

The Future of Digital Infrastructure



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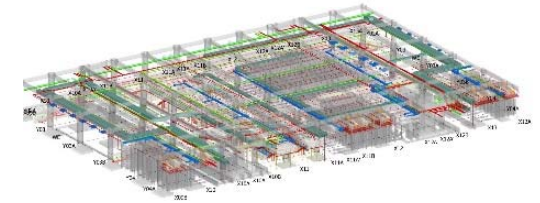


Abstract

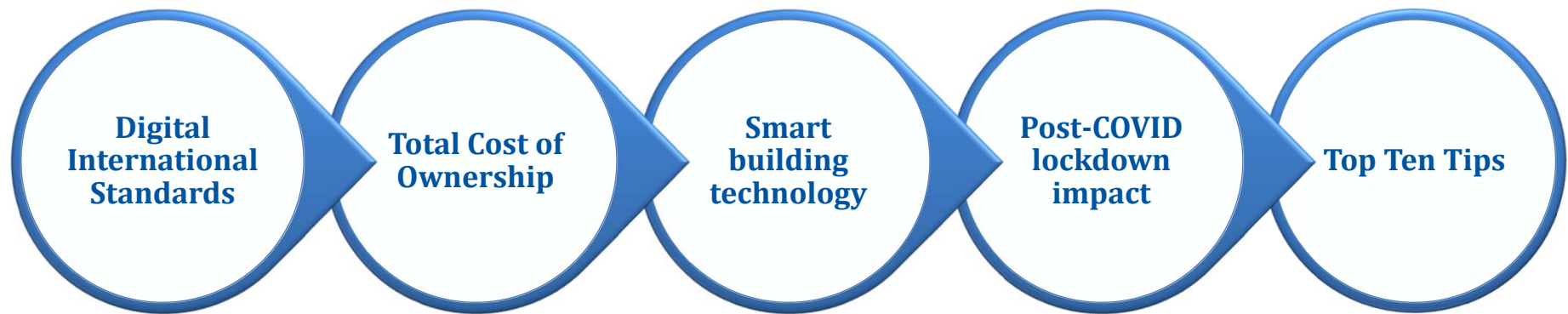
- **ISO:** A new international standard (ISO 19650-1:2018) addresses the “*organization and digitization of information about buildings... including Building Information Modelling (BIM), its concepts and principles*”
- **Impact:** The UK BIM Framework, which includes ISO 19650, via a “*Soft Landing*” process, delivers a fully populated, digitalised infrastructure asset data set that supports AM and FM activities and improves the TCO; it is tracked by an EAM system, during the operational life cycle, especially in “*Smart*” buildings
- **Benefits:** There are notable data management, HSEQ and commercial advantages, specifically via CAFM systems, used by Operations & Maintenance (O&M) teams, to achieve CAPEX and OPEX reductions



Digital Infrastructure in FM



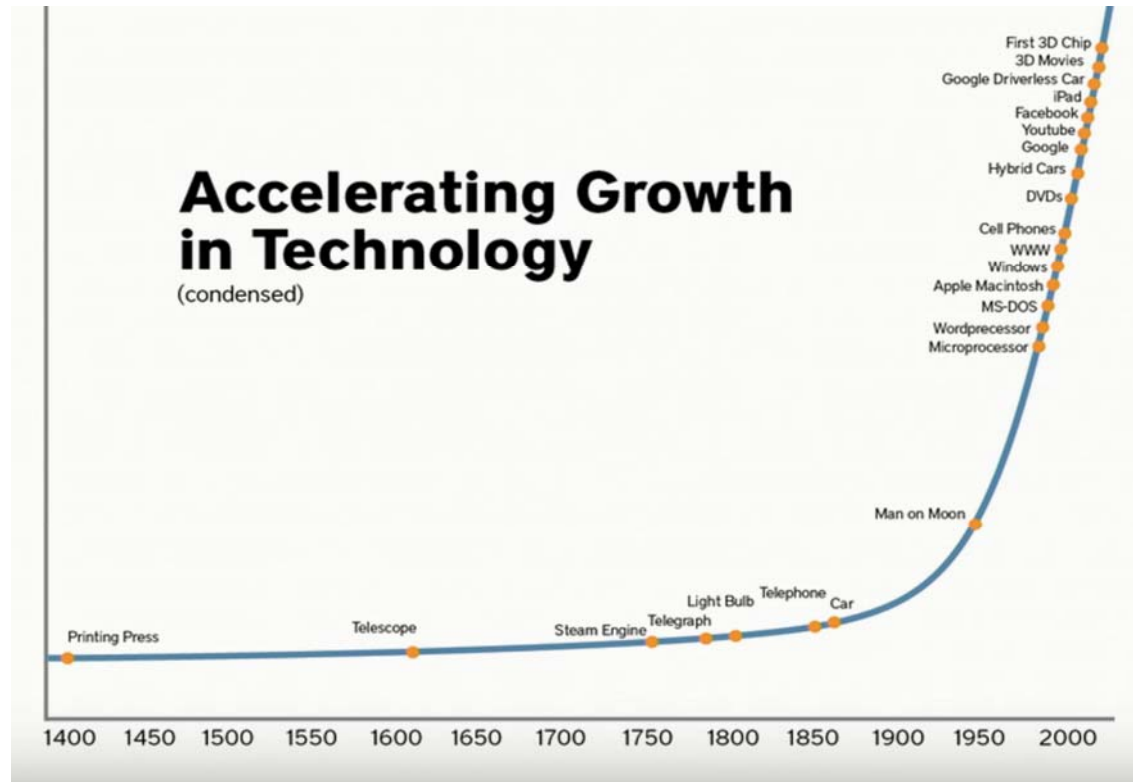
IGA's digitalised systems



New Digital ISO Standards

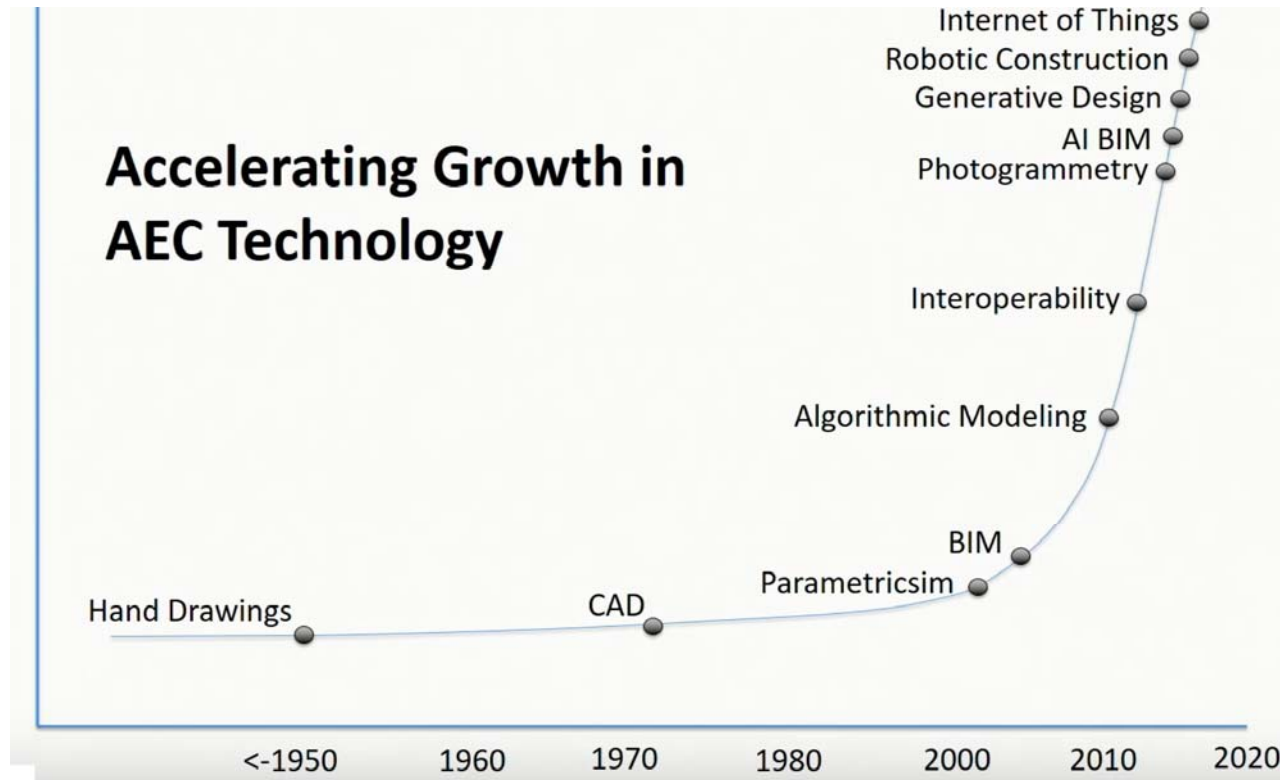


Digital Infrastructure Advances



Technology compounding
(Autodesk, 2016)

Digital AEC Sector Infrastructure Advances



Accelerating Growth in AEC Technology

Hand Drawings

CAD

Parametricsim

BIM

Algorithmic Modeling

Interoperability

Photogrammetry

AI BIM

Generative Design

Robotic Construction

Internet of Things

<-1950

1960

1970

1980

2000

2010

2020

Technology compounding
(Autodesk, 2016)



ISO 19650 Series - Part 1:2018



[ISO 19650 Series](#)

ISO 19650

TOPIC

- Organisation & Digitalisation
- BIM & IM
- Planning, DEC & DMS

Part 1

FOCUS

- Concepts & principles
- IM @ maturity stage
- Flexible, via ORAT, TC&H, O&M, Refurb

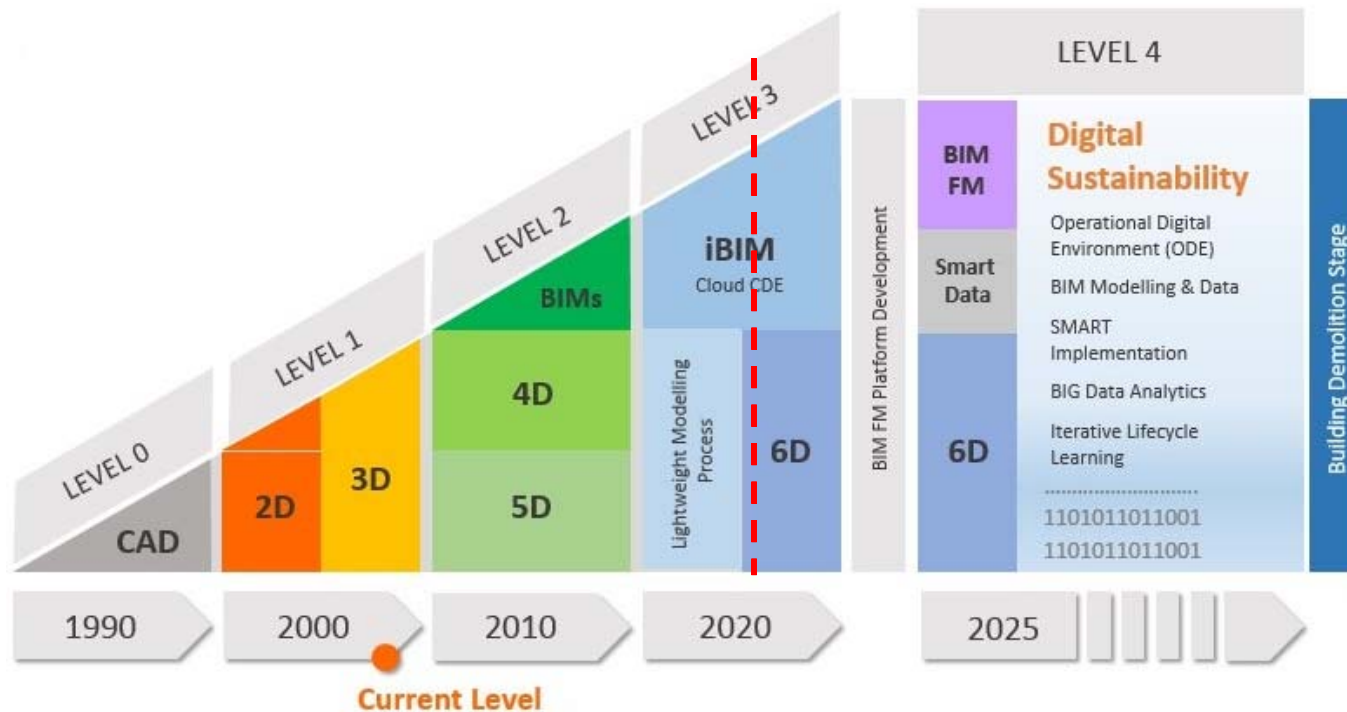
:2018

APPLICATION

- Whole Life Cycle
- Any built asset
- Any scale or complexity
- Budget neutral



BIM Maturity Levels to Digital Sustainability



BIM Maturity roadmap
(Surbana Jurong, 2018)



BIM + FM = Digitalisation and Digital Twin



BIM methodology dimensions
(BibLus, 2018)



BIM and FM in UK

UK's methodology for advancing digital infrastructure is a collaborative e-consortium:

UK BIM
FRAMEWORK

BSI

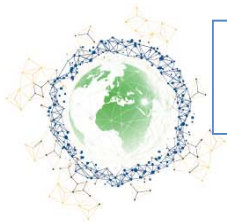
bsi.

UK BIM Alliance



Centre for Digital Built Britain

cdbb
Centre for Digital Built Britain



Bicsi
EMEA REGION
bicsi.org/emea2020

Total Cost of Ownership



FM (O&M) in Relation to an Asset's Life Cycle



O&M = 85% of a property's life cycle costs (IFMA 2016)



Digital Infrastructure Challenges

Education

- C-Suite + FMs in digitalisation & BIM

Justification

- Business case, ROI, SWOT, PESTLE

Timing

- What information, when, how, & to whom?



Smart Building Technology



SMART = Building Technology?

Concept

- Drucker, 1954
- Doran, 1981
- Management by Objectives

Language

- Capitalisation
- Initialisation
- Acronyms
- Abbreviations

“M by O”

- **S**pecific
- **M**easurable
- **A**ssignable
- **R**ealistic
- **T**ime-Bound



FMPrime's Millan

❑ FM terminology, cliches and buzzwords:

- Hard FM, Soft FM, TFM, IFM
- PPE, PPM, BIM, BMS, FFE
- **Smart** building



Smart Building (#1 of 3)



Seasonal capacity @
Medinah Airport

Infrastructure

- **Automated processes to control:**
 - Lighting, security, vertical movement
 - Drainage, landscaping, BMS, HVAC, FFS
 - Water, energy, PPM & FFE upkeep

Data Input

- **Hardware, Software & Systems**
 - Sensors, actuators, fuzzy-logic & MPUs
 - Cloud & server-based ICT & ERP Systems
 - Asset Management, Tagging & Tracking
 - Information Requirements (Asset, Exchange, Organisational, Project)



Smart Building (#2 of 3)



HSEQ risk
detection @ IGA

Benefits

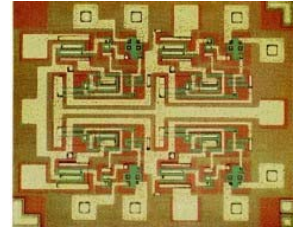
- **Helps owners, operators & FMs improve asset reliability, value & performance:**
 - Reduces HSEQ risk, CAPEX & OPEX outlay, energy consumption, waste, environmental impact
 - Over life cycle, optimises space, insurance cover
 - Enhances sustainable brand value & revenue

Connectivity

- **Buildings not “connected” digitally, are often as built, decades ago, + WiFi**
 - Criteria = only to provide “essentials” of shelter, temperature control & safety (so, at the same efficiency level for 60+ years, perhaps?)



Smart Building (#3 of 3)



Dgarte, 1990

Moore's Law (1965, 1975)

- Doubling IC capacity in 2 years, storage costs per GB falling, each year
 - New facilities, or upgraded “smart” structures, constantly improving in efficiency & performance
 - Smart FM & BAS benefits = utility savings, asset preservation, workspace environment

System Integration

- Innovation & Technology
 - WiFi, 5G, IoT-linked FFE (Doors, fridges, IRRS, LEDs, RE)
 - IR & UV-reduction, toughened, ionised & opaque glass
 - Leading companies to research: CISCO, Schneider, Honeywell, Siemens, Johnson Controls, Engie, Bosch (each has an intelligent, digitalised network BAS system)

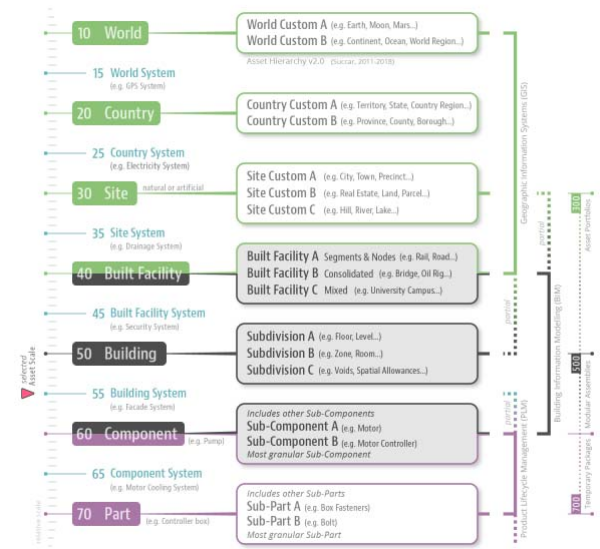


BIM Data for FM Systems: Implementation

Risk factors = abilities of C-suite's experience, knowledge or qualifications; arbitrary decisions; false assumptions; finite budgets; short-term-focus, goals & capabilities

Institutes, associations & talented consortiums have experts to guide FM organisations on transferring data from BIM into CAFM, and other ERP and FM CMMS

Optimal asset naming & data-processing protocols from outset, based on: IFCs or COBie; UNICLASS or OMNICLASS; GIS or GPS; 3D, 4D, 5D, 6D or 7D BIM usage; LOD level



Asset hierarchy example (BIM Framework, 2018)

Post-COVID Lockdown Impact



COVID-19 Impact on Digital FM (#1 of 2)

Hygiene & sterilisation: risk transfer interfaces



UV 80W lamps by GQ

Mitigation

- PPE & testing regime: workforce metadata analysis
- Intensified cleaning regime: monitoring effectiveness of processes
- Workspace redesigns: gathering & meeting areas, flow & focal points
- Isolation facility; medical support; protocols, BCP, DRP, Reaction Team
- IR cameras: screening all entries & exits in premises; UV lights to sterilise spaces

Verification

- Entry & exit checks, access systems + high-footfall & transit areas: data records
- Education & analysis of workforce, impact of WFHR; testing records
- Hand-held temperature readers backed by fixed cameras: who reviews results?
- Black & UV lights to confirm cleanliness in high-traffic & heavy-footfall areas
- Benchmark with other organisations using similar workspaces

COVID-19 Impact on Digital FM (#2 of 2)

Risk mitigation: tools & measures



Albacete HQ by COR

Investment

- Deploy space management software to plan social / risk distancing
- Adjust alarms in elevators & rooms to limit number of occupants
- Conduct customer surveys, employee satisfaction polls & space audits
- Need to integrate innovation, change, IoT and AI with new technology types
- Risk-based adjustment of cleaning KPIs & PPMs to reflect virus survivability

Management

- Mark flooring @ 2m (?) in canteens, corridors, bureaux, receptions, atriums
- QRC asset-tagging regime to register users of all FFE to tracing functions
- Communicate benefits of results vs intrusion of measures
- Monitor user feedback & employee satisfaction survey results
- Monitor productivity; resource & customer retention; metadata analysis statistics

New Techniques & Tasks (#1 of 2)

Operational Management

Data analysis = managers make better business decisions, if MI system allows

Health & wellness are strategic priorities for staff returning from WFHR

CAPEX & OPEX budgets for 2020 Q3 & Q4 will need to be adjusted: digitalisation?

Remote monitoring of AI & IoT output = competency grading, for best results

Facilities Management

Identify daily priorities, upgrade opportunities & training for all FM teams

Ensure each resource, in-house or outsourced is COVID risk-averse

Integrated multidisciplinary task force: innovation + technology + portfolio

Stakeholders develop balanced, resilient approach towards more resilience



New Techniques & Tasks (#2 of 2)

Variations

Negotiated Relationship Management & Partnering

Commercial and management impact on amended KPIs, SLAs, contracts & costs

Risks to Supply Chain service and stock providers: spot checks, audits, QA & QC

ICT and Access System security profiling to identify & track occupants



Communications

Multi-media to engage more with workforce, vendors & clients

Increase effort to enhance brand value and profile: use metadata facts

Stress induces defensive measures: longer emails, internal politics, cliques

Virtual meetings need not last all day, for one hour+ per session: manage time

Coming soon...

- **ISO:** Another new international standard, currently under development, is **ISO/WD TR 41016**
- **Impact:** The sub-title is “*Technology in facility management — Scope, key concepts and benefits*”
- **Team responsible:** ISO/TC 267/WG 6 (Working Group 6)
- **Benefits:** There are various broader technologies under consideration, incorporating:
 - Data, equipment and system integration
 - Change management and process adaptation: methodology innovation
 - Implementation goals, deliverables and benefits
 - Impact analysis of resource training and development needs
 - Measurement of output activities via Digital Twin, IoT, AI, AR, VR



Top Ten Points



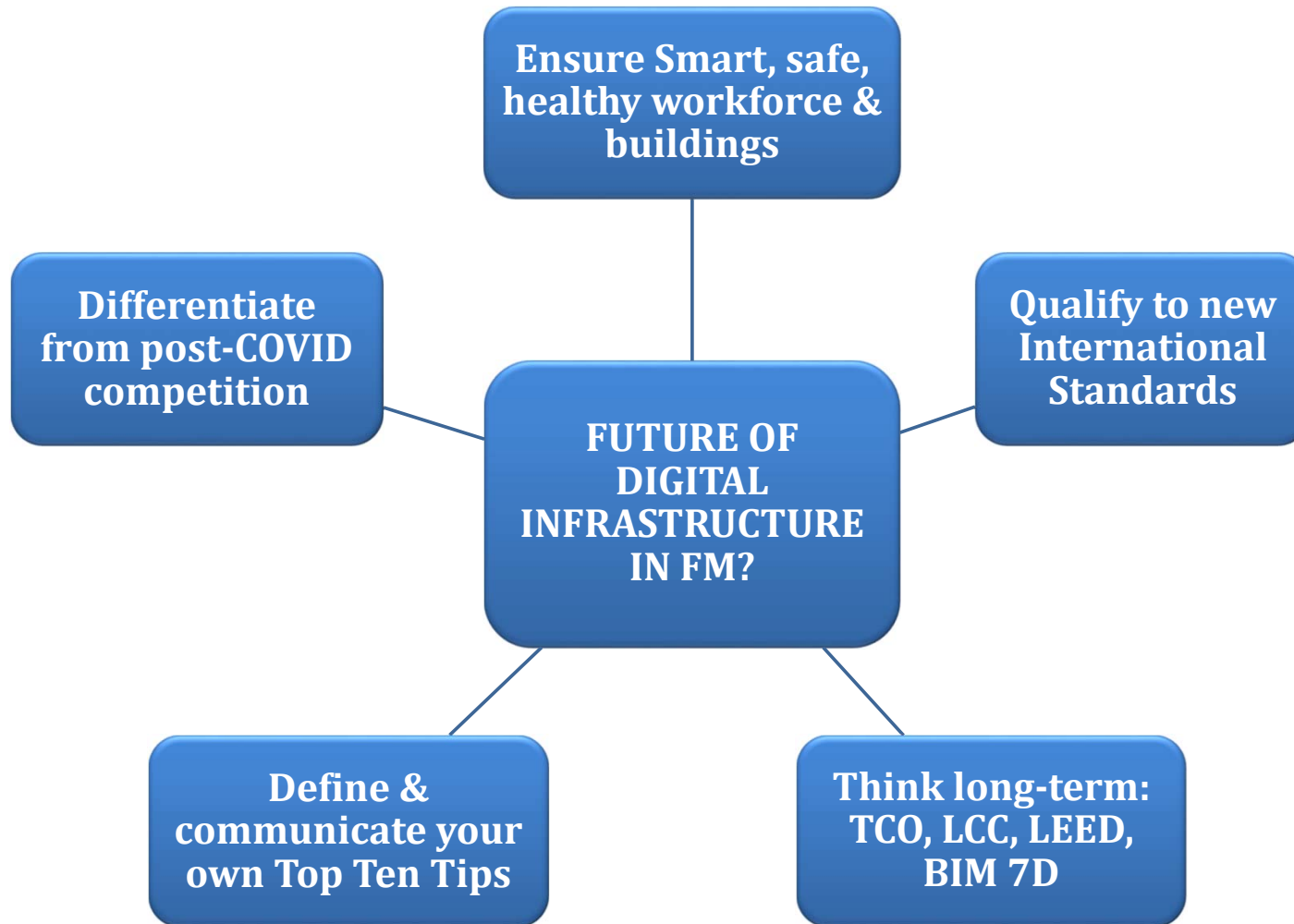
Top Ten Points: Digital Infrastructure in FM

Smart buildings	= Agile differentiators
Technology	= Moore's Law + 2020 pace
COVID-19 lockdown	= Rethink old ways (Output, not Input)
Employees' rights	= Act, educate, train
Carpe diem	= Upgrade opportunity, via ISO 19650
Standards & regulatory	= Requirements to adapt (PBM)
Learn what's best	= Benchmark, audit, test
Communicate	= Use best media to reach out
Lead & manage	= Set example, explain, do
Plan ahead	= Think long term, act now



Summary





Thank you!

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