



Digital Transformation of the Construction Industry for Sustainable Development
 Цифровая трансформация строительной отрасли для устойчивого развития

In-Touch Advisory

18 November 2019, St. Petersburg, RUSSIA
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GLOBAL COST PREDICTION in a Post-ICMS world

ГЛОБАЛЬНЫЙ ПРОГНОЗ ЗАТРАТ в пост-ICMS мире

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... connecting you with solutions for your Built Environment




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In-Touch Advisory



-  Stephen's Sydney based consulting firm In-Touch Advisory connects stakeholders with solutions for the Built Environment across the property–construction–facilities life cycle.
-  Stephen is an Australian delegate for the ISO international FM standards initiative (ISO 41000 since 2012), ISO/TC-267's global liaison to ISO/TC-251 (ISO 55000 asset management). He is also the Oceania representative to the RICS's Global Cost Prediction working group.
-  Stephen is a former member of the IFMA Board of Directors and Past Chairman of both the IFMA Foundation and FMA Australia.
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-  <https://committee.iso.org/home/tc267> for #ISO41000

Attendance and content today made possible with the assistance of our event organizer <http://bim-fm.ru/> and:












GLOBAL COST PREDICTION in a Post-ICMS world




1. Global Challenges, Opportunities and Standardization
2. International Construction Measurement Standard (ICMS) update, 1st & 2nd editions
3. RICS Global Professional Statement in Cost Prediction, reporting, benchmarking and more sustainable FM outcomes

SESSION OBJECTIVE:
Understanding of the ICMS, and the thought leadership represented in the Global Professional Statement in Cost Prediction and its impact on Facilities Management (FM) in support of the UN's Sustainable Development Goals.






Global Challenges



- Unacceptable level of project failures, and poor productivity levels
- Project management information systems (PMIS) not yet ubiquitous
- Slow adoption of technological change
- Mixed approach to risk contingencies
- Low profit margins and returns
- Skills labour shortages
- Sustainability concerns
- Adversarial contracting
- etc. etc...

Over-Budget Construction Projects In Comparison
 Selected over-budget construction projects worldwide (in U.S. dollars)*



| Project | Planned | Total | \$ Over Budget |
|---|---------|-----------|----------------|
| The Channel Tunnel | ~\$10bn | ~\$31.1bn | \$21.1bn |
| Three Gorges Dam | ~\$10bn | ~\$26.1bn | \$16.1bn |
| Boston's Big Dig | ~\$10bn | ~\$23.4bn | \$13.4bn |
| Berlin Brandenburg Airport** | ~\$10bn | ~\$13.2bn | \$3.2bn |
| Great Belt Fixed Link | ~\$10bn | ~\$11.8bn | \$1.8bn |
| Denver International Airport | ~\$10bn | ~\$13.1bn | \$3.1bn |
| World Trade Center Transportation Hub** | ~\$10bn | ~\$12.0bn | \$2.0bn |
| Montreal Olympic Stadium | ~\$10bn | ~\$13.0bn | \$3.0bn |
| Budapest Metro Line 4 | ~\$10bn | ~\$11.6bn | \$1.6bn |
| Millennium Dome | ~\$10bn | ~\$18.5bn | \$8.5bn |
| Wembley Stadium | ~\$10bn | ~\$17.6bn | \$7.6bn |
| Elbphilharmonie** | ~\$10bn | ~\$16.7bn | \$6.7bn |

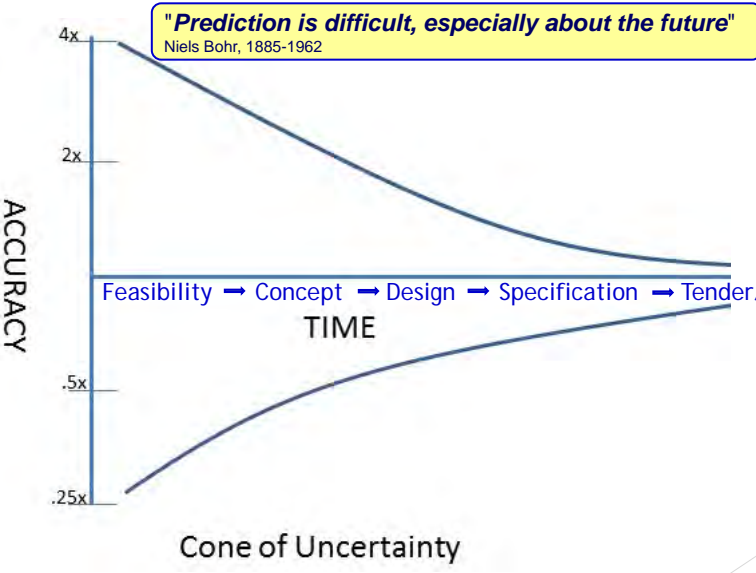
* in U.S. dollars and adjusted for inflation; ** still not completed

© Statista. Sources: Politico, Der Spiegel, NY Times

KPMG's 2015 Global Construction Project Owner's survey
"found that only 25% of projects are delivered on time and within budget – an extremely concerning statistic"



Estimating & Cost Planning



- Expectations
- Definitions
- Structure
- Measurement
- Compliance
- Forecasts
- Market
- Contract
- Risks
- Life cycle
- Commissioning
- Operations / FM



Future of Construction



Future of Construction's 2017 report: "Digital technologies are disrupting the industry, providing new opportunities to address the challenges of poor profitability/productivity, project performance, skilled labour shortages, and sustainability concerns."

Standards matter

Standards are fundamental to operating in a truly sustainable global environment, and offer:

- a common language
- consistent reporting
- greater transparency
- increased confidence through reduced risk
- ability to performance benchmark
- measure, cost, analyse and forecast


Pursuit of global market transparency, comparability and performance benchmarking.

International Construction Measurement Standard (ICMS)


- ❑ ICMS #1 released July 2017
- ❑ ICMS #2 new for September 2019
- ❑ ICMS #2 covers buildings and civil engineering assets
- ❑ Standards for measuring, reporting and benchmarking of construction project cost and now life cycle costs
- ❑ Major project delivery is increasingly multi-national and multi-disciplinary

FREE download: <https://icms-coalition.org/>

ICMS #2, represents 47 industry body signatories aiming to provide global consistency in classifying, defining, measuring, analyzing and reporting project costs



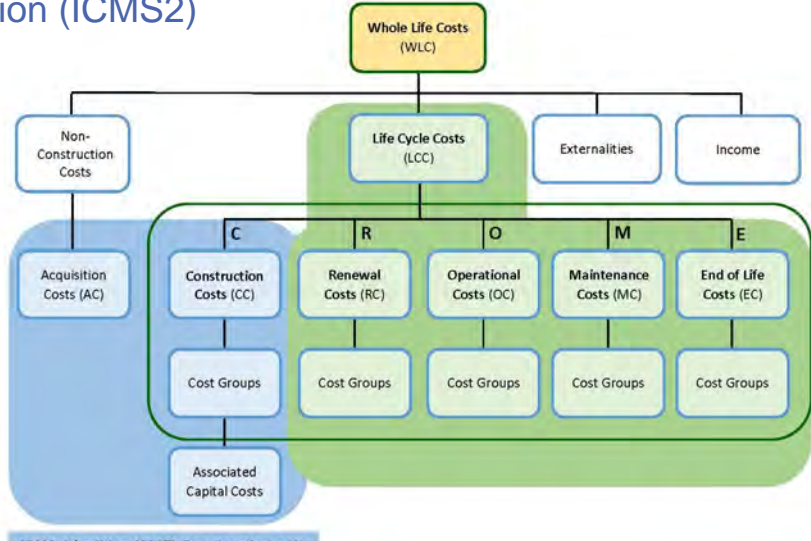
ICMS 2nd edition (ICMS2)



ICMS2 (2019) defines **CROME** as the new framework:

- Construction
- Renewal
- Operational
- Maintenance
- End of Life


“Life Cycle Costing, where the QS and the FM'er meet”
Ballesty, World Workplace Asia 2010




The diagram shows a hierarchy starting with 'Whole Life Costs (WLC)' at the top. It branches into 'Non-Construction Costs', 'Life Cycle Costs (LCC)', 'Externalities', and 'Income'. 'LCC' is further divided into 'C' (Construction Costs), 'R' (Renewal Costs), 'O' (Operational Costs), 'M' (Maintenance Costs), and 'E' (End of Life Costs). Each of these categories has 'Cost Groups' and 'Associated Capital Costs' below it.

ICMS 1st edition (2017) Construction only

ICMS 2nd edition (2019) Construction & Life Cycle



International Construction Measurement Standard (ICMS)





| Level 1: Projects or Sub-Projects | Level 2: Cost Categories | Level 3: Cost Groups | Level 4: Cost Sub-Groups (Discretionary) |
|-------------------------------------|--------------------------|----------------------|--|
| Buildings | Acquisition Costs (AC) | Cost Group | Cost Sub-Group |
| Roads, turnways and motorways | | | |
| Railways | Construction Costs (CC) | Cost Group | Cost Sub-Group |
| Bridges | | | |
| Tunnels | Renewal Costs (RC) | Cost Group | Cost Sub-Group |
| Waste water treatment works | | | |
| Water treatment works | Operational Costs (OC) | Cost Group | Cost Sub-Group |
| Pipelines | | | |
| Wells and boreholes | Maintenance Costs (MC) | Cost Group | Cost Sub-Group |
| Power generating plants | | | |
| Chemical plants | End of Life costs (EC) | Cost Group | Cost Sub-Group |
| Refineries | | | |
| Dams and reservoirs | | | |
| Mines and quarries | | | |
| Provision for further Project Types | | | |

- High-level cost classification
- Buildings and civil engineering
- Definitions, inclusions and exclusions
- Four level taxonomy
 1. Projects or Sub-Projects
 2. **Cost Categories**
 3. Cost Groups
 4. Cost Sub-Groups
- Key cost drivers

Level 2 Cost Categories

- Acquisition Costs (AC)
- Construction Costs (CC)
- Renewal Costs (RC)
- Operational Costs (OC)
- Maintenance Costs (MC)
- End of Life Costs (EC)


A simple cost classification hierarchy to overlay local methods of measurement

ICMS 2nd edition (incorporating life cycle costs)

The Iceberg Principle

Calculating Life Cycle Costs





15%

85%


NOTE: Diagrammatic only, proportions vary by sector, project and source.

- ❑ “The first edition of ICMS focused on creating a standard for capital cost reporting. The second edition builds upon this by creating a cost classification for renewal, operation and maintenance – all components which have a direct impact on **facility management**.”
- ❑ The second edition of ICMS will better connect **facility management** and early investment and construction cost decisions”.
- ❑ ICMS #2 was published late September 2019.

RICS Global Professional Statement in Cost Prediction (GPSCP)

- ❑ 22 experts from 12 countries over two years
- ❑ 1st edition Report release due in early 2020



RICS Global Professional Statement in Cost Prediction


1 Context
Defining external/internal parameters & the framework for developing cost predictions


2 Process
Inputs and outputs, process maturity, risk and de-biasing

3 Data
Data sources, structure, curation and AI and re-basing.

4 Output
Development of cost prediction report and reporting templates


GPSCP consultation draft: <https://consultations.rics.org/consult.ti/costprediction/consultationHome>

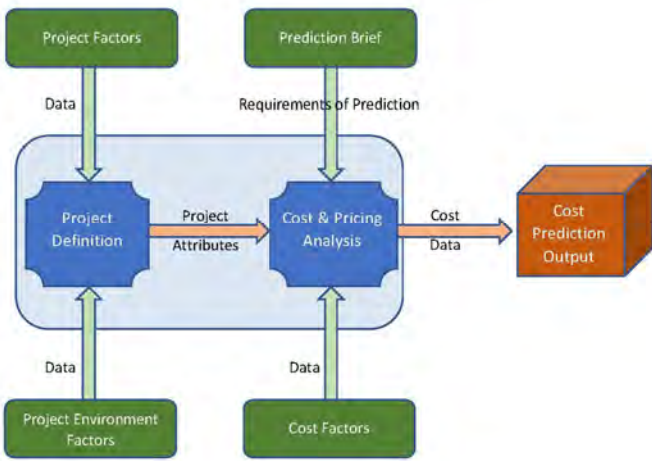


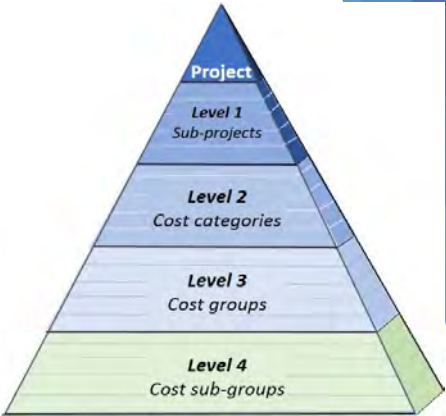


RICS Global Professional Statement in Cost Prediction (GPSCP)


Examining cost planning and control techniques








ICMS #2 alignment

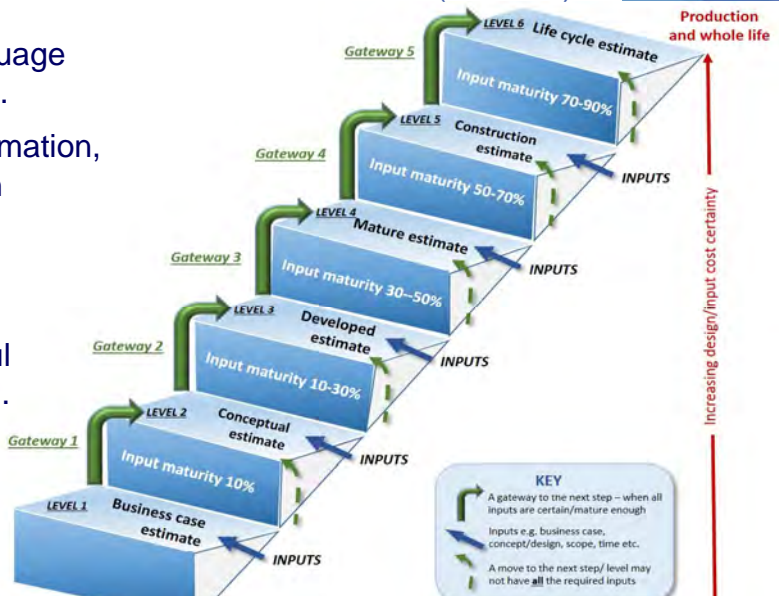


RICS Global Professional Statement in Cost Prediction (GPSCP)

- A common process language for global cost prediction.
- Inputs can be data, information, productivity, construction materials, construction methodology or time.
- FM inputs are required throughout for successful life cycle implementation.
- Design is an input, not the input.



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KEY

→ A gateway to the next step – when all inputs are certain/mature enough

↔ Inputs e.g. business case, concept/design, scope, time etc.

↘ A move to the next step/level may not have all the required inputs



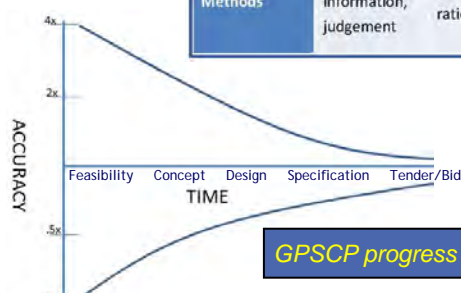


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RICS Global Professional Statement in Cost Prediction (GPSCP)


- ❑ Cone of uncertainty v's defined costing levels
- ❑ Direct correlation between design info / data completeness and costing accuracy by level

| Criteria | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 | Level 6 |
|--------------------------|-----------------------------------|---------------------|--------------------------|-------------------------|--|---------------------|
| Cost prediction levels | Business case estimate | Conceptual estimate | Developed estimate | Mature estimate | Construction estimate | Life cycle estimate |
| Information completeness | 10% | 10-30% | 30-50% | 50-70% | 70-90% | 90-100% |
| Cost prediction accuracy | -30% to +50% | -20% to +30% | -15% to +20% | -10% to +15% | -5% to +10% | >10% |
| Methods | Historical information, judgement | Parametric ratios | Semi-detailed unit costs | Detail (quantity based) | Detail (quantity based and full specs) | Economic evaluation |



GPSCP progress to prediction

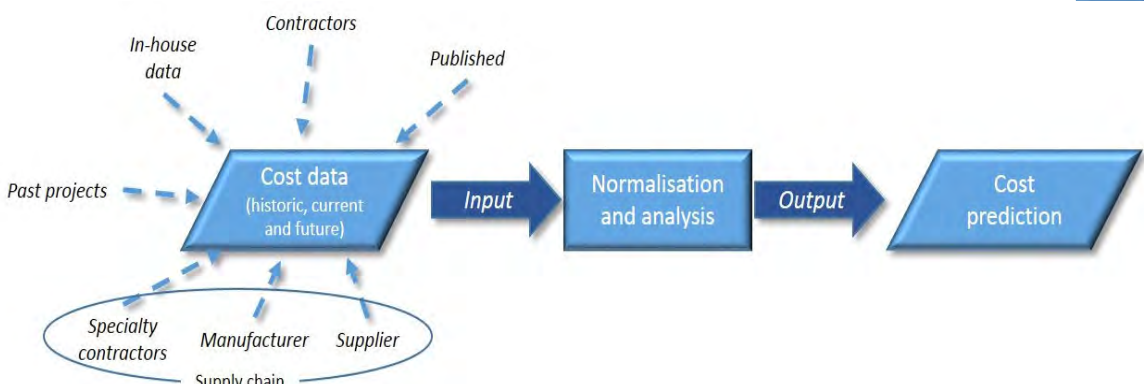






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RICS Global Professional Statement in Cost Prediction (GPSCP)

- ❑ Recognition of data sources, attributes and values



- ❑ ISO 31000:2018 defines risk as the “effect of uncertainty on objectives”
- ❑ Focus on out-turn cost / final account targets

RICS Global Professional Statement in Cost Prediction (GPSCP)

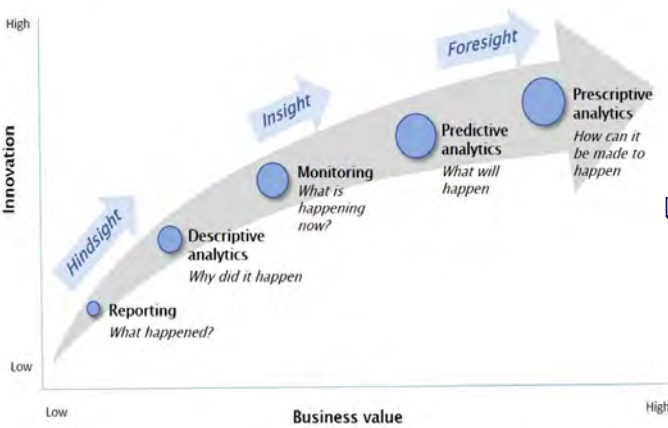
Data structure, metrics and acquisition

Data curation steps:



1. Selection
2. Logic
3. Integrity
4. Context

Data sources include:

- Clients
- Consultants
- Professional organisations
- National and supra-national agencies



demonstrated value of data processing

RICS Global Professional Statement in Cost Prediction (GPSCP)

Data structure, metrics and acquisition

| Barrier | Reason |
|----------------------|--|
| Human factors | <ul style="list-style-type: none"> ▪ Lack of trust (e.g. previous interactions and history of partnerships) ▪ Fear of misinterpretation/misuse of data ▪ Confidentiality and privacy concerns ▪ Limited resources, availability of skilled staff |
| Usability | <ul style="list-style-type: none"> ▪ Records not kept electronically ▪ Data in an incompatible format ▪ Only aggregated or incomplete data is available ▪ Frequency of data release, timeliness |
| Availability | <ul style="list-style-type: none"> ▪ Uncertainty about where data exist ▪ Uncertainty about how to access data ▪ Onerous approval process for accessing data ▪ Policies, including local and national laws that limit access |


some of the barriers to data acquisition

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Global Cost Prediction





- ❑ **ICMS 2nd edition (2019)**
- ❑ **ISO 41000** series since 2017, and now ICMS recognition of FM.
- ❑ RICS Global Professional Statement in Cost Prediction (**GPSCP, 2020**)
- ❑ **Cost Classification** for Construction, and now Life Cycle, leading to Costs being consistently and transparently benchmarked.

GPSCP OBJECTIVE: *“improved data and informed decision making on the design, construction and operation of facilities worldwide”.*



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Thank you & Questions
Спасибо & Вопросы



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... connecting you with solutions for your Built Environment