



Building Trustworthy Indicator

A government and private enterprise partnership to transforming the NSW Construction Industry using blockchain for recording the buildings DNA.

Built on the Blockchain

—

November 2022



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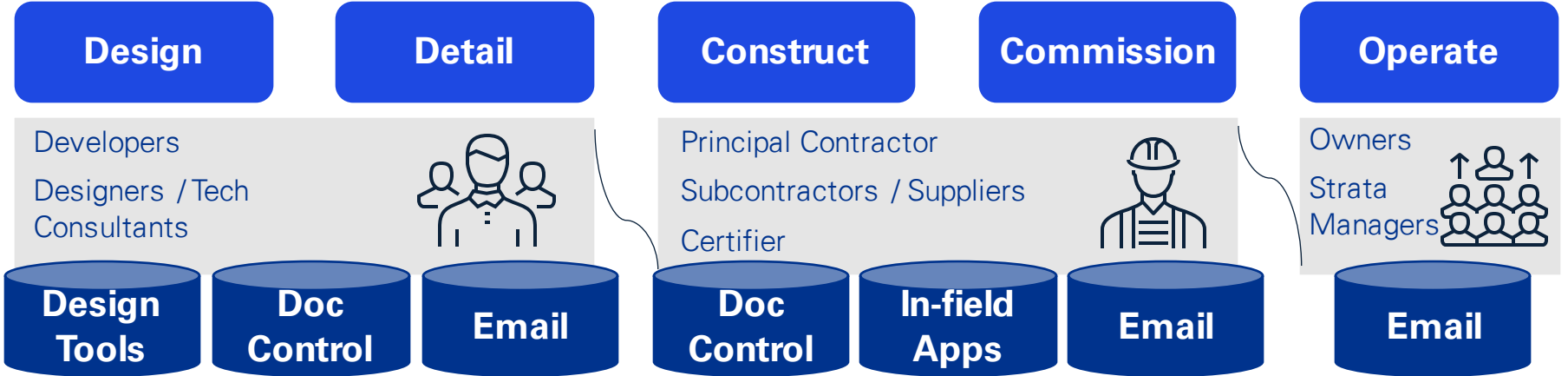
“It’s no exaggeration to say that governance and controls are the very lifeblood of projects”

KPMG—MAKE IT, OR BREAK IT—Global Construction Survey 2017

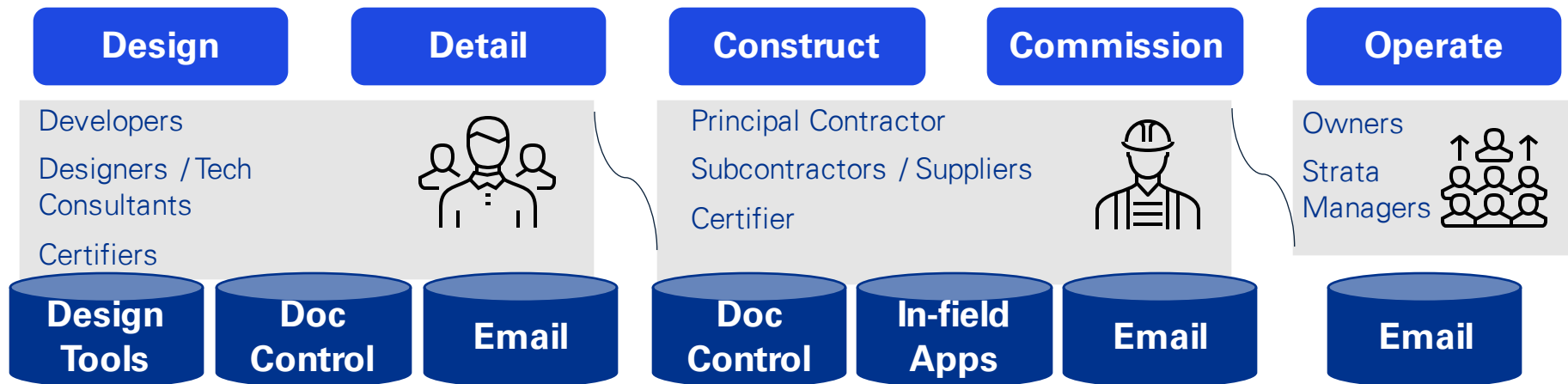
Disclaimer:

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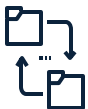
Current Operating Systems Prevent Conformance



What Are The Current Challenges?



Moving across the value chain projects shift from digitalisation to digitisation. The owners O&M Manual ends up as one giant PDF.



There is no data lineage associated with the virtual assets. "Data is not my job," hence the ultimate asset owner we can't see who did what, and when.



Information asymmetries are embedded into the system, weakening accountability and causing harm to consumers (physical + financial + mental).



No way for trustworthy players to differentiate themselves. Gucci looking websites can be deceiving!

How Does Building Trustworthy Index Work?

Participants
Credentials
Who worked on a building?



Design & Construction
Certificates
What certifications received and when, from whom?



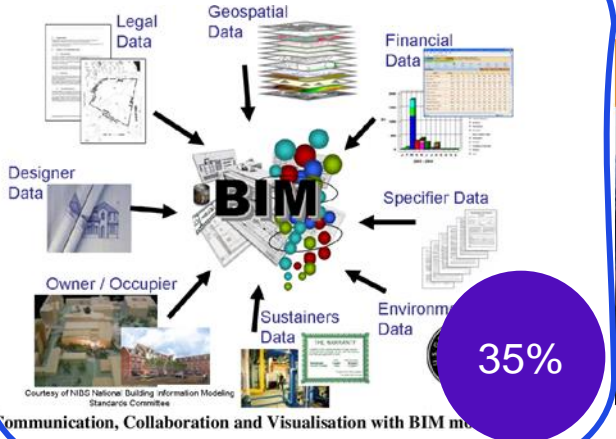
Materials
Traceability
What materials were used where, and who supplied vs manufactured them?



53% of construction companies have accelerated their investment in digital technology since Covid-19. Where is your business investing?

Where Does BTI Fit?

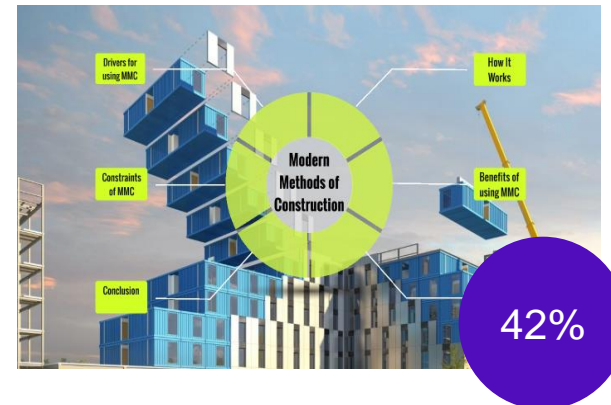
Digital Twins



Simulating the Real World



Volumetric Construction



In-Field Info & Collab Tools



Robotics & Automation



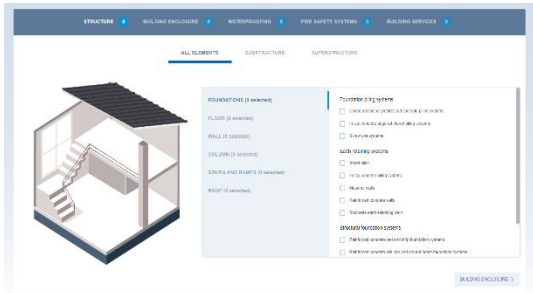
Bringing it All Together - PMIS



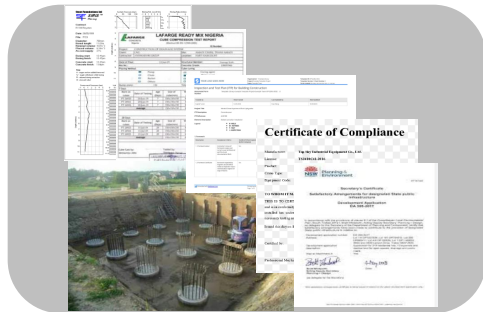
How do we prevent the cracks from continuing to form?

Does The Tech Overlay Current Operating Systems?

Configure



Ingest



Use



Standardised Data Classification

Adopted Uniclass data classification standard.

Restricted views of Uniclass are provided to users after the system is configured. No configuration required for BIM.



API First Infrastructure

Platform able to plug into many APPS via open API framework.

Working with vendors such as Procore, DLP Manager, RIB (iTwo CX) and Acconex.



Distributed Ledger Technology

The builder / developer is no longer the single point of data aggregation.

Laboratory tests from material suppliers live on chain and the contractors team grab it rather than requesting it.



Data Consumers

Data contributors receive income from making their data available to **insurers, banks, regulators, material manufacturers, contractors and consumers.**

5

5 Categories aligned to Design and Building Practitioners Act

200

Unique checks and related proofs

3-5

Construction systems per Category

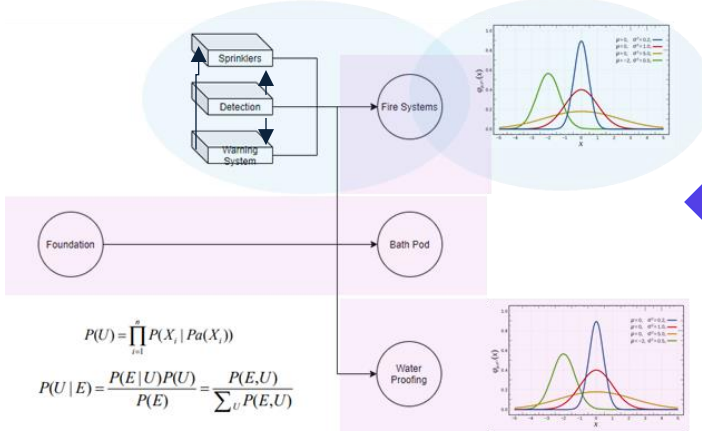
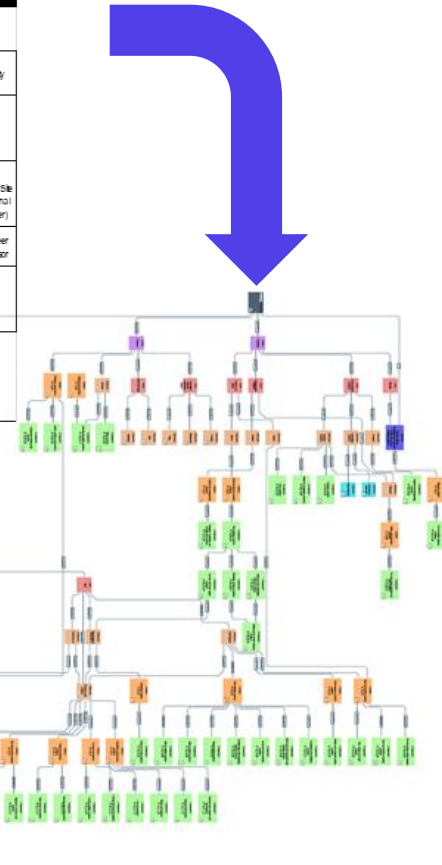
5 star

Indicator is out of 5 stars indicating best practice.

So where is the innovation?

What's Driving the Quantitative Judgement?

Confidence Matrix		note: values mapped against 2021/09/27 survey results					Declaration of compliance with		LEVEL OF COMPLIANCE		RULES	
Construction & Maintenance		The Rules	Specifications (Project Specific & Industry Stats)	Australian Standards	Design Drawings (incl. Shop Drawings)	Manufacturer/ Supplier Installation Guidelines	Data Sheets (Product/ Material)					
		COMPLIANCE with (CO)										
Artefact	Evidence Type	Rating: Red – Low, Orange – Medium, Yellow – High, Green – Very High	3.55	3.82	3.09	3.44	3.18	INDEPENDENCE of people providing the evidence (IN)		4.18	Independent 3rd Party	
Final sign off via inspection verification certificate. E.g. Certificate of Compliance for electrical works per the Acts (CCEW).	Final Inspection Verification Certificate		3.91	13.9 M	14.9 M	12.1 M	13.5	12.4	4.09	Authority/Regulator		
"Quantitative ab test / non-destructive test. E.g. coating thickness or rebar using non-destructive testing instrument."	Quantitative / Instrumental Test		4.27 S	15.2 S	16.3 S	13.2 S	14.7 S	13.6	2.64	Building Practitioner (Construction Manager/ Site Manager) and/or Internal QA Officer (QA Manager)		
"Visual verification test. E.g. Concrete slump test or wet area flood test"	Visual Verification Test		3.73	13.2	14.2	11.5	12.8	11.9	2.09	Trade Supervisor / Peer Review / Site Supervisor		
"Visual touch or check/ inspection. QA checking. E.g. Waterproofing QA checklist inspecting air no let bubbles, etc."	Visual Inspection		3.33 S	11.8	12.7	10.3 S	11.5	10.6	2.27	Practitioner		
"Third Party Verification Schemes for organisations and materials. E.g. CodeMark Certification JAZANZ Organisation ACRS Steel Certification National Structural Steel"	Third Party Verification Schemes		3.73	13.2	14.2	11.5	12.8 S	11.9				

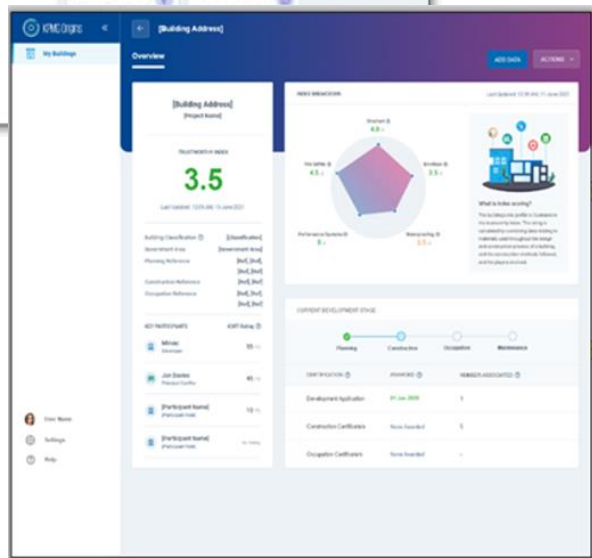


$$P(U) = \prod_{i=1}^n P(X_i | Pa(X_i))$$

$$P(U|E) = \frac{P(E|U)P(U)}{P(E)} = \frac{P(E,U)}{\sum_i P(E,U)}$$



Why Technology Has A Role To Play?



Industry

- ✓ **Participant's** approach is **differentiated** and ethical behaviour is rewarded
- ✓ **Higher costs** only paid by **non-rated operators**
- ✓ Trade labour intelligence tool available to all



Regulator

- ✓ **Unlimited capacity** and data driven risk approach targeting riskiest players
- ✓ Focus of regulator can move to the '20%' of low quality and not '80%' of industry



Insurer | Financier

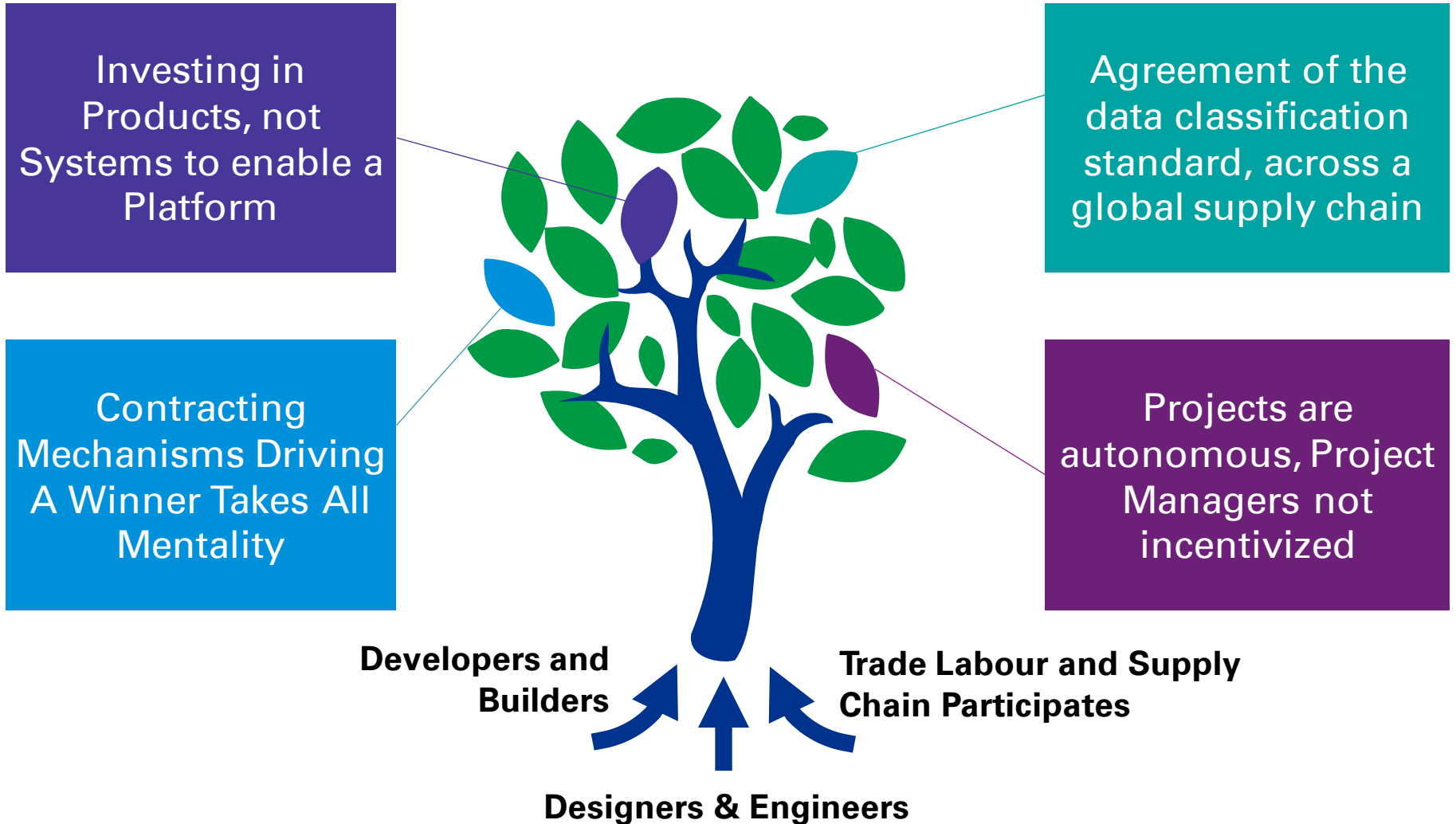
- ✓ **Enable low cost premiums** for low risk buildings with trustworthy index
- ✓ Moving to differentiated **insurance (and enable 10 year defects policy)**
- ✓ Deploy **undifferentiated insurance** premiums for risky assets without rating
- ✓ **Lower cost of debt** to low risk quality players (and mortgage holders)



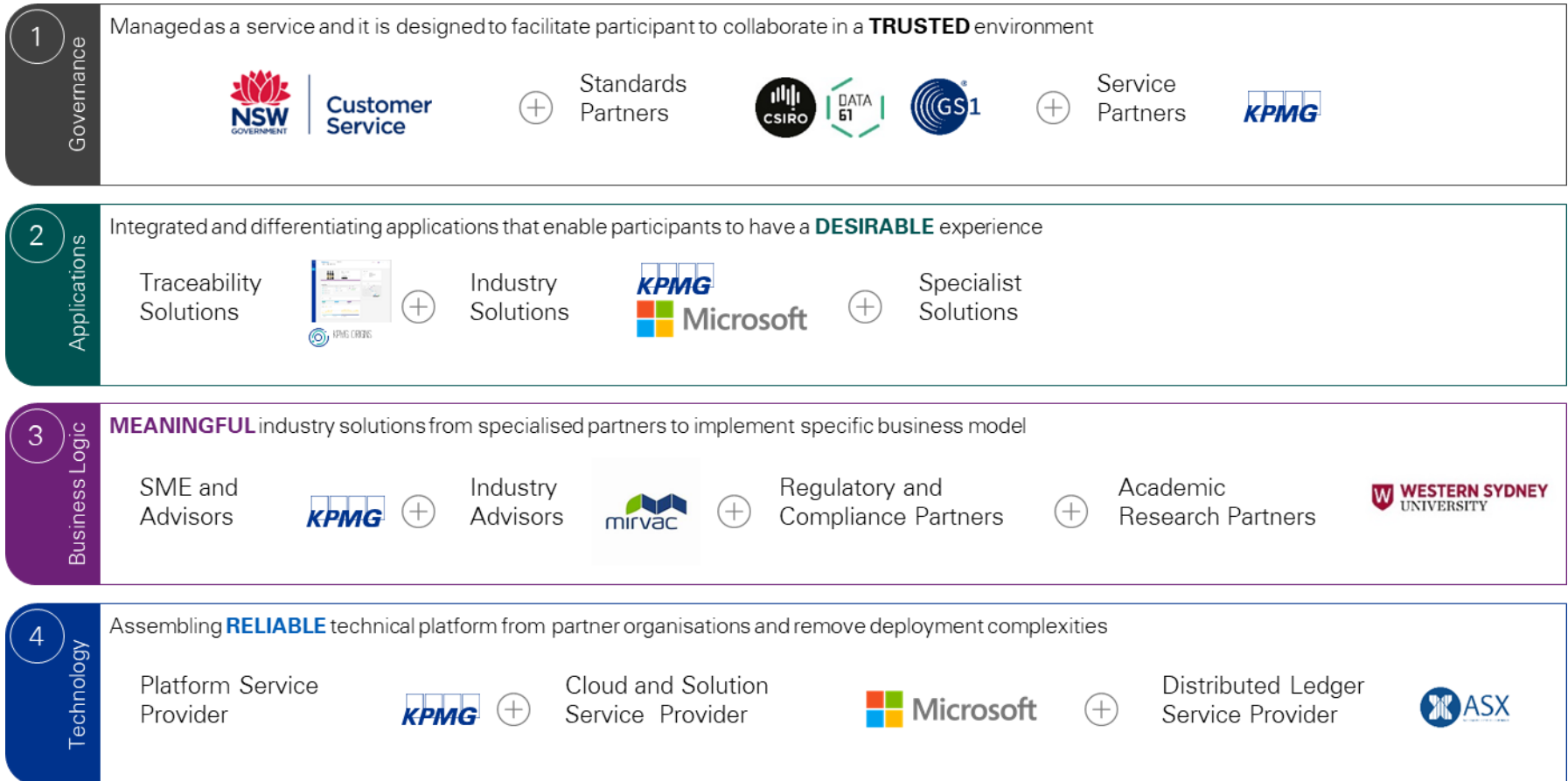
Consumer

- ✓ Moving from "**Low confidence**" and un-rated buildings where most **risk** is carried by the consumer to **trustworthy rated buildings** with measurable risk and driving higher consumer confidence and appeal
- ✓ Access to tools and rating to assess building quality – other than 'brand'
- ✓ Complete visibility of asset lifecycle or materials

So What Is Preventing Us From Going Digital?



Acknowledging the Partners





KPMG Thought Leadership

KPMG Thought Leadership

KPMG's approach is based on understanding the issues affecting the marketplace. We work closely with a number of leading industry organisations across the global in looking towards future trends and tackling some of the major issues facing the industry.



Future-Ready Index:
Leaders and followers in the engineering & construction industry (Global Construction Survey 2019)

Featuring the perspectives of senior executives from 200+ engineering & construction companies and project owners around the global.

<https://assets.kpmg/content/dam/kpmg/xx/pdf/2019/04/global-construction-survey-2019.pdf>



Make it, or break it:
Reimagining governance, people and technology in the construction industry (Global Construction Survey 2017)

Addressing changes needed to overcome fragmentation, agile and innovative competition and inconsistent performance.

<https://assets.kpmg/content/dam/kpmg/ie/pdf/2017/10/ie-global-construction-survey.pdf>



Building a technology advantage: Harnessing the potential of technology to improve the performance of major projects (Global Construction Survey 2016)

Looking at how engineering and construction firms can harness the true potential of technology, with the added perspective of a technology lens.

<https://assets.kpmg/content/dam/kpmg/cn/pdf/en/2017/09/global-construction-survey-2016.pdf>



Climbing the curve:
(2015 Global Construction Project Owners Survey)

Focusing on the challenges faced by owners as they strive to advance in planning & financial forecasting, talent hiring & development, risk & project management, contingency management and positive & effective working relationships with the supply chain.

<https://assets.kpmg/content/dam/kpmg/pdf/2015/04/2015-global-construction-survey.pdf>



Emerging Trends in Infrastructure (Annual publication)

KPMG's annual report on changing trends in the infrastructure industry pinpoints the key issues that may influence the global construction and infrastructure industries in the year ahead, and how market players may respond.

<https://assets.kpmg/content/dam/kpmg/xx/pdf/2020/01/emerging-trends-in-infrastructure.pdf>



Is your digital future in the right hands? An annual review of the real estate industry's journey into the digital age (KPMG Global PropTech Survey 2019)

Based on the results of KPMG's 2019 Global PropTech Survey, this publication explores the areas in which attitudes and practices may need to change to overcome challenges in reaching full-scale digital technology adoption.

<https://assets.kpmg/content/dam/kpmg/uk/pdf/2019/11/global-proptech-survey-2019.pdf>



The road to opportunity
An annual review of the real estate industry's journey into the digital age (KPMG Global PropTech Survey 2018)

Based on the results of KPMG's 2018 Global PropTech Survey, this publication explores how the real estate sector's journey into the digital age is more than just about technology, but also innovation and collaboration.

<https://assets.kpmg/content/dam/kpmg/uk/pdf/2018/10/kpmg-global-proptech-survey-2018.pdf>



Bridging the gap: How the real estate sector can engage with PropTech to bring the built and digital environments together (KPMG Global PropTech Survey 2017)

Based on the results of KPMG's 2017 Global PropTech Survey, this publication explores how international players in the real estate sector are moving into the digital age with construction & property technologies.

<https://assets.kpmg/content/dam/kpmg/co/pdf/2017/12/proptech-bridging-the-gap-in-rastructure.pdf>



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