



# **Sustainable Production Taxonomy**

**Global Manufacturing Think Tank**

**Cranfield University**

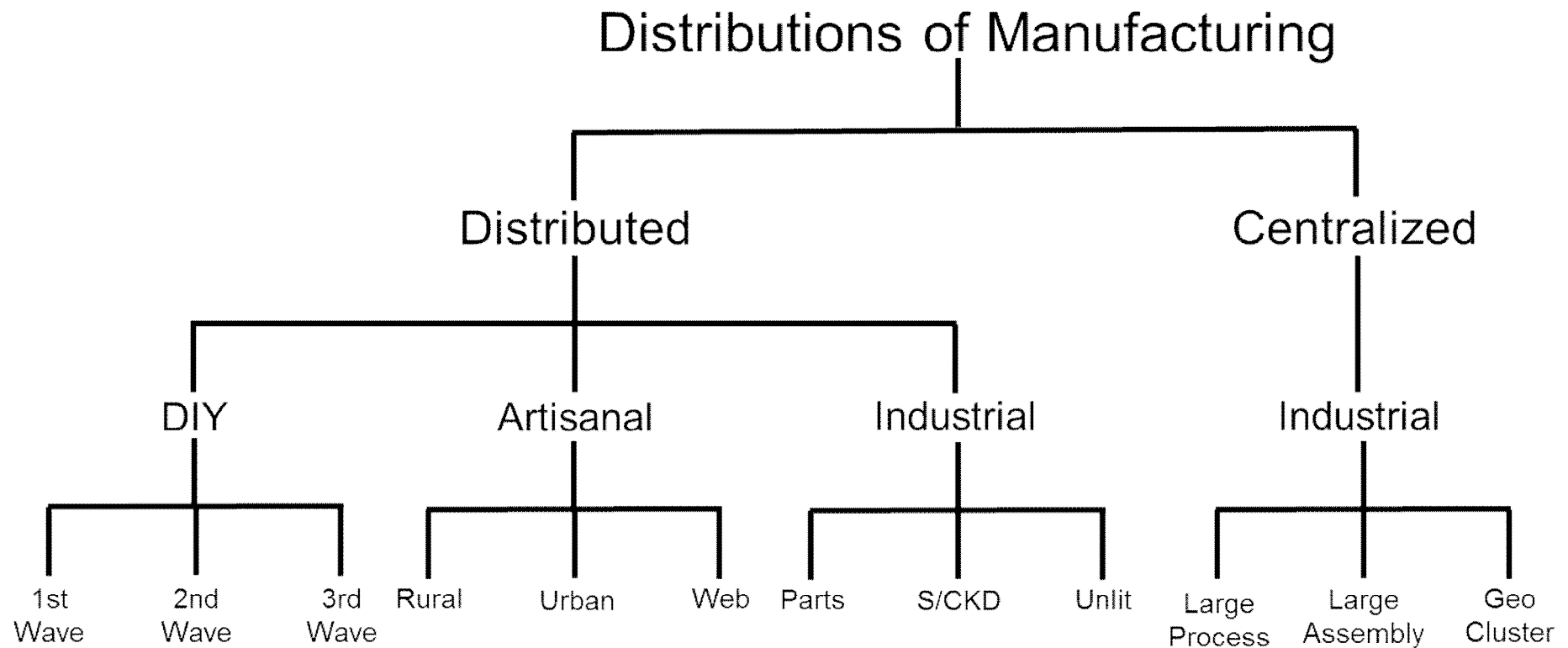
**7<sup>th</sup> March 2017**

**Stephen Fox**

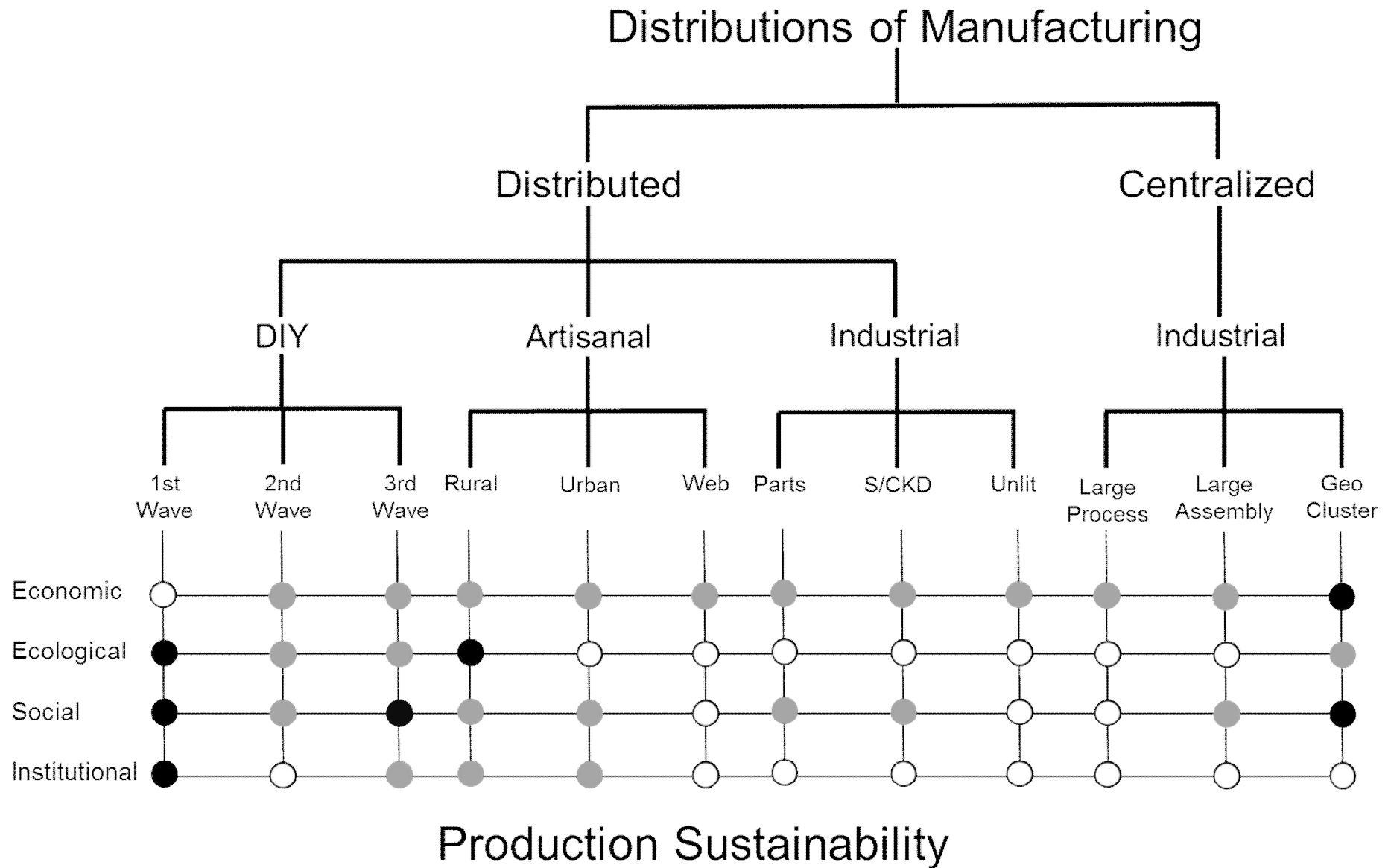
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# Sustainable Production Taxonomy



# Sustainable Production Taxonomy



# Opportunities for Manufacturing

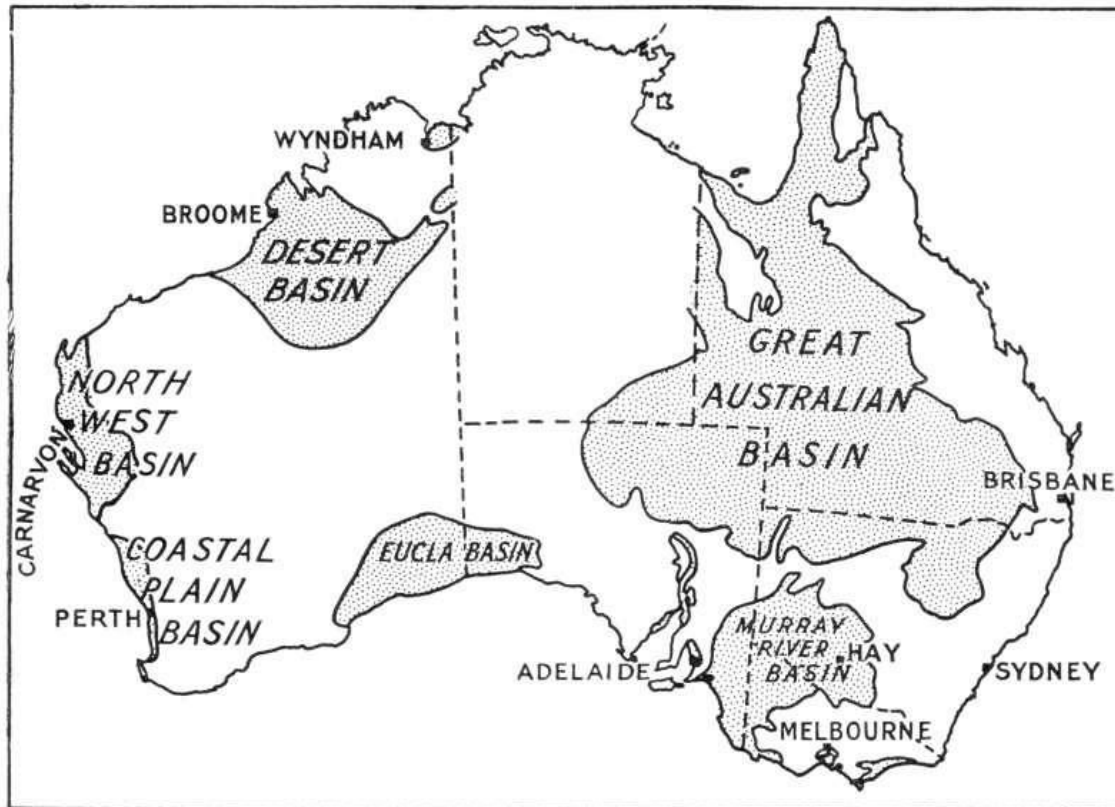
## Australia

Losing manufacturing

Mass internal migration



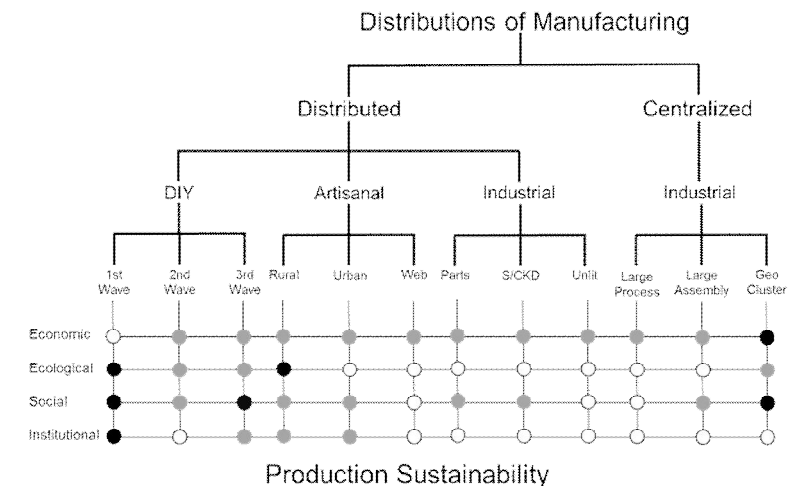
# Opportunities for Manufacturing



Australia

Intense sunlight

Vast underground waters

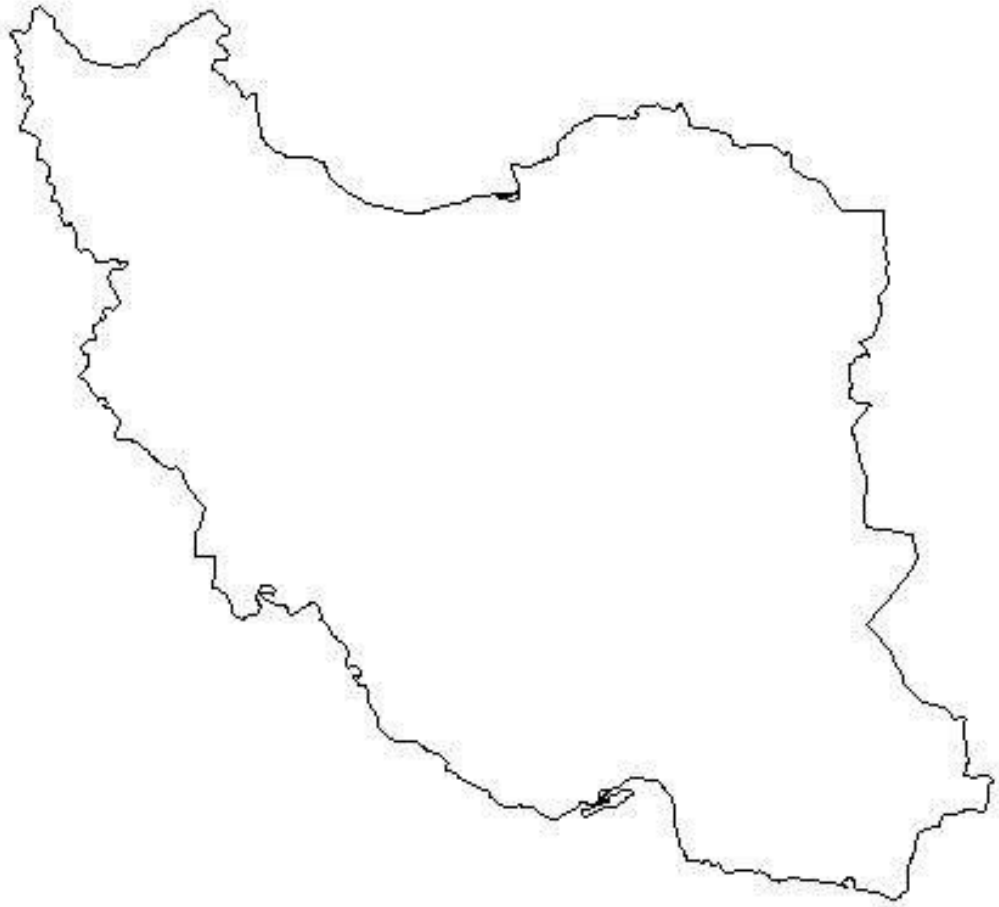


# Opportunities for Manufacturing

## Iran

Manufacturing in north

Poverty in south



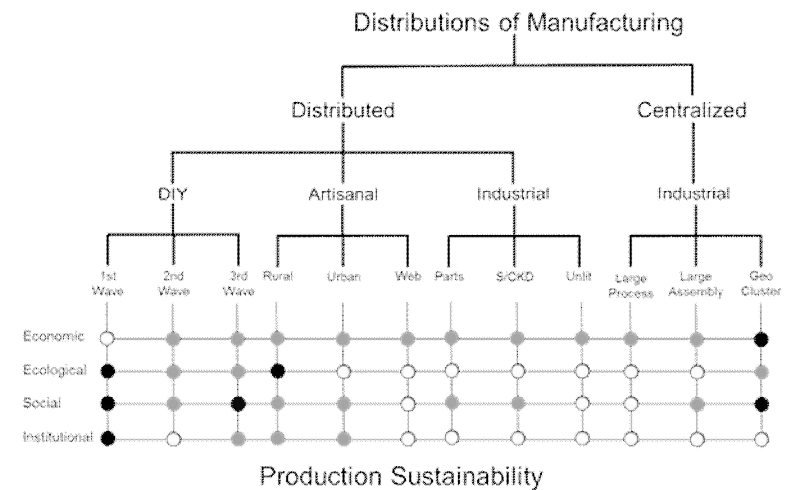
# Opportunities for Manufacturing



## Iran

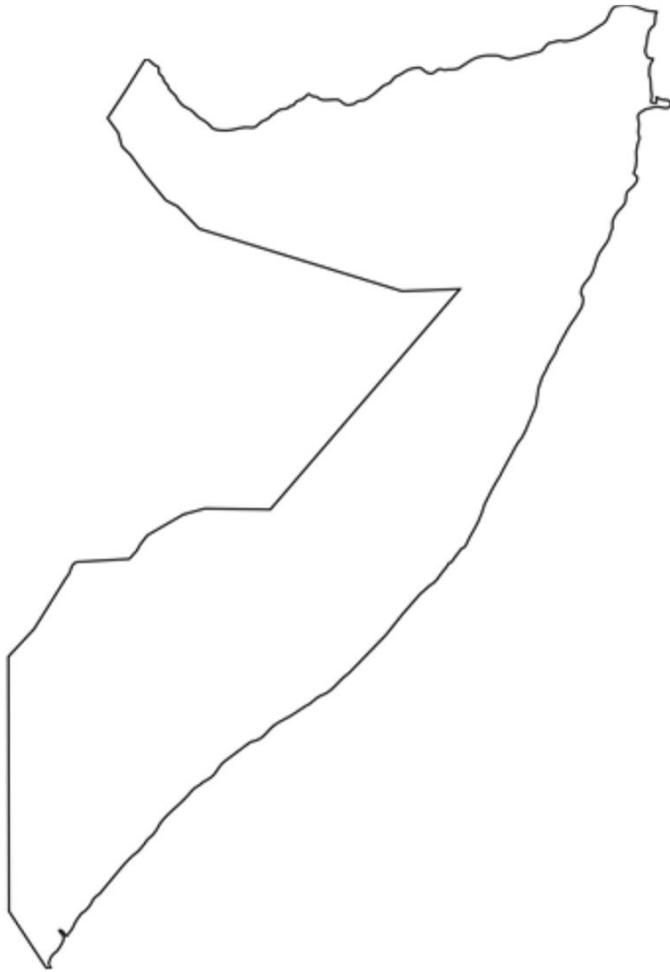
Cotton, fish, sand

Close to big markets





# Opportunities for Manufacturing

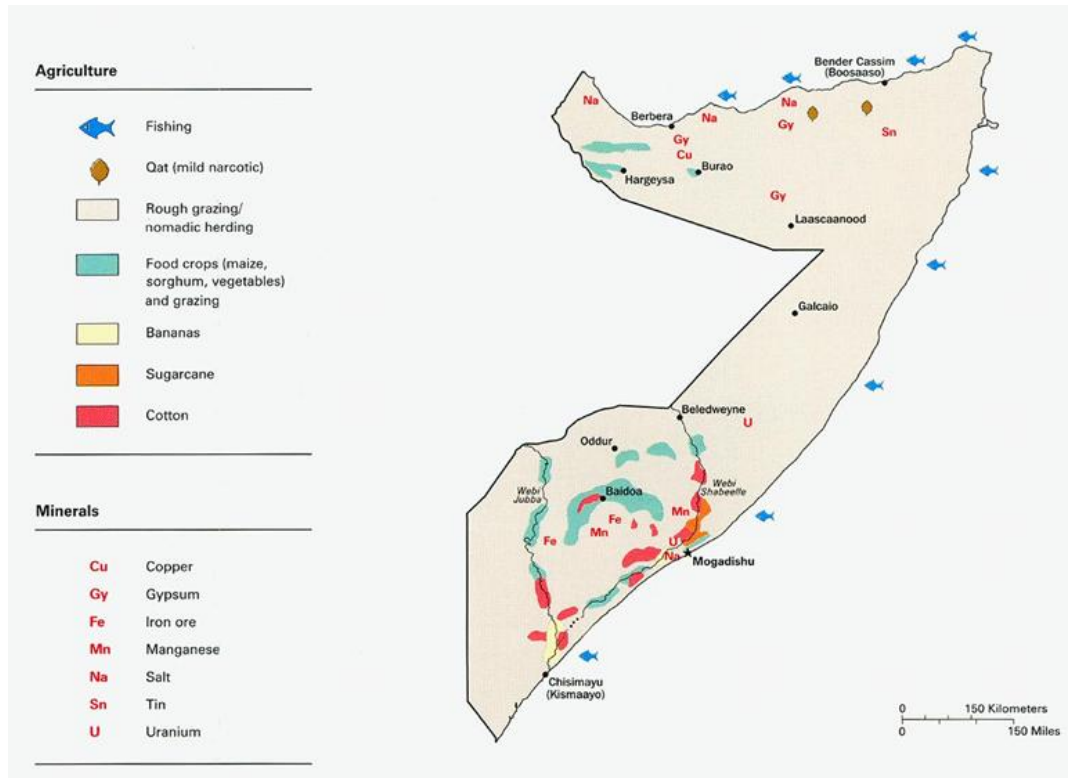


## Somalia

Manufacturing destroyed

Fragile regions

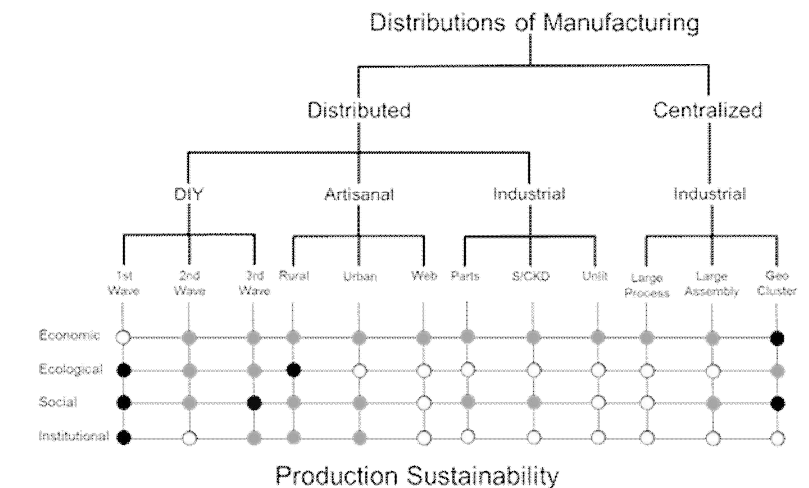
# Opportunities for Manufacturing



## Somalia

Rich in natural resources

Entrepreneurial people



# Opportunities for Manufacturing



Turkey

Manufacturing in north

Poverty in south

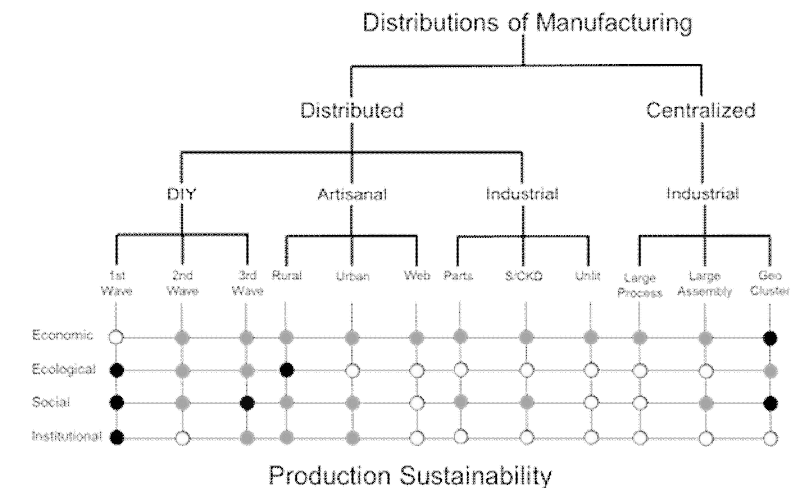
# Opportunities for Manufacturing



## Turkey

Government support

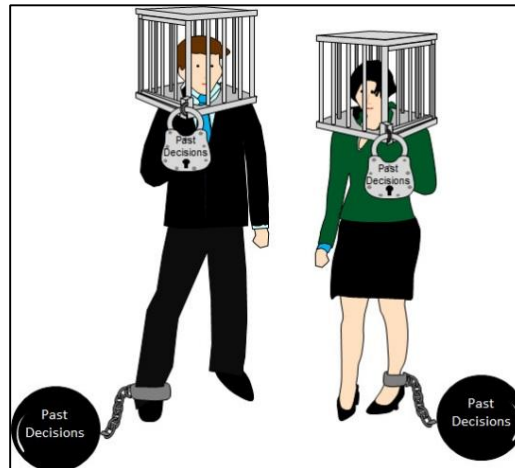
80 new factories p.a.



# Challenges for Manufacturing



Path Dependency



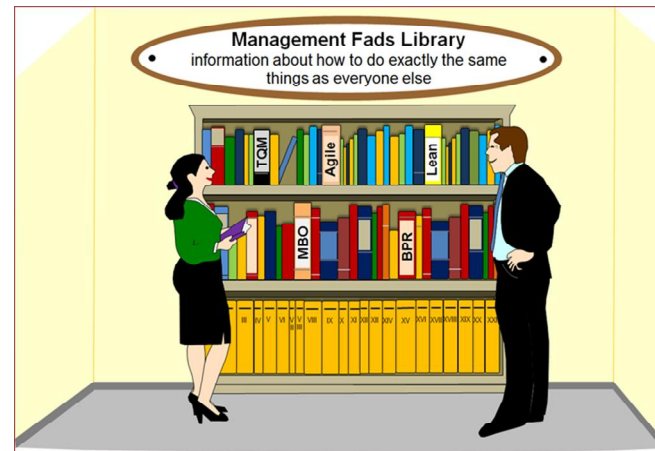
Lock-in



Prime Minister Hani Mulki attends the signing of a deal between Jordan and the EU on simplifying the rules of origin (Photo courtesy of EU mission)

Path dependencies and lock-ins can involve new manufacturing investments being based on past investments. This happens even when past investments were not successful. For example, EU's 2016 relaxed “rules of origin” deal with Jordan for factory production.

# Challenges for Manufacturing



Fads



Hype



## Emerging Tech 2015: Distributed manufacturing



Written by  
**Bernard Meyerson**  
Chief Innovation Officer and Vice-President, IBM Corporation

Published  
Wednesday 4 March 2015



### Latest Articles



**Africa can become a global economic powerhouse. This is how**

*Distributed manufacturing is one of 10 emerging technologies for 2015 highlighted by the [World Economic Forum's Meta-Council on Emerging Technologies](#).*

Distributed manufacturing turns on its head the way we make and distribute products. In traditional manufacturing, raw materials are brought together, assembled and fabricated in large centralized factories into identical finished products that are then distributed to the customer. In distributed manufacturing, the raw materials and methods of fabrication are decentralized, and the final product is manufactured very close to the final customer.

In essence, the idea of distributed manufacturing is to replace as much of the material supply chain as possible with digital information. To manufacture a chair, for example, rather than sourcing wood and fabricating it into chairs in a central factory, digital plans for cutting the parts of a chair can be distributed to local manufacturing hubs using computerized cutting tools known as CNC routers. Parts can then be assembled by the consumer or by local fabrication workshops that can turn them into finished products. One company already using this model is the US furniture company AtFAB.

Fads and hype use vague terms and fallacious reasoning, including: arguing from authority, fallacies of single cause and incomplete evidence, which involve cherry picking particular aspects of special cases, such as digital data transfer in production of wooden furniture.

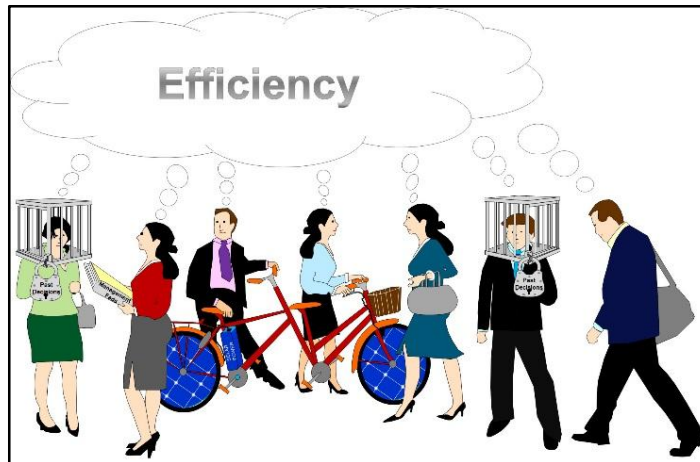
***nullius in verba  
take nobody's word for it***



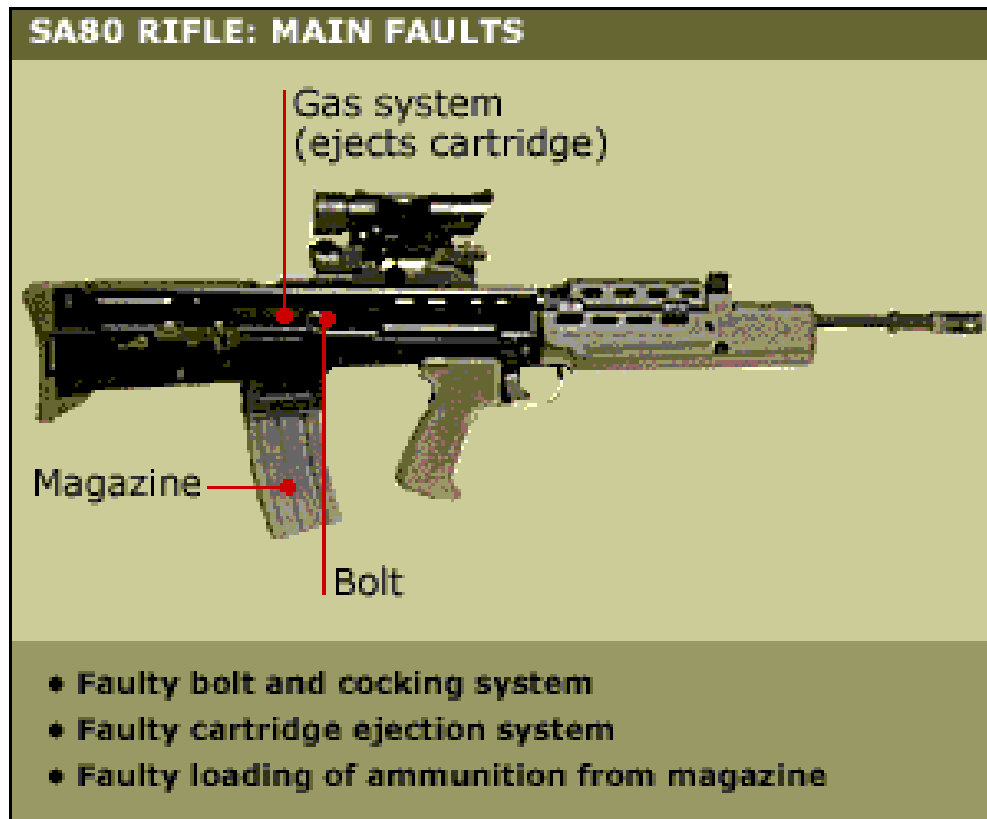
# Challenges for Manufacturing



Success trap

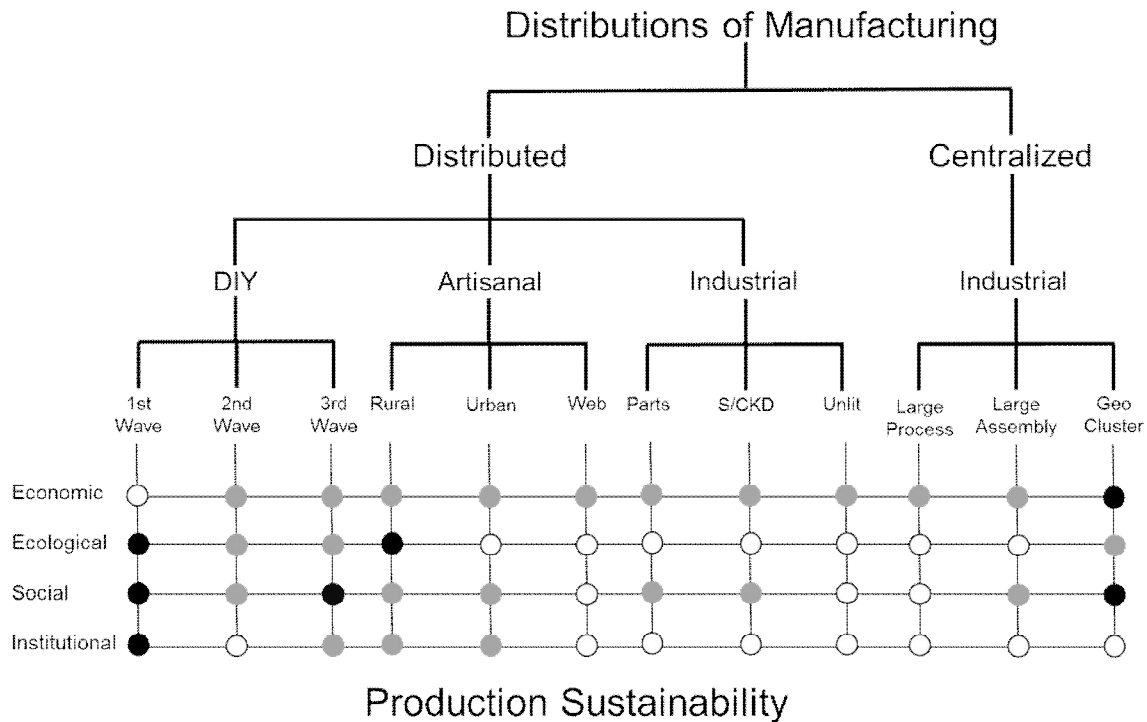


Groupthink



Success traps involve entrenched beliefs that what was successful in the past remains forever relevant. Within a country, a sector and/or an organization this can lead to inept groupthink about what to do and how to do it, which then leads to manufacturing failures such as SA80 rifle in the UK.

# Summary

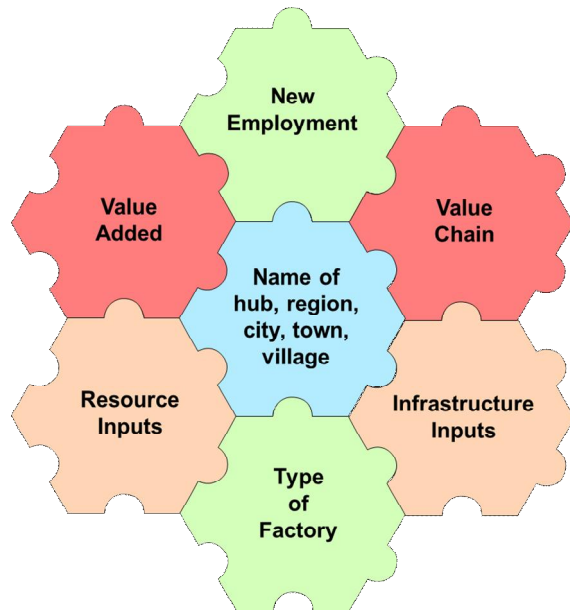


Many distribution options for manufacturing

Many global opportunities for new manufacturing

Many social psychology challenges in linking options to opportunities

# Summary



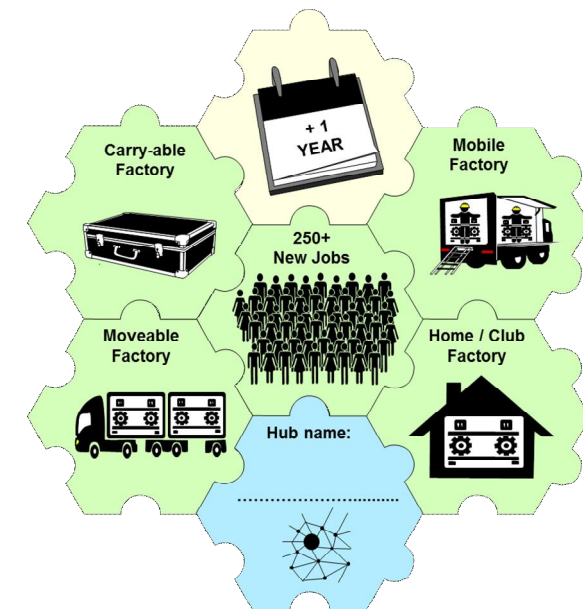
## Symbol System for Strategic Design of Innovative Production Systems

<http://www.vtt.fi/inf/pdf/technology/2016/T270.pdf>

Understand options

Generate opportunities

Address challenges



# Some References



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