



**WESTERN SYDNEY**  
UNIVERSITY



Centre for  
Smart Modern Construction

# **c4SMC INTER-UNIVERSITY ACADEMIC ROUNDTABLE**

**14th November 2018**

## **Setting the Context**

**Professor Srinath Perera**

Director, Centre for Smart Modern Construction

Chair of Built Environment & Construction Management

# The c4SMC Aim

- The Centre for Smart Modern Construction (c4SMC) is a **university and industry collaboration** investing in the future **readiness of smart modern construction** graduates and the enterprises in which they will work.



THE  
JOINING UP  
CONSTRUCTION  
CONVERSATION

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Integration

# Smart Modern Construction (SMC)

## Smart

Fintechs using  
mobile devices,  
Integrated building  
software packages

BIM (3D to nD),  
Virtual Reality &  
Augmented Reality

Robots, Drones, IoT  
applications, 3D  
printing

Digital signatures,  
digital records,  
digital twins, digital  
Smart Contracts

## Modern

Industrialization  
(prefab, panelised,  
volumetric & hybrid  
construction)

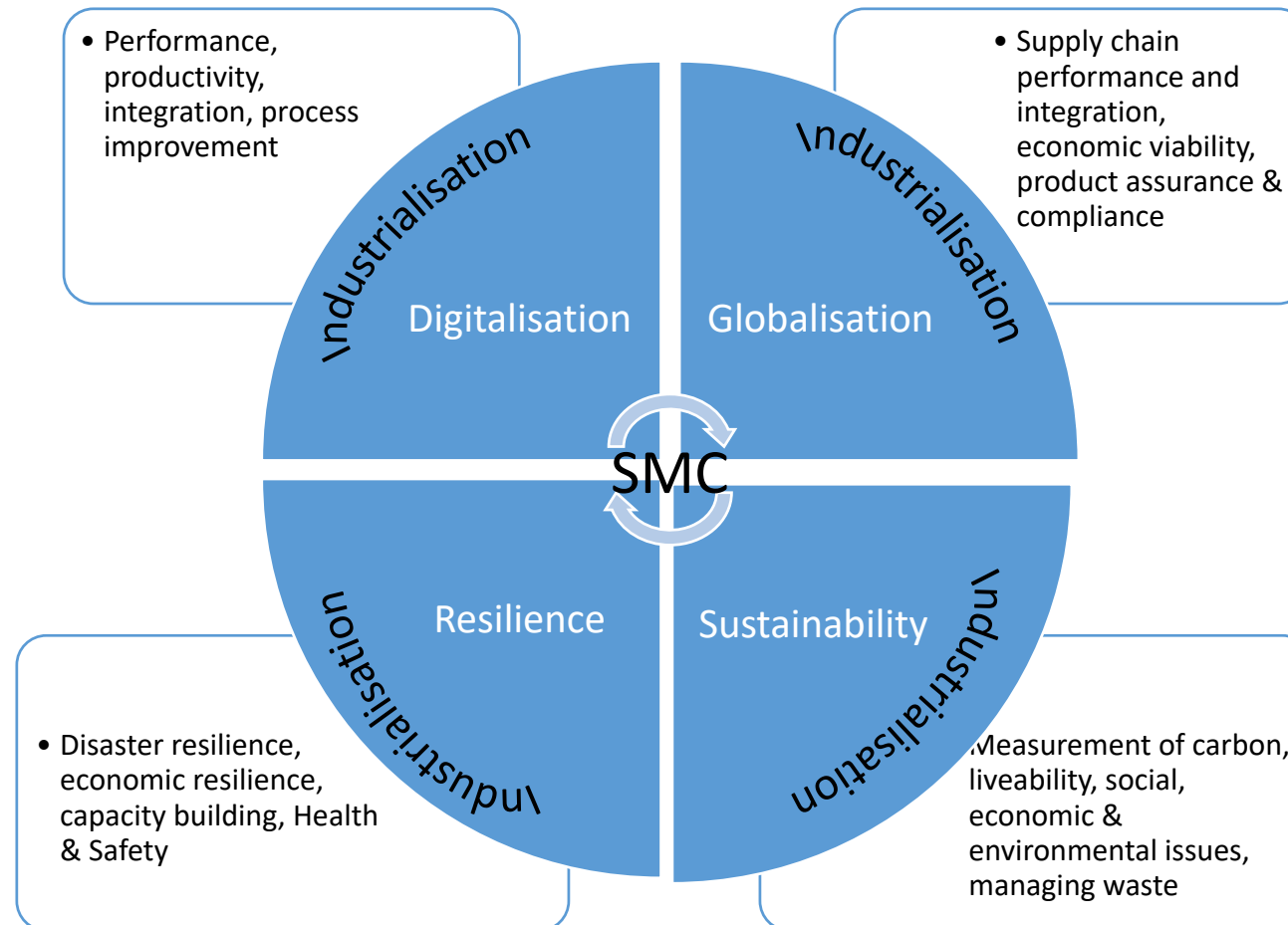
Internationalisation  
of projects and  
Supply Chains

Design for  
Manufacture and  
Assembly (DfMA)

Innovative on-site  
construction  
methods

SMC is defined as construction that  
embraces **smart and modern technologies**  
to develop **innovative and performance  
enhancing** components, products, systems  
and processes.

# SMC Research Agenda for Industry 4.0



# The tale of two Sectors

- \$10 Trillion p.a.
- Large-scale players vs Specialized trades
  - 20-40% higher productivity
  - Large number of micro & SME
  - High turnover & lower profits
  - 68% of contracts won by 20 companies

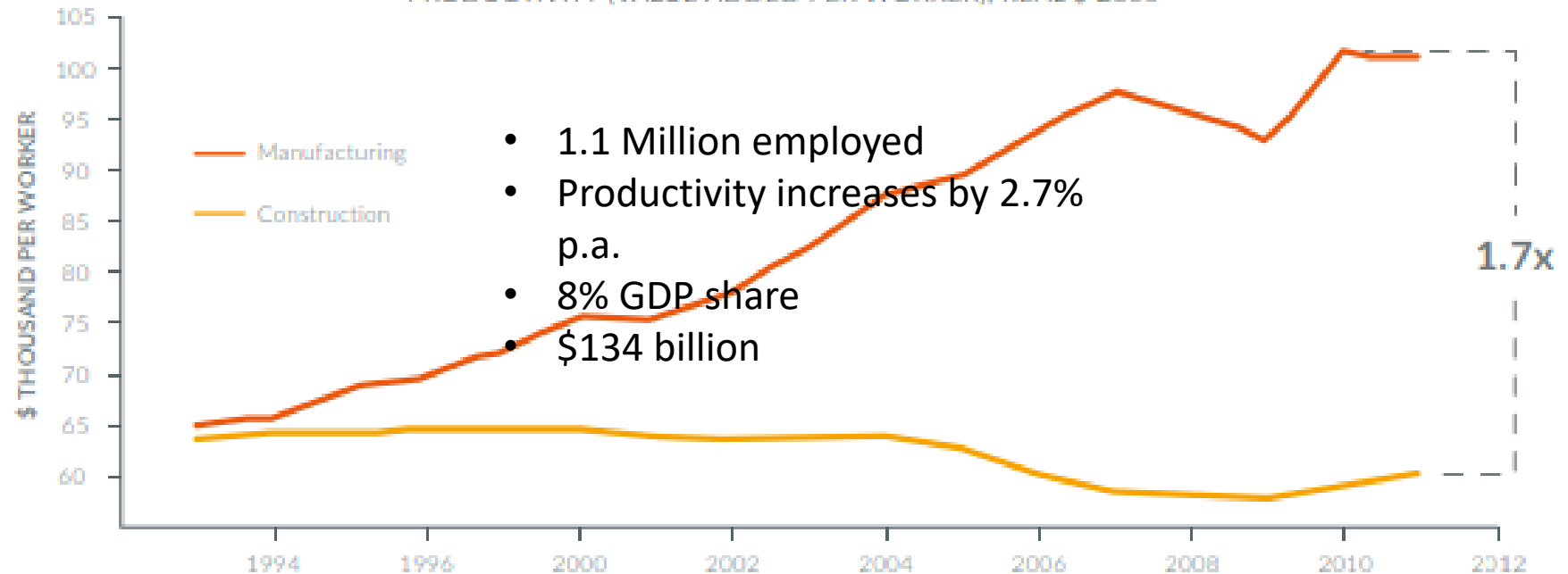
## The productivity opportunity in construction



# State of the Industry

## OVERVIEW OF PRODUCTIVITY IMPROVEMENT OVER TIME<sup>2</sup>

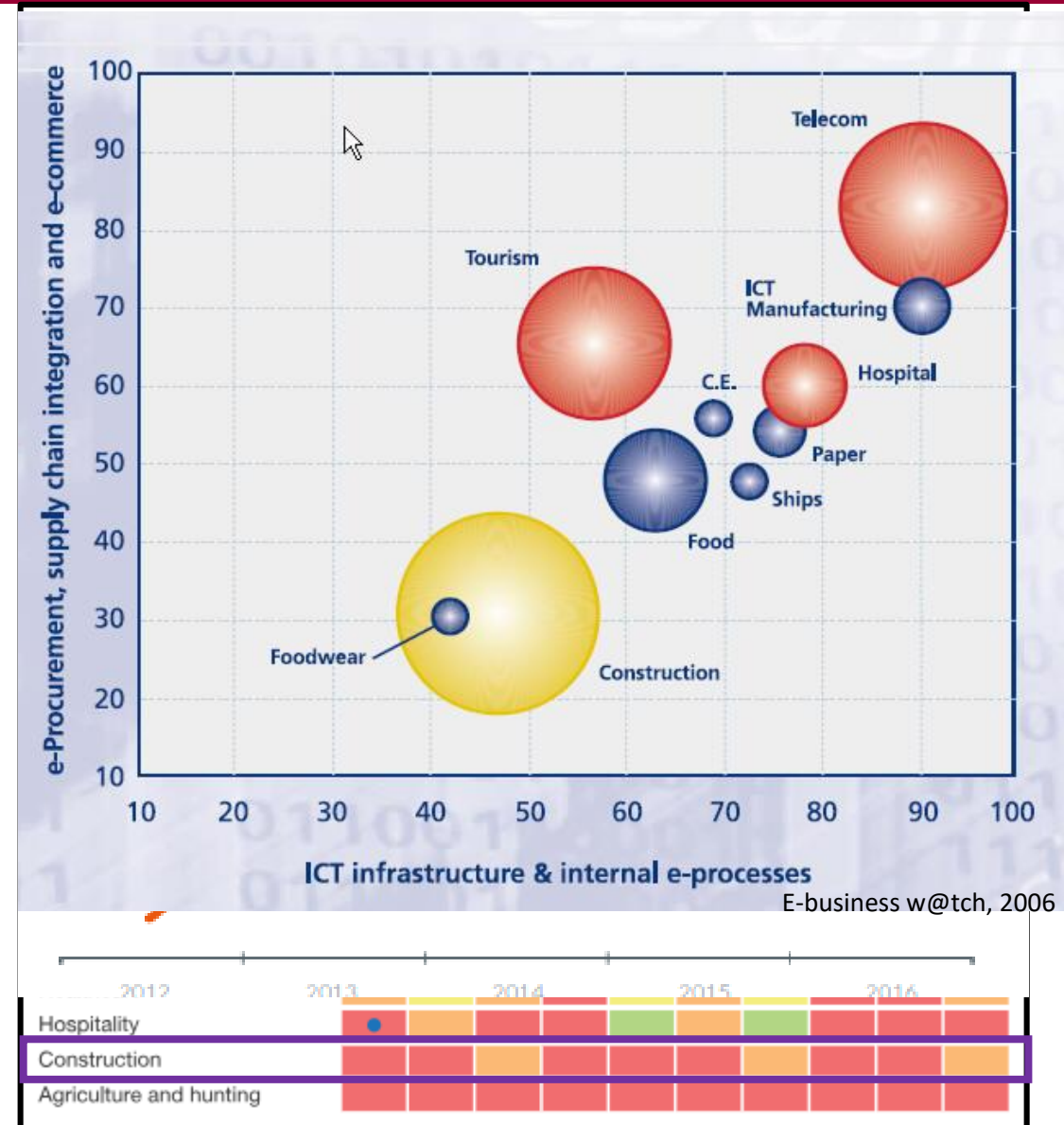
PRODUCTIVITY (VALUE ADDED PER WORKER), REAL \$ 2005



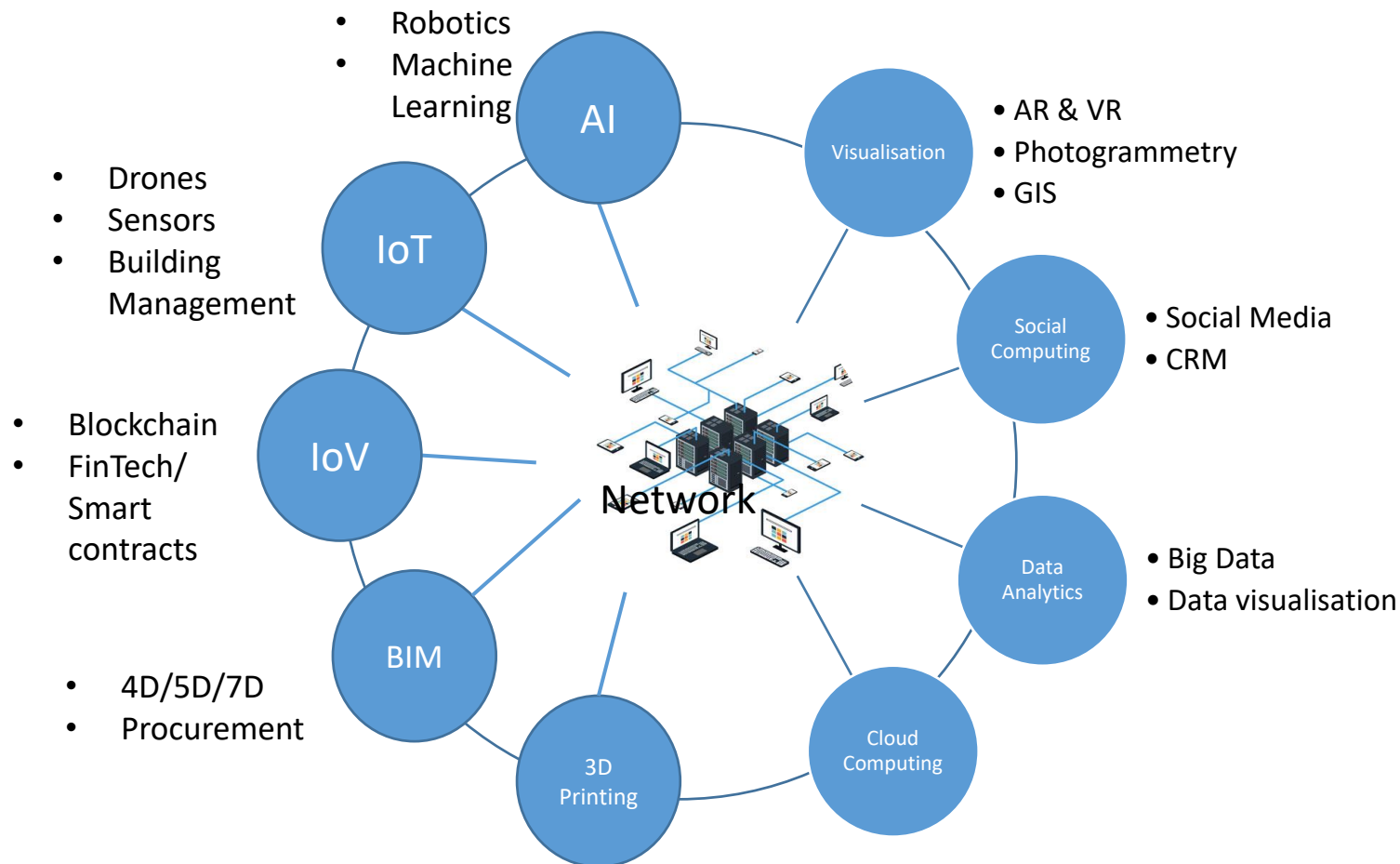
Productivity in manufacturing has nearly doubled, whereas in construction it has remained flat

# The state of Digitalisation

- Second least digitalised
  - Weak across all areas
- Ripe for disruption
  - 88% Australians have a Smart Phone
  - Largest employer of Young workers 44%
  - SaaS providers
  - Rising investment in construction tech (8.9% of VC investment)
  - Falling cost of tech
  - Construction Tech ecosystem
  - CIB TG83 research



# Convergence of Technologies



- Cyber-physical interfacing
  - Real time connection of components
- Convergence bringing in new possibilities
- Analytics that provide direction
- Ability to manage procurement
  - Project and supply chains

# What action?



**Action in seven areas  
can boost sector  
productivity by  
50–60%**

- Reshape regulation
- Rewire contracts
- Rethink design
- Improve procurement and supply chain
- Improve onsite execution
- Infuse technology and innovation
- Reskill workers

**5–10X productivity boost**

possible for some parts of the industry by moving  
to a manufacturing-style production system





# Where to from here?

- How do we improve productivity?
  - Is more off-site construction the full solution?
- Will digitalisation deliver step change expected?
- What happens where construction moves to 80% off-site?
  - Impact on enterprise?
  - Impact on the industry?
  - Impact on procurement?
  - Impact on skills?
- Deliberations for today



# PhD Projects

Project 0- Methodology for estimating embodied carbon through a distributed ledger platform for construction supply chains

Project 1- Developing a Digitalised Distributed Ledger Platform for Construction Supply Chains

Project 2- Methodology for analysing construction effectiveness using non-price measures

Project 3- Developing a smart modern construction business maturity model for construction futures

Project 4- Developing an Offsite and Onsite Construction Skill and Capability Maturity Scale for SMC Projects

Project 5- Developing a Methodology for Integrating Blockchain Data with BIM for Construction Supply Chains

Project 6- Methodology for Construction Waste Management utilising Blockchain technology



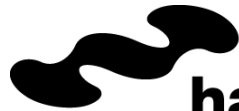
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# A C4SMC COLLABORATION



**hansen yuncken**

