**GEN 4 Wireless Positioning and Sensing Network (WPSN)**

# Wireless Positioning and Sensing Network (WPSN®)

- Real-time activity status update (in Seconds/Within 10 cm) → Productivity enhancement
- Easy integration with existing business systems → Lower deployment cost
- No human intervention required → Lower operational cost
- 100% Inter-activity and communication at the sensor level



## A Cyber Physical Installation



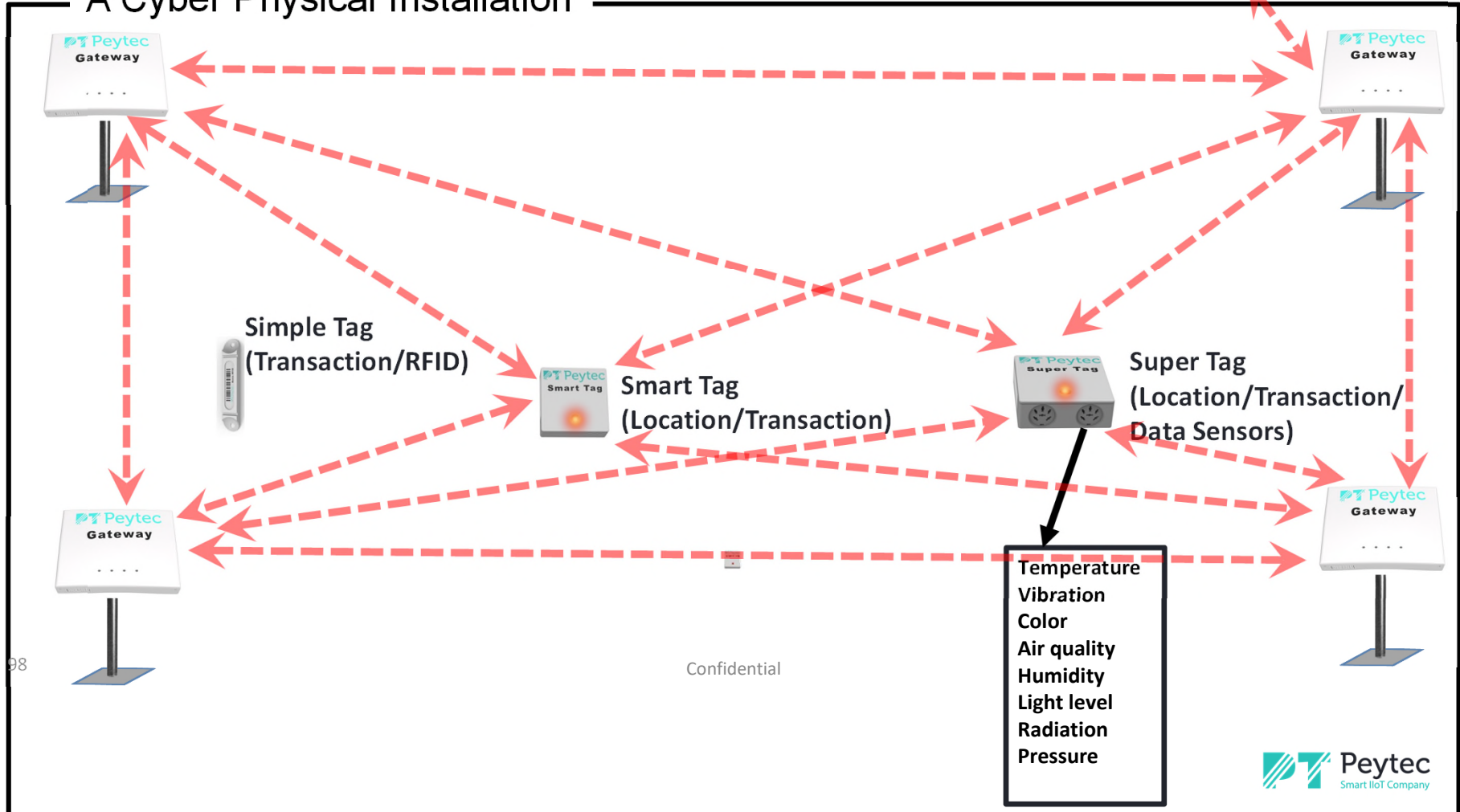
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Global positioning  
direct connectivity  
and reporting



## A Cyber Physical Installation

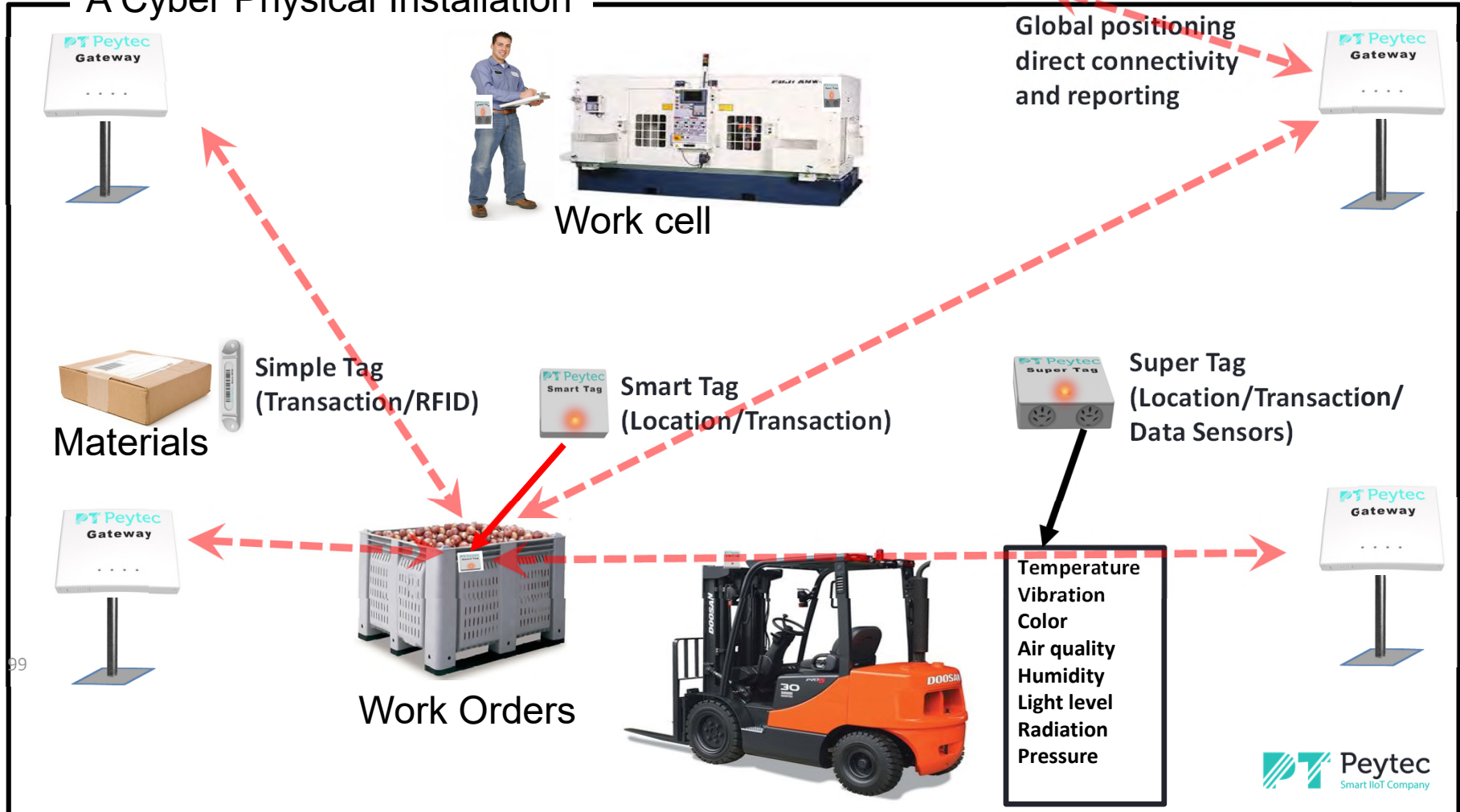


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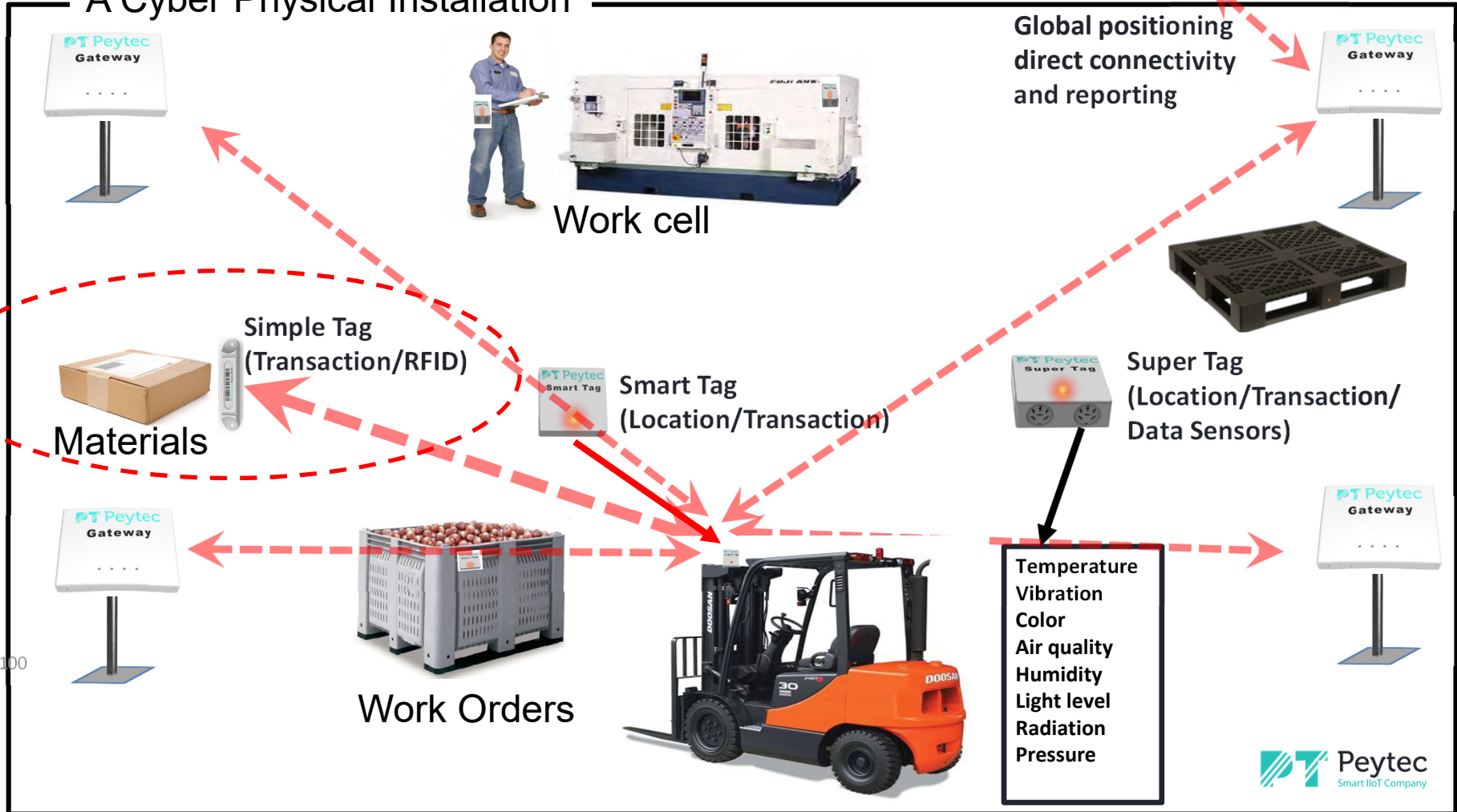


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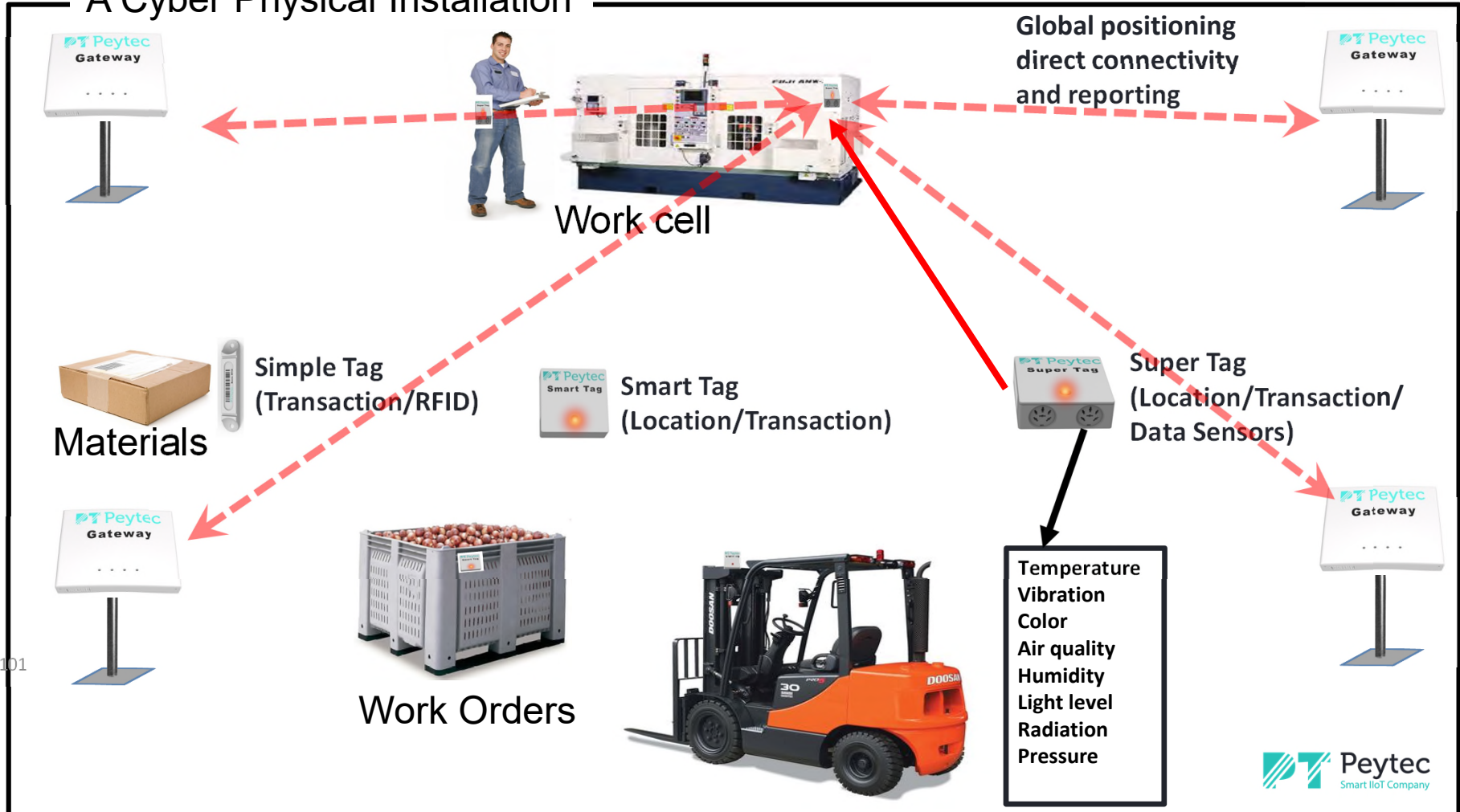


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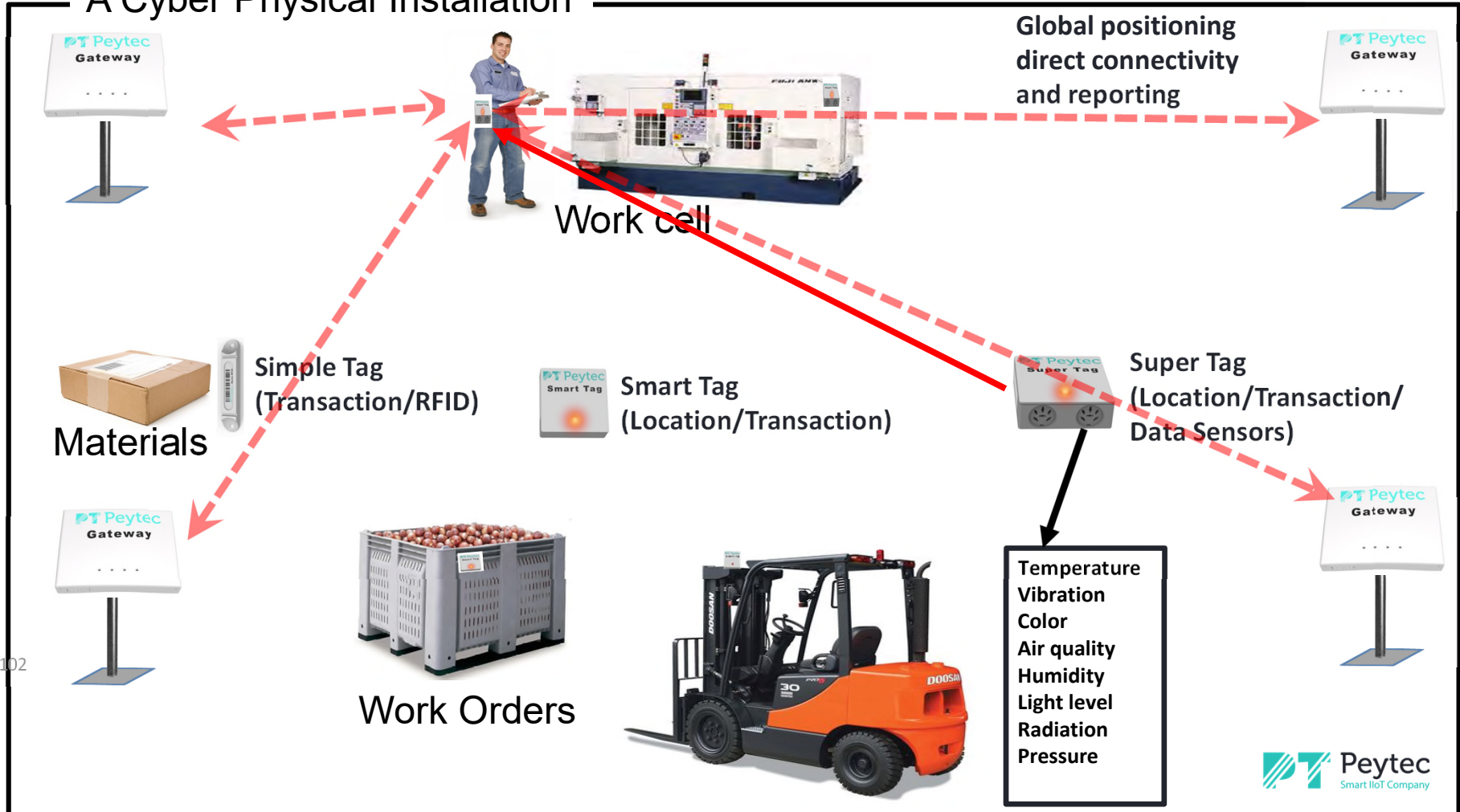


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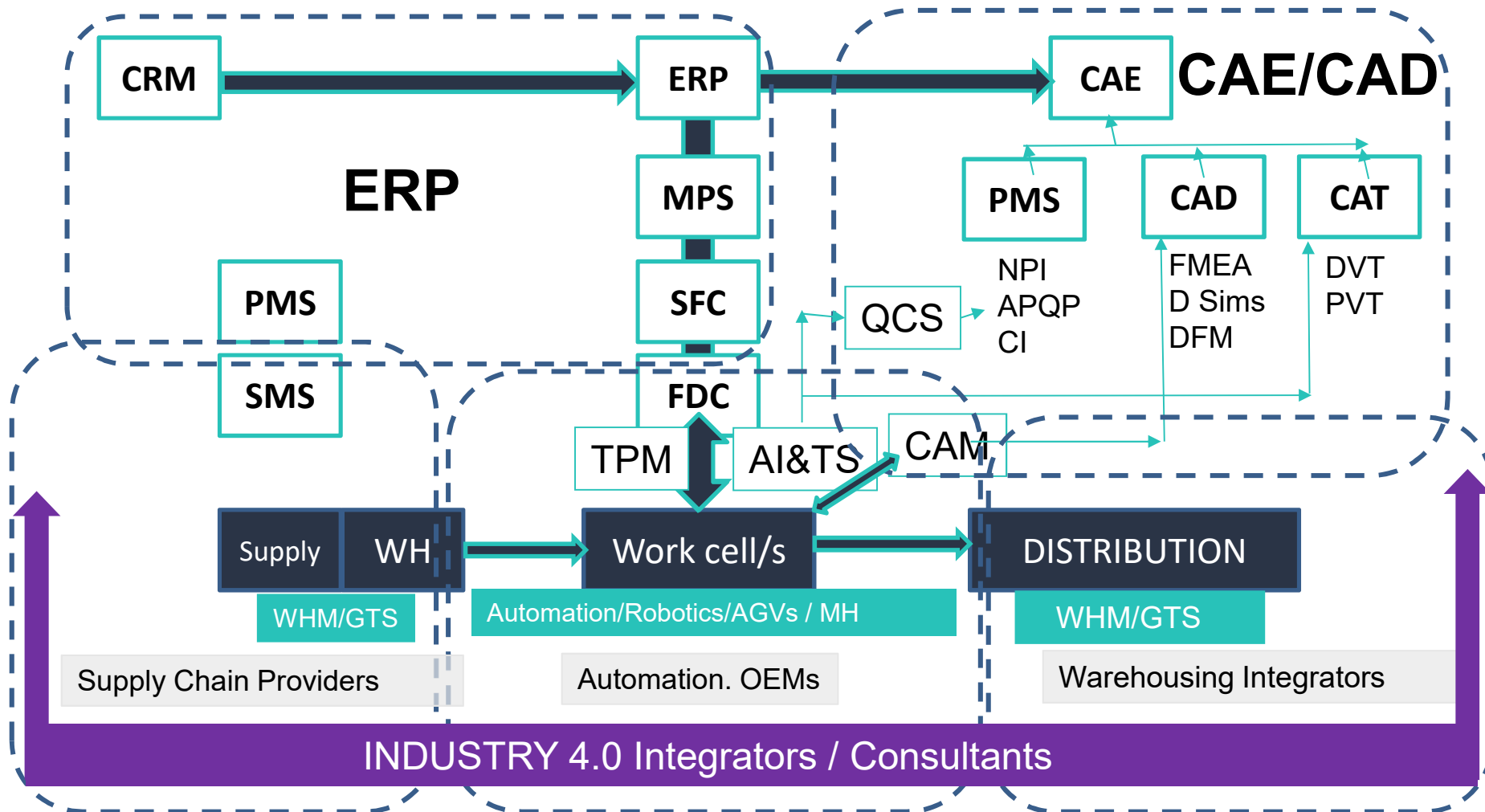
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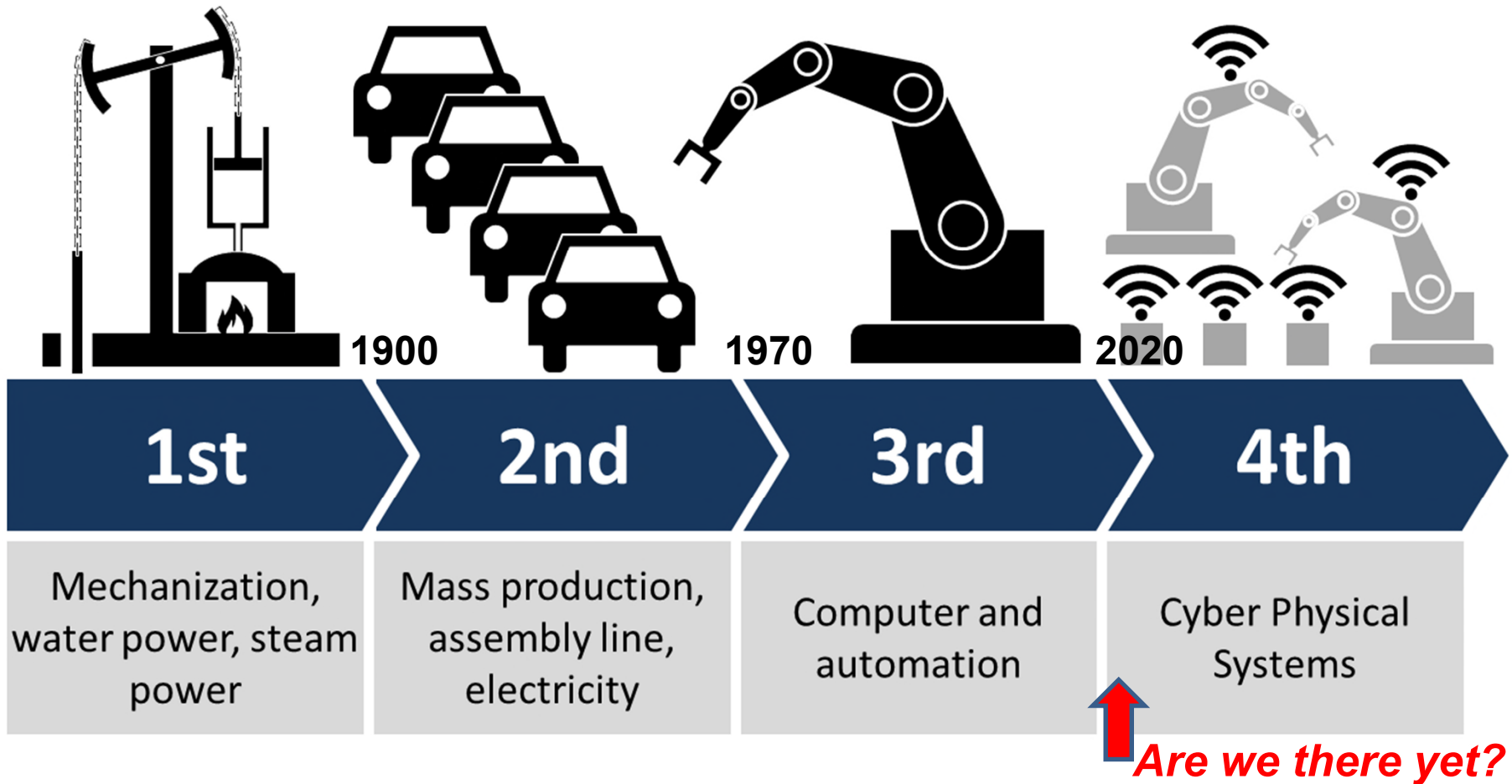
## A Cyber Physical Installation



# Business of The Future (BOTF)



# Industry 4.0...The Next Industrial Revolution/Opportunity



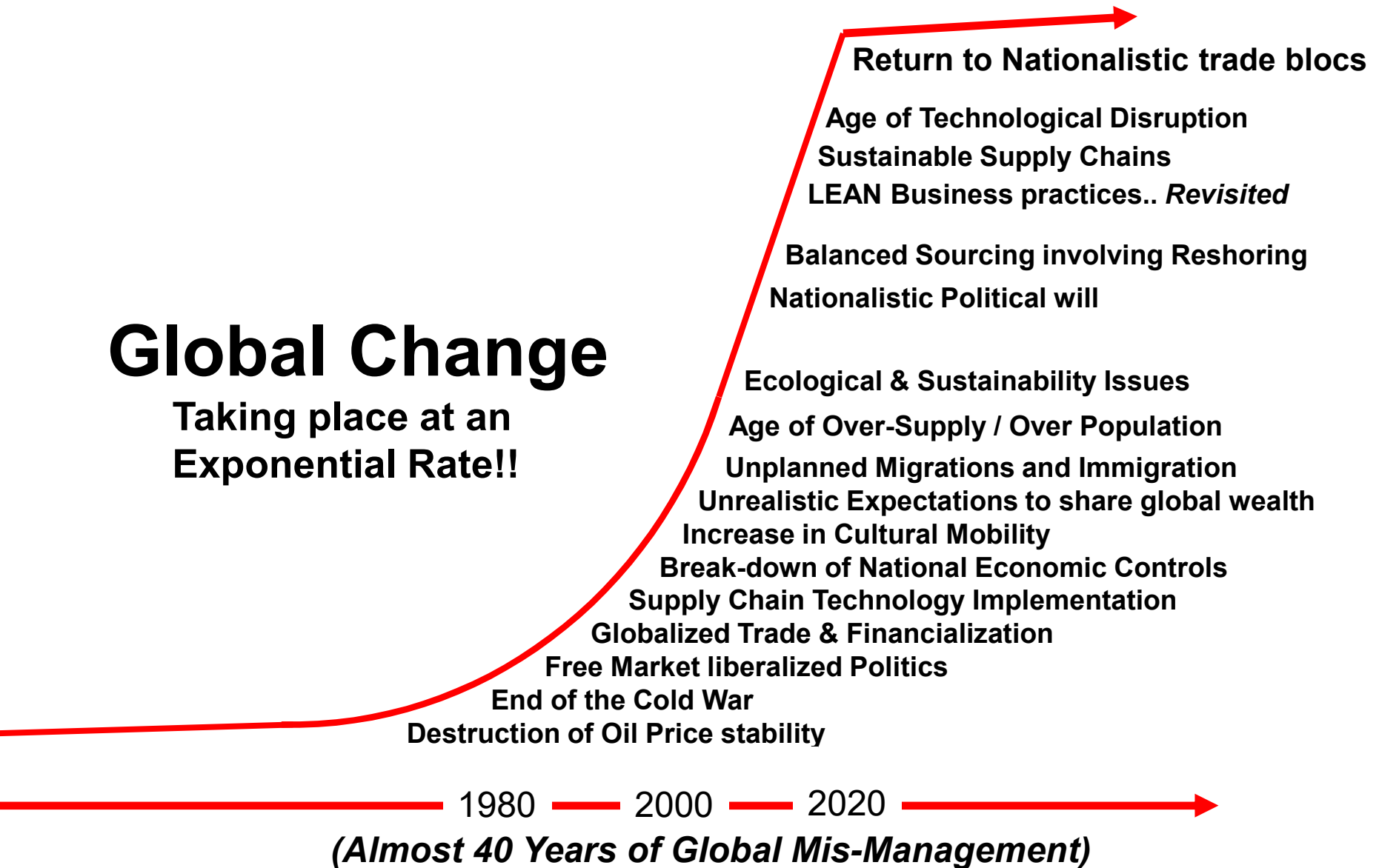
***This Disruption Can level the Manufacturing playing field.....  
..... between Low Cost Labor and Developed Countries***

# Questions?

# Globalization is NOT working

## Global Change

Taking place at an  
Exponential Rate!!





But....Are **WE** Ready???

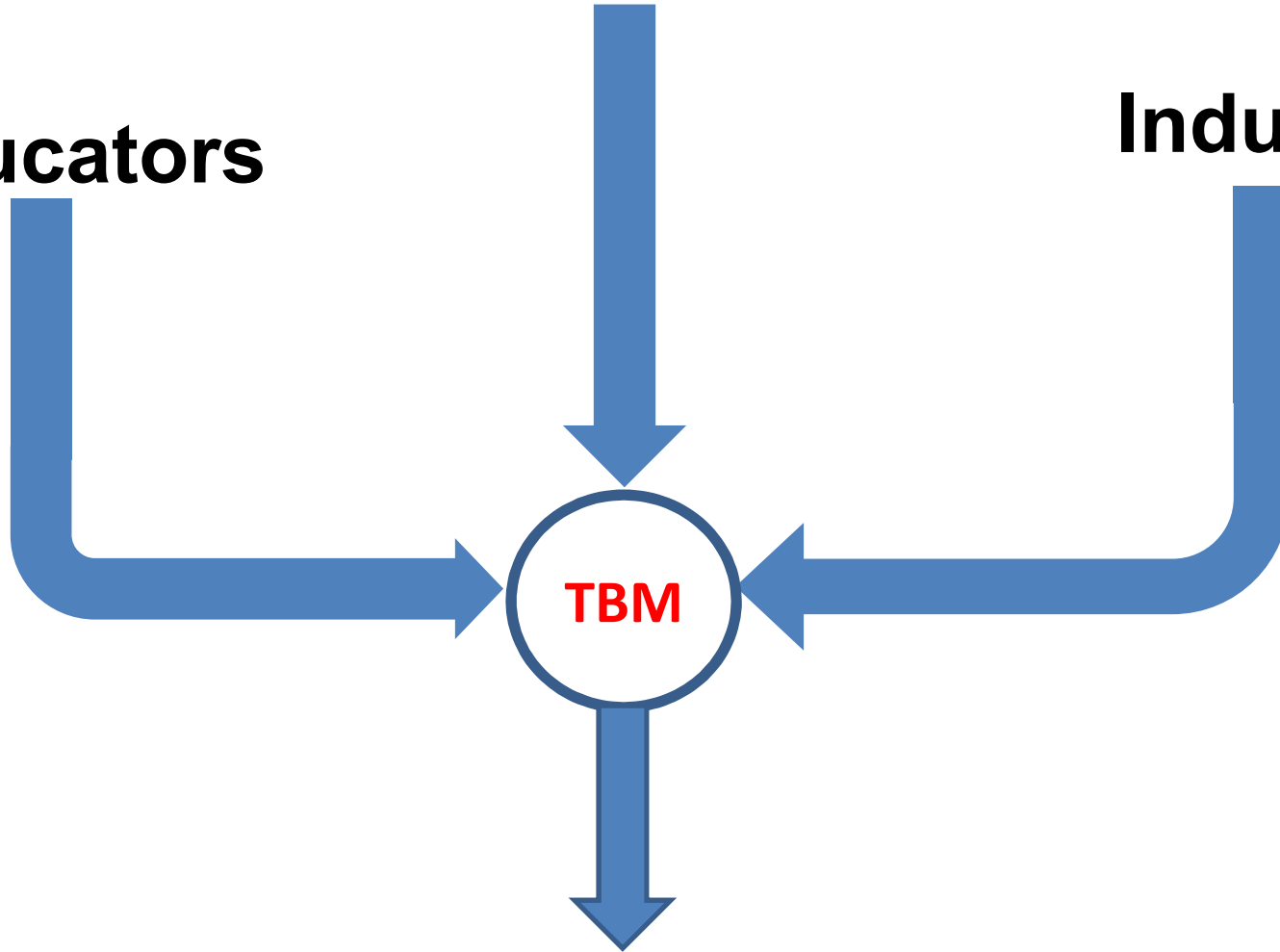


# - The 3 Parallel Imperatives

**Government**

**Educators**

**Industry**



**Manufacturing  
Prosperity for all.**

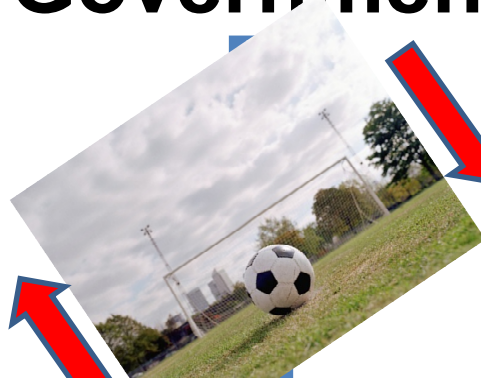


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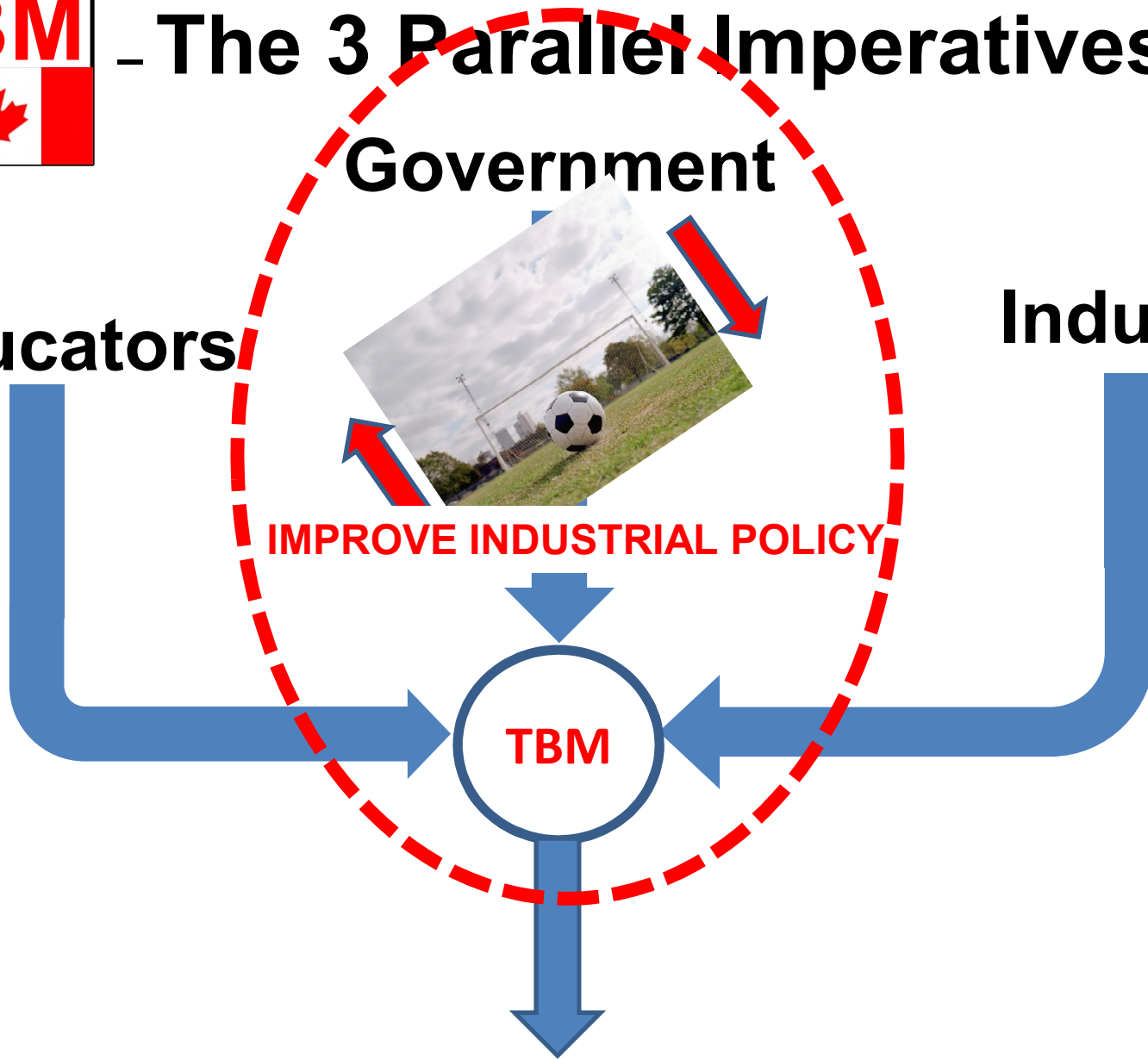
**Industry**



**IMPROVE INDUSTRIAL POLICY**

**TBM**

**Manufacturing  
Prosperity for all.**



# ***Our Biggest Threat.....***

## ***Unresponsive National Governments***



Avoid the fixation with multilateral solutions  
Focus on the local economy!  
Start looking at the national interest  
Citizens first ..... The Rest 2<sup>nd</sup>.





# - The 3 Parallel Imperatives

**Government**

**Educators**

**Industry**



**IMPROVE INDUSTRIAL POLICY**

**Hold a Policy Blitz process!!**

- Provide MORE support for Manufacturing
- Focused Industrialization POLICY and PLANS
- Avoid duplicated policy and support organizations

*In Ontario alone we have 18 different policy groups feeding off the public trough Issuing independent reports without integrated review and closure. Put them all in one room!.. Come out with one plan!*

**Manufacturing  
Prosperity for all.**

# Suggested New Industrial policy for Canada.

***“Make much more of what we consume”***

***“Use local resources much more in what we make”***

Understand that the USA is our natural “trading bloc” partner... move closer!

Continue to support (and possibly Reshore) traditional industries via new technologies....

Any ecological legislation must support the economy.

Ensure government investments are industry and associated infra-structure centered

Ensure national resource have more value added with effective government investments.

Mitigate foreign investments via a national industrial investment focus

Install a formal Integrated Industrial learning system to support the above.

Learn from lost decade (2005-15) ... Resource driven Dutch disease escalated the \$Loonie\$



**Take Back Manufacturing**

**[WWW.SME-TBM.ORG](http://WWW.SME-TBM.ORG)**



# - The 3 Parallel Imperatives

**Government**

**Industry**

**Educators**



**IMPROVE Balance**

**TBM**

**Integrated Industrial  
Learning system**

Balance Education/Training/Experience  
Focus on local population  
Ensure Learning is economically viable

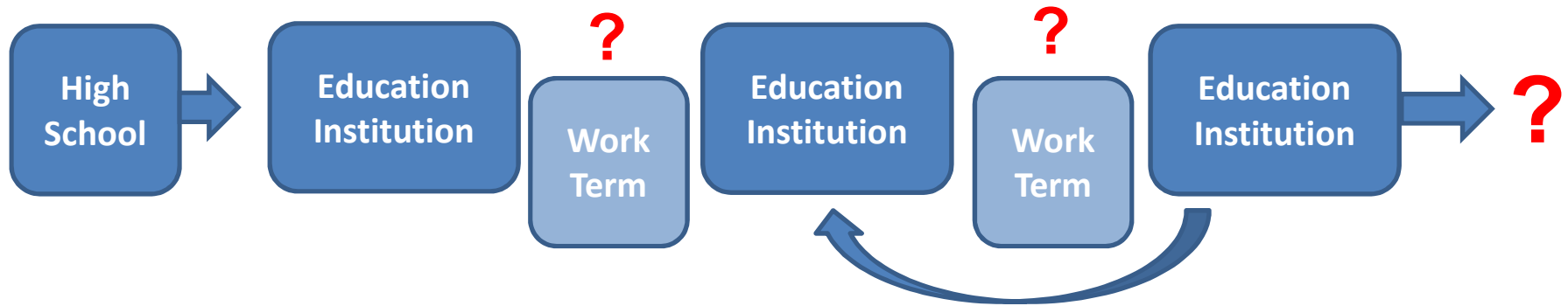
**Manufacturing  
Prosperity for all.**

# Integrated Industrial Learning System



***Take Back Manufacturing (TBM)***  
***Will demand the availability Of a future manufacturing workforce that Is well-educated, well-trained with industry experience.***

## Current Environment

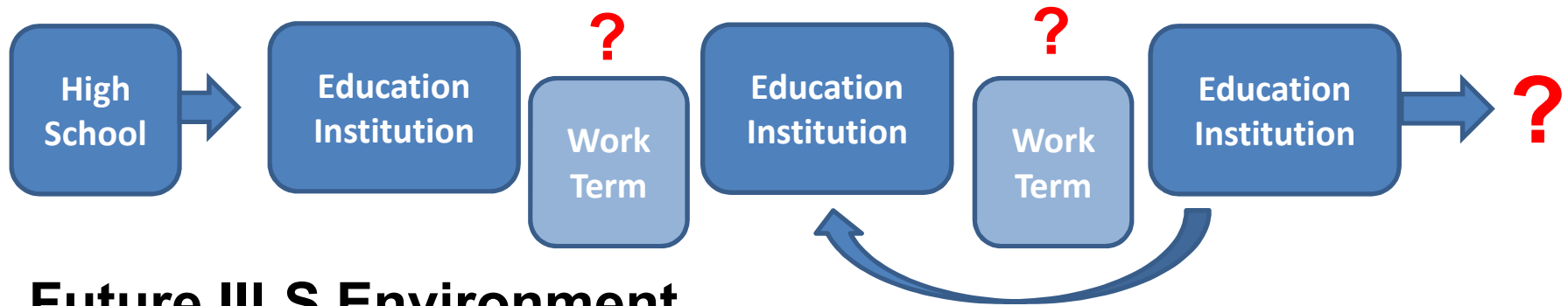


# Integrated Industrial Learning System

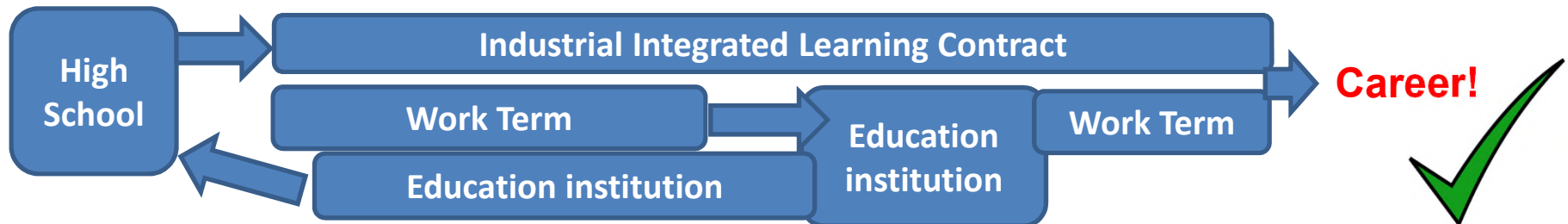


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## Current Environment



## Future IILS Environment



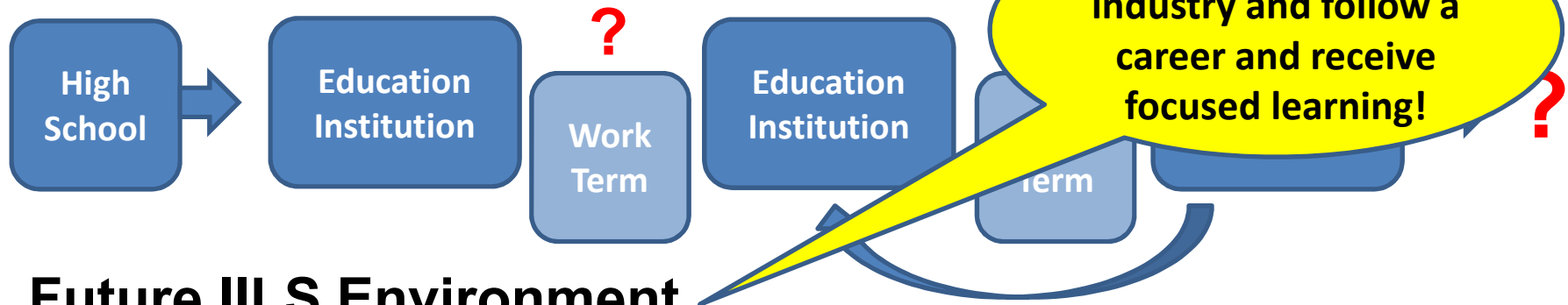
# Integrated Industrial Learning System



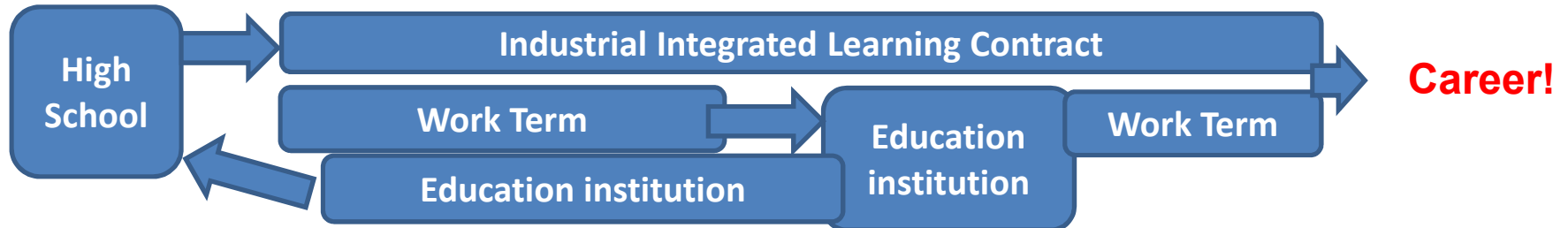
*Take Back Manufacturing (TBM)*  
*Will demand the available manufacturing workforce be well-trained with industry-relevant skills*

Provide education and hope they get a job?

## Current Environment



## Future IILS Environment



***Remove educational and association silos***

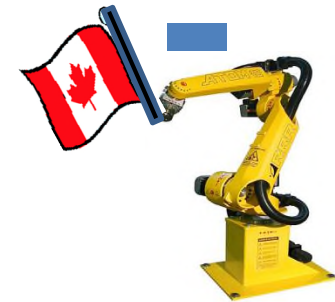


# - The 3 Parallel Imperatives

**Government**

**Educators**

**Industry**

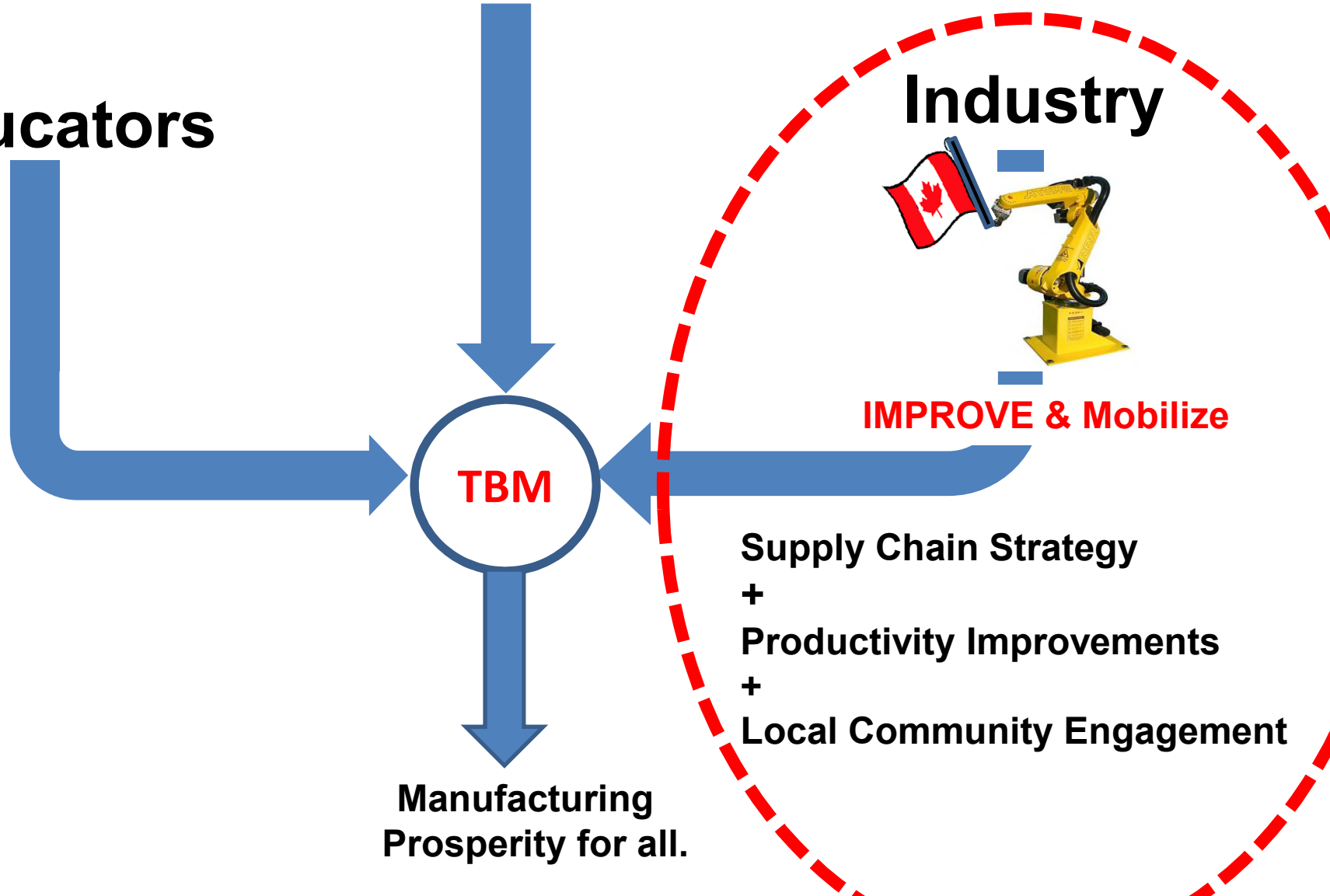


**IMPROVE & Mobilize**

**TBM**

**Supply Chain Strategy  
+  
Productivity Improvements  
+  
Local Community Engagement**

**Manufacturing  
Prosperity for all.**



# Industry Game-plan Checklist

## Supply Chain Strategy... *Reduce intrinsic waste*

Run a Balanced Sourcing model... Include all cost factors ...

Rethink Sourcing plans within NAFTA ... **RUN THE NUMBERS!!!** .... US/Canada + Mexico?

Develop shorter supply chains where possible (NAFTA + Global)

## Productivity Improvements... *In all aspects of the business*

Industrial Learning system ... Develop/retain/stabilize/mobilize workforce.

Re-invent business wide LEAN Thinking/Continuous Improvement Culture

**Need an Evolution Plan for the SMART FACTORY....** “Integration and connectivity.

New process technology/capital reinvestment... DISRUPTIVE technologies

**Apply to traditional sectors to Innovate New products**

## Local Community Engagement ..... *Work on the image*

**Re-engineer the “Image” of manufacturing** value for every-one!!

Make the rebuilding of small to large manufacturing facilities “easy and red tape free”.

Plan to minimize exposure to high energy, infrastructure logistics and transportation costs

Look at “manufacturing friendly” local taxes, Tariffs, Grants, savings and subsidies.

Ensure local legislations ( Safety/Human Resources/Environmental) are “business friendly”.

Encourage Import avoidance as well as export enhancement in fiscal rewards!!!

# ***Manufacturing has an IMAGE problem!!***

Most manufacturing-based businesses are beyond dispirited....

Our Politicians/Government/Educators/Population have little understanding of business and manufacturing...**We must EDUCATE them!!**

Manufacturing is deemed:

***Dark, Dirty, Dangerous, Deafening and Difficult....***

***..... And Smelly!***



**And....  
Highly unstable as a career!**





# Change ....

## The **Image** of Manufacturing

*Let's Make  
Manufacturing*  
**SEXY!**



### EXCITE the NEXT GENERATION



# TBM - The 3 Parallel Imperatives

## Government

## Educators



**IMPROVE Balance**

**Integrated Industrial Learning system**

Balance Education/Training/Experience  
Focus on local population  
Ensure Learning is economically viable

**IMPROVE INDUSTRIAL POLICY**

**Hold a Policy Blitz process!!**

## Industry



**IMPROVE & Mobilize**

**Supply Chain Strategy**

+  
**Productivity Improvements**  
+  
**Local Community Engagement**

**TBM**

**North-American Manufacturing  
Prosperity for all.**



# KEY Things to Remember

- **Our Manufacturing sectors are losing ground on all fronts to the global free market.**
- **Manufacturing Globalization is reversible, and Globalization has been and gone before..**
- **Global trade has been a very inefficient generator of real wealth.**
- **North America has the ability to become self sustaining...**
- **Manufacturing provides the strongest economic multiplier effect.....**
- **We only need 10% increase in price/cost of luxury goods to reshore/gain back prosperity.**
- **Sustainability not Economic growth will be the real driver of economic prosperity**
- **Our most treasured right must be our national citizenship, and the protection of personal worth, prosperity, and the stability of social order.**

# The Future Outlook

**NEXUS**

# **The Business of the Future...**

**LEAN Thinking will be a strong pre-requisite!**

**Local to Customers...** *Enables Short Supply Chain Trade Blocs*

**Sustainable to Economy/Environment/Community**

**Connected (Industry 4.0/IIoT)**

**Must be a LEAN Automated solution!**

**Flexible**

**Reliable**

**Capable to 6 SIGMA**

**Configurable Learning system (Agile)**

**Continuously Innovating and Improving**

**NEXUS**



# REMEMBER!

**LEAN Think it ...first!**

**Simplify then Automate**

**Don't Automate.... WASTE!**

*Be Prepared to paradigm shift and “Do Things Differently”*

# An old Vision of the Future....

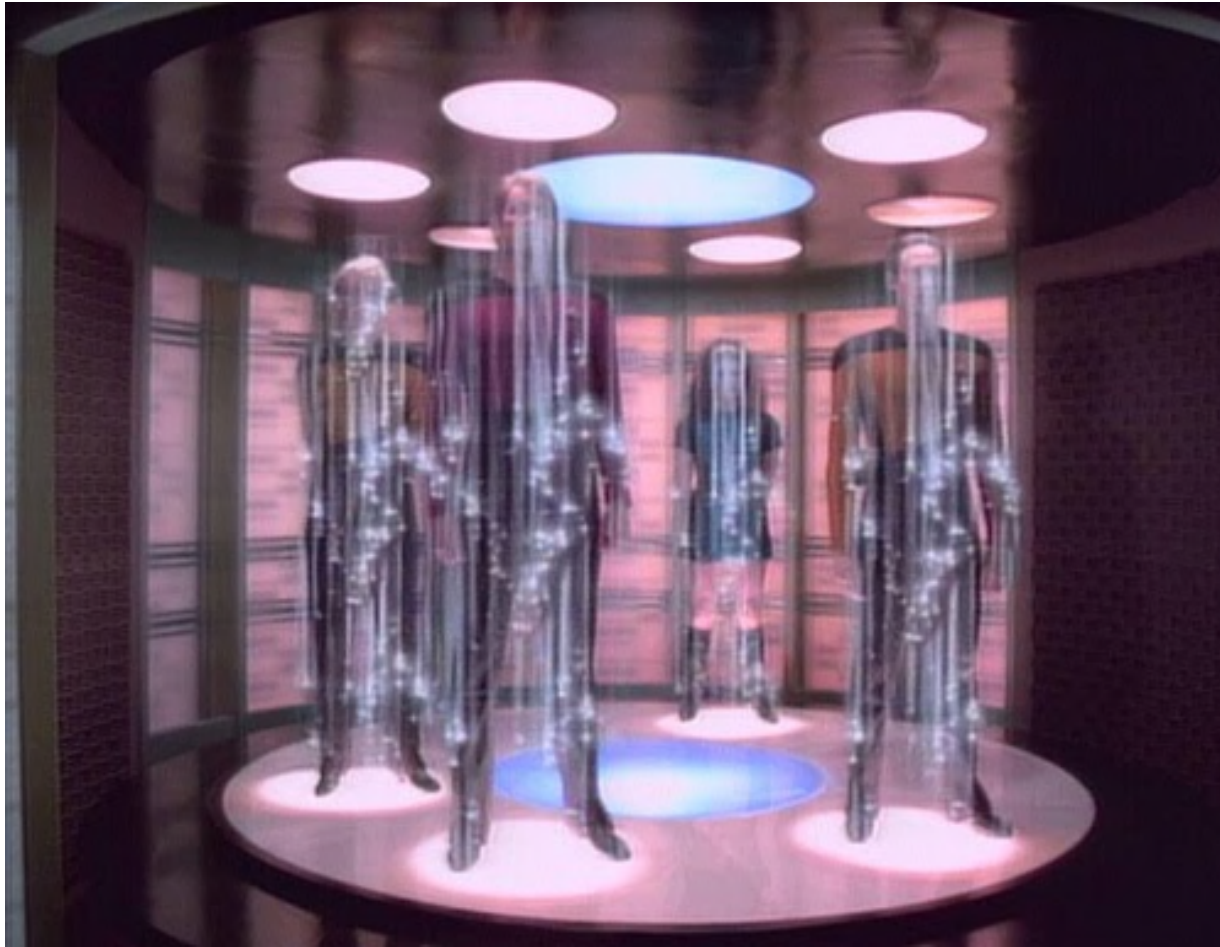


# **A Future Vision of the Future....**

**Think & VISION LEAN into the Future!**

# A Future Vision of the Future....

Think & VISION LEAN into the Future!



*Most Engineers think that  
Star Trek isn't science  
fiction;  
It's fact .....  
It just hasn't happened  
.....yet!*

**Anyway....Keep LEAN-ing *Toward* Industry 4.0**



**TBM** Take Back Manufacturing

[WWW.SME-TBM.ORG](http://WWW.SME-TBM.ORG)



*To successfully Innovate and embrace Disruptive Technologies and embrace sustainable supply chains, organizations will need to integrate LEAN THINKING principals into everything they do.*

# Questions?

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