

A strategic perspective on leading global technology developments in pursuit of digitalisation for industrial development

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Looking into the future as an inexact Science...

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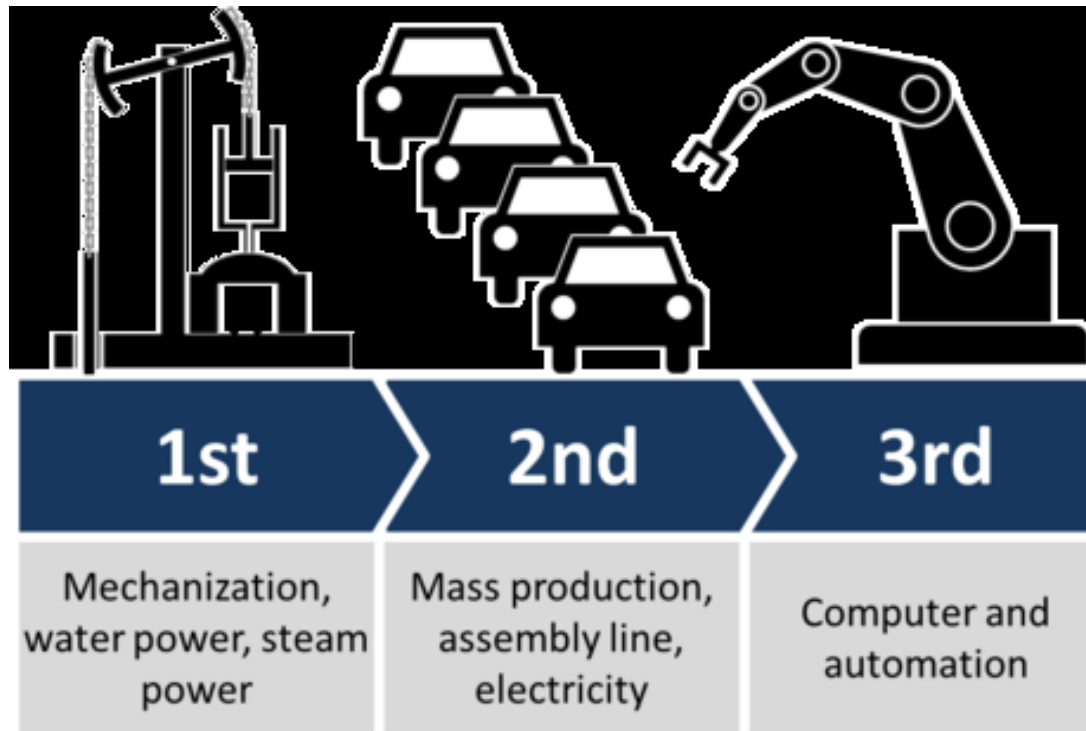
Don't look for ideas to
confirm your thinking,
rather look for trends
that will disrupt your
thinking.

Rich Simmonds // SavvyCleaner.com



4th Industrial Revolution: Change in Industry and Society

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Energy

Capitalism, Systems & Consolidation

Information Technology

Digital changes to Industry and Society

2nd Revolution with lasting impact on Industrial Development

2nd Revolution: Laying of the world-view we know today

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2nd

Mass production,
assembly line,
electricity

Large-scale
Steel,
Agriculture &
Textile mills



Large-scale
factories focused
on economies of
scale



Large-
scale
Electricity
and Oil



Advances
in
Transportation



Separation of
Labour and new
business
organisations



Before 2nd Industrial Revolution:

More direct relationship between supplier and buyer

Craftsmanship as driver / limitation of production

Capital – although limited – spread across society

Large-scale capital not as critical for business growth

More localised production / supply of goods & services

After 2nd Second Revolution:

Value Chains mostly dominated by large Organisations

Production driven by high volumes and low cost

“Capital(ist) class” owns majority of assets / wealth

Large-scale capital needed for large-scale business

Globalisation of supply & demand


Challenge: Managing Disruption and Industrial Development

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Reality: Disrupted World requires new Paradigms for success





Review of 2nd Industrial Revolution Principles critical



2nd

Expanded **globalization** – although flawed - is the only way for growing future prosperity

Large global companies are key to getting things done and raising huge capital requirements

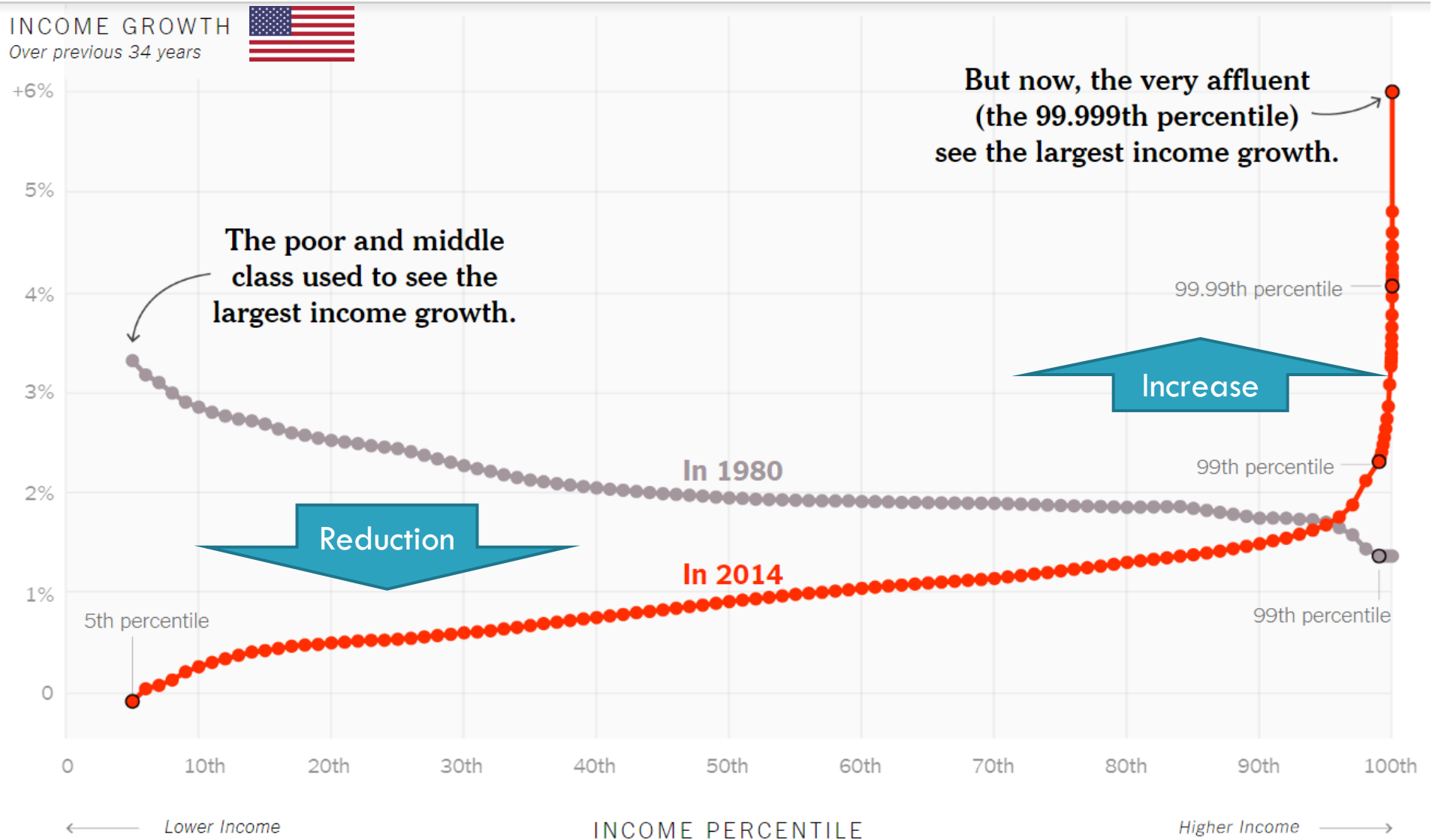
Fighting **Climate change** is not critical (yet)

Profit maximization **trumps** sustainability




Wealth disparity is a unavoidable by-product of our times and protectionism is always bad

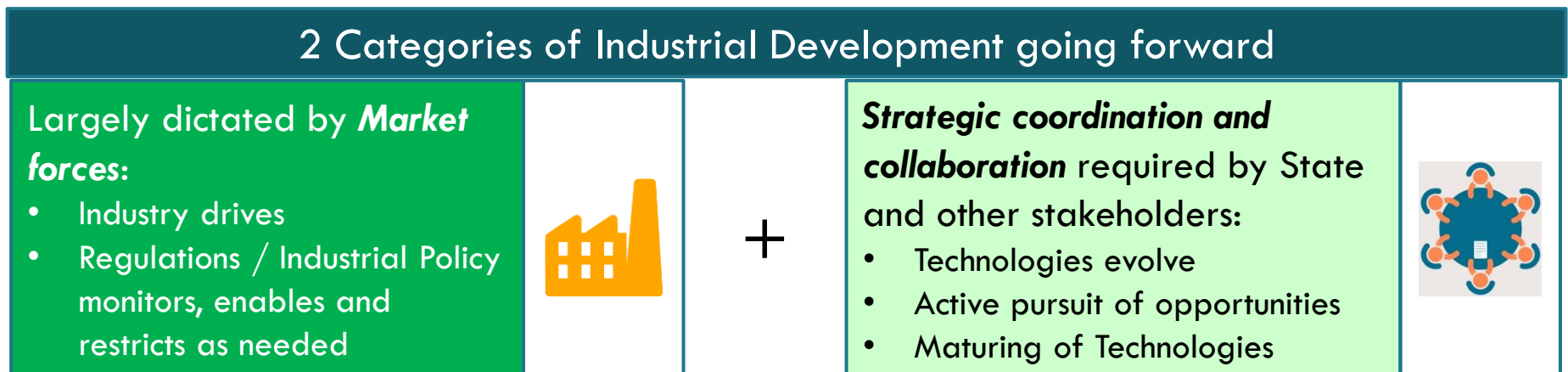
It's possible to just **add Technologies** - without fixing the major flaws of our current World

2nd Revolution: Increasing challenges to its sustainability



Two Disruptive Industrial Development Models evolving

4 th Industrial Revolution as Game Changer	
Networks to allow for people, machines and systems to communicate and interact anywhere	
Digitization of physical Systems always for massive elimination of waste and inefficiency	
Connecting parties previously limited by distance, time, trust and inter-compatibility	
Supporting the pooling and interaction of innovation and collaboration as never before	
Allowing Technologies (AI, exoskeletons, etc.) to support with human- and societal challenges	



Category 1 Industrial Development: Market-driven

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Largely dictated by *Market forces*:

- Industry drives
- Regulations / Industrial Policy monitors, enables and restricts as needed





Market Focus: Smart Connected Products & Enterprises

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Profit as Primary Driver



Machine to Machine
M2M



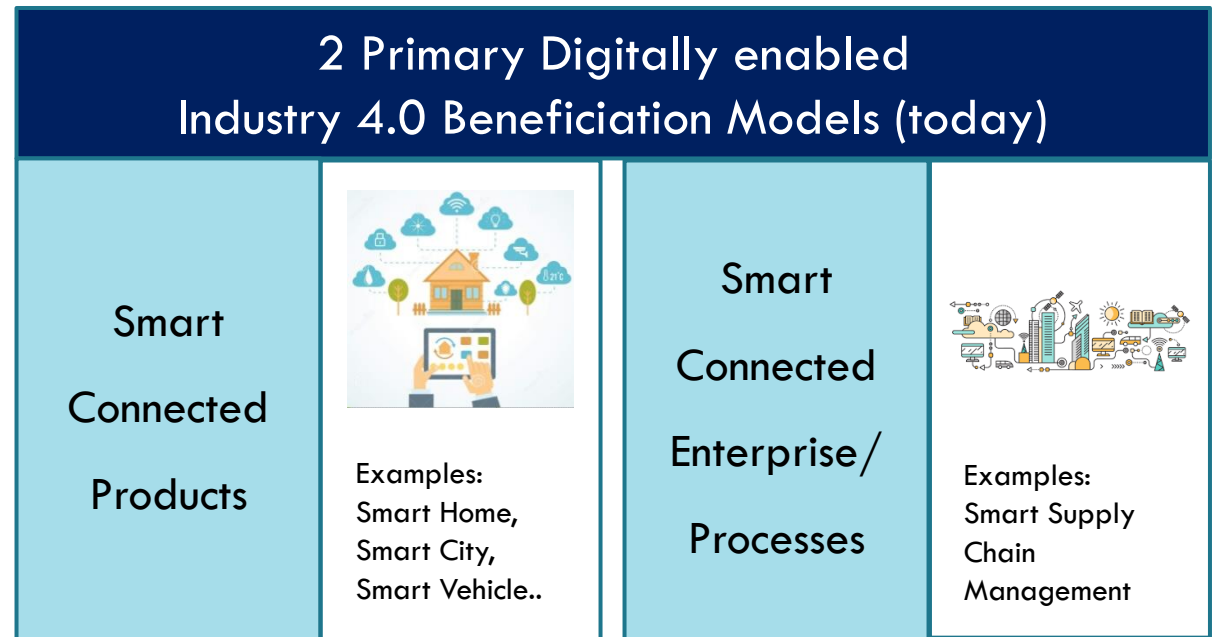
Internet of Things
IoT



Internet of Everything
IoE

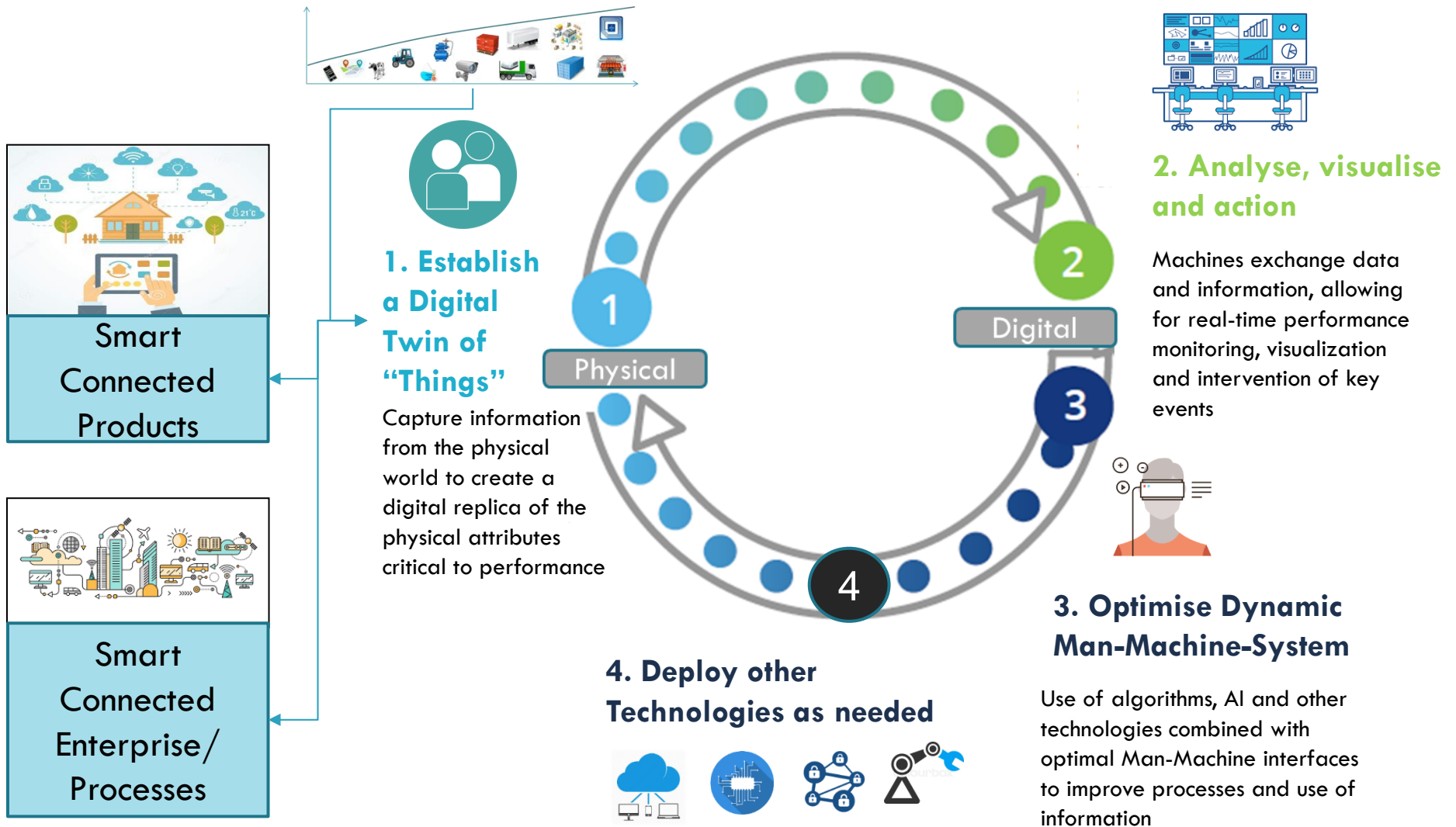


Cloud	
Robotics	
Mixed Reality	
Artificial Intelligence	
BlockChain et al	





Market focus: Improvements through integrated Digitization





Industry Case-study: Quick realisation as new reality

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Secure | <https://aerosud.1worx.co/Thingworx/Runtime/index.html#master=OverviewMaster&mashup=ExecutiveOverviewMash&appKey=cba989a5-92de-4>

AEROSUD Powered by ThingWorx

Executive Overview | CNC Machine | CMM Machine | Oven | Freezer | Robot Welder

CNC Machine | CMM Machine | Oven | Freezer | Welding

Machine Properties

Spindle Speed: 2978.00 | Feed Speed: 6.00 | Spindle Load: 39.00

Spindle Speed Manual Override | Feed Speed Manual Override

Spindle Vibration

Maintenance

Last maintenance: 2017-06-15 20:45:07.000

Runtime since last calibration: 498.98

Alerts

PPS In Progress

LotNumber	TimeIn	Duration
PPS-5876	2017-07-11 16:50:00.000	3.53
PPS-5877	2017-07-11 16:50:00.000	3.53
PPS-5878	2017-07-11 16:50:00.000	3.53
PPS-5879	2017-07-11 16:50:00.000	3.53
PPS-5880	2017-07-11 16:50:00.000	3.53

Throughput

Daily Throughput

600.0 | 300.0 | 0.0

2017/06/16 | 2017/06/29

Left Side Panel | Flange | Nozzle | End Cap | Right Side Panel

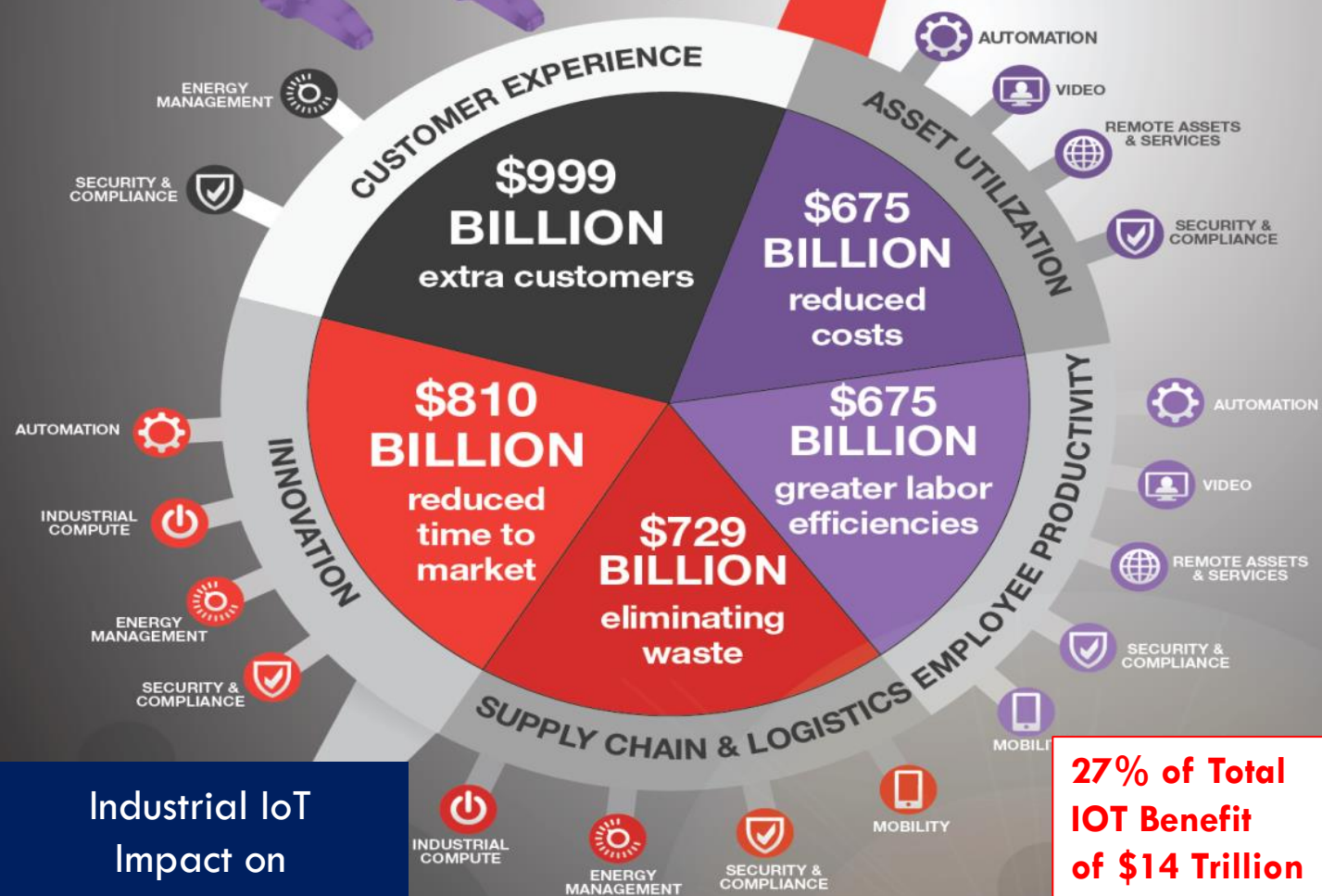
Working Solution within 10 working days incl. AR / VR



Market impact: Massive benefits from Industrial IoT

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How manufacturers can realize commercial value from the Internet of Things⁷



Industrial IoT
Impact on
Manufacturing

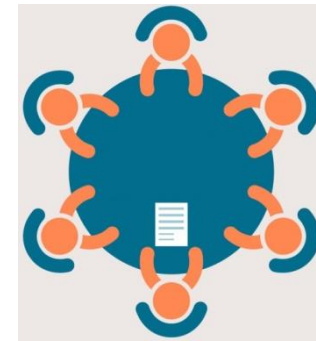
**27% of Total
IOT Benefit
of \$14 Trillion
until 2022**

Category 2 Industrial Development: Strategic collaboration

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Strategic coordination and collaboration required by State and other key stakeholders:

- Technologies evolve
- New opportunities arise and have to be actively pursued
- Technologies have to be matured and adapted to allow for optimal deployment





Collaboration Focus: Linking sustainability to New-age Tech

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Disruptive Technologies with massive potential for SA

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Emerging Disruptive Technologies with potential to support Sustainable Development



 3D PRINTING	 ADVANCED MATERIALS RECYCLING	 RENEWABLE ENERGY	 BLOCK CHAIN
 DIGITAL PLATFORM	 WATER PURIFICATION	 URBAN FARMING	 MIXED REALITY LEARNING
 DRONES	 ROBOTICS	 NEW AGE COMMERCE	 ARTIFICIAL INTELLIGENCE

New possibilities and pressure to achieve..:



Decentralized, dispersed and **Peer-to-peer** Value Creation

Combining environmental protection with holistic economic beneficiation

Increased **access to economy** through disruptive Technologies

Reduction of **wastage & pollution** of Supply Chains / globalization





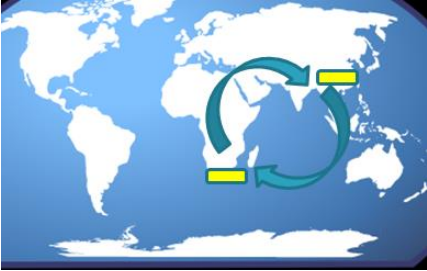




More **equitable distribution** of income and broader capitalism

Conversion of technology-enabled **Savings for societal benefits**



Opportunity: 3D-Printing for increased local value addition

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Localised 3D Printing			 3D PRINTING	 INTERNET OF THINGS	 ADVANCED MATERIALS	 ADVANCED MATERIALS RECYCLING
Industrial	Private	Food & Specialist	<ul style="list-style-type: none">Establishment of Network of 3D Printing Hubs for local productionAlternative to export raw material and importing of finished goodsMaximization of local value add and job retention / creationCollective access / usage of equipment and Printing “Files” for shared benefitsLinkage to Re-cycling of existing Materials as additional element			
						
		 3D Hub = 				



Opportunity: Broad-based Energy Production & Value addition

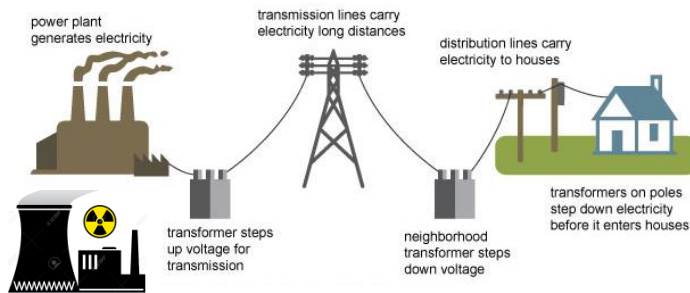
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Distributed Energy System

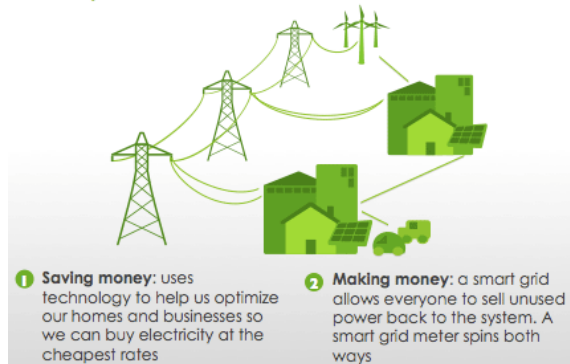
Central &
De-central
Production

Distribution
Network

Peer-to-
Peer
Market



A Super Smart Grid



- Fundamental **re-think of responsibilities** for Energy Production:
- **Utility** = Network maintenance, power gap closure and coordination
- **Energy user and supplier** = generation and exchange/ sale of power
- Broad **community participation** in economy through power generation
- **Micro-loans** to fund Asset investments
- **Purchase guarantee** as key instrument



Opportunity: Industrial IoT Service Delivery & Waste reduction

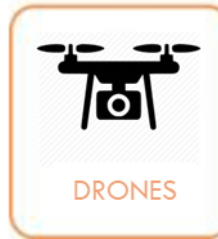
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IoT-based Public Service Delivery

Connection of all key “Things”	“Waste” & Utilization Detection	Integrated Service Delivery
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DIGITAL PLATFORM



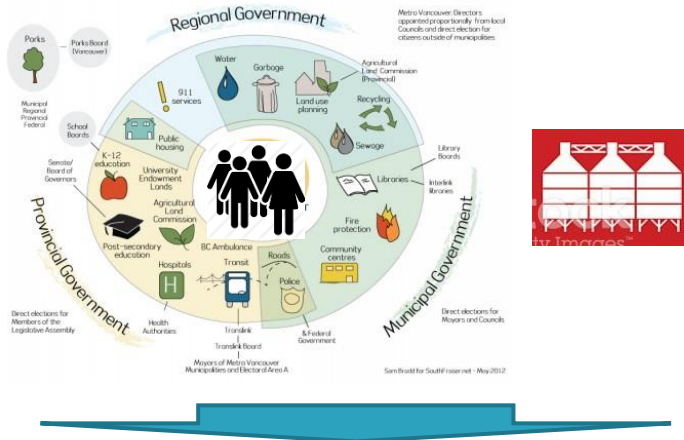
DRONES



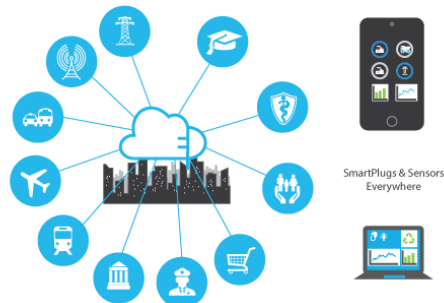
MIXED REALITY LEARNING



BLOCK CHAIN



- Application of **Industrial IoT principles** for improved Service Delivery: Connect, Analyse, Act and Improve
- Customisation of “Smart City” concept for **SA realities and challenges**
- Integration of different silo-driven elements through Network Technology and AI for **bridging Service gaps**
- **Ploughing back** of operational savings for lower rates and more investments





Opportunity: Localised Agriculture and Resource Re-cycling

Agriculture & Water protection

Use of available urban space

Pesticide-free and new energy farming

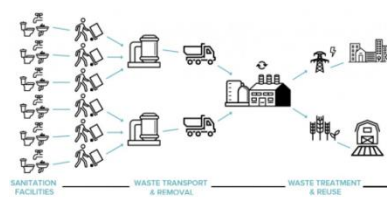
Water “re-cycling” and -harvesting



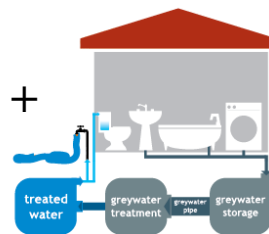
Food Value Chain



Sanitation Value Chain



Vertical & At-demand Farming



Water Harvesting and at-Location Re-usage

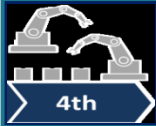


Complex Compound Break-down

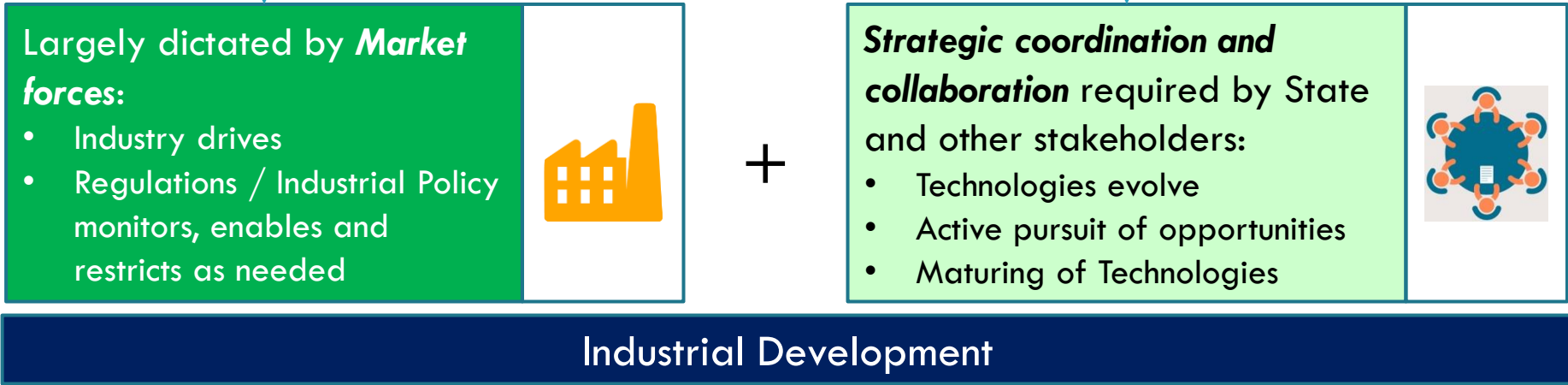
- Reduction of **logistics-intensive Farming** and optimal use of urban space
- Creation of new **supplier-buyer relationships** to support new business
- Focus on **grey-water** for load reduction on fresh water with incentives to save
- Creation of **market-place** for collection and “selling” of fresh water
- Incentivization of **Plastic Break-down**
- Optimal **integration** of all elements




Disruptive SA Industrial Development: Need for Game-Plan



4th Industrial Revolution / Technologies as Game Changer



 Game-plan	Process to follow	Parties required	Commercial Model	Role of Strategy & Innovation Players
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Disruptive SA Industrial Development: Concept Game-Plan

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