

## **Quantity Surveying Practice in Australia and the Asia-Pacific Region**

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**Key words:** Quantity Surveying, Information Technology

### **SUMMARY**

This paper examines trends in Quantity Surveying practice and services in Australia and the Asia-Pacific region. The paper is based on research involving a series of seven biennial surveys of the Australian profession spanning 1995 to 2008 and an extension of this survey to the Asia-Pacific region in 2008 that included all member associations of the Pacific Association of Quantity Surveyors. The surveys have examined trends in general practice and the utilization of information technology with the primary purpose of assisting firms in dealing with change and adapting their operations to meet industry demands. Current industry procurement and technological trends clearly indicate that firms who are unable to re-engineer their work practices to evolve with these trends will find it increasingly difficult to survive in a meaningful and profitable form. The paper initially examines trends in the structure/size/nature of the Australian profession and trends in business practices and scope of services. This is followed by an examination of trends in the utilisation of information technology by Quantity Surveying firms. These results are compared with those from the 2008 survey of quantity surveying practices in PAQS member countries. The paper concludes with suggested strategic directions for the profession based on the survey findings.

# Quantity Surveying Practice in Australia and the Asia-Pacific Region

Peter SMITH

## 1. INTRODUCTION

The construction industry in Australia and the Asia-Pacific region has undergone significant change over the past two decades due to factors such as changing industry/client demands and project procurement practices, Information Technology (IT) developments and increased levels of competition for services. The concomitant impact on the Quantity Surveying (QS) profession has seen tremendous changes in the scope and type of services provided by the profession both within and outside of the construction industry. This paper examines trends in the services provided by the QS profession in Australia since 1995 and compares this with the services provided by profession in the wider Asia-Pacific region . It is based on longitudinal research undertaken by researchers from the University of Technology Sydney (UTS) in collaboration with the Australian Institute of Quantity Surveyors (AIQS) comprising seven nationwide surveys carried out from 1995 to 2008. In 2008 the survey was extended to include all member associations in the Pacific Association of Quantity Surveyors (PAQS). The paper provides a comparative analysis of the key findings of this survey.

## 2. AUSTRALIAN QS SURVEY RESULTS & ANALYSIS

The following survey results enable evaluation of how the Australian profession has adapted over the past thirteen years to the challenges and opportunities that industry change and technological development have presented.

### 2.1 Survey Details

The surveys comprise a series of nationwide surveys of Quantity Surveying firms carried out in 1995, 1998, 1999, 2001, 2003, 2005 and 2008. The number of firms responding to each of the surveys was as follows: 1995 - 77 firms, 1998 - 65 firms, 1999 – 38 firms, 2001 – 42 firms, 2003 – 60 firms, 2005 – 52 firms and 2008 – 103 firms. The 1995 – 2005 surveys were paper-based conducted via post and fax. The 2008 survey was web-based utilizing the ‘Survey Monkey’ website ([www.surveymonkey.com](http://www.surveymonkey.com)). This made the 2008 survey much easier to distribute and respond to and is likely to be the main reason for the relatively large number of responses that year. The surveys comprised a number of questions concerning general practice details, information technology utilisation and future directions of the profession. The questions were largely the same for each survey but some questions were added to the surveys over time.

## 2.2 Respondent Profile

Figure 1 shows the size of the respondent firms expressed in terms of total number of employees. The respondents predominantly comprise small to medium sized organizations which is typical of the profession's (and industry's) structure. Approximately half had less than 5 employees and a large proportion of respondents were sole operators. These are significant factors when analyzing the survey results. Figure 2 shows that close to half of the respondent firms have been in business for over 20 years and the majority for over 10 years. This level of experience provides a solid foundation for the survey results.

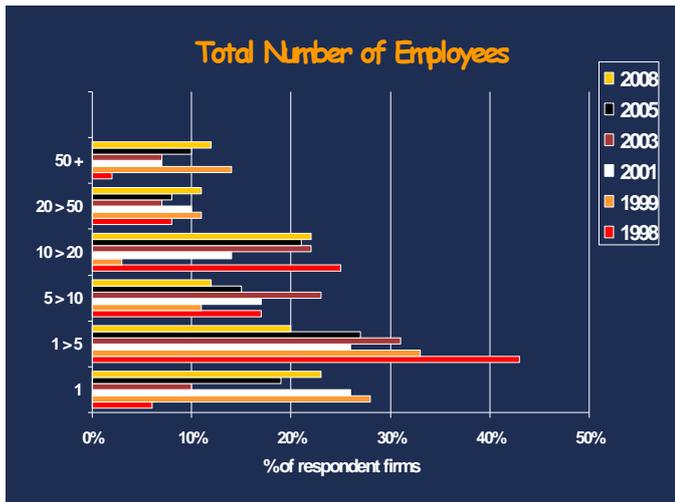


Figure 1

Size of Respondent Firms – No. of Employees



Figure 2

Age of Respondent Firms

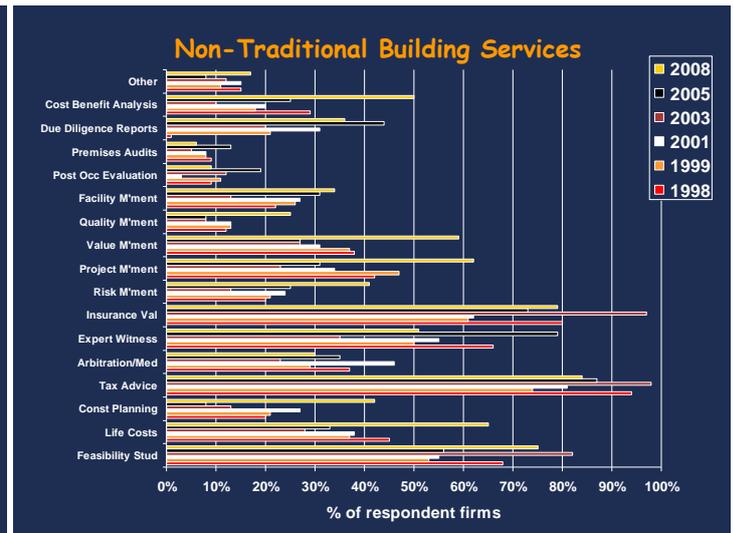
## 2.3 Services Provided

Figures 3-5 show that Quantity Surveying firms have expanded and adapted their scope of services to meet changing industry demands. Quantity Surveyors are now engaged more frequently in the "front-end" stages of projects where their expertise is of most value with Cost Planning arguably the key service of the modern day firm. There has also been a major shift to providing services in the civil, infrastructure and other 'non-building' sectors.

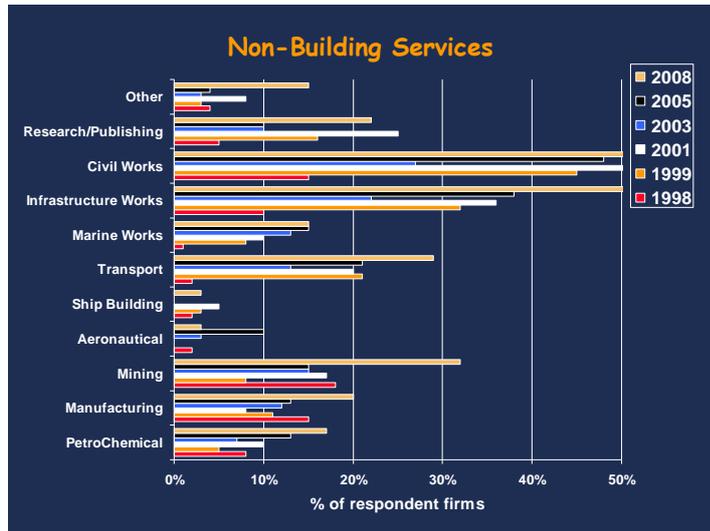
Figure 3 shows the percentage of firms providing traditional services (question not asked in 1995). Estimating/Cost Planning and Contract Administration remain the main services provided by firms. Even though the use of Bills of Quantities has declined most firms still provide this service with Builders Quantities more commonly provided.



**Figure 3**  
Traditional Services Provided by Firms



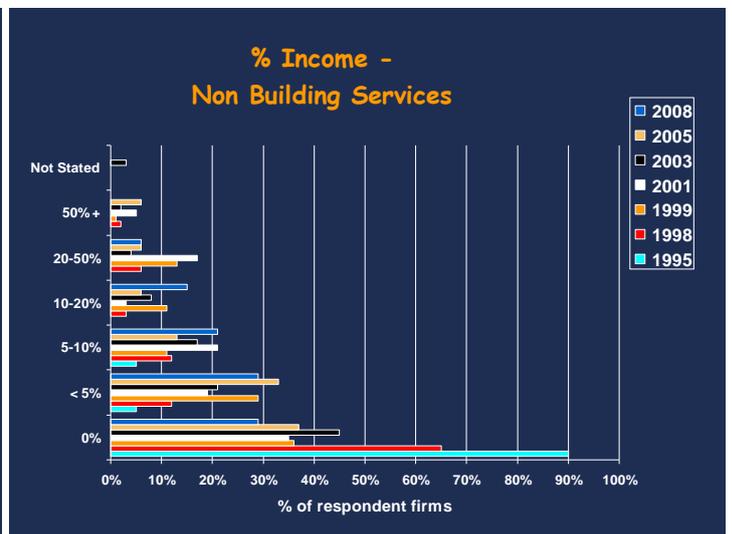
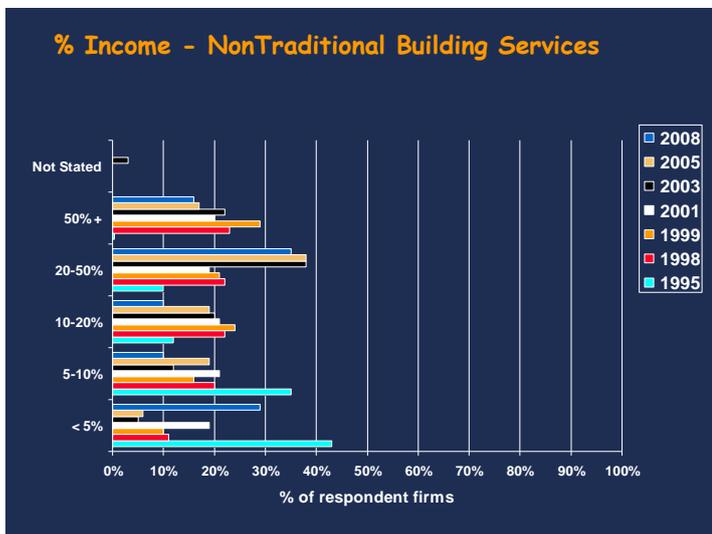
**Figure 4**  
Non-Traditional Services Provided by Firms



**Figure 5**  
Non-Building Services Provided by Firms

Figures 4 and 5 show the extent of non-traditional and non-building services provided by firms (question not asked in 1995). The 2008 results show a marked increase in the provision of Feasibility Studies, Life Cycle Costing, Value Management, Project Management, Cost Benefit Analysis and Facility Management. There have also been significant increases in the civil, infrastructure, transport, mining, manufacturing and petro-chemical sectors. This provides a good indicator of the direction that the profession is taking.

Figures 6 and 7 indicate the percentage of income that these non-traditional/non-building services provide for firms. When this survey series commenced in 1995, these services provided little if any income for the majority of firms. Since then this has clearly changed with these services providing substantial income for a large proportion of firms. These results provide an excellent indication of the diversification trends of the profession as well as industry changes over the survey periods.



**Figure 6**  
Non-Traditional Services - % of Total Income

**Figure 7**  
Non-Building Services - % of Total Income

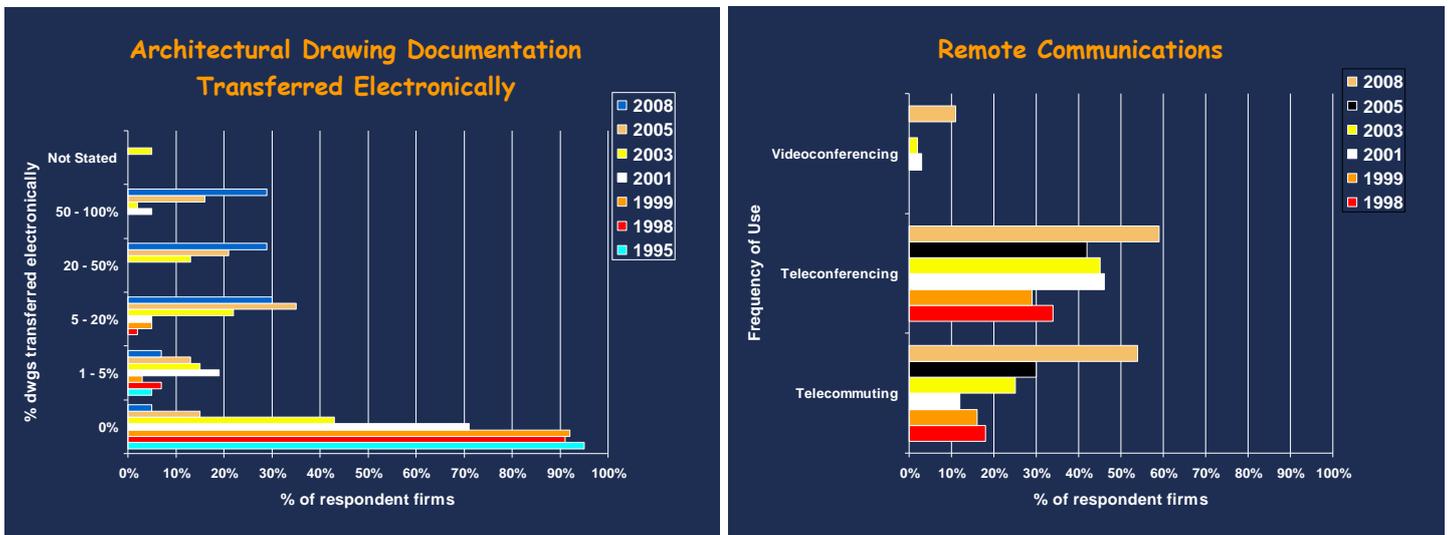
By 2005-08 non-traditional services accounted for more than 20% of total income for over 50% of firms and over 60% of total income for nearly 20% of firms. In 1995, 90% of firms did not generate any income from non-building services. By 2005-08 approximately 70% of firms now generate income from these services with many firms gaining significant proportions of their income in these sectors.

## 2.4 Information Technology

This section of the survey analysed the use of Information Technology by firms. One of the key areas explored was the way that firms are evolving with developments in the use of CAD and Building Information Modelling (BIM) technology on projects. In 1995 only 12% of firms utilised specialist CAD software and this has slowly increased over the years to approximately 35-40% of firms in 2005-08. This proportion of firms is still very low given the IT developments in the industry over this time. The 2008 survey introduced questions about the use of BIM and web-based project information management systems. 90% of firms stated that they have not been involved in the use of BIM on their projects. In terms of collaborative web-based information management systems (eg. Aconex), 56% of firms stated that they have not been involved in the use of such technology with only 5% using it on over 50% of their projects.

Figure 8 shows the level of design documentation exchanged electronically by firms. The

1995-1999 surveys showed that less than 10% of firms transferred or received design drawings electronically but this proportion has risen markedly over the period 2003-08. This was expected but there are still many firms receiving little if any documentation in this form.



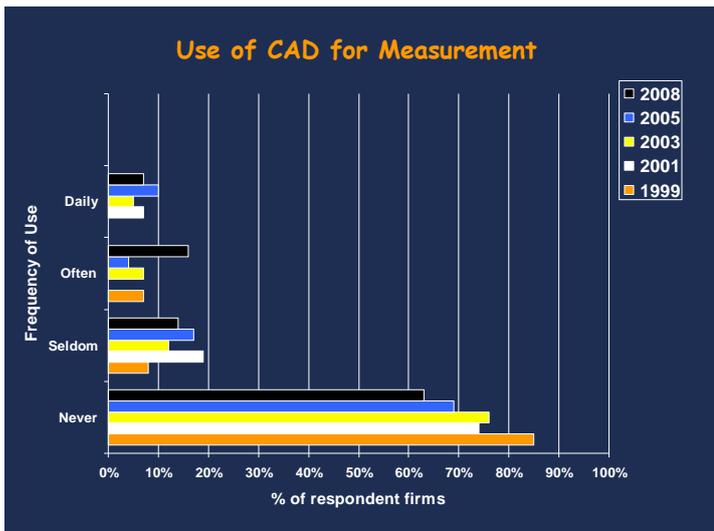
**Figure 8**  
**Electronic Design Documentation Transfer**

**Figure 9**  
**Remote Communications**

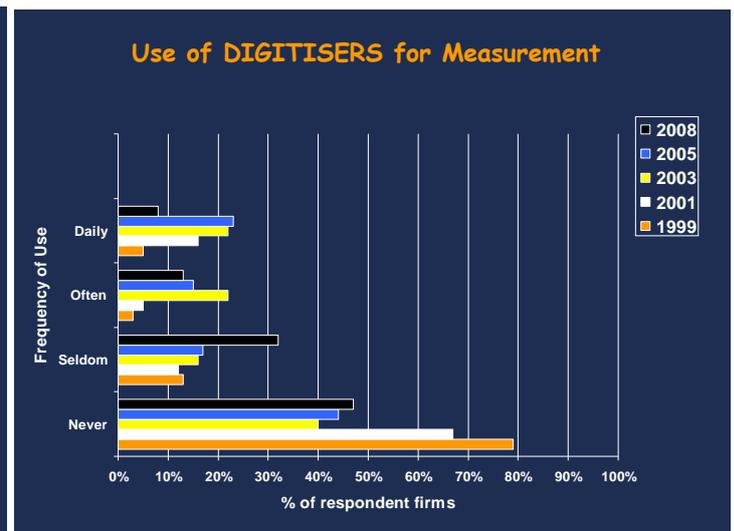
In terms of remote communications, the percentage of firms utilizing telecommuting by having some employees working at least partly from home has increased to over 50%. This is demonstrative of the benefits of telecommuting (at least in part) both for employers and employees and the IT developments that have facilitated this. Teleconferencing facilities are now widely used by approximately 60% of firms. It is also likely that many firms are utilizing web-based communication tools such as Skype.

### 2.4.2 Electronic Measurement

Electronic measurement is arguably the key area that firms should be embracing in terms of IT developments. However, the results in Figures 10 and 11 show that the majority of firms still cling to traditional approaches to measurement with the use of electronic measurement tools quite limited. The majority of respondent firms still do not utilise CAD or other enabling software to produce automatic electronically generated quantities. In 1999 85% were not using this measurement technology and by 2008 this proportion remains high at 63%. This indicates that approximately two-thirds of the profession do not use this technology. Encouraging though are the 20% of firms who now use this technology often or daily – these firms are leading the way for the profession which will hopefully lead to much wider use. It is clear that many firms view this technology negatively seeing it as too problematic rather than a tremendous opportunity to improve their business performance and increase their competitive advantage.



**Figure 10**  
**Electronic CAD-Based Measurement**



**Figure 11**  
**Digitizer Based Measurement**

The use of digitizers for measurement has traditionally been very low in the profession. Given the advances in CAD automatic quantities generation digitizers are now viewed by many as being old-fashioned (yesteryear's technology). In 1999, 79% of firms never used digitizers and by 2008 this proportion was 45%. However, it should be noted that some firms are likely to have replaced digitizers with CAD based technology.

## 2.5 Future Expectations

The next section of the survey asked firms to give their opinions on a series of propositions relating to the possible future impact of general industry changes and Information Technology advances. The propositions and results are shown in Table 1. The predominant response for each year is highlighted in bold – these were generally similar for each survey period.

In each year of the survey, the vast majority of firms **agreed** or **strongly agreed** that the role of the QS as an independent consultant will expand in the future, the QS will be a key player in the construction industry in 10 years time, CAD networking facilities and knowledge will be essential for the QS in 5 years time, the QS profession should be actively involved in utilizing, developing and promoting the use of automated quantities, greater use of IT will enable the QS profession to provide better service to clients and that the QS is well placed to take advantage of IT changes/developments in the industry.

Conversely, most firms **disagreed** with the propositions that further advances in IT will see the end of the technical QS measurer and that future QSs will be employed mainly as part of multi-disciplinary practices. Opinions were **divided** however on the propositions that IT advances will lead to fewer but more highly skilled QSs and that only larger practices have the resources to take advantage of IT developments.

	Strongly Agree					Agree					No Opinion					Disagree					Strongly Disagree								
	95	98	99	01	03	05	08	95	98	99	01	03	05	08	95	98	99	01	03	05	08	95	98	99	01	03	05	08	
<b>GENERAL PRACTICE</b>																													
1. The role of the QS as an independent consultant will expand in the future	n/a	20%	16%	26%	30%	25%	26%	n/a	58%	58%	52%	54%	55%	61%	n/a	8%	8%	12%	8%	10%	9%	n/a	11%	15%	10%	8%	10%	4%	
2. Future QSs will mainly be employed as part of a professional team in multi-disciplinary practices providing integrated "in-house" services	1%	2%	3%	3%	3%	5%	9%	19%	17%	34%	26%	10%	20%	28%	21%	8%	16%	19%	12%	20%	23%	51%	62%	47%	45%	57%	49%	38%	3%
3. The QS will be a key player in the construction industry in 10 years time	n/a	34%	13%	21%	33%	19%	31%	n/a	49%	63%	61%	57%	67%	54%	n/a	8%	8%	12%	3%	4%	2%	n/a	5%	16%	3%	7%	10%	11%	2%
<b>INFORMATION TECHNOLOGY</b>																													
4. The impact of IT on the construction industry will be minimal in the next 5 years	0%	3%	0%	0%	3%	2%	0%	20%	5%	3%	7%	18%	15%	7%	18%	3%	10%	5%	13%	6%	6%	49%	49%	60%	47%	55%	50%	48%	39%
5. The impact of IT on the construction industry will be minimal in the next 10 years	1%	2%	0%	0%	5%	2%	0%	5%	2%	0%	3%	7%	10%	2%	18%	5%	0%	8%	8%	7%	7%	52%	29%	53%	50%	53%	54%	53%	38%
6. Further advances in computing and IT generally will see the end of the technical QS measurer	4%	8%	3%	7%	3%	6%	7%	47%	18%	29%	24%	20%	8%	19%	4%	11%	13%	10%	3%	6%	15%	35%	51%	50%	40%	60%	65%	48%	11%
7. IT advances will lead to fewer but more highly skilled QSs	n/a	14%	6%	7%	10%	4%	6%	n/a	32%	52%	35%	37%	33%	26%	n/a	14%	11%	17%	13%	12%	24%	n/a	37%	28%	31%	33%	42%	38%	6%
8. CAD networking facilities and knowledge will be essential for the QS in 5 years time	n/a	20%	18%	24%	20%	15%	25%	n/a	46%	39%	45%	50%	52%	60%	n/a	12%	27%	17%	15%	4%	5%	n/a	18%	16%	14%	15%	29%	10%	0%
9. The QS profession should be actively involved in utilising, developing and promoting the use of CAD automated quantities	n/a	25%	21%	21%	22%	17%	9%	n/a	42%	55%	43%	48%	63%	62%	n/a	9%	16%	17%	13%	10%	21%	n/a	18%	8%	19%	13%	10%	6%	2%
10. Only larger practices have the resources to take advantage of IT	6%	9%	13%	7%	7%	13%	9%	19%	20%	24%	24%	33%	35%	40%	15%	11%	16%	12%	7%	10%	17%	42%	42%	42%	43%	45%	33%	28%	6%
11. Greater use of IT will enable the QS profession to provide better service to clients	32%	31%	32%	31%	15%	23%	6%	43%	45%	50%	56%	67%	54%	72%	16%	15%	10%	10%	8%	10%	9%	9%	6%	8%	3%	10%	13%	11%	2%
12. The QS is well placed to take advantage of the changes in the construction industry which will flow from the increased use of IT	25%	23%	29%	36%	18%	19%	22%	42%	54%	42%	38%	55%	54%	58%	24%	17%	16%	14%	20%	17%	10%	8%	3%	13%	12%	5%	10%	8%	
* predominate response for each year marked in bold																													

Table 1 - Respondent Views on Future Expectations

## 2.6 Major Threats

The last section of the survey asked firms to indicate what they thought the major threats to the profession would be over the next five years and what directions their firm was planning to take to be in a position of strength over the same time frame. The following is a summary of the main comments from the most recent survey.

Fee cutting and bidding amongst firms is seen as the major threat facing the profession by the majority of respondents. This has prompted firms to diversify and specialize to gain competitive advantage. The development of CAD and automatically generated quantities is seen by many firms as a major threat particularly in terms of the technical role of the quantity surveyor. However, the more enlightened firms believe that the greatest threat actually lies in not embracing CAD and CAD measurement and evolving with and being integrally involved in its development. The survey results clearly indicate that the vast majority of firms are clinging to traditional paper based measurement.

Firms clearly recognize the fact that project cost management is not the exclusive domain of the quantity surveying profession and that there are a number of other professionals carrying out this service and many others with the potential to do so. Project management and large accountancy firms were seen as the main threats. Many firms felt that the profession as a whole was poorly marketed and that the piece-meal approaches adopted by individual firms were of no real benefit to the profession as a whole.

Some respondents were dissatisfied with the quality of graduates from university courses particularly in terms of core skills in measurement and construction knowledge. Additionally, some firms have found that graduates are not interested in the technical measurement role. The extent of core quantity surveying curriculum in some university courses has declined in recent years as changes to higher education impact on the manner in which some courses are delivered. Many courses also provide more generic and broader content to reflect the changing nature of the profession, particularly with respect to the major changes in the type and scope of services provided. Another factor impinging on this area is the inability of many firms to provide “on-the-job” training to the levels experienced in years gone by.

## 3. COMPARISON WITH 2008 PAQS SURVEY RESULTS

In 2008 the survey was extended to include QS/Cost Engineering firms in all PAQS member countries. This was facilitated through the use of the web-based survey tool provided through the ‘Survey Monkey’ website. A relatively low total of 71 survey responses were received but this provided enough data for comparative purposes. The breakdown of responses received from the various PAQS member countries were as follows: Malaysia – 19, Hong Kong - 18, New Zealand – 14, Canada – 14, China – 3, Japan – 2, Singapore – 1 and ‘Other Countries’ – 3.

The scope and proportion of traditional services provided by firms was similar between

Australia and other PAQS countries (hereinafter referred to as ‘PAQS’). Figures 12 and 13 show a comparison of ‘non-traditional’ and ‘non-building services’ provided by firms. The provision of non-traditional services is extensive with similar results for most services. The major differences are that a greater proportion of Australian firms provide Tax Depreciation and Insurance Valuation services whilst a greater proportion of PAQS firms provide Premises Audits, Post Occupancy Evaluations, Quality Management, Project Management, Arbitration/Mediation and Construction Planning services. Non-building services are also very similar with the main difference being that a greater proportion of Australian firms provide services in the mining sector.

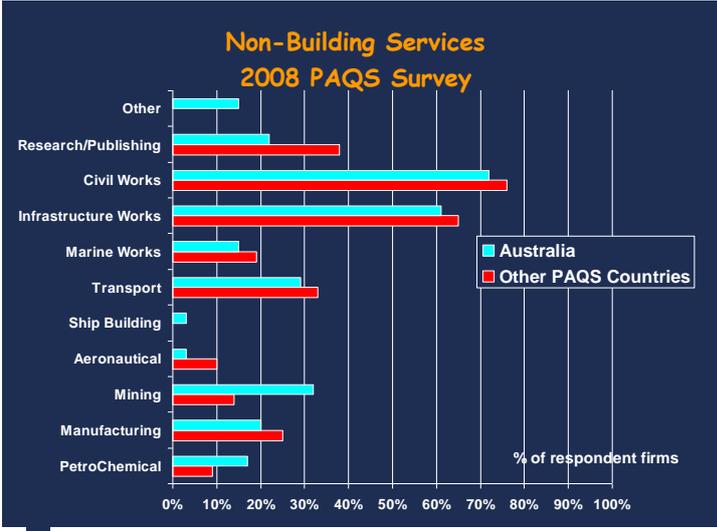
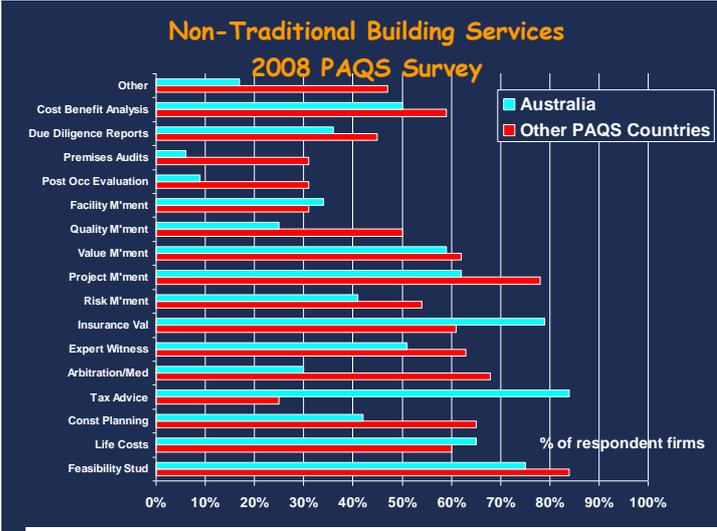


Figure 12

2008 PAQS Survey – Non-Traditional Building Services

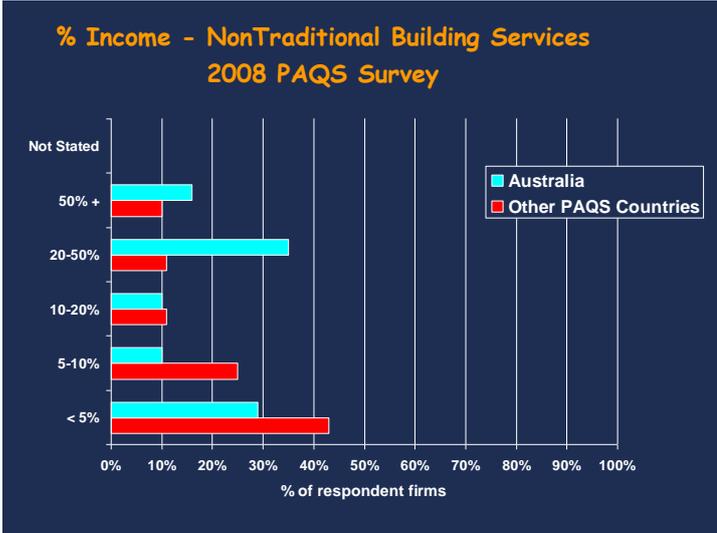
Figure 13

2008 PAQS Survey – Non Building Services

Figures 14 and 15 show a comparison of the proportion of total income that these non-traditional and non-building services generate for firms.

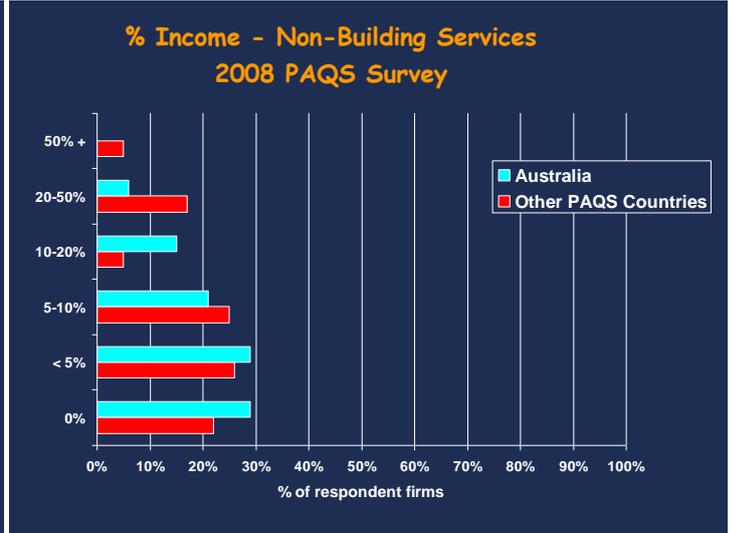
A much greater proportion of Australian firms generate more than 20% of their total income from non-traditional services than PAQS firms (51% for the former and 21% for the latter). Conversely, a greater proportion of PAQS firms generate more than 20% of their total income from non-building services (22% compared to 6% for Australian firms).

In terms of IT and electronic communication, the survey responses by PAQS firms were generally similar to that of their Australian counterparts. 93% of PAQS firms stated that they have not been involved in the use of BIM on their projects and 63% stated that they had not used web-based project information management systems (compared to 90% and 56% respectively for Australian firms).



**Figure 14**

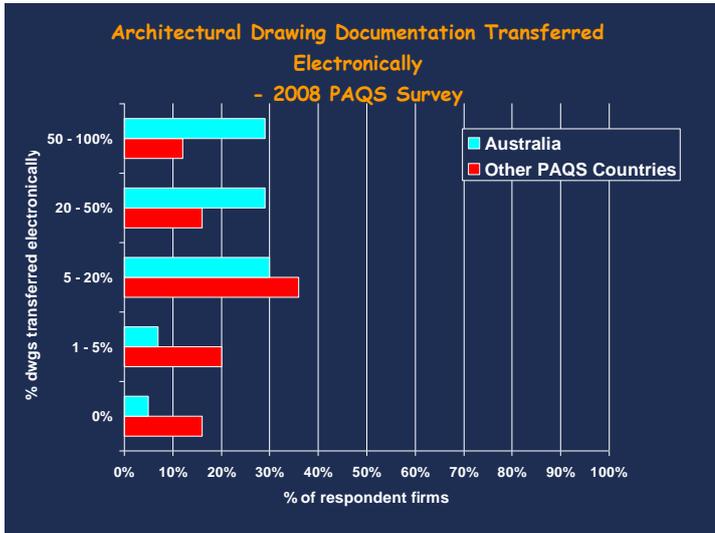
**2008 PAQS Survey – Income Non-Traditional Bldg Services**



**Figure 15**

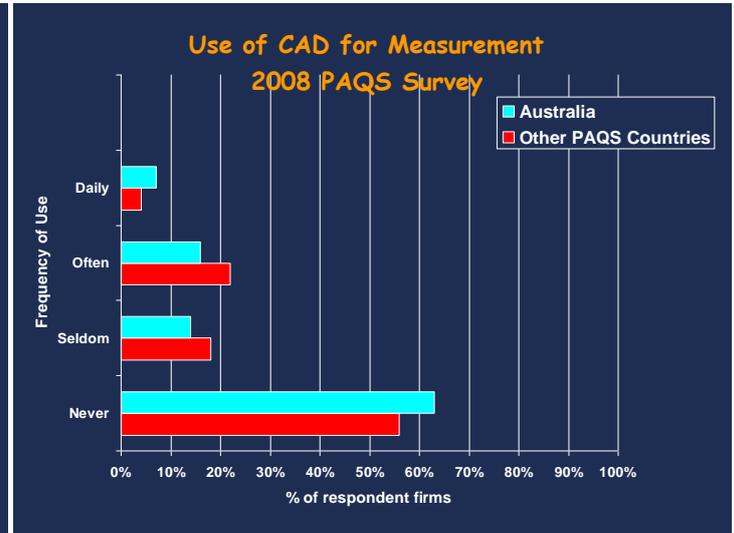
**2008 PAQS Survey – Income Non Building Services**

Figure 16 shows the level of design documentation exchanged electronically by firms. A much greater proportion of Australian firms exchanged more than 20% of documentation in this mode (58% compared to 28% of PAQS firms). Figure 17 shows that the proportion of Australian and PAQS firms utilizing CAD/CAD enabled automatic quantities measurement is similar.



**Figure 16**

**2008 PAQS Survey – Electronic Design Documentation**



**Figure 17**

**2008 PAQS Survey – CAD Measurement**

These survey results indicate that there is tremendous scope for improvement in the use of technological tools and software by the profession in the PAQS region. The low level of involvement in leading edge technology such as BIM, web-based information management systems and automatic quantities generation is a cause for concern.

The survey responses to questions exploring future expectations were also very similar amongst the Australian and PAQS firms. It was interesting to note that firms in the region strongly recognize the productivity and competitive advantage benefits that can be gained by embracing and evolving with technological applications. However, it appears that only a small proportion of firms are putting this into practice.

#### **4. STRATEGIC DIRECTIONS**

The survey results identify a number of areas that the profession should address. Arguably the biggest issue identified was the low use of leading edge technology. QS firms need to embrace CAD, information management and Building Information Modelling (BIM) systems. BIM platforms are at the core of future technological developments in the industry - this will require firms to have BIM capabilities and expertise just to be a player. The continued resistance to the use of CAD enabled automated quantities generation leaves the profession exposed to other professionals, such as project managers, who are more amenable to this form of technology. Despite the current difficulties and obstacles with utilizing this technology, automated quantities generation provides the profession with enormous opportunities. This will provide QS practitioners with more time to focus on developing sophisticated cost management systems and a wider range of value-added services.

It should be acknowledged though that the profession needs to ensure that Qs have sufficient professional expertise in the core competencies and skills of the profession and continue to develop this expertise. Adequate "on-the-job" training needs to be implemented for inexperienced employees and to also complement tertiary education. Too much focus on the use of IT could well lead to the deterioration of fundamental professional skills. Continuing Professional Development (CPD) will continue to be a fundamental requirement for all Quantity Surveyors.

Diversification and adaptability is also important for the future of the profession. The survey results show that the proportion of income obtained from non-traditional and non-building work has risen markedly in the past 13 years and this looks likely to increase further.

Whilst the construction industry is generally conservative by nature, the survey results indicate that the quantity surveying profession is more conservative than most in terms of IT utilization. The inability to change and re-engineer processes to take full advantage of technological advances will drag the profession down. Some felt that directors of many firms lacked motivation to embark down this path due to a focus on short-term profits. Some respondents felt that this was particularly the case with some directors who were nearing retirement and were not prepared to take the plunge into IT development that would have longer term benefits.

Some respondents felt that too many firms focused on the traditional technical role of the quantity surveyor and were not prepared or capable of raising their services to a higher and more professional value-adding level. Many firms clearly need to focus on the bigger picture and evolve more effectively with digital technologies to maintain competitiveness.

Firms clearly recognize the fact that project cost management is not the exclusive domain of the quantity surveying profession and that there are a number of other professionals carrying out this service and many others with the potential to do so. Many project managers, engineers, contractors and other professionals also provide cost management services within the industry and those with business practices that embrace automated quantities technology will prove to have significant advantages over quantity surveying firms without these capabilities. Large accountancy firms are now also major competitors particularly on larger projects. Perhaps the greatest threat in this respect lies with other professionals more amenable to utilizing IT capabilities.

However, the competitive advantages already being realised by some firms that have heavily embraced digital technologies are likely to provide more of a catalyst for change in the profession than anything else. The longer firms delay their entry into the automated quantities and digital world the further other firms with these capabilities will progress and add to their competitive advantage. The strategies taken by leading firms to embrace these technological tools and adapt their business practices accordingly should provide considerable motivation for other firms to follow suit.

## **5. CONCLUSION**

Industry changes and technological developments will continue to present the profession with many challenges, threats and opportunities. Whatever direction the profession takes, the financial management expertise of the Quantity Surveyor will remain in demand. In Australia, the demand for experienced and expert Quantity Surveyors remains very high despite the impacts of the recent global financial crisis. In many ways this crisis has highlighted the need for strong financial management of projects to reduce the risk to finance providers.

## **ACKNOWLEDGMENTS**

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## **BIOGRAPHICAL NOTES**

**Dr. Peter Smith** is the Course Director of the Construction and Facility Management Programs at the University of Technology Sydney. He is also the Secretary General of the International Cost Engineering Council (ICEC). Peter has over 28 years experience as a QS practitioner and has a bachelors and masters degree in quantity surveying from the University of Technology Sydney and a PhD from the University of Sydney. He is a Fellow of the Australian Institute of Quantity Surveyors (AIQS) and is a corporate member of the Royal Institution of Chartered Surveyors (RICS), Australian Institute of Building (AIB) and the Association for the Advancement of Cost Engineering International (AACE-I). He has been an AIQS NSW Chapter Councilor and is an AIQS Federal Education Committee member. He is also the editor of the Pacific Association of Quantity Surveyor's (PAQS) newsletter.

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