

Improving certainty in construction: the need for international standards

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ABSTRACT

Purpose:

Uncertainty is a major drag on investment in construction and infrastructure. In turn, uncertainty is often caused by a lack of comparable, consistent and collaborative standards. The paper will explore the vision of how International *Construction* Measurement Standards (ICMS) could appropriately connect with, and be a next step, of International *Property* Measurement Standards (IPMS) (a current, ongoing project). The ICMS would involve the collaborative development and implementation of internationally agreed and recognized measurement standards for the construction and infrastructure sectors.

Design and Methodology:

A review of economic literature, applied to how standards improve efficiency and decision-making, is undertaken. Since global accounting standards follow this principle, it is then shown how this can be applied to the measurement of floor areas and hence property valuation (a substantial sub-set of the now accepted International Financial Reporting Standards). In turn, it is shown how the same principles can be applied to the measurement of construction, with the attendant improvement in efficiency and certainty that this will bring, culminating in examples of areas where the standards could be developed with collaborating and like-minded, expert, bodies.

Findings:

Currently, there is a lack of measurement standards relevant to the construction industry at a global level. This lack of measurement standards means that construction projects, their inherent works elements and the resultant assets are incomparable from one geographical market to another. In addition, robust global benchmarks for cost, time, quality, risk, sustainability and technology are not available.

The IPMS coalition now constitutes over 40 organizations and is functioning productively and effectively. It would be intended to extend this concept and form a separate coalition to represent key, global construction bodies.

Value and practical implications:

Adopt a “top down, bottom up” approach to develop a set of international, principle-based, measurement standards, which will cascade through the international markets (top down) to enable accurate and efficient benchmarking and comparison of construction performance worldwide.

The international measurement standard principles should integrate with detailed measurement standards in accordance with local market jurisdictions to ensure the standards are adopted by practitioners (bottom up). The standards should be developed in consultation with expert, international practitioners, bodies, and panels, subject to international consultation and stakeholder review.

Keywords: international measurement, international standards, international construction; construction measurement; construction standards.

1 INTRODUCTION

This paper addresses one of the key areas of market inefficiency, that of market knowledge. “*The efficiency of markets is reduced by imperfect knowledge*” (Harvey & Jowsey, 2006, p. 29). Specifically, the paper explores the need for a set of collaboratively developed, principles based, international measurement standards for global construction markets, primarily focused around construction costs, while remaining cognizant of the inherent risk and uncertainty in construction.

It is acknowledged in this paper that there are other aspects that can potentially offer benefits by having a collaboratively developed set of principles based international measurement standards.

The paper does not attempt to describe *what* the international standards might look like; the paper’s main aim is to identify the need, and to explain *why* international measurement standards for construction will benefit the economy.

The paper provides an outline of what has already been achieved in terms of international property measurement standards (IPMS), how international measurement standards for construction connect into the IPMS project, and how international measurement standards for construction may be collaboratively developed and adopted. IPMS is an ongoing, international project being managed by a coalition of bodies and institutions who are committed to developing international measurement standards for property, collaboratively. Thus, this paper will provide insight into how International Construction Measurement Standards (ICMS) can mirror this success in the building and infrastructure arenas.

It is important at this stage to make the distinction between *property* and *construction* in terms of measurement. Property (like land) is a *noun*, it is an asset and material object that one may touch, and it can be measured in terms of dimensions. Conversely, construction is a *verb*; it is a process that cannot be touched, however we may measure aspects of the construction process such as the cost associated with the construction process, or the time taken to complete a construction process.

The paper is written primarily from a commercial perspective, in that it explores how international construction measurement standards can improve private financial investment decision making. Public sector decision making tends to be based more on Cost Benefit Analysis, i.e. considering the public and social benefits realized by a development project, rather than on an investment return basis. It should be acknowledged however that there are significant benefits for the public and regulated sectors by adopting these standards.

2 METHODOLOGY

International Standards and International Measurement Standards are well researched by others, meaning that references and citations are readily available and form many of the arguments within this paper.

ICMS are not so well researched and as such, this paper draws on few references and citations for this section. Instead, the author draws on the consequences from the earlier sections of this paper and uses the experience and views of others gained from the IPMS project to explore the idea of ICMS and the potential benefits that may be realized from their development and adoption.

3 INTERNATIONAL STANDARDS AND ECONOMICS

This section introduces the relationship between international standards and the global macro economy, and describes how international standards can have a positive effect on the efficient use of resources in a market economy. International Standards can be defined as: “*Standards, with international scope, which set out high level principles to be satisfied by a practitioner, and the procedures for checking conformity to these requirements.*”

Standards have a direct relationship with the global macro economy. The Organization for Economic Cooperation and Development and the US Department of Commerce both show that standards and related conformity assessment (checking that products and services measure up to standards) have an impact on 80% of the world’s trade in commodities (ISO 2013).

Having established that standards and economics are inextricably linked, it is useful to establish some fundamentals around economics. Economics is concerned with the allocation of scarce resources. Many of the world’s available resources are finite; however people have an infinite, insatiable appetite for consuming the world’s resources. Therefore at any one point in time we are faced with the problem

of having many wants, from a limited amount of resources; this problem is formally referred to in economic science as *scarcity* (Myers 2006).

Economists argue that to address the problem of scarcity, people must make careful choices about what is made, how it is made and for whom it is made. Essentially economics is known colloquially as the “science of choice”.

Decision-making is the act of selecting one choice over others, often because of a lack of resources. When making a decision, some other thing has to be foregone, choosing one thing over another inevitably means giving up something else; an opportunity has been missed, or sacrificed. In economics, this situation is highlighted and addressed by applying the concept of *opportunity cost*. A definition of opportunity cost is: “*The value of the alternative forgone by choosing a particular activity.*” (Myers 2006)

When a choice is made, there is a trade-off between the use of one resource for one or more alternatives. In economic terms, the real cost of the foregone choice (the opportunity cost) is the trade-off. To ensure the public interest in a market economy effective decision making (making the right choice) and the efficient use of resources is an essential element.

This concept draws attention to the importance of *efficiency* in the utilization of resources. It also highlights the need for the sound assessments of information (such as cost and value) to inform sound *decision making* around the management of production, distribution and consumption.

According to ISO, International Standards help to harmonize technical specifications of products and services making industry more efficient, increasing levels of productivity within a given amount of resources. ISO (2013) state that “*International Standards are strategic tools and guidelines to help companies tackle some of the most demanding challenges of modern business. They ensure that business operations are as efficient as possible, increase productivity and help company’s access new markets.*”

At a general level, the benefits realized by adopting standards include but are not limited to the following:

- Cost savings
- Client/ customer satisfaction
- Access new markets
- Increased market share
- Environmental benefits (ISO 2013)

The International Federation of Surveyors (FIG) guide on standardization from 2006 looks at ‘the benefits of standards’. Research undertaken by the Technical University of Dresden and the Fraunhofer Institute for Systems and Innovations::

- The benefit to the German economy from standardization amounts to more than US\$ 15 billion per year;
- Standards contribute more to economic growth than patents and licenses;
- Companies that participate actively in standards work have a head start on their competitors in adapting to market demands and new technologies;
- Transaction costs are lower when European and International Standards are used;
- Research risks and development costs are reduced for companies contributing to the standardization process. (DIN, 2011).

Further work in the UK in 2005 found that “13% of the UK’s economic growth between 1948 and 2002 could be attributed to standards” (Department of Trade Industry, UK 2005).

4 INTERNATIONAL STANDARDS FOR MEASUREMENT

Having established the benefits and global applicability of international standards, this section explores why we would want to establish a set of international *measurement* standards, in collaboration with others, at both a micro and macroeconomic level. Measurement is defined as: “*The quantification of an entity or event using accepted metrics to define it and to allow the accurate comparison with other entities or events.*” Or, put another way: “*If you can’t measure it, you can’t manage it.*”(Drucker 2009

Measurement is used in business for a plethora of reasons ranging from simply wanting a set of data quantified for a rudimentary comparison, through to monitoring the performance of a manual labour process, or a machine’s output, or an investment’s return, through to measuring areas that will form the basis of an asset valuation.

A business may want to compare the revenue of different regional offices relative to the number of staff in each office, or monitor the output of two different production lines, or appraise the return on a number of different investment options. Essentially, each of these scenarios will require measurement of some form, and each set of measurements will be compared against each other to assess their performance.

The assessment, or the measurement and analysis of performance, is the means by which businesses detect waste in the utilization of resources in their supply chain or business activities, with the view to minimizing this waste to improve overall performance. In many business sectors, all members of the supply chain collaborate to constantly measure their performance with regards to the utilization of resources and then collaborate further to devise ways of reducing or eliminating causes of waste and inefficiency so that performance is continuously improved (Cain, 2004).

This improvement in performance may take on many forms such as reduced costs, reduced risk, increased profit margins, reduced time, or improved quality, but each of these forms can be brought back to the fundamental objective of economics; to improve efficiency. However, this only considers performance and efficiency at an individual, local, micro economic level.

Having established the benefits of measurement, and the analysis of the results to improve performance and efficiency at a microeconomic level, it's necessary to explore how measurement, analysis, performance improvement and increased efficiency transpose to an international, macroeconomic level.

Anyone with a vested interest in understanding, managing or planning matters related to economics will need to interpret economic statistics. These economic statistics are derived from a number of measures referred to as macroeconomic objectives. While there are many texts listing and defining the macroeconomic objectives slightly differently, they may broadly be summarized as follows:

- Stable prices
- Full employment
- Sustained economic growth
- External balance
- Protection of the environment

In their attempts to achieve these macroeconomic objectives, governments adopt what are referred to as policy instruments; these are tools that can manipulate an economy. These policy instruments may broadly be classified as fiscal policy, monetary policy and direct policy.

It is not the purpose of this paper to explore each of these macroeconomic objectives and the policy instruments that influence them. What is important however is to understand that each of these objectives requires a form of measurement to harness the data, so that it may be presented in a certain format that can be analyzed for performance measurement, to facilitate better decision making that may be acted on to drive improved performance. We may therefore summarize that the statistical representation of macroeconomic objectives and their performance, are derived from measurement.

Economic forecasting is adopted by both governments and business alike to inform decisions that are taken to improve performance. The data that drives the forecasts is based largely on measurement and seeks to convert the measured data of a complex set of parameters into a simplified output. Currently, this data is measured in inconsistent ways, globally. The complexity around forecasting is compounded by the fact that forecasting requires a set of assumptions to account for the unknown data at a given time. These assumptions are also driven by measurement, often by measuring historic data and projecting a trend line into the future. Again, these assumptions are measured differently. Given the challenges of measurement around economic forecasting, it is unsurprising that economic forecasts are often incorrect. What is important to realize however is that an economic forecast seeks to identify, measure and monitor the key variables of an economy, to facilitate better decision making around resource allocation, to drive growth in an economy. While the forecasts may be too complex to predict with real certainty, having a set of data with some certainty is far better than having no data and complete uncertainty, and furthermore, having the data that is measured and collected in a consistent manner, i.e. in accordance with a standard, is better still (Myers, 2006).

5. INTERNATIONAL PROPERTY MEASUREMENT STANDARDS (IPMS)

The International Measurement Standards (IMS) journey has already begun and has momentum. IMS are currently being developed for *property* measurement (*separately from construction measurement*) in collaboration with a number of organizations that have formed a global coalition that includes among others the World Bank, International Monetary Fund, FIG and BOMA. The coalition

has 44 official members who have signed a declaration and comprise not-for-profit, standard-setting organisations and non-commercial firms.

The Coalition has also created a voluntary status of “IPMS Partner” for commercial entities. IPMS Partners are listed on the IPMS website (www.ipmsc.org) and are at the forefront of the IPMS initiative and have registered their support in establishing the standard across property markets. There are currently 34 IPMS Partners, though the number of both Coalition Members and Partners is growing all the time. The coalition has developed a “top down, bottom up” strategy that will facilitate the collaborative development and adoption of a set of high level, principles based standards that will be recognized across the global community, while allowing locally based practices to continue.

In July 2013 the IPMSC selected real estate experts from around the world to form its Standards Setting Committee (SSC) and develop global standards for property measurement. The SSC comprises 18 property experts from 11 different countries and 5 different continents. Between them, the Standards Setting Committee has experience of property measurement methodologies in almost 50 countries. The SSC recently published an Exposure Draft of an IPMS for Offices and this is currently open for public consultation, comment and feedback. The final standard is due to be issued in November 2014.

The development of the IPMS has a clear focus on global collaboration amongst professional associations, standard setting organisations and other entities. Considerable effort has taken place to invite and encourage global participation in this initiative. It is very apparent that this initiative would not be successful if it was developed by a small number of organisations – this would limit the global ‘take-up’ of the standards and would open up the standards to criticism/cynicism due to perceptions that they were influenced by the vested interests of these organisations. Focusing on global collaboration and ensuring that the coalition drives the standards development, rather than individual organisations, has seen the IPMS flourish and gain considerable global momentum in a very short space of time.

6 BENEFITS OF INTERNATIONAL CONSTRUCTION MEASUREMENT STANDARDS

Having explored the subject areas of international standards and international measurement standards, this section explores the benefits that can be realized from international construction measurement standards (ICMS) and how these can contribute to realizing an efficient global, macro economy. Construction may be defined as: *“In the fields of architecture and civil engineering, construction is a process that consists of the building or assembling of materials in order to produce buildings or infrastructure.”*

6.1 Standards for measuring construction costs: nationally

When considering the relationship between measurement and construction, one may automatically think of a surveyor or engineer measuring quantities of materials required to construct a building, a port, or a bridge for example. This aspect of measurement is vital to construction since it directly drives the costs associated with a construction project, which is one of the key areas of interest (and indeed of dispute) between the parties to a construction contract.

There is clearly a need for a measurement standard for construction, so that a consistent approach to estimating can be adopted (thus giving construction clients confidence in cost estimates for benchmarking, decision making and financing) and to enable the quantification of works so that the parties to a construction contract can agree the value of works accurately, for payments to a construction company undertaking works, or for a valuation for an interested party such as an investor.

In terms of construction costs, the RICS has developed a suite of measurement standards for buildings titled the New Rules for Measurement (NRM) that form the basis of construction cost estimates, while other institutions such as the European Council of Construction Economists (CEEC) have also developed standards of a similar nature. The African Association of Quantity Surveyors (AAQS) is also developing a construction measurement standard for the African region.

However, these standards are most useful at a national level, specifically for the reasons described above, where projects within a region have similar construction methodologies, technologies, labour costs and material costs, which are all relatively comparable.

At a global level, the demand for a measurement standard for construction may be less clear. To elaborate, we may pose the question: Why would a local Chinese (for example) developer choose to

benchmark the cost of a new build office block in China, against one in France (for example) to determine whether the scheme was designed efficiently and offers value for money?

There are numerous factors aside from the actual design that would make the comparison challenging and tenuous; these include legislation, design and specification standards, construction methodologies, the availability and cost of materials and labour, not to mention the prevailing exchange rates. Where the sole objective is to determine whether a project's design offers efficiency and value for money, it's far more efficient and effective to benchmark a project against similar projects in the same region where the majority of non-design factors are immediately comparable, i.e. "*all other things being equal*" so that we may isolate just the design for comparison.

6.2 Standards for measuring construction costs: internationally

Data is recognized as the fourth factor of production (Ong 2012). It is therefore necessary that data is measured, collected, managed and harnessed in a way that maximizes the efficiency of production. International construction measurement standards (ICMS) may offer the greatest benefit by increasing the quality of comparable data used to inform decisions on international expenditure, production and investment. See Lian Ong, Quantity Surveyor and Past President of the RICS, has noted that "*All other things being equal, the country with the better data and information – and the ability to use it effectively – will achieve faster growth*" (Ong 2012, p.5). In an increasingly global market investors search for, and have exposure to greater opportunities for international investment in construction development projects.

Investors are often faced with limited capital funds, or the capacity to invest in only one project on a given site meaning that projects are 'mutually exclusive'. Where only one project may be chosen as an investment vehicle, it is essential to choose the project whose value exceeds the cost of inputs used by the greatest amount. This decision making process requires investment options (in this case development projects) to be measured, scored, and ranked (Harvey & Jowsey, 2006, p. 86).

From a purely monetary perspective, an investor's decision-making around scoring, ranking and selecting a particular investment project, will be broadly based around the following considerations:

- a) The cost of land
- b) Construction costs
- c) Other development costs (fees, statutory and legislative costs etc.)
- d) Developer's profit
- e) Value of the completed development

The relationship between these considerations may be considered as follows:

$$a + b + c + d = e$$

This paper is concerned only with item b); Construction costs, which may typically account for 30% – 40% of e) the value of the completed development.

At a regional level, i.e. where investors are ranking and appraising investment options all within one region, the data used for ranking may or may not be measured to a consistent standard. However, it's likely that the data may at least be comparable within any given region. By making reasonable assumptions based on knowledge of the regional market, then leveling and manipulating the data a meaningful comparison can be made to inform decision making.

For example, a surveyor may be commissioned to appraise the construction costs of a number of investment options on behalf of a client. When making an appraisal, a surveyor would need to consider aspects that include but may not be limited to the following:

- Technical design (structure, services, finishes)
- Specification (quality and performance of materials, finishes, equipment)
- Contractor's preliminaries
- Design efficiency (net to gross area ratio, wall to floor ratio)
- Construction start date and duration
- Design and management fees
- Legislative and statutory matters
- Construction methodologies available
- Construction technologies available
- Location factors
- Risk

The surveyor may use historic data, forecasts and judgment to make assumptions that will enable a meaningful comparison of the various schemes. In regions that have nationally agreed standards, or recognized practices for measuring construction costs each of the factors listed above could be

measured on a comparable basis. In the UK and across a number of European countries for example, surveyors adopt and generally adhere to a standard for measuring construction costs. In the UK quantity surveyors predominantly use the Standard Form of Cost Analysis which offers a recognized structure for measuring construction works, which is applicable to all building types and can be repeated, thereby offering a consistent basis for comparing numerous building or investment options with one another, to inform decision making.

The CEEC has done considerable work on measurement standards in Europe. By comparing the various measurement standards of a number of European nations on a single, common design scheme, the CEEC has highlighted the discrepancy in the resulting costs generated by using the various standards. The results found a cost variance of almost 100%. This significant discrepancy was the result of the various definitions of the measurement of quantities within each standard, however it was also found that different national standards either included or excluded various scope items within the standard. For example, depending on the country, the following costs were included:

- Building construction and external works (all countries)
- Professional fees for planning (all countries except France)
- Land costs (only Switzerland and Denmark)
- The cost of finance (only Switzerland and Denmark)

The resulting comparison of costs /m² were therefore highly misleading (Wright, M & Stoy, C 2008) and as such would potentially lead to investment decisions being taken on substantially inaccurate data regarding the construction costs of a development.

The CEEC has responded to this situation by developing in collaboration with its European members a European Code for Cost Planning that defines all of the construction elements which *“provides a long-sought for basis for meaningful European cross-border cost comparison of buildings. References to national standards enable analysis and comparison of building projects based on available data”* (Wright, M & Stoy, C 2008).

At a global level, there is no single standard of measurement for construction. Based on the work by CEEC across Europe, we may extrapolate that a similar situation exists where inconsistent data leads to significant variations in the reporting of construction costs between world regions. This inconsistency of data creates challenges to the investor who needs to make choices between international investment options. Specifically, the status quo is that when comparing development projects between different countries, there is no international standard that defines what is included within a construction cost estimate, making cost comparisons inefficient and/or inaccurate. At best; the investor can make reasonable assumptions to make construction investment options more comparable to make informed decisions. At worst; decisions are based on poor quality information and may lead to significant losses for governments, businesses, institutions and/or investors.

Some examples of recent projects demonstrating the use and benefits of international standards are as follows:

6.3 Standards Case Study 1:

An Australian State has engaged with a consultancy (confidential parties) to develop and implement a standard for its real estate portfolio that can be benchmarked internationally, to improve its efficiency and drive cost savings in its construction and refurbishment programs across over 1,000 assets.

6.4 Standards Case Study 2:

A case study by consultant EC Harris shows how a corporate client saved €18m across its real estate portfolio by developing a global work place strategy. The basis of the work place strategy was a global standard of measurement to be applied across the business, which enabled “like-for-like cross-portfolio benchmarking” to drive improved decision making based on higher quality data.

These two case studies offer practical examples and highlight the demand and benefits that may be realized from an international construction measurement standard at both corporate and governmental levels. It should be emphasized again that finding these improvements and efficiencies at the microeconomic level influence and have a positive effect on the macro economy by driving growth.

6.5 Beneficiaries

A list of potential stakeholders who could benefit from an improved quality of data (and therefore reduced risk and uncertainty) made possible by ICMS include but may not be limited to the following:

- Investors: investment funds, private equity, pension funds, corporate and private investors, REITs
- Insurance providers: insurers and re-insurers
- Private clients: developers, end users, real estate/ property companies, banks, global corporates
- Governments: wishing to benchmark against other nations
- Consultants: all consultants by offering better, comparable, consistent advice, more efficiently which results in improved service, using less resource
- International construction companies: improved transparency re tendering/ pricing

7 THE FIRST STEP – INTERNATIONAL CONSULTATION & COLLABORATION

7.1 Consultation

The RICS and the CEEC have laid the initial foundations for the development of an international construction measurement standard and have recently been joined by the International Cost Engineering Council (ICEC) in support of the venture. The RICS, CEEC and ICEC have commenced the first step in the development of the ICMS by reaching out to the global project cost management community to inform them about the proposal and invite them to be involved.

The objective is to implement a similar strategy to that adopted by the International Property Measurement Standards Coalition (IPMSC) with the focus on collaboration and input from project cost management organisations and other allied entities around the world. This would involve the formation of a global coalition to further explore international construction measurement standards and to develop collaboratively a set of principles based standards that will be adopted by the coalition members at a global level. The intent is not to supplant existing national and/or regional measurement standards but rather produce over-arching global standards that are recognized and used by all coalition members but also provide scope for the standards to be adapted to suit specific national and/or regional requirements.

The primary benefit of this venture does not lie with individual members of the coalition but rather with the global project cost management profession as a whole (be it quantity surveying, cost engineering, construction economics, project management, project controls or other descriptor of the profession). The profession lacks a global identity and needs to come together to develop common global standards, common bodies of knowledge and standard definitions/terminology. Large global entities typically require International Standards, International Certification and International Accreditation and this is distinctly lacking in the profession. Internationally recognized standards would also facilitate greater engagement with and recognition by major global organizations such as the United Nations (UN), the World Bank, the World Trade Organisation and the International Monetary Fund (IMF).

7.2 Professional Associations

The ICMS could be the catalyst for long term collaboration within the profession. A key factor will be the collaboration, support and input of the various national, regional and global project cost management associations around the world. Without this support the development of the ICMS is unlikely to succeed. Fortunately, the profession is well placed with strong national and regional/global associations around the world.

The following outlines the main global and regional associations that would potentially form the foundation for the ICMS coalition. Key associations include the International Cost Engineering Council (ICEC), the Royal Institution of Chartered Surveyors (RICS), the Association for the Advancement of Cost Engineering International (AACE International), the International Project Management Association (IPMA), the International Federation of Surveyors (FIG), the African Association of Quantity Surveyors (AAQS), the Pacific Association of Quantity Surveyors (PAQS) and the European Council of Construction Economists (CEEC).

ICEC is a global entity that acts as an umbrella organisation for cost engineering, quantity surveying and project management associations around the world with a membership base of 40 national

associations located in nearly 40 countries and representing over 100,000 cost management professionals working in over 120 different countries. Its primary mission is to bring project cost management associations together to network, share information and knowledge to raise global professional standards of practice. Accordingly, ICEC, given its leadership role in the industry, is well placed to bring a large number of associations into the ICMS Coalition.

The RICS are a large global organization with over 100,000 qualified members and 34,000 student members in 146 countries. It represents professionals working in property, land and the built environment with 16 professional groups across these fields (RICS 2014).

The AACE (formerly the American Association of Cost Engineering) was formed in 1956 and was originally nationally focused but it is now a global organisation with over 7,500 members world-wide. They have members in 87 countries with over 80 local and international sections (AACE 2014).

IPMA is a global organization that represents the professional disciplines of project, programme and portfolio management. Cost management is a core activity of the project manager so there is a lot of correlation between IPMA and cost management associations. IPMA has 54 member association with the majority of these associations in Europe (IPMA 2014).

FIG is the main organisation representing the surveying profession around the world with 106 member associations from 88 countries and representing surveyors from 120 countries. The field of Quantity Surveying/Cost Management/Construction Economics is represented by FIG's Commission 10 – Construction Economics (FIG 2014).

A range of regional associations also represent the profession. The AAQS provide regional representation for the quantity surveying profession in Africa. Membership primarily comprises quantity surveying professional associations in Africa but recently membership was opened to professional firms. The AAQS has 16 member associations from across Africa (AAQS 2014).

PAQS represents the quantity surveying/cost engineering profession in the Asia-Pacific region with 12 member associations drawn from the region (PAQS 2014).

The CEEC represents the field of construction economics in Europe and promotes the profession at the European level. Membership primarily comprises professional associations or groups within a European country and individual members in countries where relevant professional associations don't exist (CEEC 2014).

Clearly there are strong and extensive professional association networks in the project cost management field. The challenge is to bring them together to work on initiatives such as the ICMS for the overall development of the profession.

It is important to note that the ICMS venture will start out with a 'blank page' hence will have no pre-conceived plans or agendas – the aim is for the scope and content of the ICMS to be determined by the coalition.

8 SCOPE OF INTERNATIONAL CONSTRUCTION MEASUREMENT STANDARDS

This paper explores *why* ICMS are needed and the benefits that can be realized, specifically from a construction cost perspective. There are however, a number of other potential measurement standards for construction that may offer similar benefits to investors and decision makers.

Additional potential international construction measurement standards may include but not be limited to:

- Whole life cycle costs: (what is included in WLC, is cleaning included for example?)
- Construction programmes: (number of hours in a work day, or work week)
- Project risk: (risk rating and scoring methodologies)
- Construction quality: (design & specification, building control)
- Legal: (construction contract contents/ features)
- Carbon: (embodied and/ or emitted)
- Performance of construction labour: (levels of labour force productivity)
- International construction cost indices: (location, tender and inflation indices)
- Technology: (BIM completeness and data drops)
- Sustainability: (environmental, economic and social aspects)
- Others

The construction industry has many tools and methodologies for measuring some of the above. However there is disparity and inconsistency in the way each factor is measured. For example, the United States (LEED), United Kingdom (BREEAM) and Australia (Green Star) each have their own

green building ratings. There is no agreed, recognized standard for consistently measuring the performance and comparing the performance of buildings between these countries. A global standard for green building performance would allow global corporate real estate managers to compare the performance of their portfolio and take a more strategic and better informed approach to decision making with regard to investing in improvements to its corporate real estate portfolio.

9 CONCLUSION

Following a review of the theory of international standards and how this has been applied successfully to international accounting standards, it can be seen that this provides a robust template for the extension of international standards into property and construction. Empirical evidence to date with the IPMS suggests that a coalition of like-minded bodies can agree and derive international standards that are recognized by world bodies and national governments. For example, the Dubai government has recently recognized the IPMS.

Challenges to this approach may reside in ontology and cultural relativism. However, if the international standards follow the tested approach of tangibility, flexibility and are framed at a high, in principle, level it has been shown that these challenges can be overcome. Globalisation has increased the need for comparability and consistency to such an extent that it now increasingly overrides a narrow, insular approach.

Hence, the intention is for international construction measurement standards to follow the same model as the international property measurement standards i.e. explore the needs and benefits, form a coalition of interested parties and stakeholders across the global construction community, form a standards setting committee, collaboratively develop the standards, communicate, adopt and apply the standards, monitor success, gather feedback and refine where necessary. In short, a truly collaborative and integrated approach to resolve an accepted impediment to world trade and economic efficiency.

This paper has shown that there is a realizable need to develop ICMS and to thus improve certainty and attract investment to construction projects worldwide.

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