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A DECADE OF CHANGE AND IMPROVEMENT? AN INDUSTRY VIEW OF CONSTRUCTION INDUSTRY DEVELOPMENT IN SINGAPORE UNDER CONSTRUCTION 21

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Abstract
Sir John Egan's report on UK construction industry in 1998, Rethinking Construction, inspired a similar review in Singapore in 1999. The Construction 21 (C21) report has served as the blueprint for developing Singapore's construction industry. A series of interviews was carried out in late 2009 to investigate the implementation of the C21 report during the ten-year period. The aim was to ascertain the achievements and challenges, and the consequent changes in practices and procedures in the industry. A representative cross section of samples was taken to include policy makers, clients, consultants, professional bodies, and trade associations. The general perception was that considerable progress had been attained in the development of construction industry, although the achievements had not as much as had been intended in the C21 report. Although a range of progressive practices highlighted in C21 have been adopted in the industry, some of the initiatives in the recommendations in the report are still in progress and some have been launched but have not been pervasively used in the industry. Although Singapore has made much progress in developing its construction industry, the extent to which the industry reforms have fulfilled their original intentions is not completely clear. The impact of the initiatives on the way companies and practitioners work is also not clear. Hence, there is a need to revisit priorities and review the progress so far and map out general strategies for the future.

Keywords: Construction 21, change, construction industry development, industry perspective, Singapore.

INTRODUCTION

In 1998, Sir John Egan published his seminal report on the UK construction industry entitled *Rethinking Construction* (Egan, 1998). This was followed by similarly high-profile reviews of the construction industries in other countries, such as Singapore and Hong Kong, the reports on which were published in 1999 and 2001 respectively (Construction 21 Steering Committee, 1999; Construction Industry Review Committee, 2001). Each of the studies was initiated to address concerns in the local construction industry. For example, in Singapore, the

intention was to attain a radical transformation of construction performance through a planned series of change initiatives.

In Singapore, the Construction 21 (C21) committee put forth 39 recommendations under six strategic thrusts to help achieve the vision of the industry, which is "To be a world class builder in the knowledge age" (Figure 1). The strategic thrusts were: (i) enhancing the professionalism of the industry; (ii) raising the skills level; (iii) improving industry practices and techniques; (iv) adopting an integrated approach to construction; (v) developing an external wing; and (vi) a collective championing effort for the construction industry. The C21 study aimed to transform the construction industry in Singapore from a Dirty, Demanding and Dangerous (3D) to a Professional, Productive and Progressive (3P) industry. Hence, C21 seeks to upgrade all aspects of the construction industry, from processes (improving practices and techniques as well as adopting an integrated approach to construction) and players (professionalising the industry and raising skills levels of construction workers) to the products of the industry (improving construction quality) (Construction 21 Steering Committee, 1999).

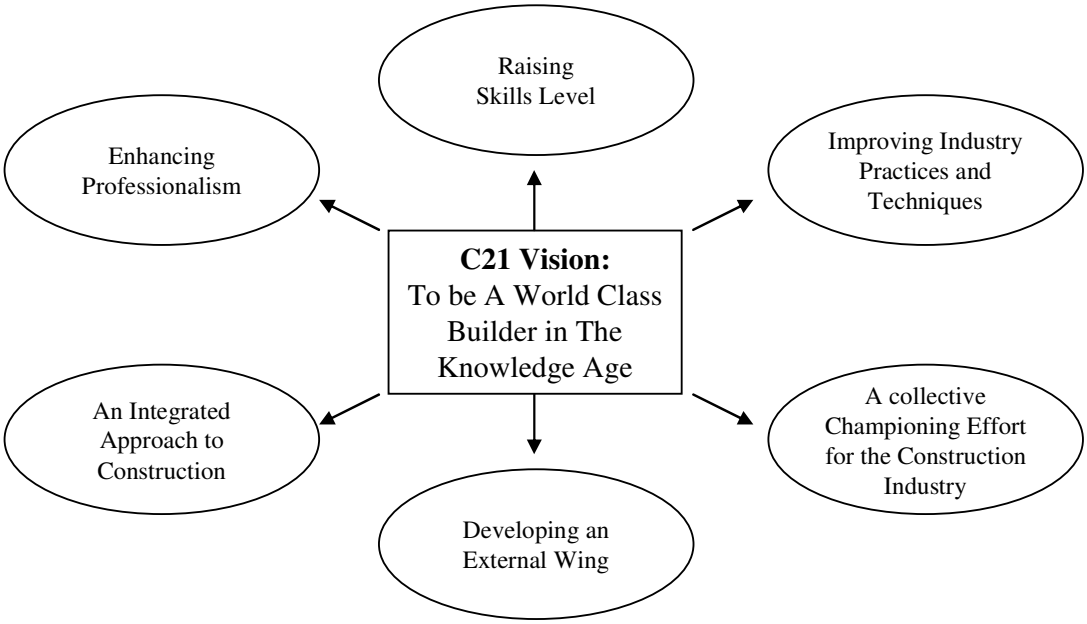

***Figure 1**: The six strategic thrusts and vision of C21*
Source: Construction 21 Steering Committee, 1999

The C21 report has served as the blueprint for developing Singapore's construction industry. It has encouraged the adoption of a range of progressive practices and formal assessments, including Information and Communication Technology (ICT) adoption, greater consideration of buildability and quality during both the design and construction stages, and greater recognition of Continuing Professional Development (CPD). Construction and Real Estate Network (CORENET) is regarded by many as the most successful achievement of C21; it has led Singapore to be ranked the first in the world in the ease of doing business (International Finance Corporation, 2008).

Although most of the C21 recommendations have been implemented, by around the middle of the ten-year period set out for the implementation, the programme was losing some

momentum, with meetings to discuss progress becoming rather routine (Ang *et al.*, 2004). Some of the C21 initiatives and programmes have not succeeded. These include the promotion of Design and Build (D&B) and the intention to reduce the number of foreign workers in the construction industry by imposing stricter controls on the number of such workers (see Dulaimi *et al.*, 2003). As the programme was drawing to the end of its planned period of implementation, it was considered to be pertinent to assess its achievements and the continuing challenges facing the industry. The results of such an assessment would provide the basis for making proposals for enhancing the performance of the industry over the next decade.

This paper presents the results of a research project undertaken to examine the implementation of the C21 initiative in Singapore from 1999 to 2009. The study is founded on a review of the literature on industry development in Singapore (which formed the basis of a set of interview questions), and a series of interviews. Nine in-depth, face-to-face, interviews were conducted in late 2009 with 12 key people from the public and private sectors of the construction industry (Table 1).

INTERVIEWEE	POSITION	ORGANISATION TYPE
1A 1B	Director Deputy Director	Government
2	Executive Director	Consultancy firm
3	President	Professional body
4A 4B 4C	President and Chief Executive Officer (CEO) Executive Vice President Executive Vice President	Consultancy firm
5	Chairman	Consultancy firm
6	Past President	Professional body
7	General Manager	Developer
8	Executive Director	Trade association
9	Deputy Director	Government

Table 1: *Profile of interviewees.*

THE CONSTRUCTION 21 STUDY

The general perception from the interviewees was that each initiative under C21 has been followed up. There has been a major improvement, although a radical transformation as envisioned by C21 has not been achieved. According to Interviewee 1A, *"What had to be done, has been done. What was not undertaken back then in the initial stages (i.e. export promotion and research) has been done."* Interviewee 8 acknowledged, *"The report card on C21 would be a decent one because everything that can be done has been done. In many cases, they went beyond what was proposed."*

In terms of the transformation from a 3D to a 3P industry, in general, the interviewees agreed that the progress has been attained in the industry, but it had not been as much as had been intended in the C21 report. For example, the industry continued to depend on subcontracting and foreign workers. Interviewee 2 commented: *"Because of our system and dependence on foreign workers, you don't get the image of professionalism. Safety is still a concern because many foreign workers, who do not get proper training, do not understand dangers before they work on the site."* In Interviewee 4C's words, *"We are trying to achieve first world standards*

using third world workers." The reliance on subcontracting was not viewed as a problem; it has always pertained in Singapore, and is an integral part of the structure of the industry. The aspect which has been considered to be undesirable is the common phenomenon of multi-level subcontracting. Interviewee 4A noted, *"In Singapore, trade contractors do the bulk of the work. Hence, reform must go to that level, instead of focusing on the main contractors."* However, according to Interviewee 1A, the recent green initiatives have given opportunities for the industry to have a more positive image.

STRATEGIC THRUST 1: ENHANCING THE PROFESSIONALISM OF THE INDUSTRY

To achieve the vision to become a world class builder and to change the image of the 3D industry, the C21 report pointed out that the professionalism and capabilities of industry practitioners must be raised. The professional institutions have responded to the C21 recommendation by making CPD compulsory as a pre-requisite for renewing the practicing certificate. However, it is important to strike a balance. As Interviewee 2 explained, *"If you enforce it strictly, you may lose some members, but gain some respect as an institution."* Interviewee 6 noted that CPD may be more effective for certain professions than others; for example, it is more effective for architects than it is for quantity surveyors.

At the industry level, the development of CORENET has been influential in the business process reengineering of the construction industry. Furthermore, CORENET is inspiring similar developments in other countries. Singapore has been the top-ranked economy globally on the ease of doing business by the World Bank (International Finance Corporation, 2008). CORENET has been highlighted as one key reform that sped up the process for dealing with construction permits, reducing the time from 102 days to 38. Almost 99 percent of applications are now submitted electronically through the CORENET. According to Eastman *et al.* (2009), the Singapore effort in building code checking was the earliest, most mature and the farthest along. The interviewees agreed that CORENET has been the most significant achievement of C21.

C21 recommended that all contractors, including sub-contractors, be licensed to influence their standards and professionalism. To be licensed, firms must be financially sound, have good safety records, and employ qualified and experienced personnel to manage the firm and supervise its construction works. It took nine years after C21 before the contractor licensing scheme was launched. According to Interviewee 8, who was involved in the process of development and consultation, there had to be a lot of compromises along the way.

C21 recommended that an industry-wide code of conduct spelling out industry standards with regard to the working relationships among the various players be developed. The interviewees disclosed that the codes of conduct were drafted, but they have not been implemented because according to Interviewee 2, who was involved in the drafting process, the codes were too general and so they were considered to be unnecessary. Interviewee 6 noted that the development of the industry-wide code of conduct is very unreasonable. It is not possible to enforce it if there are no sanctions, while regulation should not go to that extent.

In summary, the professionalism of the industry has been improved. New awards have been created, incorporating key points from previous ones. There are now many new degree

programmes to meet the needs of the industry; however, a number of interviewees have expressed their concerns on the quality of the curriculum and graduates. CPD has become mandatory for some professionals in the industry. There is scope for further progress. Interviewee 4A noted, *"If you want professionalism, then you must downplay regulation, or have regulation with a lighter touch, and allow peer pressure to raise standards. We can say that professionalism has been achieved when the industry does the right thing without too many regulations."*

STRATEGIC THRUST 2: RAISING THE SKILLS LEVEL

Given its small geographical size, Singapore faces many physical limitations including the size of its population. The situation is worse in construction because, owing to the poor image of construction, the industry is unable to attract many Singaporeans. Thus, over 80 percent of the industry's workforce comprises foreign workers. There has been a set of initiatives and incentives to increase the proportion of skilled workers in the construction workforce. These include controls on the number of foreign workers; minimum training requirements for foreign workers before they are admitted into Singapore; and requirements for the employment of a resident engineer and a safety manager on each building project based on the value of projects.

The Man-Year Entitlements (MYE) system allows contractors to employ a maximum number of foreign workers for a specific project volume. To reduce reliance on foreign workers, the C21 report recommended that the MYE for projects should be tightened to 70 percent by 2005 and 50 percent by 2010, or earlier if practicable. The formula for calculating the MYE has since been adjusted a number of times in response to feedback from the industry (Ministry of Manpower, 2010). The interviewees agreed that MYE has not been an effective tool in addressing the supply of workers. Unexpected practices have developed, which gave an impression that the MYE is still at a comfortable level for the contractors.

The issue of foreign workers is the main concern for many interviewees. They highlighted the cultural differences, transient nature of the workers, hidden costs, skills, safety, and support from the government for the workers. There was a general feeling that the industry cannot do without foreign workers. Hence, the policies should be directed at integrating them into the industry. Currently, all incentives are intended to increase the number of locals joining the workforce. However, the interviewees felt that as it has been increasingly difficult to find Singaporeans who are willing to join the construction industry, the government should be more realistic and provide support for the foreign workers.

STRATEGIC THRUST 3: IMPROVING INDUSTRY PRACTICES AND TECHNIQUES

Enhancing Buildability

In Singapore, the concept of "buildability" is promoted for construction practitioners to take account of productivity during the design stage. The principles are: (i) standardisation – repetition of grids, sizes of components and connection details; (ii) simplicity – use of uncomplicated building construction systems and installation details; and (iii) single integrated elements – those that combine related components together into a single element that may be prefabricated in the factory. All new building projects with gross floor area

(GFA) of at least 2,000 sqm, are required to meet the minimum buildability scores. The total buildability score of a design is obtained by summing up the scores of the Structural System, the Wall System, and Other Buildable Design Features. The score is subject to a maximum of 50 points for the structural system, 40 points for the wall system, and 10 points for other buildable features. The maximum score that can be achieved is 100 points. The minimum buildability scores have been increased progressively over time. They were last adjusted with effect from 1 August 2008. The building designs were required to meet prescribed minimum buildability scores ranging from 60 to 77, depending on the building type. The C21 report noted that government intervention is required to achieve higher buildability.

The interviewees agreed that due to the increase in buildability scores, productivity has improved, but there is room for improvement. The policy on buildability has moved towards constructability. The most recent scheme to boost productivity is the Construction Productivity and Capability Fund (CPCF), which was launched in 2010 as part of the national drive to increase productivity. The government set aside S$250 million in the fund to help the construction industry to raise productivity. The fund, administered by the Building and Construction Authority (BCA), comprises incentive schemes to promote workforce development, technology adoption and capability development. It is still too early to assess the effectiveness of the schemes under the fund. The BCA has been actively promoting the schemes and the response from the industry has been encouraging.

Enhancing Maintainability

The C21 report recommended that a study be undertaken to devise a system that can be used to audit maintenance costs and produce manuals which give the design life and maintenance costs of components. A study, "Maintainability of Buildings" (NUS, 2005), an initiative of the BCA and the National University of Singapore (NUS),. aims to study the maintainability issues of various categories of buildings under tropical conditions. The research spearheads the incorporation of maintainability into processes right from the design stage by improving the knowledge of maintainability and setting maintainability benchmarks. The study developed a defects library, a materials manual, and a maintainability scoring system. Although the research results and findings have been disseminated through dialogue sessions, workshops, seminars, and publications, the interviews revealed that the results are not widely used in the industry.

Quality

The quality development programme is one of the BCA's key long-running initiatives. The Construction Quality Assessment System (CONQUAS) was developed to assess the quality of building work to provide a standardized, quantifiable, and systematic assessment system for grading the construction quality of a building (Construction Industry Development Board, 1995). CONQUAS sets out the standards for the various aspects of construction work and awards points for works that meet the standards. The points are then summed up to give a total CONQUAS score for the building project. Over the years, reviews have been carried out and key changes have been introduced to CONQUAS, considering industry concerns and end-user feedback. The average CONQUAS score has risen steadily (Figure 2). The C21 committee has set a target CONQUAS score of 79 by 2005 and 82 by 2010. In 2005, the average score was 80.6, above the target score of 79. In 2009, the average score reached 82, which was the target score to achieve by 2010. These figures are in line with the consensus among the interviewees that the quality of construction has improved.

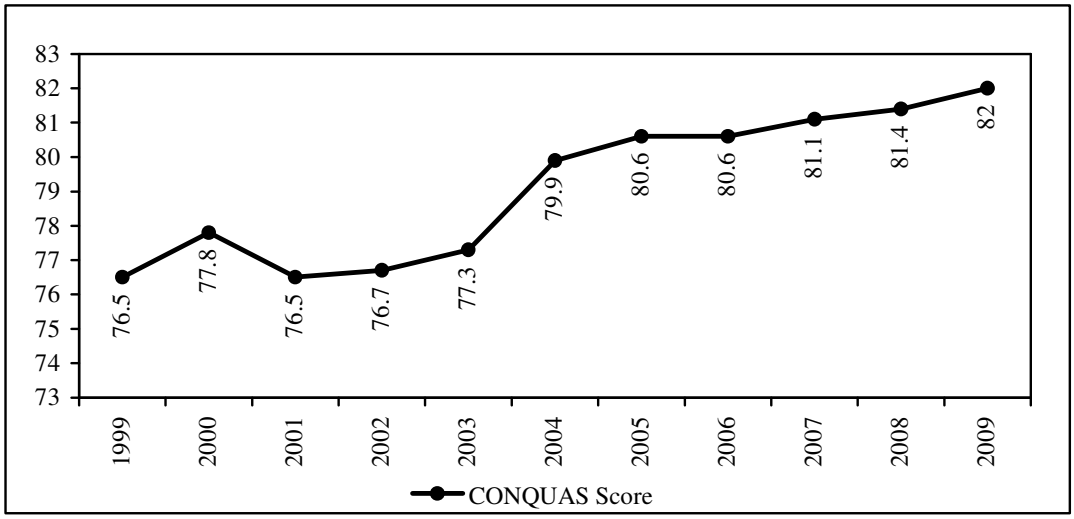

Figure 2: *Average CONQUAS score, 1999-2009*
Source: BCA (2002, 2006, 2008, 2010)

The formulation of a set of National Productivity and Quality Specifications (NPQS) was one of the recommendations of the C21 report. The NPQS is a set of standard specifications for building projects, which covers architectural, civil and structural, and mechanical and electrical works. NPQS aims to harmonise the specifications utilized in the building industry and provide a standard platform for achieving greater efficiency and quality in design and construction. Target users of the NPQS are developers, architects, consulting engineers, contracting companies, quantity surveyors, and suppliers y. It was launched in May 2004. The NPQS has not been pervasively used in the industry. Hence, there have been efforts to improve it. The NPQS is currently being revamped.

Health and Safety

The C21 report recommended the introduction of the Construction (Design and Management) Regulations after the enactment of the Occupational and Safety Health Act (OSHA) in 2000/2001. The new Occupational Safety and Health (OSH) framework was introduced on 10 March 2005. It was guided by three basic principles: requiring all stakeholders to eliminate or minimise the risks they create, instilling greater ownership of safety and health outcomes by industry, and preventing accidents through higher penalties for poor safety management (MOM, 2008). The Workplace Safety and Health Act (WSHA), which came into effect on 1 March 2006, is an essential part of the new framework. In the WSHA, general duties are prescribed for owners, occupiers, employers, designers, suppliers of machinery, equipment and hazardous substances, and individual workers. This is consistent with the principle of holding accountable those who create risks or have primary control over these risks (Joint MND-MOM Review Committee, 2005).

The MOM has been working closely with the Workplace Safety and Health (WSH) Council to improve WSH performance in Singapore. One area that they are working on is to develop the Construction (Design and Management) or CDM Regulations based on the UK's CDM Regulations. The regulations will require designers to work closely with contractors in thinking through safety management for the entire life-cycle of a project.

Implementing WSH 2018 for Construction Sector in Singapore (WSH Council, 2010) was published in April 2010 as part of the national WSH 2018 strategy. It sets the targeted outcomes, key strategies and initiatives to further enhance WSH standards in the construction sector and aims to guide all stakeholders to create a safer and healthier construction sector with a progressive and pervasive WSH culture. Its long-term goal is to achieve zero injury in the construction industry. Currently, the accidents in the construction sector by fatality rate and by injury rate are higher than those in other sectors (WSH Council, 2010).

The interviewees acknowledged the progress on the safety regulations. However, despite the extensive regulations on construction safety, Interviewee 2 believed that it is the mindset of the developers, project managers, and contractors that should be changed. Emphasis should also be placed on the lower levels, such as the supervisors and workers. Teo and Phang (2005) found that contractors understand the importance of a safety culture but do not have the right mindset or attitude towards implementing it. Interviewee 2 felt that Singapore construction still lags behind its comparable counterparts in terms of safety. He commented, *"In terms of safety, we are just two or three only on a scale of one to ten, considering where we've started from - zero."*

Stepping Up Research and Development

The C21 report recommended the establishment of a National Construction Research Institute (NCRI) to co-ordinate construction research and development (R&D) within five years after the publication of the report. The government's response to this recommendation was that it would consider it at a later stage. Hence, the proposed central body of construction research has not been set up. Research remains segregated in the industry. R&D activities are conducted separately or jointly by public agencies, companies and tertiary institutions. Research in construction has been encouraged by the Ministry of National Development (MND) Research Fund for the Built Environment, administered by the BCA under which S$50 million has been set aside for research during 2008-2013 (BCA, 2009).

Improving Construction Management

The C21 report recommended the development of a generic Construction Management System for all contractors and subcontractors and use appropriate incentive schemes to assist adoption of the system. In response to the recommendation, the Construction Productivity Benchmarking System (CPBS) was developed to help contractors to measure productivity and benchmark their performance against those of their competitors (*Framework*, 2001). CPBS is an IT toolkit comprising a smart card for identification of workers, Personal Digital Assistant (PDA) which acts as a tracking device and a desktop computer for generating reports. It enables contractors to analyse manpower usage, determine how activities are being performed on site, identify work patterns, as well as improve communication within the project team and with the head office. A web-based application for the Construction Management System was completed in 2004, but did not take off in the industry.

The C21 report also recommended the development of a pool of supervisors trained in proper site management and safety procedures to ensure high productivity and safety levels. The BCA Academy, the training arm of agency, offers certification courses for supervisors in the areas of precast concrete construction, waterproofing, and geotechnical instrumentation. It also offers safety courses for supervisors, on metal scaffold erection, formwork, co-ordination

of work, recognition of hazards in deep excavation temporary retaining structures, and general building construction.

The intention to minimise modifications to the standard forms of construction contracts for the private sector has not been realized. Many of the professional institutions has its own standard of contract. The interviewees agreed that there should be only one basic form. As Interviewee 4A noted, *"Everyone protects their own thing. That's all right but we need a uniform idea of what is a reasonable risk transfer."* Although there have been attempts under the umbrella of the Construction Industry Joint Committee (CIJC)t o unify the contracts in the, not much has been achieved. Interviewee 5 observed, *"It's a hugely end-user driven thing. Partly because there's no costing of the extra fees and other work. Our industry needs to mature to the point that architects and engineers must be allowed to charge for the extra work because of client's changing his mind."*

STRATEGIC THRUST 4: AN INTEGRATED APPROACH TO CONSTRUCTION

The construction industry is highly fragmented but the approach to construction is changing. The C21 report acknowledged that the development of more complex intelligent buildings, the demand by clients for greater responsiveness, guaranteed cost and delivery schedules of projects, and the push for greater efficiency, have increased the need to integrate the processes and roles of the various players. The C21 report recommended that BCA continue to promote D&B to private-sector developers.

The C21 report also recommended that the BCA undertake a comprehensive review of the Architects Act, Professional Engineers Act and Building Control Act to facilitate D&B arrangements. Following the amendments, with effect from 2003, D&B services can be offered by providing a single point of contact for the client. Moreover, the industry will have more choices of D&B arrangements. An architect or professional engineer can offer D&B without tying up with a builder's firm. Builders can offer D&B packages jointly with architects and professional engineers. Licensed corporations can also offer D&B services.

Despite the push from the government, there has not been much change in building projects. There seems to be lack of willingness of the parties involved in a D&B project to compromise. Among the issues cited are: the reluctance of architects to give away some of their 'traditional' control on projects (Interviewees 1A and 5); the small number of enlightened contractors which were willing to increase costs and let architects improve the design (Interviewee 4B); and the limited number of contractors which were capable of handling D&B projects (Interviewee 5). As reiterated by Interviewee 1A, D&B is used more on civil engineering projects than on building works. Interviewee 6 noted that D&B is only one type of many procurement methods, and it may not be appropriate for certain projects. In summary, the interviewees agreed that the use of D&B should be decided by the market; it should not be pushed by the government.

The interviewees agreed that the formation of multi-disciplinary firms which had been encouraged by C21 did not take off in the industry. They noted that some design firms have grown and added areas to their initial expertise, but they remain consultants. Similarly, contractors remain as they were. Consultants and contractors tie up in consortia to undertake some projects overseas (see below), but they do not form multi-disciplinary firms.

STRATEGIC THRUST 5: DEVELOPING AN EXTERNAL WING

One of the recommendations in the C21 report was that BCA should assist construction companies and consultancy firms to venture abroad. Despite the government's response which indicated that the emphasis should be given at a later stage and that BCA should focus on improving the domestic construction industry, the BCA launched an export promotion drive, which included the establishment of Export Digest, Export Link Services, workshops, seminars, overseas mission trips, and executive programmes (Framework, 2002, 2003a, 2003b, Pillars, 2008).

In general, Singapore-based architects have done quite well abroad. The contractors feel the need to go overseas, especially when there are fewer jobs in Singapore. In late 1990s and early 2000s, the depressed local market spurred firms on to seek opportunities abroad. From 2004 to 2009, except in 2008 when the global recession dampened construction demand, Singapore construction and engineering firms clinched more than S$2 billion worth of construction contracts each year (Figure 3). A number of consortia have been set up to pursue projects overseas. Several of these have been facilitated by the BCA.

Figure 3: *Construction exports, 2001-2009*
Source: BCA (2006, 2008, 2009, 2010)

STRATEGIC THRUST 6: A COLLECTIVE CHAMPIONING EFFORT FOR THE CONSTRUCTION INDUSTRY

The C21 report recommended that BCA should adopt the role of a champion agency for the construction industry and oversee the implementation of the C21 recommendations. The role of BCA as the champion agency in the efforts towards achieving the vision of C21 is significant, considering that BCA was appointed as the lead agency for 19 of the 39 recommendations set out on the C21 report. BCA has since steadily worked with the other relevant public agencies, professional institutions and trade associations, and universities to implement the recommendations.

The C21 report also recommended that BCA work in partnership with the CIJC to implement the C21 recommendations and develop the industry. Thus, the government encouraged and supported the formation of the Construction Industry Joint Committee (CIJC) in 2000 to formalise the co-operation among the key organisations in the construction industry. CIJC embraces clients, various design professionals, and contractors.

The interviews revealed that BCA has actively monitored and followed up on the list of C21 recommendations. BCA held quarterly meetings with CIJC to track the progress of the implementation, in addition to *ad hoc* meetings. Feedback sessions with the industry were also conducted. Within CIJC, each member institution was assigned specific C21 initiatives to spearhead. However, it is widely realised that CIJC has its limitations. It acts by consensus, which gives each body an effective veto on initiatives (Interviewee 3). It is a loose grouping of institutions (Interviewees 2 and 5). There is no real leadership; instead, there is a rotation of its president among the members every year (Interviewees 4A and 5). Each organisation tends to protect its own interests (Interviewee 7). The interviewees considered the CIJC important, and agreed that it needs to be strengthened.

CONCLUSIONS

The construction industry in Singapore has evolved since the publication of the C21 report a decade ago. There have been new regulations and initiatives that impacted on the industry's practices. In the past decade, the adoption of a range of progressive practices in Singapore has been encouraged by C21. CORENET has been one of the most successful initiatives. In addition, there has been greater consideration of buildability; widespread adherence to the construction quality programme; and greater adoption of CPD programmes. However, a decade after the publication of the C21 report, some of the recommendations have not been implemented. Industry-wide codes of conduct have been drafted, but they were considered to be rather too general. In the area of construction safety, Construction (Design and Management) Regulations were still in progress. Some of the C21 initiatives and programmes have not succeeded. They include the intention to reduce the number of foreign workers, MYE, maintainability study, NPQS, Construction Management System, standardisation of contracts, and multi-disciplinary firms.

The study reported on in this paper is based on interviews of some of the leaders of the industry in Singapore who were instrumental in the formulation, implementation and monitoring of C21. Their opinions were compared with the literature as well as the comments and views expressed by others in both the public and private sectors. The interviewees agreed that through C21, Singapore has made a considerable amount of progress in developing its construction industry. However, it is evident that more needs to be done in the future. The intended radical transformation of the industry has not been attained. After a decade, some of the underlying issues remain the same. The extent to which the industry reforms have fulfilled their original intentions is not completely clear. The impact of the initiatives on the way companies and practitioners work is also not clear. Hence, there is a need to revisit priorities and review the progress so far and map out general strategies for the future.

Considering the nature of the construction industry in Singapore, there will be continued reliance on subcontracting and foreign workers into the future. Thus, long-term solutions are needed. Improvement in quality must be accompanied by sustainability considerations. It is evident that the focus in construction industry development in Singapore will be on

improving productivity as part of the national, economy-wide drive. The government is also aggressive in promoting health and safety, and this will be another major consideration. In the area of IT, Building Information Modelling (BIM) will be used as a platform to facilitate the integration of knowledge in design, construction, and facilities management.

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