# The International Cost Engineering Council and the Global Demand for Cost Engineers

*Dr. Peter Vincent Smith*

**ABSTRACT:** This article describes the development of the International Cost Engineering Council (ICEC) since its inception in 1976 and links this with the global expansion of the project cost management profession over the same period. ICEC is an international confederation of cost management associations with the main objectives of facilitating cooperation between these associations and promoting the profession worldwide. Commencing with four founding associations in 1976, ICEC has grown to a membership base of 44 national associations located in 40 countries. ICEC now represents more than 100,000 quantity surveyors/cost engineers in over 120 different nations. This in itself provides demonstrable evidence of the global rise and recognition of the profession. This article will track this growth and the concomitant recognition and development of the profession internationally. This will include emerging trends in Africa, China, India, and the Middle-East. This has created tremendous international opportunities for expert project cost management professionals and demand for these services is at an all-time high. Unfortunately, this demand has not been matched by supply resulting in a global shortage in the profession. This article was presented at the 2008 Annual Meeting as manuscript DEV.11.

**KEY WORDS:** Construction, cost engineering, cost management, ICEC, and quantity surveyors

The International Cost Engineering Council (ICEC) was founded in 1976 by four project cost management associations from America, The Netherlands, the United Kingdom and Mexico [12]. Led by visionaries from within these organizations, ICEC was established in recognition of the need for the project cost management profession to be represented and promoted on a global scale. It acts as an umbrella organization for cost engineering, quantity surveying and project management associations around the world.

The organization has grown substantially over the past two decades to the point that it now has a membership base of 46 national associations located in 40 countries and represents over 100,000 cost management professionals working in over 120 different countries. Membership discussions are currently underway with six other associations and one membership application is currently being processed. This is demonstrative of the enormous development and recognition of the project cost management profession internationally.

This article will commence with an overview of the ICEC organization and will then describe the enormous global growth of the cost engineering profession. It will examine the unprecedented growth in global construction activity generally, the global shortage of construction professionals and the impact of this for the cost engineering profession.

## TERMINOLOGY FOR THE COST MANAGEMENT PROFESSIONAL

A major feature of the development of ICEC has been the bringing together of the three main disciplines providing cost management services around the world: cost engineers, quantity surveyors, and project managers. Quantity surveying is a profession with origins in the United Kingdom and is a professional title recognized mainly in Commonwealth countries. Cost engineering is the term used in North and South America, China and some parts of Europe. In other regions, particularly in Europe, neither of these two titles is recognized with cost management services largely carried out by project managers as part of their suite of services. The fundamental cost management principles and practices of these professions are the same—the main differences lie in the fact that cost engineering generally has wider application to other industries (particularly engineering projects and processes) and that project management encompasses cost management as one of the components of the overall management of projects. For the purposes of this article, the term cost engineer will be used as the common descriptor for these disciplines.

## ICEC STRUCTURE AND MEMBERSHIP

As a non-political and non-profit organization, ICEC has a small budget with the only salaried position being an administrative manager appointed on a part-time basis. The main communication/information vehicle is the ICEC website (www.icoste.org) and email. The ICEC organizational framework consists of a Council of Delegates, Officers and Secretariat. Each member society appoints one Council Delegate to represent them on the ICEC Council. Elected positions in the ICEC Executive comprise a Chair, Past Chair, Senior Vice-Chair, two Administrative Vice-Chairs, Technical Vice-Chairs, Secretary-Treasurer, Regional Directors and Regional Assistant Secretaries. The current Chair is Ginette Basak from Canada. These positions are elected for two year terms. The ICEC Secretariat is located in Canberra, Australia, within the offices of the Australian Institute of Quantity Surveyors. The Secretariat is run by the Administrative Manager, Robyne Nash.

A driving force behind the development of ICEC has been Dr. Kenneth K. Humphreys, PE CCE, from the US who has held the role of Secretary-Treasurer for approximately 30 years, since the inception of the organization until his recent retirement.

The ICEC organization is divided into four geographical regions and has a country membership base as shown in table 1. Member societies of ICEC are generally national associations or institutes and many of these have sections/chapters/members in several countries. This table is demonstrative of the global coverage of cost management associations. A Region Director is appointed to oversee ICEC activities within each region.

### United Nations ECOSOC Roster Status

Another important objective is to assist in raising the profile and recognition of the project cost management profession on an

international scale. A good example of this is the recent decision by the United Nations Economic and Social Council (ECOSOC) to grant roster consultative status to ICEC, which will provide tremendous opportunities for ICEC and its member associations to contribute to the work of the United Nations.

This was the result of a number of years work by the ICEC Human Settlements Working Group led by its Chair, Murtala Oladapo (Nigeria) and the past ICEC Secretary-Treasurer, Dr. Humphreys (US).

The Roster lists non-government organizations (NGOs), typically with a technical focus, which the ECOSOC or the UN Secretary-General considers can make, "occasional and useful contributions to the work of the Council or its subsidiary bodies. " UN recognized NGOs, including those on the roster, that express a wish to attend the relevant international conferences convened by the United Nations and the meetings of the preparatory bodies of the said conferences, as a rule are able to participate.

**Collaboration With Other International Associations**

ICEC collaborates with other kindred international professional associations. These include the Pacific Association of Quantity Surveyors (PAQS), the Africa Association of Quantity Surveyors (AAQS), the International Federation of Surveyors (FIG), the International Project Management Association (IPMA) and the Royal Institution of Chartered Surveyors (RICS). ICEC has formal reciprocity agreements with FIG and IPMA.

## Globalization of the Construction Industry and the Cost Engineering Profession

The growth of ICEC is paralleled by the growth of international membership in member associations, a marked increase in the number of cost management firms offering their services on an international scale, and a major growth in the demand for cost engineers.

This is all reflective of the rapid globalization of the construction industry and a surge in global construction activity in recent years. This has led to unprecedented demand for construction professionals and workers around the world —a demand that has led to a serious global skills shortage in the industry generally. Cost engineers are in high demand and the profession is facing a global shortage that is predicted to escalate rather than improve.

**Global Economic Trends**

The world economy has experienced robust above-trend growth over the past decade and the past few years in particular. World GDP is estimated to have grown by around 5¼ percent in 2006—the strongest growth in 33 years. A defining feature of the recent strong world growth has been the contribution from developing countries. Over 70 percent of world growth over the past three years has come from developing countries, despite these comprising only 47 percent of world production. China alone has contributed nearly one-third of world growth over the past three years [13].

It is the growing economic weight and influence of Asia (particularly China and India) that arguably will have the most far-reaching consequences for the global economy and, hence, construction industry. Figure 1 shows that in 1980, Asia produced around one-fifth of the world's output measured in purchasing power parity terms. Twenty-five years later, its

| Region 1<br>North/South America | Region 2<br>Europe | Region 3<br>Africa | Region 4<br>Asia-Pacific |
|---|---|---|---|
| Brazil (CE) | Austria (PM) | Ghana (QS) | Australia (QS) |
| Canada (CE) | Cyprus (QS) | Kenya (QS) | Australia (CE) |
| Canada (QS) | Czech Republic (PM) | Mauritius (QS) | China (CE) |
| Mexico (CE) | Denmark (PM) | Namibia (QS) | Fiji (QS) |
| United States (CE) | Finland (PM) | Nigeria (QS) | Hong Kong (QS) |
| Venezuela (CE) | France (PM) | South Africa (CE) | India (PM) |
| | Greece (PM) | South Africa (QS) | Japan (CE) |
| | Hungary (CE) | South Africa (PM) | Japan (QS) |
| | Iceland (PM) | Tanzania (QS) | Malaysia (QS) |
| | Italy (CE) | | New Zealand (QS) |
| | Netherlands (CE) | | Singapore (QS) |
| | Norway (PM) | | Sri Lanka (QS) |
| | Romania (CE) | | Sri Lanka (PM) |
| | Slovakia (PM) | | |
| | Slovenia (PM) | | |
| | Spain (PM) | | |
| | Sweden (PM) | | |
| | United Kingdom (CE) | | |

CE - Cost Engineering Association
QS - Quantity Surveying Association
PM - Project Management Association

**Table 1 — ICEC Member Countries**

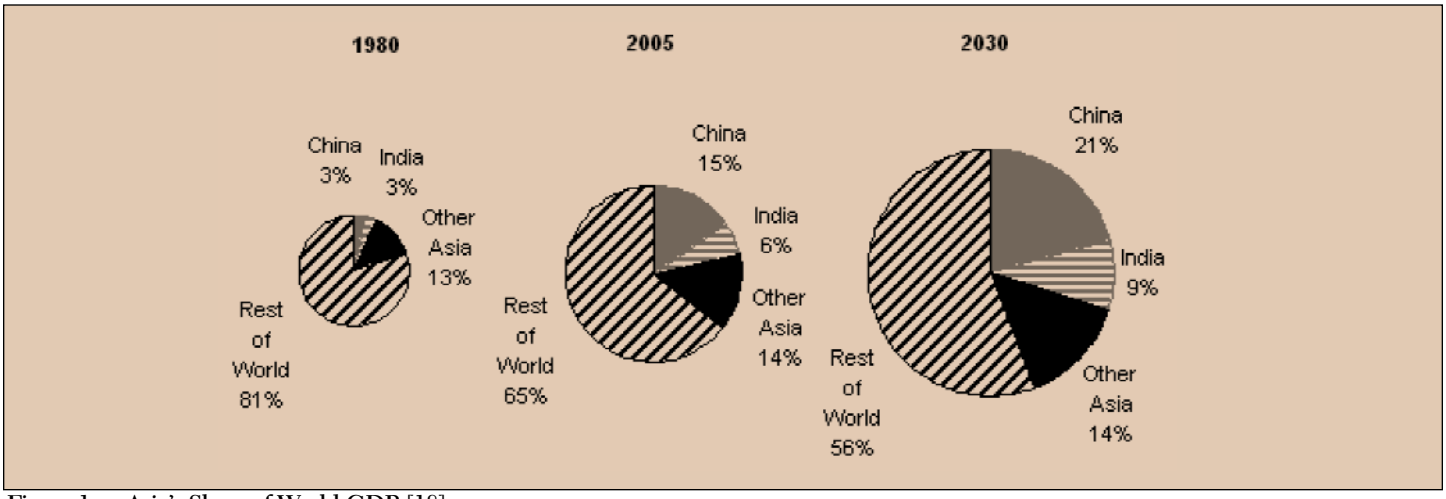


**Figure 1 — Asia's Share of World GDP** [18]

share has risen to around one-third while its share of world population has remained fairly stable at around 50 percent [18].

It is projected that by the year 2015, China will have overtaken the US as the world's largest economy, while India will have moved past Japan into third place. These projections are set out in table 2.

Demand for global construction and infrastructure development will continue unabated. The global construction market is now estimated to be worth an annual $4 trillion [19]. It is estimated that the Chinese construction industry's total current output of $151US billion will grow to $700US billion by 2015, surpassing the US construction market as the world's No 1. Already, two Chinese contractors have entered the list of the ten biggest construction firms in the world for the first time [9,1].

## Global Shortages in Construction Personnel

This has led to serious shortfalls in personnel available to meet industry demands. KPMG undertook a major global construction survey of the world's leading providers of construction services [15]. They identified that the clear major problem facing these firms and the industry generally is a severe shortage of qualified construction professionals, contractors and workers generally. This has led to a 'war on talent' with more and more firms seeking to tackle the apparent dearth of qualified workers. With a finite pool of workers being pulled in ever-increasing directions, projects are at a greater risk of not being delivered on time or to budget. Many of the companies surveyed said that they had seen contractors put forward one team as part of their bid to win work, only for them to supply a totally different, and often less experienced team, in order to deliver the project [15].

These developments have led to concomitant shortages in quantity surveyors. In the United Kingdom, recent RICS research revealed there were around 6,500 QS vacancies across the country in January 2007. Fortynine percent of these were unfilled for more than six months and 35 percent for more than 12 months [6]. Michael Sullivan, vice-chairman of the RICS quantity surveying and construction faculty, commented that, "there is widespread recognition of a chronic shortage of quantity surveyors. Firms have been struggling to recruit experienced UK -based and overseas QS's for some time. Some large firms have had up to 60 vacancies each." The problem is so severe that in August 2007, the UK government put the Chartered Quantity Surveying (QS) profession on the UK national shortage occupation list. This is significant as it will provide UK firms with much easier access to the pool of foreign, professionally qualified QS's. South Africa, Australia, and China have been identified as countries that UK firms will particularly target as a result [6].

This shortage is mirrored in countries like Australia. This has arisen not only because of local Australian demand, but also because of recruitment of Australian QSs overseas particularly in the United Kingdom, the Middle East, and China [14]. The increasing international recognition of QS qualifications has enhanced the portability of employment for QS, opening up greater global work opportunities [7].

Attractive remuneration packages in the Middle East are particularly having an effect. Stuart Earl, partner of Gleeds, one of the largest cost consultancy practices in the world, laments that many of their younger QSs are being attracted to countries like Dubai where development is of mammoth proportions [11]. To meet these demands, QSs are being offered remuneration that can't be matched in most other countries.

## Global Workforce

Mercer contends that this is all continuing evidence of strong trends toward a mobile global workforce [16]. "When it comes to deploying their workforce, companies face an unprecedented array of choices and challenges. Trade and economic barriers have fallen. Demographic shifts have opened up vast new labor markets around the world. Advances in education and technology have increased the portability of an ever-expanding range of jobs and skills.

This rapid expansion of workforce deployment options now provides many attractive new business opportunities—not just for reducing labor costs, but also for improving productivity, enhancing quality, boosting customer responsiveness, entering new markets, and strengthening talent and capabilities.

The very idea of a "home country" is dissolving for many companies; their organizations, like their markets, are becoming truly global. Rather than relying on expatriates to staff overseas operations, companies today can draw on many

| | GDP - 2005 | | Projected growth rate, 2005-2015 | GDP – 2015(f) | |
|---|---|---|---|---|---|
| | US$ bn | Rank | | US$bn | Rank |
| United States | 12,332 | 1 | 3.2 | 16,950 | 2 |
| China | 8,092 | 2 | 8.0 | 17,533 | 1 |
| Japan | 4,009 | 3 | 1.5 | 4,662 | 4 |
| India | 3,603 | 4 | 6.9 | 7,015 | 3 |
| Germany | 2,499 | 5 | 1.5 | 2,897 | 5 |
| United Kingdom | 1,826 | 6 | 2.1 | 2,250 | =7 |
| France | 1,812 | 7 | 2.1 | 2,239 | 9 |
| Italy | 1,695 | 8 | 1.6 | 1,978 | 10 |
| Russia | 1,586 | 9 | 5.0 | 2,585 | 6 |
| Brazil | 1,553 | 10 | 3.8 | 2,252 | =7 |
| Canada | 1,112 | 11 | 2.7 | 1,448 | 14 |
| Korea | 1,099 | 12 | 4.5 | 1,702 | 11 |
| Mexico | 1,065 | 13 | 3.7 | 1,537 | =12 |
| Spain | 1,026 | 14 | 2.8 | 1,422 | 15 |
| Indonesia | 864 | 15 | 6.0 | 1,543 | =12 |

**Table 2 — Actual and Projected GDP in US$ at 2005 PPPs, 2005 and 2015 Source [10]**

sources of labor around the world. At the same time, we are seeing the emergence of stateless talent—a small number of highly skilled "citizens of the world" who are happy to relocate wherever their rewards will be greatest. To put it simply, the old rules of human capital management no longer apply [16]."

As the supply of new labor markets has grown, so too has demand for them. Increasingly, developed countries in North America, Europe, and the Pacific Rim face labor shortages. With relatively low birth rates, their internal workforces are aging, creating a vacuum for many skilled and unskilled jobs. In the US, for example, the increasing pace of worker retirements means that some 15.6 million additional workers will be required by 2015, just to maintain the 2001 workforce level. In the meantime, the International Labor Organization estimates that China and India will account for 40 percent of the world's workforce by 2010, with India's share projected to relatively increase during that time [16].

### Global Demographics

Another major trend contributing to global workforce shortages is global demographic change, encompassing changing patterns of global population growth, population aging, and the global movement of people.

The global population has grown enormously over the last half century, from around two and a half billion people in 1950 to over six billion today. Most of this increase has come from the world's less developed regions, particularly Asia. This trend is expected to continue over the next 50 years with the global population expected to reach around nine billion by 2050.

There will, however, be a great deal of variation in population growth between countries. The populations of Japan and Europe (including Russia) have already begun to decline, while the population of China is expected to grow for another 25 years before also beginning to decline. In contrast, the populations of India, Africa, the US and Australia are all expected to keep growing over the next 50 years [5]. Indeed, by about 2030, around the time that China's population is expected to begin declining, India is projected to become the world's most populous country, with a population approaching one and a half billion people [4, 18].

As an example, G. Zeiss (2007) comments that Statistics Canada predicts that in Canada by 2016, there will no longer be enough new workers to replace retirees. The Canadian Construction Council found that 1.5 percent of the construction industry labor force is retiring annually, and that over the next 10 years this rate will increase to two percent [3].

In the US, it is estimated that by 2010 the number of workers aged 35 to 44 will decline by 19 percent; aged 45 to 54 will increase 21 percent; and aged 55 to 64 will increase 52 percent. This is a world-wide phenomenon. The number of workers aged 35 to 44 is expected to decline by 27 percent in Germany, 19 percent in the U.K., 9 percent in Italy, 10 percent in Japan, and by 8 percent in China (Atkinson 2007).

## CASE EXAMPLES - GLOBAL EXPANSION OF THE PROFESSION

The following section will provide examples of the international endeavors of a sample of associations and firms to provide a snapshot of global developments in the profession.

## MEMBER ASSOCIATIONS

### Association for the Advancement of Cost Engineering International (AACE-International)

AACE International (formerly the American Association of Cost Engineers) was established in 1956 and is one of the leading professional societies for cost estimators, cost engineers, schedulers project managers and project control specialists.

While originally US focused, the Association decided many years ago to broaden its membership base in recognition of the large number of cost engineering professionals working around the world. This led to the change in the name of the organization. This international expansion has been

spectacular with AACE International now having more than 6,000 members worldwide, with members in 78 countries and 71 local sections [1].

**Australian Institute of Quantity Surveyors (AIQS)**

Membership of the AIQS has traditionally been largely confined to members working and living in Australia, but this has changed markedly over the past decade to the point now where overseas membership accounts for approximately one-third of total membership. This is demonstrative not only of the value placed on AIQS membership overseas, but also the number of quantity surveyors practicing overseas.

The AIQS has members living and working in 42 countries comprising Bahrain, Bermuda, Botswana, Brunei, Canada, East Africa, East Malaysia, Fiji, Germany, Hong Kong, India, Indonesia, Ireland, Italy, Japan, Jordan, Saudi Arabia, Kuwait, Lebanon, Libya, Macau, Malaysia, Mauritius, Mozambique, New Zealand, Pakistan, Papua New Guinea, China, Singapore, South Africa, Sri Lanka, Qatar, Oman, Taiwan, Thailand, the Philippines, Caicos Islands, United Arab Emirates, United Kingdom, United States, Vietnam and West Malaysia.

While membership in some of these countries is small this spread is indicative of the global expansion of the quantity surveying profession well beyond Commonwealth countries where quantity surveying has historically been confined to. There has been particularly strong growth in AQIS membership in the Middle East in recent years with demand for quantity surveyors in this region continuing to escalate. The United Arab Emirates, Qatar and Brunei have seen the greatest growth. The AIQS also has a very large membership base in Sri Lanka with many of these Sri Lankan quantity surveyors working regularly in the Middle East.

The AIQS has recently signed a Memorandum of Understanding (MOU) with the Institution of Surveyors India (ISI) which should eventually lead to a full reciprocity agreement following further development of QS education programs in India. Despite being a Commonwealth country, India has not embraced the quantity surveying discipline with cost management largely being carried out by engineers and project managers as part of their general suite of services. However, there are now signs that the profession is on the verge of widespread recognition and development. An example is provided by the Australian Quantity Surveying firm, Padghams, whose Managing Director is Peter Cox, ICEC Vice-President and President of the AIQS. This firm established a practice in Chennai, India, in 2003, and continues to develop strongly as recognition of quantity surveying practice broadens in India [2].

China Engineering Cost Association (CECA)

As with India, quantity surveying has not traditionally been a recognized profession in China. However, this has changed dramatically in the past decade with the official recognition of the cost engineer in the Chinese construction industry. While cost engineer is the preferred term, the work carried out is very similar to the traditional role of the quantity surveyor.

Between 1950-1980 project prices were planned by the government and were based on the Soviet Union's system of construction "constants." However, reformation of construction cost management began during the 1980s and 1990s. While project prices were still established by the government, the use of the competitive tendering system was explored and began to be used.

Project prices have gradually begun to be determined by the market since the early 1990s, but it has only been in recent times that momentum in this respect has picked up. A major development for the profession was the introduction of Bills of Quantities into tender documents by the Chinese government from July 2003. The government is now investigating the use of effective whole-process cost management approaches.

The market demand for construction cost professionals in China continues to surge. The total number of people working in the cost engineering field in China is estimated to be approximately 1.2 million. The total number of qualified cost engineers is over 70,000 and increasing at an annual rate of approximately 10 percent. The total number of formal cost engineering consultant firms is about 5,000 [2].

CECA is the organization with the responsibility and authority to conduct certification and accreditation programs for cost engineers and to guide the general development of the profession. The first university course in cost engineering/quantity surveying in China commenced in 2002, and a number of universities now conduct such courses.

This explosive development of the profession in the world's most populous country in such a short space of time is staggering and perhaps the greatest example of the global expansion of the profession. With the profession also emerging as a recognized discipline in India potential opportunities abound.

## FIRMS

**Gleeds**

Gleeds is one of the oldest quantity surveying firms in the world, having been established over 120 years ago in the United Kingdom. This firm provides a good example of global expansion over the past two decades to the point where they now employ over 1,200 people in 13 countries across five continents. While the services provided are adapted to suit the specific requirements in the various countries, quantity surveying remains the basis for their activities. Their services also extend beyond the construction industry to many other industry sectors.

Gleeds now has offices in the United Kingdom, Ireland, the Czech Republic, France, Germany, Hungary, Poland, Romania, Slovak Republic, Spain, the Ukraine, China, Australia, the US, Cyprus, Egypt, Lebanon, East Africa, South Africa, West Africa, Abu Dhabi, Dubai, and Qatar [11].

**Davis Langdon**

Davis Langdon is another long-established quantity surveying firm, well renowned for its global network of firms. They now have 85 offices in 28 countries around the world throughout Europe, Asia, Africa and the US. They recognize the importance these days of internationalization and their staff get many opportunities to work on international projects, spend time in different offices, or move to a new country.

However, this has created some problems. Mark Beattie, the managing director of their Sydney office, recently reported in Davis Langdon's global review publication that the message from 'down under' is, "we want our people back." This

is actually a government-supported initiative to attract wandering Australians back home [8].

It is evident that the global expansion has led to increased interest in cost management professionals embarking overseas for work. International experience is increasingly being seen as important for career development.

**Turner & Townsend**

Turner & Townsend is yet another example of a dynamic quantity surveying consultancy firm focused on international expansion. Part of this expansion included merging with the Rawlinsons Group in Australia, New Zealand, and Asia. They now have a global network of 51 offices in Australia, China, France, Germany, Italy, Ireland, Japan, Malawi, Malaysia, Mozambique, Netherlands, Poland, Russia, Singapore, Spain, South Africa, UAE, UK, the US, Zambia, and Zimbabwe [20].

**Rider Levett Bucknall**

Rider Hunt, Australia's largest construction cost consultancy, has recently added to this trend. They have formed a global practice with Levett & Bailey in Asia and Bucknall Austin in the UK, together forming the third largest construction consultancy in the world—Rider Levett Bucknall.

Rider Hunt's first foray into international expansion occurred in 1969, with the opening of their Singapore office in partnership with Levett & Bailey of Hong Kong. In 1972, they began opening offices in New Zealand. Their offices began undertaking work throughout the Pacific Islands and in 1982, they opened up operations in North America.

Through this alliance, they are now a real global force with an annual turnover of approximately $A260million and over 1,750 staff in over 70 offices across the Americas, Asia, Oceania, Europe and the Middle East. This includes 11 offices in North America, a region with no quantity surveying background. The inroads made here are further evidence of global expansion [6]

**Page Kirkland**

Page Kirkland is a quantity surveying firm established in Australia in 1980, that has embarked on a program of internationalization since the late 1980s. The firm now has 350 staff working in 24 offices located in Australia, Abu Dhabi, China, Dubai, Japan, Hong Kong, Malaysia, New Zealand, Singapore, Thailand, the US and Vietnam. They also have alliances in Ireland, South Africa, Sri Lanka, and the United Kingdom [17].

The project cost management profession is now recognized as a distinct professional discipline around the globe. Whether it be carried out by quantity surveyors, cost engineers, or project managers, the basic principles of effective project cost management remain the same and the portability of professionals to work within each of these three disciplines is evident. The scope of services provided by these professionals is now very broad as firms embrace the concept of total cost management to effectively service their clients.

The growth of the project cost management profession in China, and imminent growth in India, provides perhaps the greatest vision of the future. These are two countries representing approximately one-third of the world's population that, until recently, have not recognized the role of the independent cost management professional. It is clear that the future for expert cost management professionals is very bright with the only reservation being whether there are enough appropriately qualified professionals available both now and into the future to meet this demand. ◆

**ACKNOWLEDGMENTS**

The author would like to acknowledge the resources and information on the ICEC website that have formed the basis for this article. This information has been prepared/written by a variety of people, but in particular by Dr. Kenneth K. Humphreys, PE CCE, past Secretary-Treasurer of ICEC, and Robyne Nash, ICEC Administrative Manager.

**REFERENCES**

1. AACE International, Overview - AACE International, http://www.aacei.org/membership/about/overview.shtml, (2007).
2. AIQS website," http://www.aiqs.com.au, (2007).
3. Atkinson, Presentation to the Annual Summit and Convention of the Association of Consulting Engineers of Canada, (June 30, 2006) St. John's, NL.
4. Broadman, H.G, *Africa's Silk Road - China and India's New Economic Frontier*, World Bank, Washington, (2007).
5. Centre for Chinese Studies, *China's Interest and Activity in Africa's Construction and Infrastructure Sectors*, Prepared for DFID China, Stellenbosch University, (2007).
6. Clark, P., *RICS Claims QS Visa Victory Building*, http://www.building.co.uk/story.asp?storycode=3092044, (2007).
7. Conduit, *QS Shortages in UK and Australia*, Conduit Recruitment Services, http://www.conduitrecruitment.com.au/files/news/34QSShortagesinUKandAustralia.doc, (2007).
8. Davis Langdon, Global Review 2005, http://www.davislangdon-usa.com/upload/StaticFiles/GlobalReview06.pdf, (2005).
9. Design-Build Network, China Syndrome, http://www.designbuild-network.com/features/feature858/, (2007).
10. Eslake, S, *China and India in the World Economy*, Paper presented to the International Conference of Commercial Bank Economists, Costa do Sauípe, Bahía, Brazil, (July 7, 2005).
11. Gleeds Worldwide, http://www.gleeds.com/worldwide/ (2007).
12. ICEC website, http://www.icoste.org, (2007).
13. Kennedy, S. and P. Garton, *AIG Economy 2007 - Global Realities for Australia - China, Manufacturing and the Resources Boom*," the Australian Government Treasury, Canberra, (2007).
14. KPMG, *Construction Procurement for the 21st Century - Global Construction Survey 2007*, KPMG International, United Kingdom, (2007).
15. Mercer, **The New Global Workforce - Putting the Right People in the Right Places**, Mercer Human Resources Consulting, New York, (2005).
16. Page Kirkland, Page Kirkland Celebrates 25 Constructive Can Do Years, http://www.pagekirkland.com/home.asp?pageid=181B772D4C28D5EA&newsid=BA8446BF79207F86 (2005).

17. Parkinson, M. and N. Dal Boni, *Global Economic Trends and the Role of Well-Functioning Markets*, Address To The 59th International Banking Summer School, the Australian Government Treasury, Canberra, (August 29, 2006).
18. Rider Levett Bucknall, Press Release, http://www.rlb.com, (2007).
19. Turner Townsend, "Directory of Offices," http://www.turnerandtownsend.com /pdfs/offices.pdf, (2007).
20. Yi-Lin, Y., L*atest Developments in the Cost Engineering Profession and Higher Education in Mainland China*," Discussion Paper, PAQS Newsletter, (December 2004).
21. Zeiss, G., *"Between the Poles"* http://geospatial.blogs.com/geospatial/, (2007).

**ABOUT THE AUTHOR**

Dr. Peter Vincent Smith is Secretary-Treasurer - International Cost Engineering Council (ICEC). He is the Program Director - Facility Management, Faculty of Design, Architecture and Building, with the University of Technology, in Sydney, Australia. He can be contacted by sending e-mail to: peter.smith@uts.edu.au.