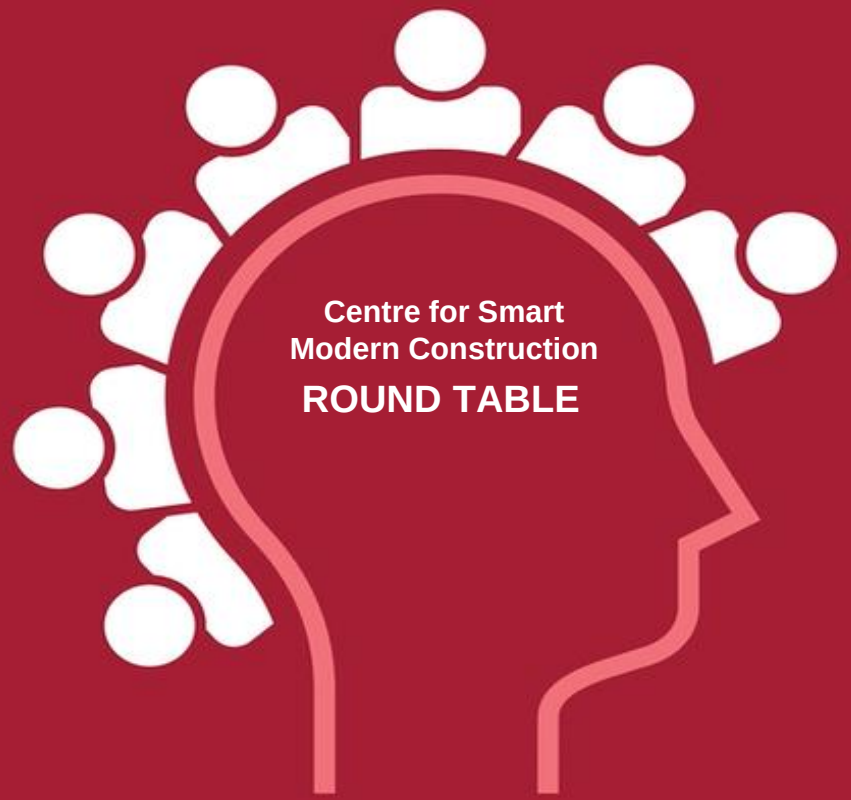


UNIVERSITY OF WOLLONGONG AUSTRALIA

WESTERN SYDNEY UNIVERSITY

Centre for Smart Modern Construction

c4SMC INTER-UNIVERSITY ACADEMIC ROUND TABLE

14th November 2018

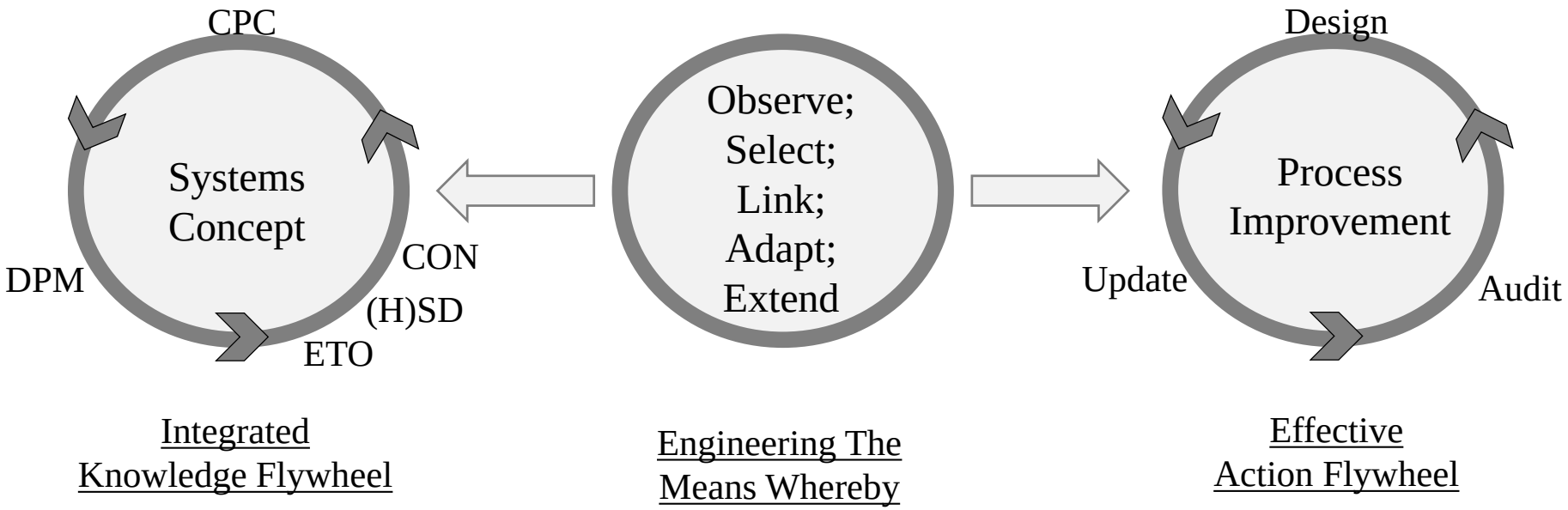
Construction Supply Chain Reconfiguration: A skills analysis

Dr Tillmann Bőhme

University of Wollongong/ Sustainable Building Research Centre

- Whilst labor productivity in Australia in the last 25 years has risen significantly in sectors like manufacturing and retail, in the construction sector it has remained virtually flat over this time (Australian Government Productivity Commission, 2014, p. 2)
- Productivity can be defined as the output produced as a proportion of the inputs required (OECD, 2001).

Figure 1: System Effective Flywheel

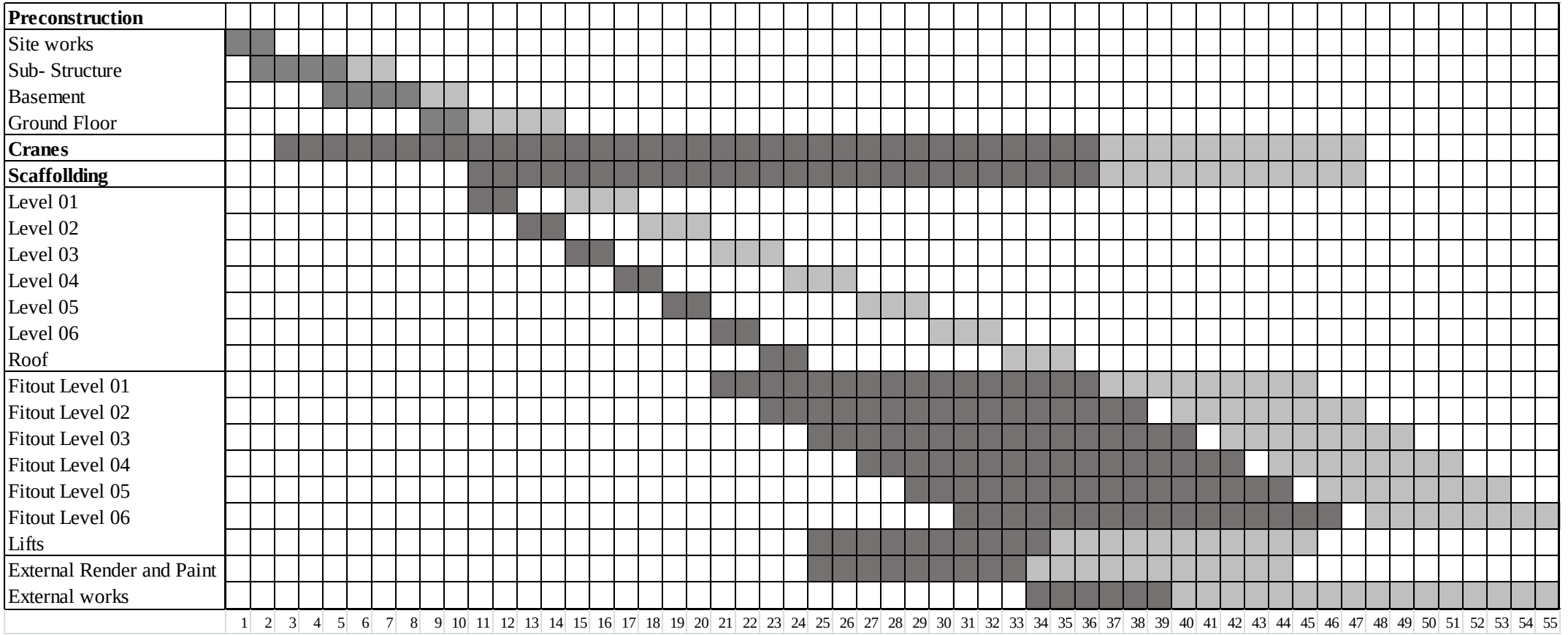


Key:

	CPC	- Chemical Process Control
	DPM	- Discrete Parts Manufacture
	ETO	- Engineering to Order
	(H)SD	- (Healthcare) Services Delivery
	CON	- Construction

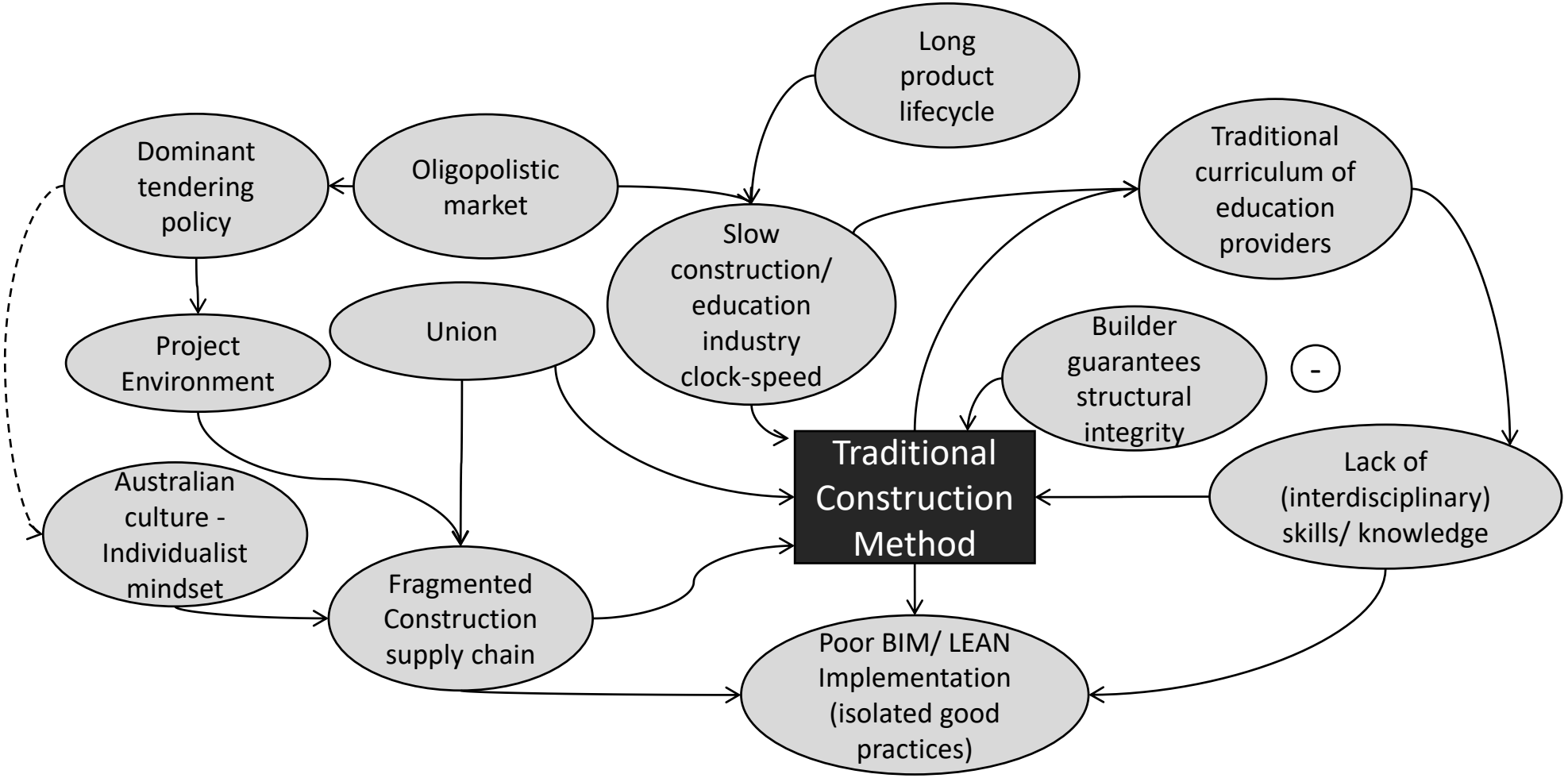
Source: (Bőhme et al., 2016)

Figure 2: Planned versus actual construction performance using traditional construction method



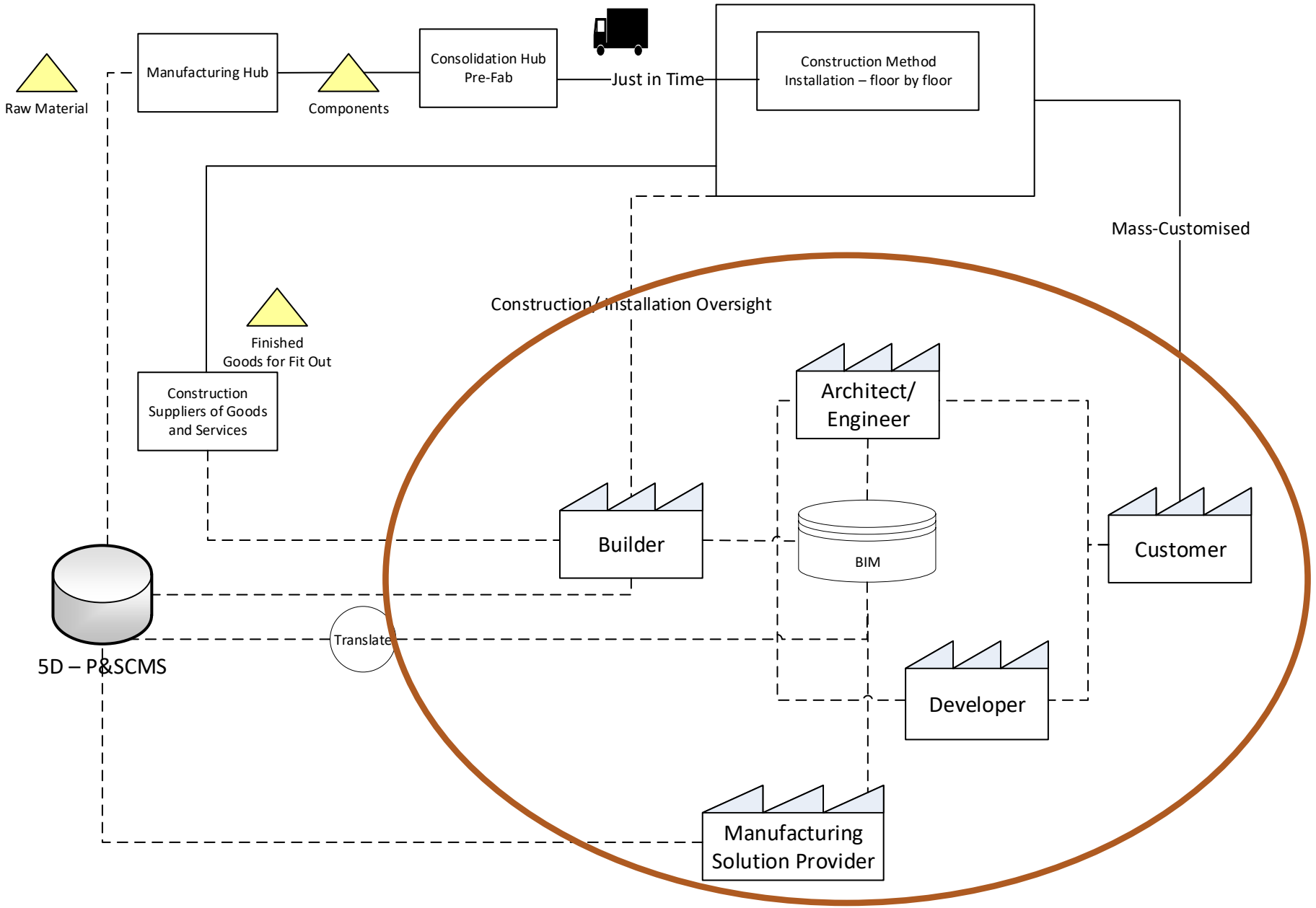
Source (Bőhme et al., 2018)

Figure 3: Cause and Effect Analysis



Source: Adapted from (Bőhme et al., 2018)

Figure 4: Reconfiguration of the CSC

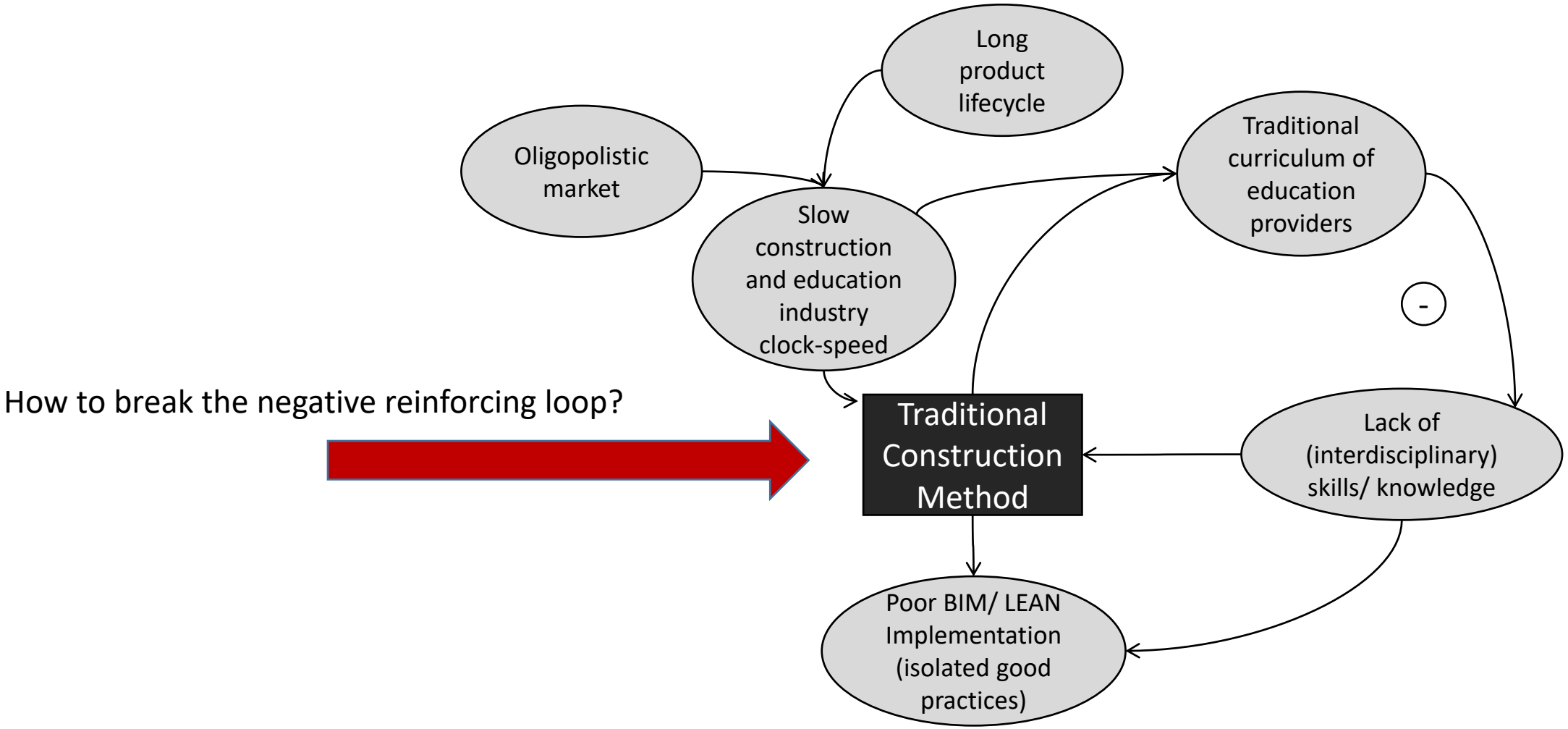


Systems Design

- The system needs to be governed by a clear philosophy – e.g. lean
- Key principles need to be embedded by systems players
- Tools and techniques require to be selected in line with philosophy and principles such as DfMA, IPD, relational contracts to improve flow (information flow and information transparency critical for improved material flow)
- Companies and associated employees need to understand their role in the system and cause and effect of decision making on the system as a whole

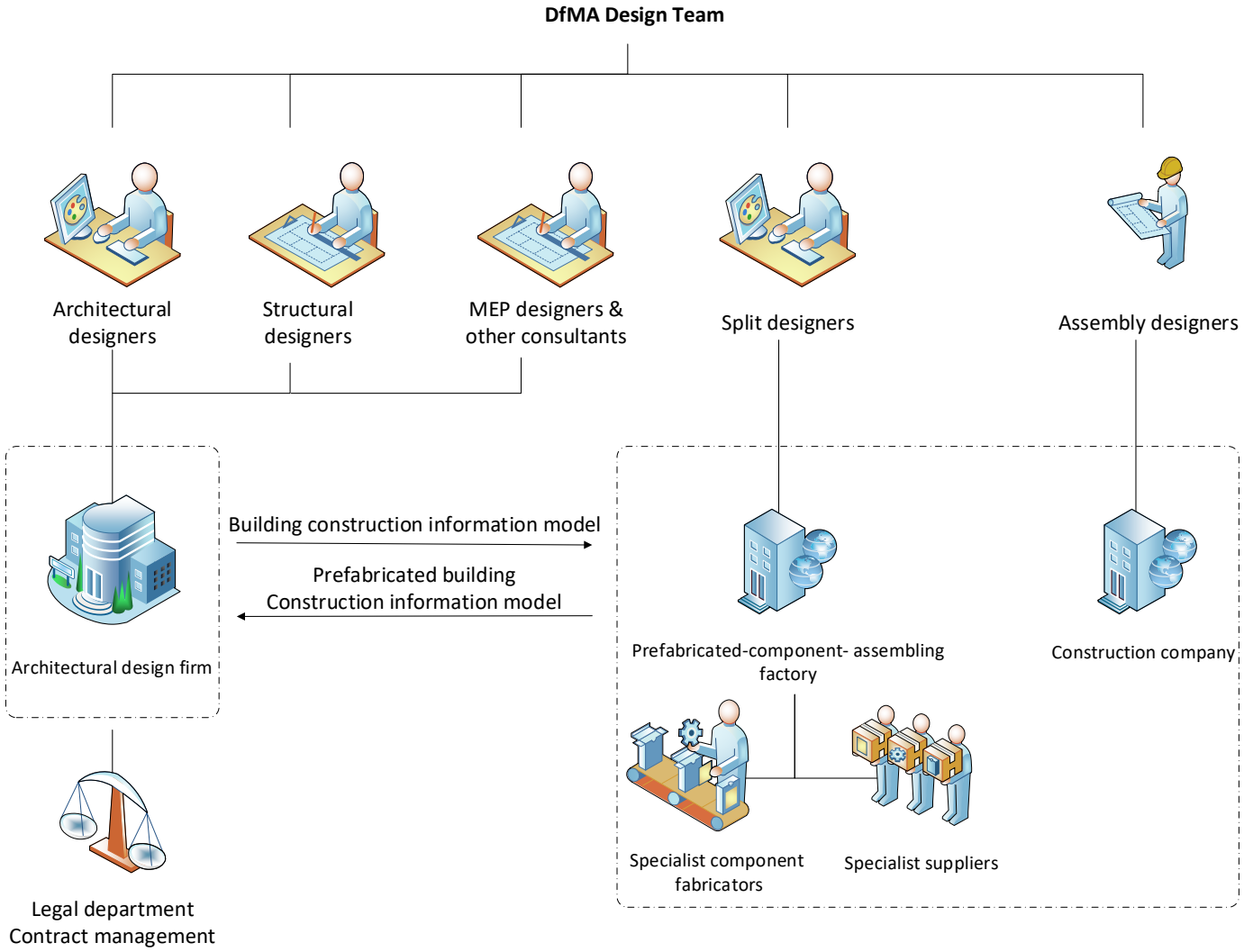
Lean Principles (Gosling et al., 2014)	Explanation	Managerial Skill Set Required
Time Compression	Automation, Modular Platforms, Component Rationalisation	Strategic Supply Chain Management, Supply Chain Design, Concurrent Engineering, Lean Thinking
Synchronisation	JIT Deliveries, Kanban, Process Standardisation	Logistics, Process Mapping, Quality Management, Continuous Improvement, TPS and Lean Thinking, BIM, Sales and Operational Planning
Echelon Elimination	Supplier Rationalisation, Framework Agreements, Accreditation of Suppliers	Strategic Procurement, Supplier Benchmarking and Auditing, Legal, BIM Procurement
Control System	KPI System, Consolidation Centres, Visual Control Boards	Logistics Coordination, IT (5D BIM including time and cost), Human Resource and Cultural Development towards Manufacturing Empowerment
Information Transparency	Web-based Project Planning, Lead Time Visibility, Sharing Demand Information	Collaboration, Programming, Advanced IT Capabilities (BIM 5D; Sensors, Track and Trace, Drones)
Design for X	Early Supplier Involvement, Design for Manufacture/ Assembly	Concurrent Engineering, Collaboration, IT, (BIM CAD, CAM), Legal (relational contracts)

Figure 5: Cause and Effect Analysis



Source: Adapted from (Bőhme et al., 2018)

Appendix



(Escribano, A 2018)