

# Supply chain transformation enabled by advanced technologies

## Implications for producers, consumers and society



# Digital Supply Chain Consortium

- **Work-to-date**



- Digital Transformation scenarios
- Digital Innovation and collaborative consortia models; reflections on Remedies
- Digital Network Design; multi-layer modelling

- ***Input sessions to future activity***

- *Capturing value in digital supply chains – incremental and radical perspectives*
- *Refining the ten scenario transformation framework – academic and practitioner perspectives*
- *Digital backbone – a gamification approach through pairwise comparison*

# Reconfiguring medicines E2E supply – Project Remedies

- Headed up by GlaxoSmithKline (GSK)
- Research led by the University of Cambridge's Institute for Manufacturing (IfM)
- Brings together key players in the medicines end-to-end supply chain
- £11.5 m contribution from industry, £11.5 m of government funding through The Advanced Manufacturing Supply Chain Initiative (AMSCI) and the Scottish Funding Council

<http://remediesproject.com/>



## Processes and Technologies developed:

- ➔ Continuous Manufacturing techniques that shrink factory scale, provide speed, lower cost
- ➔ Smart Packaging technologies that enable product tracking, monitoring and patient engagement
- ➔ Technologies that support right-first time quality and yield improvements
- ➔ Improved Process Analytical Technologies for in-line monitoring and quality assurance
- ➔ Supportive Regulatory Regimes for these emerging technologies
- ➔ Developing new End-to-End SC Clinical & Commercial platforms that support patient-centric agile supply

# World Economic Forum initiative



## World Economic Forum 2018, 12<sup>th</sup> Jan 2018 Weekly Expert Edition:

- *Future Agenda: Srjai J.S., The Digital Supply Chain Revolution- A mountain worth climbing?*
- *On our Radar: Podcast: Srjai J.S., A glimpse into the future digital transformation in manufacturing supply chains?*

# Shaping the Future of Production - Six drivers on how production will play out through to 2030



## Disrupted

Exponential **takeoff of new technologies**, early breakthroughs propelling artificial and machine intelligence to unimaginable levels. Hyperconvergence of key technologies already happening.

## Damaged

Populism and unbridled protectionism translate into a profoundly **uneven landscape for global production** – widespread “islandization” of both economies and production systems.



## Deterred

Advancement of production curtailed by pervasive **cyber conflict** between states and their proxies, owing to critical infrastructure being compromised and production processes being interrupted.

## Devolved

Sharp deterioration in the physical environment prompts urgent action to mitigate the consequences, leading to **production becoming more localised**.

# Digital Lighthouses

## Use-Cases

- 14 sites nominated
- China, Europe, US

## Performance differentiators

- OEE
- Inventory reduction
- Lead Time
- Labour Productivity
- Quality Defect Reduction
- Energy Saving



TECHNOLOGY ADOPTION

WORKFORCE

COMMUNITY

**LEGEND**

- Stock to Grow
- Intervention
- Challenge
- Stock to Reduce
- Technology
- Project

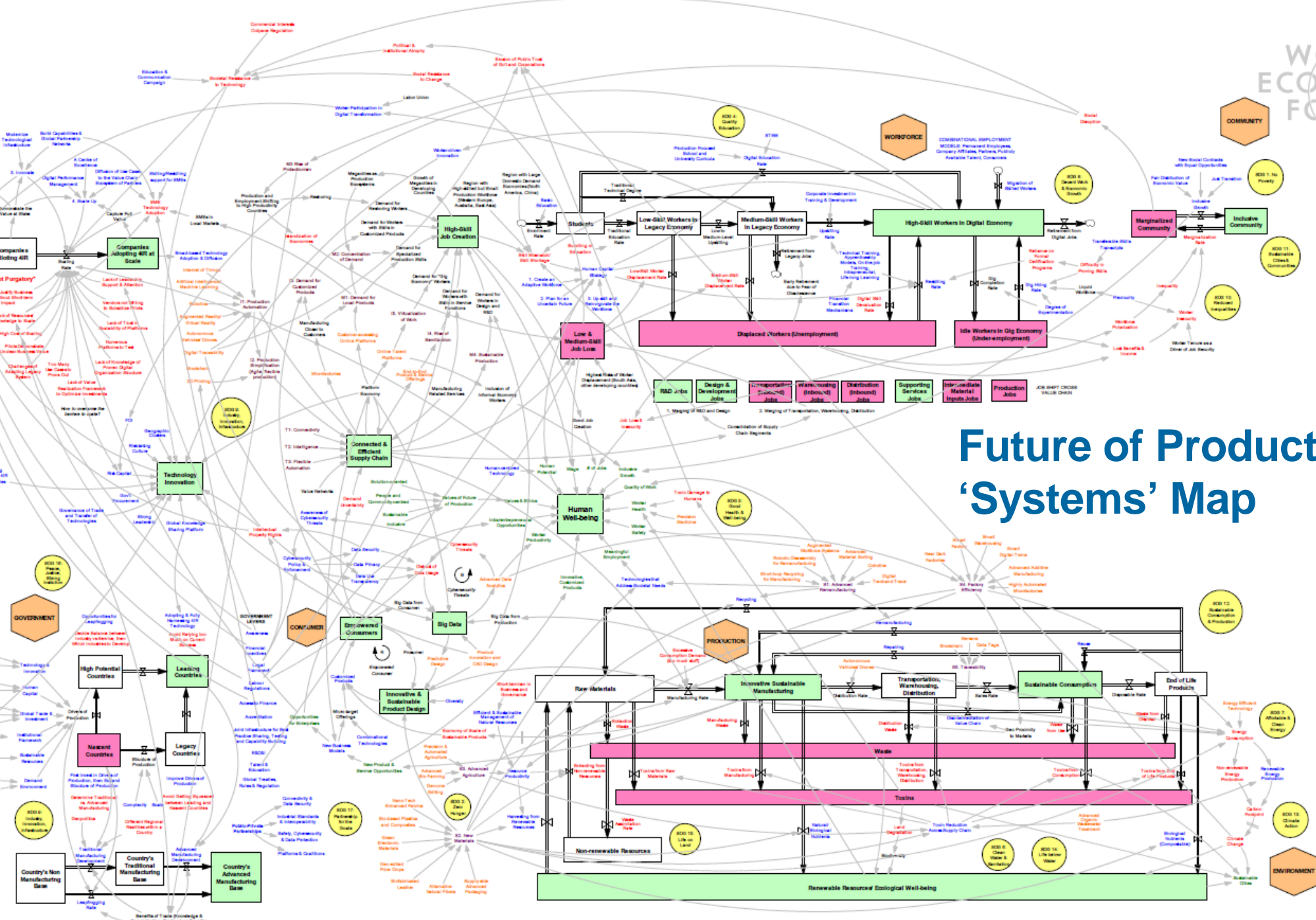
T: Technology Megatrends  
 I: Industry Trends  
 M: Macro Trends  
 S: Sustainability Trends

⌚: Resilience (Positive) Line  
 ⌚: Resilience (Negative) Line

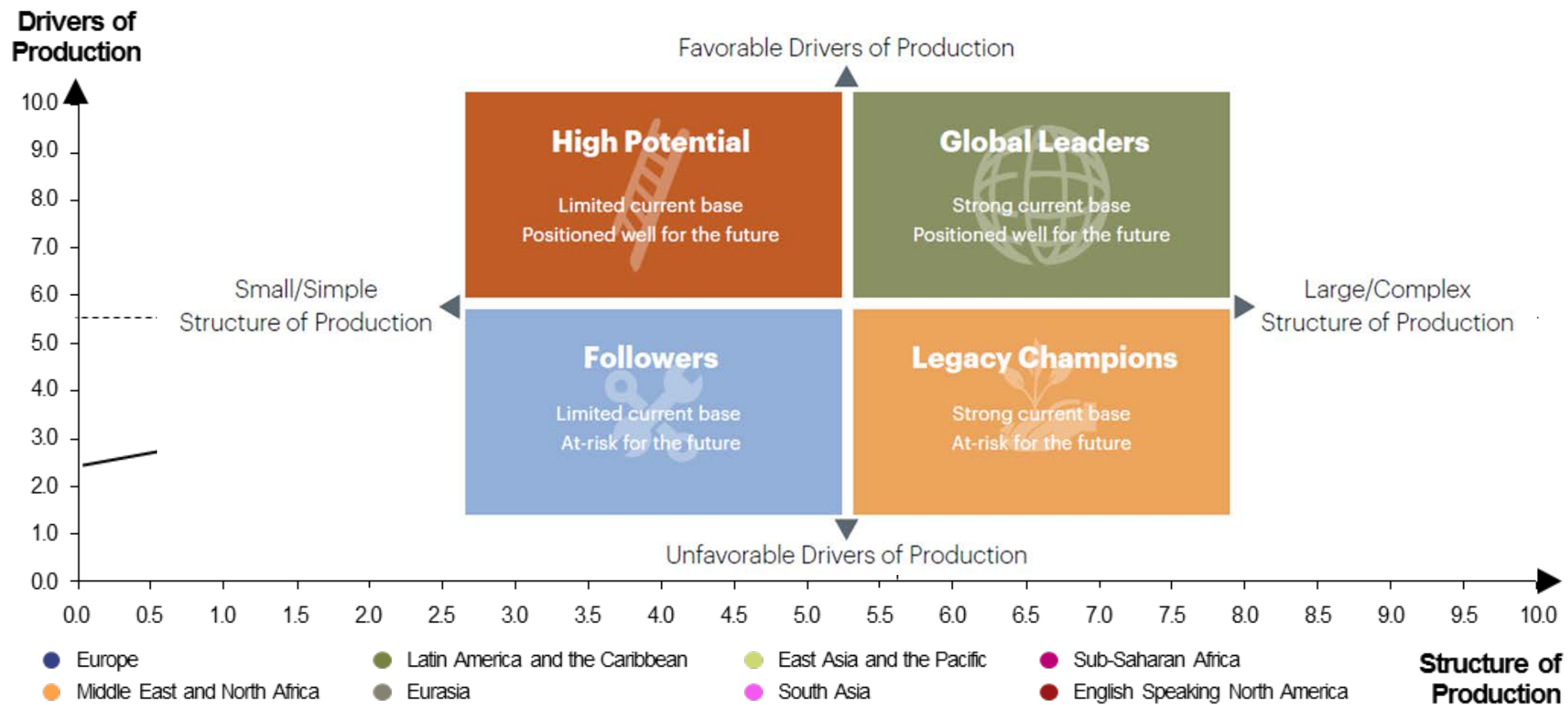
⬆️: Positive Causality  
 ⬇️: Negative Causality

Future of Production Systems Map

Future of Production 'Systems' Map



# 4IR - Country Readiness and projected impact on jobs





# Projected impact of 4IR digital technologies on jobs

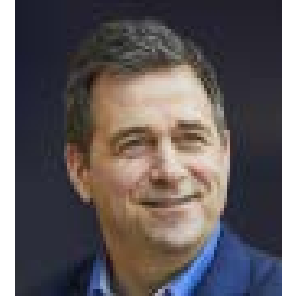
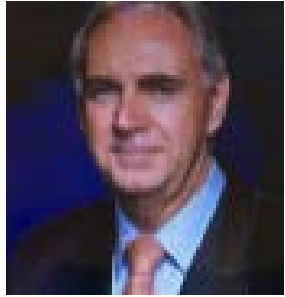
Geographies will be effected in different ways, as job creation will not occur equally across regions or types of workers



<p><b>Western Europe</b> Current: 15.4 million people (5% of total) Change: -17.5%</p> <p>↑ R&amp;D +30% Services +7%</p> <p>↓ Logistics -21% Fabrication -25%</p>	<p><b>Eastern Europe</b> Current: 14.5 million people (5% of total) Change: -19.3%</p> <p>↑ R&amp;D +22% Services +3%</p> <p>↓ Logistics -21% Fabrication -21%</p>	<p><b>Latin America</b> Current: 15 million people (5% of total) Change: -21%</p> <p>↑ R&amp;D +19% Services +3%</p> <p>↓ Logistics -21% Fabrication -23%</p>
<p><b>North America</b> Current: 8.2 million people (3% of total) Change: -1.2%</p> <p>↑ R&amp;D +42% Services +24%</p> <p>↓ Logistics -12% Fabrication -4%</p>	<p><b>China</b> Current: 115 million people (36% of total) Change: -6.5%</p> <p>↑ R&amp;D +38% Services +18%</p> <p>↓ Logistics -10% Fabrication -9%</p>	<p><b>East Asia</b> Current: 10.9 million people (3% of total) Change: -18.3%</p> <p>↑ R&amp;D +37% Services +8%</p> <p>↓ Logistics -23% Fabrication -24%</p>
<p><b>South Asia</b> Current: 57.9 million people (18% of total) Change: -22.6%</p> <p>↑ R&amp;D +20% Services +1%</p> <p>↓ Logistics -23% Fabrication -22%</p>	<p><b>Rest of World (Other)</b> Current: 79 million people, (25% of total) Change: -26.8%</p> <p>↑ R&amp;D +16% Services 0%</p> <p>↓ Logistics -25% Fabrication -31%</p>	<p><b>Notes:</b></p> <ul style="list-style-type: none"> <li>• Number of people are the total number of people engaged within that geography for the 5 value chains</li> <li>• % of total is the % of people that geography employs of the total global employment of the 5 sample value chains</li> <li>• Change is the net change in employment for the specific geography</li> </ul>

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## Industry Day 1



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## Academic Day 2

### Keynotes



### Parallel Tracks

Global supply networks

Digital supply chain design, analysis and operation

Sustainability and the circular economy

Supply chain transformation enabled by advanced technologies

Digital supply chain analytics

### Special Tracks



Digital transformation of the Automotive supply chain



Food supply chains – Sustainable production



Global Manufacturing and China

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## Evening dinner – Christ's College

